November 8, 2019

Via fax: 902-424-6925

Environmental Assessment Branch
Attn: Honourable Gordon Wilson, Minister of Environment
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

Dear Minister Wilson:

I am in favour of giving Northern Pulp an extension to complete their new effluent system. As the government cannot start the cleanup of Boat Harbour until a Federal Environmental Assessment is completed and approved, I think it is appropriate that the government allow Northern Pulp to use Boat Harbour until such time the cleanup process can begin.

Sincerely,

Upper Stewiacke, NS



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Top on the minds of Canadians and folks all over the world is "climate change". If Northern Pulp is forced into closure, the Forest Industry of Nova Scotia will take a dramatic hit. Well managed forests aid in the prevention of forest fires. Forest fires emit mass volumes of greenhouse gasses into the atmosphere. Well managed forests aid in the prevention of massive pest outbreaks, killing trees of all ages. When trees die, they fall to the ground and decay. Decaying trees release the carbon stored into the soils and waterways. Harvested trees can be turned into products which store the carbon instead of releasing the carbon into the atmosphere. In summary, a healthy forest industry plays a vital role in climate change management. I strongly support an approval of Northern Pulp's Environmental Assessment.

Nova Scotia Needs Forestry. Northern Pulp grows more than 6,000,000 seedlings every year. That is impressive! Treated effluent from the mill has been flowing into the Northumberland Strait for over 50 years. Northern Pulp's plan is to re-route the treated effluent to a different location. For 50 years, the fishing industry has successfully fished the Strait. Third party environmental experts have assessed that no significant impacts are expected on any fisheries or fish habitat as a result of this project.

I am proud of our forest industry. The forestry, fishing, mining and agriculture industries have demonstrated they can work together successfully. I believe in the science. The economy and the environment must work together.

The Lahey Report and good forestry depends on a market for the low-grade wood fibre in our forest and the major consumer of this product is Northern Pulp.

If Northern Pulp passes the Environmental Assessment, there is no reason not to complete the project.

Sincerely,

Halifax, NS



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When this state-of-the-art wastewater treatment facility is complete, Northern Pulp's environment footprint will be significantly reduced. Forestry and fishing industries will be able to thrive and co-exist and finally, and very importantly, the Boat Harbour cleanup will begin and the community can begin to heal.

I am proud of our forest industry. The forestry, fishing, mining and agriculture industries have demonstrated they can work together successfully. I believe in the science. The economy and the environment must work together.

Northern Pulp generates 90% of its power requirements from a low carbon, renewable resource and not from burning coal that NSP uses producing 60% of its energy.

The Lahey Report and good forestry depends on a market for the low-grade wood fibre in our forest and the major consumer of this product is Northern Pulp.

If Northern Pulp passes the Environmental Assessment, there is no reason not to complete the project.

Sincerely,



Lantz, NS

November 8, 2019

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Northern Pulp engaged independent consultants to consider, study and report their findings to the Nova Scotia Department of the Environment on the impact their project may or may not have on the environment. These findings are reported in Northern Pulp's Environmental Assessment. I am not a scientist, but I believe in science.

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If Northern Pulp passes the Environmental Assessment, there is no reason not to complete the project.

Anyone who thinks the white stuff coming out of the stacks at Northern Pulp is polluting smoke, it is 98% steam.

Northern Pulp produces 23MW of electricity daily, most of which is green energy. NSP would love to have this on their record.

Sincerely,

Halifax, NS

N.S. ENVIRONMENT
ENVIRONMENT
ASSESSMENT BRANCH
NOV 0 8
RECEIVED

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East Stewiacke, NS



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If Northern Pulp receives the extension it rightfully deserves, I am hopeful other companies in Nova Scotia, Atlantic Canada and abroad will also follow suit to substantially reducing the amount of pollutants they are putting into the waterways and the air we breathe. It is not right for the mainstream media to just cover one company's problems. They must cover others as well. I believe Northern Pulp will make a change.

Sincerely,

Dutch Settlement, NS



N.S. ENVIRONMENT
ENVIRONMENT ASSESSMENT BRANCH
NOV 0 8 2019
RECEIVED

Pictou N.S.

November 4 2019

Premier Stephen McNeil
Minister Gordon Wilson
Province of Nova Scotia

Dear Sirs:

Northern Pulp Focus Report

For 50+ yrs. the citizens of Pictou have tolerated the air pollution spewing from this mill. Yes, much needed jobs were created. But, unfortunately, we have paid the price for these jobs. We have breathed in the pollutants, tolerated the putrid odours and watched as tourists turned away because of the fog that hangs over our town.

It is no secret that the Pictou area has the highest cancer rates and respiratory ailments, such as asthma, in the province.

On a personal level my family has suffered. I myself am a cancer survivor - one of the fortunate ones. However,

passed away from cancer years ago. It is interesting to note that both of us were asked at the Cancer Centre in Halifax if we lived near a pulp mill. Coincidence? I think not. I cannot prove that death was caused by the mill, but we are convinced would still be with us if not for Northern Pulp.

I understand the pressure placed on you and your department. But we can no longer bury our heads to the environmental harm being done to our children and future generations. NOW is the time to put <u>principle</u> over <u>politics</u>.

As my mother always taught me "it is not always easy, but it is never wrong to do what is right".

So, Mr Premier and Mr. Minister, I ask that when it is time to make your decision concerning Northern Pulp that you will think of Our and all the others who have paid, or are still paying the price, and do the right thing.

You will never regret doing what is right.

What a legacy to leave - to be the first Premier and Minister to stand up against big business and do what is right for the environment and future Nova Scotians!

Please, Honour the Boat Harbour Act!

Sincerely

Northern Pulp Nova Scotia
Replacement Effluent Treatment Facility Project.
Focus Report

Pictou NS
I am a Commercial Fisherman out of Caribou Wharf
I have fished out of Caribou for years
I am presently fishing lobster, herring and rock crab

I am asking the Nova Scotia Environment Minister that a review of the focus report indicates that there is likelihood that the undertaking will cause adverse effects or significant environmental effects which are unacceptable and to reject NPNS Focus report.



NPNS is comparing their untreated effluent to Veolia/AnoxKaldnes Facility in Lund Sweden. Why are they not comparing to any in Canada. NPNS is advertising that there are 88 pulp mills in Canada. To the best of my knowledge none of these pulp mills put their effluent directly into shallow water where there is a lucrative fisheries. (Lobster, Herring, Rock Crab and Scallops) Again I would like to point out how shallow this area is. Where the diffuser is located is 20m 65 feet, you do not have to go very far NNE and SSW to reach 30 feet of water.
NPNS is comparing their Sediment Transport Modeling to Howe Sound Mill and Crofton Mill. Howe Sound water depth is 285m 935 feet. In 1988 the Howe Sound Mill started up dating their mill because they killed every fish in the area. The cost was 1.3 billion dollars. What is that in today money? NPNS or should I say the taxpayers of Nova Scotia is spending less than 200 million.
NPNS is trying to put a Band-Aid on something that needs brain surgery!

NPNS is advertising that the effluent has been going in the Northumberland Strait for the last 50 years. NPNS has provides a map of it now going into the Strait (4.0 Marine water and Sediment Page 95 Figure 4.2-6) On this map I do not see much effluent entering into the Strait. Compared to the maps (4.0 Marine water and Sediment Page 87 4.2-3 summer and page 89 4.2-4 winter), which clearly shows a large area in the Strait. I cannot find anywhere where NPNS says the TSS is going to settle down?
I am providing a map of the shell fish closer in this area provide online from the department of fisheries. The similarities are scary. Take note of the statement on the map (Eating contaminated shellfish can cause illness or be fatal)

I have major concerns over the accuracy of the effluent maps found on page 87 and 89 of Marine water and Sediment of the focus report.
In both maps it is showing the larger portion of effluent to the southeast with patches of effluent stretching to the northwest. Since the diffuser is stationary, with a continuously flow how did the effluent become patches? I would conclude that all the effluent would be attached. It is not patches on the map on page 95 where in now comes out of Boat Harbour. Why did they only do two different months? I would like to see a model of 12-month period. They simulated the summer map where wind and waves are modeled at the water surface in July. During Dorian with a strong rising tide and northeast wind, I believe that it would fill Caribou Harbour. On the winter map page 89 the effluent is all ready been shown in the Caribou Channel. Again on the winter map it is not showing how far southeast the effluent reaches. With any amount of Northerly winds the effluent will be touching the beaches from Caribou Provincial Park to the Pictou Lodge.

The effluent reaching the shoreline from Caribou Provincial Park Beach to the Pictou Lodge will have significant effect on the Tourist Industry.

Since the shellfish closer map that I provided is very similar to the Effluent map coming out of Boat Harbour, I would also conclude there would be a shellfish closer area similar to these two maps where the effluent is predicted to be in the Strait.

I believe Boat Harbour is doing its job and that there is very little to no toxic solids (TSS) entering the Strait. In NPNS original proposal they stated (TSS, unit mg/L, value 48). Based on peak flow rate 85,000,000 L per day that equals 4080 kg per day or 8994.86 pounds. Focus reports mentions in a few different areas. (2.0 Project Description Page 28 table 2.3-2 mg/L 365)(Page 30 Table2.3-3)(Page39 Table2.4-3 TSS 1717-1875- 4080)
In the focus report, I am not sure what numbers that they are using at the end of the diffuser, regardless THAT'S A LOT OF TOXIC SOLIDS.

Impact Assessment Marine Fish
Appendix 7.3 (Page 65 3-15)

The proposed pipeline route and diffuser location will have a direct interaction with the Lobster Fisheries resource.
The proposed pipeline route will directly interact with the know Atlantic Herring resource.
Scallops were present and such habitat will directly interact with the proposed project.
The proposed project will directly interact with the Rock Crab resource.

(Page 91 table 4-5 to page 106) These tables basically say the same thing.
-Effects is expected to be continuous through construction, operation maintenance and decommissioning of the project.
-Effects is irreversible with respect to the potential loss of shellfish along the corridor and diffuser area.
-Overall effects are to be considered to be generally minor, localized and not reversible and may require compensation.
-Effect will occur.

I cannot find anywhere that they did a Lobster larvae study. I guess that they ran out of time and money.

How can we have a sustainable fisheries

The surrounding area of the diffuser will have a direct impact on the local fishing causing adverse effect.

NPNS in their original submission was miss leading and incorrect on the amount of fishing done in the diffuser area. In this focus report they still are. (7.0 Fish and Fish Habitat of the focus report Page 130 Figure 7.3-3)

NPNS does not clarify what a cluster is.

NPNS is not showing a Lobster buoys individually.

I personally fish lobster from the begin of May, with buoys north less than one mile away and in June less than 100 yards away from where the diffuser is located.

In this map there is only one piece of bottom where you will not find a lobster trawl of a fisherman some time during the season. And that is where the ferry track is coming and going to PEI. If the ferry runs over your buoys you will lose your traps, I have experience on this matter.

Do you honestly think that fisherman only fish in clusters?

This is easy to verify, as the local department of fisheries in Pictou.

7.0 Fish and Fish Habitat of the Focus Report (Page 134 7.3-7) Rock crab map

In my 30 years of fishing rock crab I have not seen crab traps inside of Munroe's Island, but I do fish as well as other people fish the edge of the channel where the diffuser is located.

NPNS is inaccurate and misleading on something so simple to find out the proper information, what does it say about finding out real science on the affect that the effluent and TTS is going to have on the Northumberland Strait?

Appendix 2.2 Marine Geotechnical Survey (Page 99) Ice Scouring Map

Ice scouting is accruing pretty much everywhere the pipeline is located inside of Munroe's Island. Outside of Munroe's Island it's in closest vicinity of CKP 2.5 and CKP 3, as well as east of the diffuser. The maximum-recorded depth of an ice scour was .04 m, and the maximum water depth of an ice scour was 9 m.

This is one-year picture of the ice scour. I do not think for one second that the same ice scouring would be the same two years ago or next year.

At CKP 2.5 that is where the fishing boats head north out of the channel because the water is too shallow before that point. We do not follow the buoys put in for the Northumberland Ferries; our boats are not that big.

Is this pipe going to emptied our right away?

I have notice threw out the survey work that there is very little surveying done north west between CPK 1.5 to CKP 2.5. The reason is that there is no water.

3.0 Facility Design, Construction and Operation and Maintenance (Page 62 3.0)

This tells me that the pipeline leak detection is only on land put between Pictou and Caribou. Since the pipeline is vulnerable to ice scouring from the water edge at Caribou threw out to the diffuser WHY IS THEIR NO PIPELINE DETECTION PUT IN PLACE!

Focus report Section 2
Appendix 2.5

In my opinion this section you might as well throw into the recycle bin for the following reasons.
Makai Ocean Engineering has completed a preliminary study of the new marine outfall construction for NPNS. This report provides an OPIONION of the likely construction methods and design features of the pipeline.

This is an opinion. Who ever is going to build this will not have this same kind of equipment that they are suggesting, and furthermore it is lacking information and design is wrong.

Digging the trench would take at least 84 days. That's 3 months. Every month you have a new moon and a full moon that has a stronger period of tides. That means the trenches is exposed for six periods of strong tides, and then add some wind into that equation. NPNS thinks that they will excavate 20,000 cubic metres per km, time 4 km equals 80,000 metres of soil. (Table 2.5-1) They do not say where the soil is to be stored or disposed of.
If you go to the beach at low tide and build a sand castle or dig a big hole in the sand at the water edges, come back in 12 hours, your castle and hole are no longer their. Since a lot of this pipeline route is in a sand bar or around sand the trench will fill in. To me that's a no brainer!

In March of 2019 NPNS was given one year to do a Focus Report for the Replacement Effluent Treatment Facility Project. NPNS decided to do the report in six months. This report is lacking information, misleading, incomplete and raises more questions.
The science provided in the Focus Report does show that it will have negative effects in the fishing industry and the environment.

NPNS has not received permission from the Nova Scotia Department of Transportation and Infrastructure to uses highway 106, or From the Federal Department of Transportation for the land west of the Northumberland Ferries.

NPNS claim that they have a good working relationship with the First Nation people of Pictou Landing and the local Fisherman.
I can speak from being a fisherman, since the first meetings fisherman has had with NPNS they tells us that they are putting a pipe in the Strait. There was no consultation with the fisherman before hand. In the fall of 2018 the fisherman blockaded the survey boats from surveying the new area of the pipeline and diffuser area. In return NPNS put a court injunction against the Fisherman from doing so in the future.
This does not sound like a good relationship to me. I cannot speak for the First Nation people of Pictou Landing but I do think they would have a harsher statement.

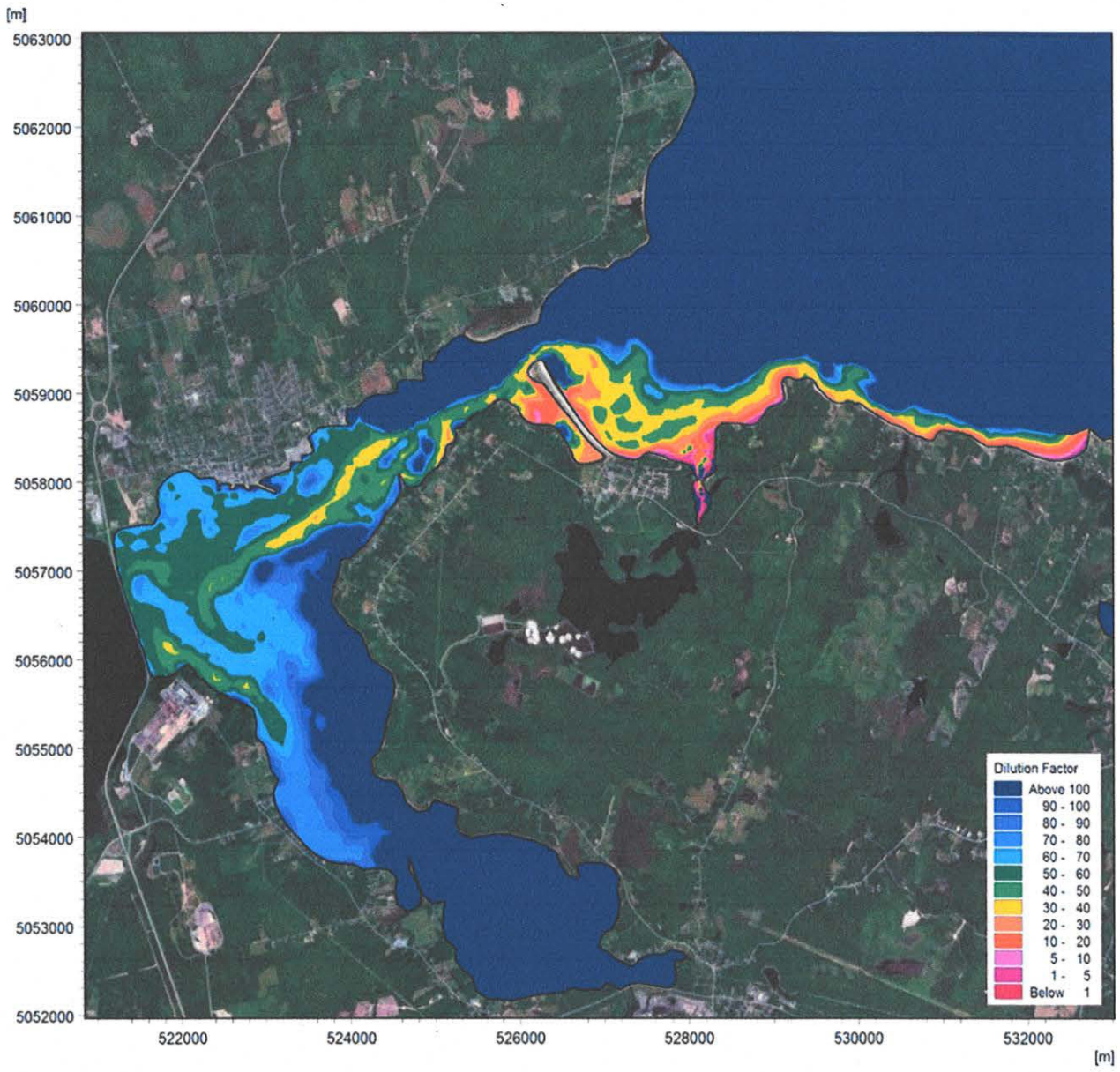
As I pointed out in my original submission of NPNS Replacement Effluent Treatment Facility (Mine starts on Page 681 of part 2 Mar. 4- Mar. 9, 2019) NPNS, Stantec and KSH bears no responsibly, cost or damage. Its come down to the Province of Nova Scotia taking all the responsibility when this Effluent Facility fails.

NPNS is creating another Boat Harbour scenario at the diffuse area causing harm to the fishing industry and the environment. You stop cutting trees down the forest will grow bigger.

I ask the Minister to use the PERCAUTIONARY PRINCIPAL.

I am asking the Environment Minister of Nova Scotia to reject Northern Pulp Focus Report.

Figure 4.2-6: Spatial Distribution of Simulated Effluent Dilution Factor at the End of a One-Month Simulation Period July 2016



Note: The figure assume no particle degradation over the simulation period)

Check the map and Prohibition Orders before harvesting!

For fishing seasons, size and quota limits refer to the Regulations and Variation Orders under the *Fisheries Act*. Contact your local DFO office for details.

Anyone harvesting bivalve shellfish, i.e. shellfish with two shells, including all clam species, oysters, cockles, mussels and scallops, is responsible for ensuring that an area is designated as safe for harvesting. Eating contaminated shellfish can cause serious illness or be fatal.

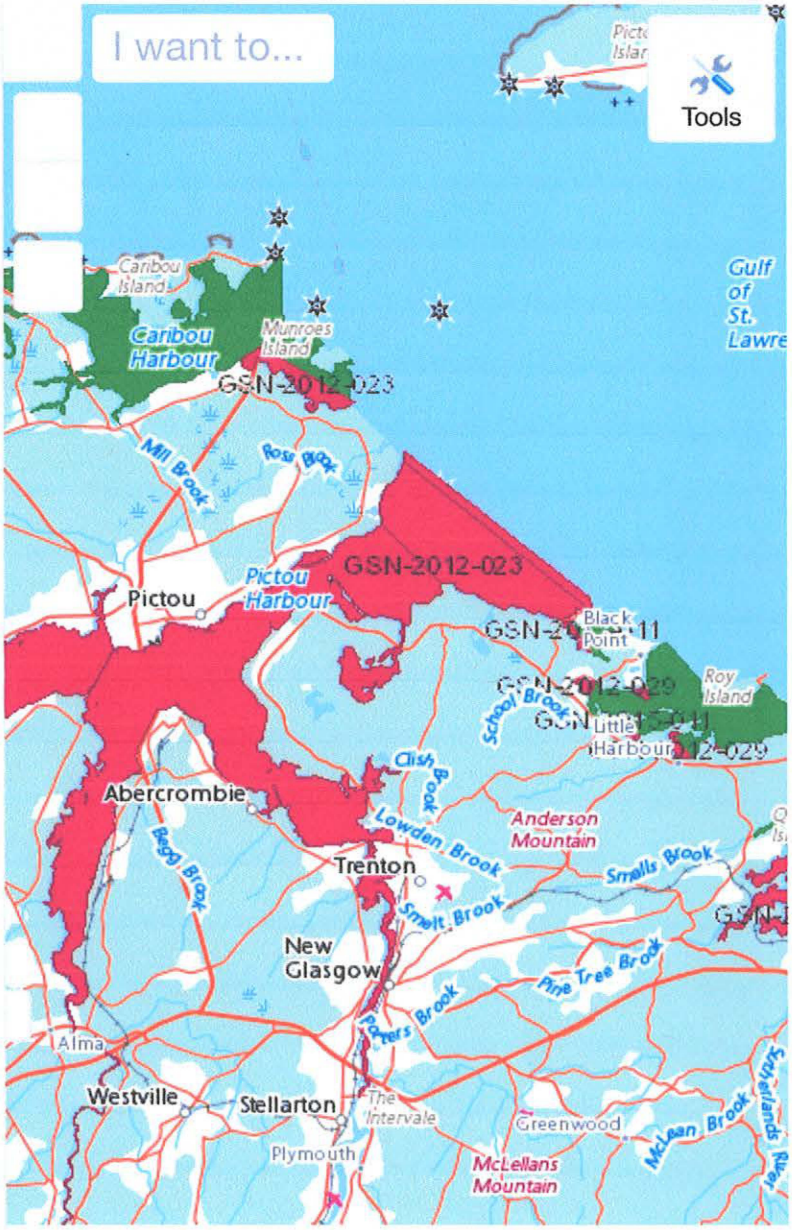
Shellfish should not be harvested in unmonitored areas or within 125 metres (410 feet) of a wharf, a marina, an aquaculture operation or a floating house. Unless clearly stated otherwise, all closures extend to the coastline.

Legend

- **Green** areas are **approved** for harvesting of all species of bivalve molluscs
- **Red** areas are **prohibited** for all species of bivalve molluscs
- **Red hatching** are areas where harvesting of only some species of bivalve molluscs is **prohibited**
- **Yellow** areas are under **variation orders** issued for conservation, safety or contamination

Zoom in and click on an area for more information

[Shellfish harvesting and safety]



From:
To: Environment Assessment Web Account
Subject: Northern pulp EA
Date: November 8, 2019 12:11:19 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Mr. Gordan Wilson

Northern Pulp Nova Scotia - Environmental Assessment Registration Document-Replacement Effluent Treatment Facility(Focus Report)

My name is I live in Stellarton Nova Scotia . I have . I am very concerned about the lack of information in the environmental assessment.

I am currently in the process of purchasing a lobster licence . Same water as the proposed effluent discharge pipe. Water has no boundaries as you know.
I have many issues with the proposed , one Being that there isn't enough scientific research done on the effects on lobster habitats and the reproductive system. We need this information to be able to protect and sustain our fishery for years to come.

Another point I would like to make is that there is a plan to dig a trench 3.6 Kms long in a marine refuge area which to my understanding is In place to protect juvenile lobster. How can this be even slightly considered as ok to do .Why even have these buffer zones if we are just going to let this happen. Northern pulp should have done a better job researching or reaching out to Dfo on this matter.

My third point is to do with air quality. I've lived here my whole life and the air quality is terrible . The plan to burn the solids in the power boiler that already Cannot pass air quality test is not acceptable. How can we do this to ourself and our kids, We need more information on this matter to protect the public of Pictou county.

In conclusion there are many things to speak of and this is just a couple of my families concerns. You need to please reject this Environmental assessment due to the lack of scientific information provided. Thank you for hearing my concerns Say no to northern pulp .
Reject reject reject

stellarton
Nova Scotia

Get Outlook for iOS

From:	Environment
To:	Environment Assessment Web Account
Subject:	Proposed Project Comments
Date:	November 8, 2019 12:58:26 AM

Project: replacement_effluent_treatment_facility_project Comments: Northern pulp has done a phenomenal job developing a state of the art, environmentally conscious effluent treatment facility. After rigorous scientific study, it is evident that the effluent released into the Northumberland Straight will not be detectable by humans or marine life. The reports show that there will be no effect to the temperature, clarity, or purity of the straights water.Furthermore, the air quality will not be impacted by the release of effluent. Name: Email: Address: Municipality: Halifax Postal-Code: Phone: Fax: email_message: Privacy-Statement: agree x: 63 y: 31

From: @yahoo.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:30:36 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Please give northern pulp extra time to make the necessary changes to the effluent treatment plant. Northern pulps environmental impact is only average for Canadian kraft pulp mills, the media makes it sound like they are the worst, and thatâ?Ts just false. The pipeline will be buried so it wonâ?Tt be bothered by ice and the pipe walls will be over 2â? thick, and over 2-1/2â? thick at the watershed area with leak detection. They pump raw sewage over the watershed now without all of the thick walled pipes and leak detection. Please give them the time they need to make these changes so they can improve the environmental impact. Name: Email: @yahoo.ca Address: Municipality: Camperdown Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 78 y: 33

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:49:24 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Please give northern pulp the time they need to makes the changes for the project. They will pass all existing laws and any foreseen laws in the future. The new outfall is better than boat harbour because of better mixing conditions and dilution is 3 times higher than the last site. Treated effluent wonâ?Tt warm up the strait and will be invisible at the surface of the water and air quality will meet all regulations. Please just give them the time they need to make the changes. Name: @gmail.com Address:
Municipality: Camperdown Postal-Code: Fax: ### ### - ####
email_message: Privacy-Statement: agree x: 75 y: 23

From: @ualocal401.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:42:03 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: - Choose - Comments: I support Northern Pulp! Name: Email: @ualocal401.ca Address: Municipality: Lansdowne Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 62 y: 28

From: @freemanlumber.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:33:26 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am writing in support of the Northern Pulp Replacement Effluent Treatment Facility Project. I have been employed in the forest industry in Nova Scotia for nearly 20 years. Forestry has allowed me to make a life for myself and my family here in rural Nova Scotia. Forestry has kept us here in the communities we grew up in, the same communities we love because of their diversity and natural beauty. The forest industry and its tight knit relationship with the environment has changed drastically in the last 60 years. We often pay for the mistakes made by those before us and I pride myself on contributing to the many changes in policies, practices, and procedures that over my career have put a greater emphasis on the balance between industry and our environment. If a company like Northern Pulp is willing to invest in changes to how they operate to improve our environment, to do what they do better, to help rectify the mistakes that were made before them, why would Nova Scotians argue with that? Closing Northern Pulp will effectively destroy Nova Scotia, its economy, and have more of a negative impact on its environment than people realize. Northern Pulp is a huge part of the economy of all of Nova Scotia. Understanding the links between economic and environmental issues is top priority in the forest industry. Realizing that long term economic prosperity greatly depends on sound environmental management, and that effective environmental protection depends on a strong economy is paramount for the future of Nova Scotias forest industry, environment, and economy. It would seem that with the scope of this project, no one may understand this better than Northern Pulp. Science has shown that Northern Pulps proposed replacement effluent treatment facility project is a major step in the direction of finding a better balance between industry and the environment. The project has my support Name: Email: @freemanlumber.com Address: Municipality: Liverpool Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 74 y: 35

From: @nncweb.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:54:29 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I would like to voice my support for the new effluent treatment facility project at Northern Pulp in Pictou, NS for the following reasons: 1. Paper products are used daily by people worldwide. It is our responsibility to manufacture products with environmental regulations and oversight which we have here in Nova Scotia. We live in a global community and we have an opportunity to supply paper products worldwide in a responsible way and receive the economic benefits as well. 2. Northern Pulps ETF environmental assessment focus report indicates to me that treated pulp effluent in our oceans is far less harmful than plastic. The Nova Scotia forestry industry harvests a renewal resource and Northern Pulp Mill is like a recycling facility for that industrys waste. Northern Pulp purchases the waste material and produces a value-added product. Northern Pulp produces a material that can be used instead of plastic in many products that we use daily. Name: Email: @nncweb.ca Address: Municipality: Pugwash Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 25

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:56:25 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: We need Northern Pulp to stay open. I work at we purchase wood to produce siding. owns a logging company. Here are some comments to support northern pulp: This is a world class treatment facility there is no reason the mill should have to close. 1. Northern Pulp engaged independent consultants to consider, study and report their findings to the Nova Scotia Department of the Environment on the impact their project may or may not have on the environment. These findings are reported in Northern Pulpâ?Ts Environmental Assessment. I am not a scientist, but I believe in science. 2. Top on the minds of Canadians and folks all over the world is â?oclimate changeâ? . If Northern Pulp is forced into closure, the Forest Industry of Nova Scotia will take a dramatic hit. Well managed forests aid in the prevention of forest fires. Forest fires emit mass volumes of greenhouse gasses into the atmosphere. Well managed forests aid in the prevention of massive pest outbreaks, killing trees of all ages. When trees die, they fall to the ground and decay. Decaying trees release the carbon stored into the soils and waterways. Harvested trees can be turned into products which store the carbon instead of releasing the carbon into the atmosphere. In summary, a healthy forest industry plays a vital role in climate change management. I strongly support an approval of Northern Pulpâ?Ts Environmental Assessment. 3. Nova Scotia Needs Forestry. Northern Pulp grows more than 6,000,000 seedlings every year. That is impressive! Treated effluent from the mill has been flowing into the Northumberland Strait for over 50 years. Northern Pulpâ?Ts plan is to re-route the treated effluent to a different location. For 50 years, the fishing industry has successfully fished the Strait. Third party environmental experts have assessed that no significant impacts are expected on any fisheries or fish habitat as a result of this project. 4. Third party environmental experts have concluded the ocean water quality within 5 meters of the proposed diffuser will meet Canadian marine guidelines and there is no history of ice scour at the planned location of the diffuser. Based on this information, I believe this project will have little impact on the Strait and fisheries. 5. When this state-of-the-art wastewater treatment facility is complete, Northern Pulpâ?Ts environment footprint will be significantly reduced. Forestry and fishing industries will be able to thrive and co-exist and finally, and very importantly, the Boat Harbour cleanup will begin and the community can begin to heal. 6. I am proud of our forest industry. The forestry, fishing, mining and agriculture industries have demonstrated they can work together successfully. I believe in the science. The economy and the environment must work together. 7. The pulp plantâ?Ts effluent has been flowing into the Northumberland Strait for well over a half a century and the fishing seems to be better than ever. This project will be an improvement. 8. Concern has been raised about the accumulation of materials around the diffuser. A third-party consultant, Stantec, has conclude that it is unlikely that sediment will build up in either the near or far-field. 9. The Lahey Report and good forestry depends on a market for the low-grade wood fibre in our forest and the major consumer of this product is Northern Pulp. 10. Northern Pulp generates 90 of its power requirements from a low carbon, renewable resource and not from burning coal that NSP uses producing 60 of its energy. 11. If Northern Pulp passes the Environmental Assessment, there is no reason not to complete the project. 12. Anyone who thinks the white

stuff coming out of the stacks at Northern Pulp is polluting smoke, it is 98 steam. 13. Northern Pulp produces 23MW of electricity daily, most of which is green energy. NSP would love to have this on their record. Name: @gmail.com Address: Municipality: Chester Grant Postal-Code: Phone: : ### ### - #### email_message: Privacy-Statement: agree x: 33 y: 26

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:56:54 AM

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Project: replacement_effluent_treatment_facility_project Comments: I am writing in support of Northern Pulps Replacement Effluent Treatment Facility. After considering the points brought forth in the focus report summary, it would seem that completion of this project is a step in improving our environment and keeping Nova Scotians working in Nova Scotia. I give my full support! Name: @eastlink.ca Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 68 y: 25

From: @icloud.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:00:04 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: My Dad works in the woods. He often tries to explain what he does, who is involved, and how it is all connected to our environment. Hes explained Northern Pulps role in what he does and how closure of the mill might affect us. He has also explained what Northern Pulp is doing to be better. To make our environment better. I give my support to the project. Name: Email: @icloud.com Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 63 y: 27

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:00:23 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Northern Pulp is building a world class treatment facility please allow the mill to remain open. I own a logging operation in southern Nova Scotia and we are all depending on northern pulp. Here are some comments to support northern pulp : 1. Northern Pulp engaged independent consultants to consider, study and report their findings to the Nova Scotia Department of the Environment on the impact their project may or may not have on the environment. These findings are reported in Northern Pulpâ?Ts Environmental Assessment. I am not a scientist, but I believe in science. 2. Top on the minds of Canadians and folks all over the world is â?oclimate changeâ? . If Northern Pulp is forced into closure, the Forest Industry of Nova Scotia will take a dramatic hit. Well managed forests aid in the prevention of forest fires. Forest fires emit mass volumes of greenhouse gasses into the atmosphere. Well managed forests aid in the prevention of massive pest outbreaks, killing trees of all ages. When trees die, they fall to the ground and decay. Decaying trees release the carbon stored into the soils and waterways. Harvested trees can be turned into products which store the carbon instead of releasing the carbon into the atmosphere. In summary, a healthy forest industry plays a vital role in climate change management. I strongly support an approval of Northern Pulpâ?Ts Environmental Assessment. 3. Nova Scotia Needs Forestry. Northern Pulp grows more than 6,000,000 seedlings every year. That is impressive! Treated effluent from the mill has been flowing into the Northumberland Strait for over 50 years. Northern Pulpâ?Ts plan is to re-route the treated effluent to a different location. For 50 years, the fishing industry has successfully fished the Strait. Third party environmental experts have assessed that no significant impacts are expected on any fisheries or fish habitat as a result of this project. 4. Third party environmental experts have concluded the ocean water quality within 5 meters of the proposed diffuser will meet Canadian marine guidelines and there is no history of ice scour at the planned location of the diffuser. Based on this information, I believe this project will have little impact on the Strait and fisheries. 5. When this state-of-the-art wastewater treatment facility is complete, Northern Pulpâ?Ts environment footprint will be significantly reduced. Forestry and fishing industries will be able to thrive and co-exist and finally, and very importantly, the Boat Harbour cleanup will begin and the community can begin to heal. 6. I am proud of our forest industry. The forestry, fishing, mining and agriculture industries have demonstrated they can work together successfully. I believe in the science. The economy and the environment must work together. 7. The pulp plantâ?Ts effluent has been flowing into the Northumberland Strait for well over a half a century and the fishing seems to be better than ever. This project will be an improvement. 8. Concern has been raised about the accumulation of materials around the diffuser. A third-party consultant, Stantec, has conclude that it is unlikely that sediment will build up in either the near or far-field. 9. The Lahey Report and good forestry depends on a market for the low-grade wood fibre in our forest and the major consumer of this product is Northern Pulp. 10. Northern Pulp generates 90 of its power requirements from a low carbon, renewable resource and not from burning coal that NSP uses producing 60 of its energy. 11. If Northern Pulp passes the Environmental Assessment, there is no reason not to complete the project. 12. Anyone who thinks the white stuff coming out of

the stacks at Northern Pulp is polluting smoke, it is 98 steam. 13. Northern Pulp produces 23MW of electricity daily, most of which is green energy. NSP would love to have this on their record. Name: @gmail.com Address: Municipality: Chester Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 53 y: 22

From: @icloud.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:06:44 AM

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Project: replacement_effluent_treatment_facility_project Comments: If a big company is willing to spend a lot of money to make what it does safer for the environment, I am in support of that. Name: @icloud.com Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 50 y: 31

From: @hotmail.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:23:40 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: This pulp mill needs to be closed permanently. It has been poisoning residents since the 1960s. People around Pictou county have very high rates of respiratory illnesses and higher than normal incidence of cancer. no pulp waste in our water. No pollution in the air we breathe. Put it in yours if you think it is such a good idea. needs to ship his wood somewhere else to be processed. Name: @hotmail.ca Address: Municipality: westville Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 21

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:37:27 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Please do not allow NP to continue polluting Pictou County and the Northumberland Strait. Name: @gmail.com Address: Municipality: Waterside Postal-Code: Phone: _message: Privacy-Statement: agree x: 57 y: 32

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:57:43 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I support the new wastewater treatment facility. The proposed wastewater treatment facility is similar to others across Canada and around the world and those plants do not have a detrimental environmental impact. Those plants harmoniously exist with fishing and agricultural industries. I encourage the government to show leadership and work with Northern Pulp to get this facility built. Name: @gmail.com Address:
Municipality: Hopewell Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 62 y: 30

From:
To: Environment Assessment Web Account
Cc: info@friendsofthenorthumberlandstrait.ca
Subject: Response to NPs Environtmental Assessment
Date: November 8, 2019 7:18:45 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Hello,

My name is I am and I would like to tell you why I think putting a pipe into the strait would be a tragedy.

When I was growing up, I spent a lot of time at house in Caribou; a clear view of Caribou Harbour, the end of Caribou Island, and on to Prince Edward Island. We would walk down to the ferry and watch the cars come in, take a swim, or hop ice cakes that were on the small beach right there. When I wasn't spending time with I was at . From the perch on my windowsill in bedroom I had a stunning view of quite a bit of Pictou Harbour, spanning all the way from Pictou Landing, to the causeway and the rolling hills beyond, and directly in the heart of the scenery, sticking out like a tiny industrial city that never sleeps, was the Mill.

people only to be revolted so much by the cloud and smell emanating from The Mill that they would get ill and have to leave the town. This happened a notable number of times – where else do people leave because the air is suffocating them? I have included an excerpt from The Lonely Planet and their view on the town of Pictou: "Many people stop in Pictou for a side trip or as a stopover via the ferry from Prince Edward Island, but it's also an enjoyable base for exploring Northumberland Strait. Water St, the main street, is lined with interesting shops and beautiful old stone buildings. Unfortunately, the views are blighted by a giant, smoking pulp mill on the opposite side of the estuary; the mill has long been slated for closure due to environmental concerns." (https://www.lonelyplanet.com/canada/nova-scotia/pictou)

I personally have learned a ton about the planet and culture, made many friends and have some really neat experiences because of this unique opportunity where people from all over the world would come to my house. It enabled me the opportunity to travel to where sustainable aquaculture in the form of Black Pearls was a big deal and now the norm because you have to be able to SUSTAIN, not pillage and destroy. I have seen what sustainability can do, that it is possible. What unique opportunities did the Mill afford me? Stinky air that caused people to leave and my house to stink, cancer and premature deaths, a polluted harbour not fit for even sticking your toes in (including the 4 tonnes of mercury they spilled onto the bottom below the plant, oops right?). Which life experiences would you choose? With tourism and culture come people who want to partake in outdoor leisure activities. Pictou is a bedroom town, there are not very many jobs there but with tourism able to thrive, that could completely change! People will come to the town from miles away to tap into that beauty (as with Chester and Lunenberg and that whole shore! Even Tatamagouche is up and coming and they all have one thing in common – NO MILL.)

when a group of marine biologists were doing tests on the shellfish in the harbour – I have included a reference link to the page of findings (in a nutshell) and it directly notes The Mill's toxins as being one of 2 causes of leukaemia the shellfish acquired.
https://www.researchgate.net/publication/33547288_Detecting_p53_family_proteins_in_haemocytic_leukemia_cells_of_Mytilus_edulis_from_Pictou_Harbour_Nova_Scotia_Canada

My whole life has been spent in and around the water, most notably the waters around Caribou and Pictou Islands and they are very special marine places, places that don't exist in quantity or quality on Earth right now. Every summer was spent at Caribou Park Beach, Pictou Island, and boating in the strait with friends.
By the lighthouse, at low tide you can walk seemingly almost to Caribou Wharf across the small harbour, finding creatures like hundreds of rainbow starfish, skates, huge snails, clams , giant quahogs, I have even found weird worms with hundreds of legs and a rainbow iridescence TWICE on Caribou shores(https://en.wikipedia.org/wiki/Polychaete). There are seals that hang out on the reef at the end of the island and Canada Geese and seagulls and sometimes even eagles! When you walk out to the end of the reef at low tide, you are completely surrounded by water with no way back except the way you came and a shelf that drops off before your eyes into the abyss of the strait, knowing only mere feet away could be a massive whale.

Summer days on Pictou Island were spent snorkelling and diving in clean, clear water with an almost white sand bottom. A tiny gem in the middle of the strait, it is home to some very interesting marine life including hundreds of seals and rumoured great white sharks, among others, thousands of sand dollars and starfish, whales, porpoises, and seals that circle the boat for hours chasing the shoals of herring that pass underneath, sharing with diving ganets and other seabirds. Summer nights on Pictou Island were often spent trekking through spooky old trails in the middle of the night to go swimming at John Dan's cove, and one lucky night, in 2009, we encountered bioluminescent algae which I had only ever encountered in French Polynesia and did not think it was possible, nor had I ever seen it in all my years in the water around here. (I have included a video of someone kayaking in the Northwest Arm in Halifax experiencing the same thing as we did for proof that it can and does happen in N.S.) https://www.youtube.com/watch?v=9U1JSGNzNZ8)

Back to the great white sharks. In recent years, a group called Ocearch from Cape Cod has been coming to Nova Scotia on their shark tracking expeditions, following previously tagged sharks up the coast to what they have learned may be a breeding ground for these magnificent creatures and also tagging newfound sharks in the area. It is the first time they have been able to track these sharks to a potential breeding ground and is the first insight we have into how these sharks reproduce – it has not been known until now where and how great white's populate. (I have included a newspaper article from this year's expedition for just a brief overview of what they do https://www.cbc.ca/news/canada/nova-scotia/sharks-ocearch-nova-scotia-expedition-1.5293273) It is no surprise though, as back in 1983 fishermen pulled the second largest great white shark that had ever been recorded from tangled fishing gear just off of Rustico, P.E.I. (https://www.cbc.ca/news/canada/prince-edward-island/great-white-shark-from-1983-attracts-new-attention-1.2712914). Is it really that far-fetched to extrapolate that if there are sharks that migrate vast distances that are hanging out in the water off of Cape Breton and Prince Edward Island, that they might also be in the Northumberland Strait? And if these sharks are protected and they have for the first time made ground-breaking discoveries on the animal, shouldn't the water they literally reproduce in, stay protected as well?

In speaking about reproduction with this ecosystem, the effluent coming out of that pipe will kill everything in this delicate, shallow ecosystem.
the 1980's when they would fly over the strait, there would be a visible black tentacle of pollution that stuck out 100 km into the water from the shore of Boat Harbour. Chemistry is chemistry, and I have been told that Caribou Harbour is a nursery for shellfish, already fragile and in need of protection, and not to add extra stressors to it. I have also heard that it doesn't even need pollutants to kill off whatever vulnerable flora and fauna are in there, even warm fresh water is enough to completely wipe out saltwater species.

Once the balance of nature has shifted, it is incredibly difficult to get it back to the same state it was in before it was destroyed. The impact is severe and long lasting. For the sake of capitalism, another area that is depended upon by so many humans for both leisure and to put food on their tables, will be ruined and Pictou will then be COMPLETELY surrounded by sludge and wastewater. There will be nowhere to escape. Boat Harbour and Pictou Harbour will take a lifetime, if not more, to bounce back. If you put a pipe into the strait, you are taking away the last bit of outdoor recreation for nature lovers and people who generally know that being outside, and not indoors watching t.v. or being on a computer all the time, are how you stay healthy. It is incredibly hard to breathe with that Pulp Mill still going. The residents of Pictou and Pictou Landing will still suffer the ill health effects caused by the emissions from the Mill.

Another point is that right there in Caribou Harbour dock the Ferries that take people from our province onto another. The very last thing that those people are going to encounter leaving our beautiful province is the sight, and stench as far as they can see and smell and absolutely no marine life as they exit onto the next journey through our Country. How disgusting. How shameful. What happened to being an ambassador, a good host?

There are 2 types of humans coming out of this whole scene – there are humans who seemingly want money and don't leave their house for anything outdoor recreation wise and live to work – at a dirty old Mill polluting and causing direct harm to others. The other type of human, are the ones who enjoy other human interaction – travellers, people who crave culture, who enjoy learning about real life and how life is done other places, how enjoyable life can be and who understand that human interaction – not bleached TOILET PAPER, is going to "make the world a better place". And isn't that phrase important right now? In a time where pristine nature is so rare, and climate change is so glaring? Isn't it time to be fair to the people who have complained enough is enough? Letting tourism, fishing and pleasant human interaction free of air pollutants and water pollutants have a chance is only FAIR at this point. How is it fair to RUIN someone else's livelihood to take for your own? They have taken from so many people all these years – in the form of literal shortening of life spans, now they want to keep it going and destroy the only thing Pictou has left other than dirty business?

And let's at I least be honest with ourselves that NP has NOT been honest with us over the years. If Joan Baxter's book "The Mill" has taught me anything, it is that the Mill has done more shady dealings behind closed doors to purposefully take advantage of, and leave in the dark, the citizens who are impacted the most negatively by keeping the Mill operating (856 references of information, in fact). The other glaring aspect is that the whole way along, including the original Environmental Report sent to be assessed, they seemed to leave out very specific points; points that were thankfully picked up by the Environment Minister and she asked them to divulge this information – information that they should have already known from years of operating, information that should have been presented the first time around but seems like it was conveniently left out. Information such as the exact chemicals and amounts that would be released into the strait, information on how it affects sealife and human life . My question is why? The impression I get is one of two: Are they hiding something? Or are they really ignorant enough to think that information was not pertinent? Why did they reject putting air quality meters directly in the town of

Pictou as requested by the residents? Why do they want to avoid some areas and not others when conducting their "scientific studies"? Why are the same people who study the impact on behalf of the company, the same people who would benefit from said pipe? Conflict of Interests have abounded.

This situation is by no means funny, but there are many movies and tv shows based on good vs evil; good being nature and evil being corporations that pollute. I have included the introduction of a tv show I used to watch called the Oblongs and this is sort of art imitating life; the people who have money and live up on the hill all stay healthy and completely aware of what's happening. Meanwhile, the people at the bottom of the hill, where all the factory "foam" ends up, all live in a filthy area of town and each family member has their own very obvious health issue that has arisen directly from being poisoned by corporate greed. (https://www.youtube.com/watch?v=Y7SEqMIQy6w) Fern Gully is another really great example.

I am also wondering how many of these Mill workers eat seafood that has come directly from the place they want to pollute? commented that the diversity of seafood that comes from the Northumberland Strait is unparalleled. Over the years, my own family has spent many days taking a drive out to Logan's fishmart or to Caribou Wharf to ask the fishermen for the freshest catches anywhere. Would it be fair to ask these mill workers to give us their diets and see how much they actually depend on our strait for food and fun without even knowing it? Do they enjoy going to restaurants like the Pictou Lodge (I think they do as The Pictou Lodge actually cancelled their Christmas Party reservations in lieu of the obvious conflict of interest) to eat? Do they go and enjoy the Pictou Lobster Carnival? Do they take advantage of all the things the rest of us are fighting so hard to keep? How many of them have boats and leisure craft that they take to the strait in summer, walk the beaches for fun digging fresh clams as you go, birdwatching, enjoying the view from the lighthouse on the end of Caribou Island? All of these things would be ruined.

I am going to wrap this up by saying PLEASE do not allow a pipe into the Strait. I have tried to paint a picture of how much life has been enjoyed from this exact area and how taking it away will be so hurtful. We now know that the "standards" set forth for capitalism are not congruent with current knowledge of sustainability in this particular area anyway, and Northern Pulp seems to be confused as to why this information would ever be pertinent. They also said they would do "the studies" and they have included thousands of pages for a response that I'm sure, if they had nothing to hide and was done properly and to the fullest scientific extent, would only take a few minutes to put together in a way that was compact and straightforward for everyone. Instead, they seem to be doing what they have done the whole way along for 50 years, purposefully misleading people with fluff and filler words, not going out and obtaining information for the purpose of not divulging it, and pressuring PLFN continuously (even after a 5 year deadline and the Boat Harbour Act). Please, on behalf of my for our love of the oceans and all things in it, and ourselves and all of our future friends and family, please don't let them pollute Caribou Harbour or Pictou anymore, and destroy the beauty and livelihoods of so many.

Thank you for taking the time to read what we had to share.

Sincerely,

From: @live.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:19:07 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: November 8, 2019 Hon. Gordon Wilson Nova Scotia Minister of Environment Dear Hon. Wilson, I would like to offer my support to Northern Pulp Nova Scotia NPNS, in their efforts to get approval to build an on-site effluent treatment facility, with the discharge in the Northumberland Strait. I have viewed the fact sheets as well as some of the support documents associated with the recent environmental assessment presented by the company NPNS. It seems to me that the report prepared by third party consulting firms covers most of the inefficiencies from the first environmental assessment presented. Many of the concerns reported in the media from fishermen have been addressed, such as pipeline discharge temperature variation, discoloration of the water at the diffusion area, harm to marine species and habitat at discharge site as well as the concern of ice scour at discharge. The technology of the Biological Activated Sludge process appears to be well received in other pulp mills in North America as well as many different industries around the world. There are 88 pulp mills that co-exist with communities in Canada, many using this process. As a retired employee of NPNS I have a vested interest the ongoing operation of the mill. I am also an avid fisherman, thereby using many of NPNS access roads to visit lakes and rivers in the province, and acre woodlot, which we have sold round wood to NPNS in the past. I also have a concern about how the closure of NPNS will affect the economy of Nova Scotia. I urge you to approve the Environmental Assessment which would allow NPNS to continue operating. Thank you for taking the time to read this letter, Email: @live.ca Address: Municipality: WESTVILLE Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 58 y: 15

From: @icloud.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:20:59 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Please give these ppl more time to get this right. To put these people out of work,in this country you liberals created is criminal,give this company a chance,they have a lifetime of demand in there market,that mill is more secure than ever. With the talk of separation of Alberta we need more support than ever. They will get this project right, to affect there production will only further harm our suffering province. Nova Scotia needs forestry. Name: @icloud.com Address: Westville n.s Municipality: Westville Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 81 y: 18

From:
To: Environment Assessment Web Account
Subject: federal environmental assessment
Date: November 8, 2019 7:22:23 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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I do support the responsible and accountable **request** to have a Federal Environmental Assessment done for a Northern Pulp's purposed pipe into the Northumberland Strait.

Please protect with respect and responsibility our land and waters.

@yahoo.ca

From: @scottandstewart.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:22:36 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: It appears from the work of the scientists who worked on the focus report that the replacement of the effluent treatment facility at Northern Pulp will have no significant negative impacts on our environment during the construction and operation of this new state of the art facility. If the scientist at the Nova Scotia Department of the Environment agree with the information in the Focus Report resulting in a positive Environmental Assessment, I am in full support of the project. The continued operation of Northern Pulp is critical to the forestry industry in Nova Scotia and the forest industry is critical to the economic well being of our Province. Name: @scottandstewart.com Address: Municipality: St Andrews Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 63 y: 21

From:	Environment
To:	Environment Assessment Web Account
Subject:	Proposed Project Comments
Date:	November 8, 2019 7:23:04 AM

Project: replacement_effluent_treatment_facility_project Comments: I support this project. I support it because of the contribution Northern Pulp makes to the County of Pictou and the Province of Nova Scotia. I support the science behind the effluent treatment proposal and the fact that comparable mills run elsewhere in Canada and the world without causing negative environmental impacts. The timelines imposed on this company by The Boat Harbour Act, and subsequent environmental approval requirements were unreasonable and unfair, and they should be granted an extension to operate their existing treatment facility until such a time as the new facility is operational. Northern Pulp is a cornerstone in the forest industry in this province, and if this facility were to cease operations, untold numbers of forest operators, sawmills and contractors would lose their livelihoods, not to mention the direct employees of the mill itself. The forest industry in this province has just begun to recover from the 2008 recession and the prospects fo r the future of this mill are strong, if they are allowed to make the investments they are proposing in the future of their facility. Name: Email: Address: Municipality: Antigonish Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 63 y: 15

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:28:40 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I support Northern Pulp and the forestry in Nova Scotia. Name: @hotmail.com Address: Municipality: Pictou Postal-Code: - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 66 y: 10

From:
To: Environment Assessment Web Account
Subject: Replacement Effluent Treatment Facility Project
Date: November 8, 2019 7:35:36 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

To Hon. Gordon Wilson,

Forestry has long been a critical and vital part of Nova Scotia's economy. Thousands of jobs in the province are directly and indirectly linked to the sector. More importantly, many of these jobs are located in rural areas. These communities depend on the the revenue and incomes associated with forestry to build business and support thousands of families, including mine.

Paper Excellence is a relatively new owner of Northern Pulp. It has been my privilege to work for a company that has invested millions to reduce and improve their environmental footprint and increase the quality of life for people in this area. Nova Scotia's rural areas have long been have not areas where most people have needed to relocate to find employment. Paper Excellence is a company wanting and committing to spending hundreds of millions of dollars to continue to meet and improve the environmental regulations associated with this pulp mill. Not many companies are seeking the opportunity to do the same in rural areas of this province.

This investment will allow families to stay in the rural area and provide for their family. We relocated our family to Pictou County from Halifax solely because of the opportunity this company has provided us to provide our children with a bright future.

Paper Excellence wants to continue to meet and exceed the environmental requirements. When you are making your decision about the future of Northern Pulp, please consider the investment Paper Excellence is offering to Nova Scotia families like mine, rural development and the rural economy.

Northern Pulp Employee

From: Environment
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:49:09 AM

Project: replacement_effluent_treatment_facility_project Comments: Nova Scotia needs forestry! I supper northern pulp! Name: Email: Address: Municipality: Postal-Code: Phone: # ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 64 y: 11

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:56:14 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Cleaning one this by destroying another doesnâ?Tt make any sense, at all. Our oceans need to be cleaned, not poisoned. This plan is backwards, itâ?Ts destructive and I know very well that we can do better than that. Clean air, clean soil and a clean ocean should be at the very top of the priority list of large companies and politicians. This â?~treatmentâ?T plan is lazy, cruel and inhumane. Letâ?Ts please do better! Name: @gmail.com Address: Municipality: Halifax Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 38 y: 27

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:59:29 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I just wanted to say I think its great that northern pulp wants to put the treatment facility on site. The fact that no untreated effluent will be transported off property will be great and along with the leak detection that is going on the new outflow pipe seems like a fantastic idea. Name: @gmail.com Address: Municipality: UPPERSTEWIACKE Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 75 y: 24

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:05:20 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Its well past time that there must be a solution to pollution in Pictou County specifically concerning Northern Pulp. I live at the mouth of the Inlet and have seen what happens when theres a discharge from the Mill. Youve had plenty of time to sort this out. Rachel Carson wrote Since Silent Spring 50 years ago and here we are still fouling our home. Name: Email: @hotmail.com Address: Pictou NS Municipality: PIctou Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 67 y: 17

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 7:39:02 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Sent from my iPhone

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 7:27:15 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Sent from my iPad

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 4:36:29 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the moral decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens. Think of the long-term burdens this and past ill advised actions will and have placed on this and other generations and the environment.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 4:34:28 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Sent from my Samsung Galaxy smartphone.

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 1:31:11 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 11:29:59 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 10:05:49 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Halifax
B3K 3W8

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 9:48:40 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 9:39:20 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Sent from my iPhone

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 9:31:04 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I’m writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia’s tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Dear Gordon Wilson
A government who would allow Northern Pulp, to pollute our beautiful province,is not much of a government. Big business has clear cut most of our province and now Northern Pulp wants to pollute our coaster waters,it's soon time the public,if they care about our environment start speaking out.but it's all about the big money same as the oil company's who don't give a dame about the environment it's all about kissing the governments you know ... And big business let's start thinking about our environment and stop the pollution. Thank you for your time .

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 9:21:33 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson
We own a cottage on Caribou .
It is an outrage that in this day and age this pipe is even being considered .
Please consider some other options .

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Sent from my iPhone

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 9:05:42 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 8:13:34 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

This situation has become an environmental disaster, a total disgrace and a huge embarassment.

The pulp mill has lied about the damage their actions will cause time and time again, do you really want to let this madness continue?

I'll leave you with a quote from the legendary historic figure Marcus Aurelius:

"What we do now, echoes in eternity."

Now is your chance to make a difference.

Sincerely,

From:
To: Minister, Env
Subject: Say No to Northern Pulp
Date: November 7, 2019 8:04:03 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 7:52:20 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

I do understand that this decision involves political risk for both your Government and your Party, but it is time to place the environment ahead of short term gain and build a sustainable future. The decision timeline may not fit neatly into the 4-5 years of a government mandate, but this issue has dragged on long enough. Just ask the Pictou Landing First Nation who will be dealing with the old sludge residue in Boat Harbour for decades to come.

Thank you!

Sincerely,

Kentville, Nova Scotia

@bellaliant.net

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 6:55:08 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson, I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife. Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely, no matter the form of letter here,

From:
To: Minister, Env
Subject: Say NO to Northern Pulp
Date: November 7, 2019 6:34:11 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to REJECT this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea.

This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

PLEASE, please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 6:27:07 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Sent from my iPad

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 6:23:29 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

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Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

My family has long had a treasured property on Big Island. We have already noted the effects of the Mill over the years. I dread to think of the effect of the pipe system. The science tells us this dangerous, and any government that ignores science is too irresponsible to have my support.

Sincerely,

From: @gmail.com
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 6:16:41 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I am writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Halifax, NS

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 6:06:03 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,
Sent from Mail for Windows 10

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 6:02:31 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia and PEI's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Sent from my Samsung Galaxy smartphone.

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 5:53:03 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I am writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. Please reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife. A long-term decision is needed to protect our environment in so many ways—rather than a short term decision with disastrous long-term detrimental effects.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 5:33:30 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson, I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife. Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens. Sincerely,

Get Outlook for Android

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 5:20:07 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

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Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

communication (including any attachments) may contain privileged or confidential information of Nova Scotia Community College and is intended for a specific individual. If you are not the intended recipient, you should delete this communication, including any attachments without reading or saving them in any manner, and you are hereby notified that any disclosure, copying, or distribution of this communication, or the taking of any action based on it, is strictly prohibited.

From:
To: Minister, Env
Subject: Say NO to Northern Pulp
Date: November 7, 2019 5:15:52 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Halifax.

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 7, 2019 5:09:35 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. It is a terrible idea. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say NO to Northern Pulp
Date: November 7, 2019 4:37:19 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Bedford NS

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:15:12 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Need a federal assessment.only fair re conflict of interest of ns government. Name: Email: @gmail.com Address: Municipality: Pictou Postal-Code: ## ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 83 y: 33

From: Minister, Env
Subject: Northern Pulp
Date: November 7, 2019 11:37:54 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Minister Wilson;

I am writing today to express my great concern regarding Northern Pulp's plan to continue to dump effluent into the Northumberland Strait. This plan quite clearly infringes on First Nation's sovereignty and risks the viability of the nearby fisheries -- fisheries which are already being threatened by warming waters and ocean acidification caused by climate change.

Permitting such ecosystem degradation is unthinkable, and flies in the face of your government's recent attempt to paint itself as environmentally aware. Your government is 2 years away from facing the electorate, and I guarantee that we will hold you accountable for these decisions.

Please take the appropriate steps for our province, and do not permit this multinational corporation to continue to pollute our waters.

Yours sincerely;

From:

Premier; Minister, Env

Subject: Northern Pulp

Date: November 7, 2019 11:17:35 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Minister Wilson;

I am writing today to express my great concern regarding Northern Pulp's plan to continue to dump effluent into the Northumberland Strait. This plan quite clearly risks the viability of the nearby fisheries and infringes on First Nation's sovereignty. It flies in the face of your government's recent attempt to paint itself as environmentally aware.

Permitting such ecosystem degradation is unthinkable. Your government is 2 years away from facing the electorate, and I guarantee that we will hold you accountable for these decisions.

Please take the appropriate steps for our province, and do not permit this multinational corporation to continue to pollute our waters.

Yours sincerely;

From:
To: Minister, Env
Subject: Northern Pulp
Date: November 7, 2019 10:16:49 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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The Honourable Gordon Wilson
Minister of the Environment

Dear Minister,

I am writing to ask that you not permit Northern Pulp to pursue it's risky plan to pump the toxic effluent produced in its mill out into the waters of the Northumberland Strait. Disposing of wastes in Boat Harbour, as it has done for decades, is bad enough, but at least there is some prospect of containment and, yes, perhaps even cleanup at not too rich a price-tag. Somewhat like the line about "keeping your friends close but your enemies closer." But the Strait has no such confines. It is alive is all senses of the word - biologically, hydro-dynamically, oceanographicly, and so on. Should unintended consequences occur, they would likely be near impossible to counteract and impossibly expensive to clean-up. Indeed, a Boat Harbour or Sidney Tar of much greater dimension, both spatially and temporally. Therefore, please invoke the precautionary principal of environmental stewardship, and direct Northern Pulp to consider the much less risky albeit more costly option of on-land treatment and disposal. After all, water should be for drinking, not poisoning.

Thank you for considering my comments. Below I have appended the text of my comments posted to you Department's website this evening.

Halifax, Nova Scotia

"When Prime Minister Trudeau introduced his first cabinet, he was asked why was it important to have gender equality in his government. His succinct answer - "Because it's 2016." It's what we ought to, finally, in this modern world, be doing.

So now Nova Scotia has to answer the question, why is it important that Northern Pulp be allowed to pipe its toxic wastes far into the waters of Northumberland Strait. "Because it's 2020?"

The number 2020 connotes perfect vision, yet the prospect, in the year 2020, of dumping toxic waste into biologically rich waters where they will be free to forever mix into an unbounded oceanic environment, harkens back to thinking and actions that have been proven wrong time and time again in the past. In Canada, in the United States and around the world, there are countless toxic sites, many abandoned by their makers, in need of clean-up. It's playing an environmental shell game, where the bad stuff gets dumped far enough to perhaps satisfy the locals for a time, but sooner or later their descendants (our children or grandchildren) realize they've got a serious mess on our hands that will not go away. Eventually, someone will pay

the price, so it's better the producer of the waste pay the price now, whether it's costlier waste processing on-site and on-land, with minimal impacts on sites (i.e., Northumberland Strait depths) perhaps impossible to remedy if need be in the future, or even ceasing to operate.

In 2020, we should simply not allow these wastes to be pumped into an environment where their containment is problematic and their long-term impacts essentially unknown. Maybe this would have been fine with our forebears; after all, their generations gave us Sidney's Tar Ponds, gold mining's rich history of arsenic poisoned waters, etc. What will Nova Scotia's legacy be a generation down the road? Will our children be wondering why we burdened them with another set of environment problems? And will Northern Pulp even be here, or will their stock holders have moved off to chase laxer environmental oversight elsewhere?"

From:
To: Minister, Env
Subject: Northern Pulp
Date: November 7, 2019 8:45:32 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Minister Wilson;

I am writing today to express my great concern regarding Northern Pulp's plan to continue to dump effluent into the Northumberland Strait. This plan quite clearly risks the viability of the nearby fisheries and infringes on First Nation's sovereignty. It flies in the face of your government's recent attempt to paint itself as environmentally aware.

Permitting such ecosystem degradation is unthinkable. Your government is 2 years away from facing the electorate, and I guarantee that we will hold you accountable for these decisions.

Please take the appropriate steps for our province, and do not permit this multinational corporation to continue to pollute our waters.

Yours sincerely;

From:
To: Premier
Cc: Minister, Env
Subject: Northern Pulp
Date: November 7, 2019 4:45:52 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Minister Wilson;

I am writing today to express my great concern regarding Northern Pulp's plan to continue to dump effluent into the Northumberland Strait. This plan quite clearly risks the viability of the nearby fisheries and infringes on First Nation's sovereignty. It flies in the face of your government's recent attempt to paint itself as environmentally aware.

Permitting such ecosystem degradation is unthinkable. Your government is 2 years away from facing the electorate, and I guarantee that we will hold you accountable for these decisions.

Please take the appropriate steps for our province, and do not permit this multinational corporation to continue to pollute our waters.

Yours sincerely;

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From:
To: Minister, Env
Date: November 7, 2019 11:26:12 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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To Gordon Wilson,

I am writing to voice my strong opposition to the proposed plan for Northern Pulp to pump effluent into the Strait. We need to put the environment first and
put an end to the continued destruction of our irreplaceable lands forests and waters. Stop the dumping of this toxic waste into our home our earth and ocean.

From:
To: Minister, Env
Cc: Premier; @gmail.com; @gmail.com;
Subject: Northern Pulp Focus Report comments
Date: November 7, 2019 10:54:04 PM
Attachments: Comments on the Focus Report.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister:
Please find attached comments on the Northern Pulp Nova Scotia Focus Report.
Sincerely yours,

Comments on the

NORTHERN PULP NOVA SCOTIA FOCUS REPORT
Replacement Effluent Treatment Facility
October 2019

Dear Honourable Gordon Wilson, Minister of the Environment,

First, the time available for individuals to review this document seems totally inadequate. As your government was a co-funder of this report it would have been appropriate to fund an independent panel to review the document to give an unbiased opinion.

I do have several concerns that I wish to share;

1. It is not clear that effluent reduction or the application of more environmentally friendly processes has been considered. There are efforts underway around the world to develop closed cycle bleached kraft mills.
2. It would appear that these efforts are not receiving the attention by the industry that they deserve. In fact, a spokesperson for Northern Pulp has declared that it is impossible to create a closed cycle kraft mill.[1] This assertion is also based on the use of ECF technology.
3. The move to the TCF in Sweden was driven by government and industry cooperating to find even better alternatives than the ECF process[2]
4. Bill 213 emphasized "clean growth" and the desire to keep Northern Pulp in operation should be informed by the need to make the mill as "clean" as possible.
5. There is no mention of the "missing" mercury from Canso Chemicals (up to 5 tonnes / year) adjacent to the proposed location of the ETF. If there is information available on the current state of this buried hazard it should have been part of the Report. If it is not available, I would suggest that it be evaluated.
6. It would be desirable to show the wellhead protection zones for the Pictou water supply on the maps showing the route of the effluent pipeline.

In conclusion, given that the Boat Harbour Act was passed in 2015 it seems like the January 31, 2020 closure of the Boat Harbour treatment facility wasn't taken seriously by Northern Pulp. Even if this proposed effluent treatment plan were to be approved it is not clear how one could proceed and stay within the law. Frankly, putting off the closure of the Boat Harbour facility would be the ultimate betrayal of the Pictou Landing First Nation and a sign of bad faith by the government and a willingness to allow corporations to dictate to the government.

Sincerely yours,

---

[1] Sponsored content: https://www.ngnews.ca/lifestyles/bleached-kraft-mills-cannot-be-closed-loop-175759/

[2] **Transition to chlorine free pulp!: Experiences from the Swedish pulp and paper industry in contrast to the U.S.**
Ann-Kristin Bergquist, department of Geography and Economic History, Umeå University, Sweden

Kristina Söderholm, department of Business Administration, Technology and Social Sciences, Luleå university of technology, Sweden
-see below-

Transition to chlorine free pulp!
Experiences from the Swedish pulp and paper industry in contrast to the U.S.

Ann-Kristin Bergquist, department of Geography and Economic History, Umeå University, Sweden

Kristina Söderholm, department of Business Administration, Technology and Social Sciences, Luleå university of technology, Sweden

Abstract

In 1985, the U.S. Environmental Protection Agency (EPA) detected low concentrations of dioxins in fish caught downstream a few paper mills. It was not previously known that those extremely toxic highly chlorinated hydrocarbons could be formed in the manufacturing of paper. In both the U.S. and in Sweden the pulp and paper industry together with environmental authorities immediately started to investigate the formation of dioxins in pulp mills. Two years later, in September in 1987, the US EPA announced the results of the investigation to the public, i.e., dioxins had been detected in pulp mill effluents, in fish caught downstream from the pulp mills, and in various bleached paper products. The EPA report raised the issue of bleached pulp on public and governmental agendas throughout the world and consumers began to ask for chlorine-free paper.

Although both North American and Swedish firms were exposed to the dioxin alarm simultaneously, Swedish (and Scandinavian) firms would lead and move ahead U.S. firms in the transition towards chlorine-free pulp bleaching. Oxygen delignification, the core technology to implement elementary chlorine free bleaching, was first developed and commercially operative in Sweden. It was also Swedish mills that developed and commercialized total chlorine free bleached pulp. According to previous research, this was mainly due to a new green (primarily German) market for the Scandinavian firms in the late 1980s, for chlorine-free pulp. In this paper, we argue that the explanation behind why Swedish companies were at the forefront in the production of chlorine-free paper must be sought deeper than in changing market demands in the late 1980s. By focusing on the pollution control strategies of Swedish pulp and paper firms in the 1970s, and by contrasting them to U.S. strategies, we will try to show how the regulatory framework, in tandem with business strategies, came to foster initial knowledge development and technological approaches that had implications for the potential to respond to the dioxin alarm and subsequent regulatory measures in the late 1980s.

1. INTRODUCTION

In 1985, the US Environmental Protection Agency (EPA) detected dioxins in fish caught downstream a few paper mills. The concentrations were low, but dioxins, which are the name of a group of highly chlorinated hydrocarbons, are extremely toxic. It was previously known that dioxins could be formed. That dioxins could be formed in the manufacturing of paper was however a novelty. The U.S. paper industry immediately started up further investigations together with the US EPA. At the same time in Sweden, both industry and authorities started to study the formation of dioxins in pulp mills. The results were unambiguous. In the sewage from factories producing bleached chemical pulp – but not unbleached – dioxins were found in measurable levels.[1] Finally, in September in 1987, the US EPA announced public that dioxins had been detected in pulp mill effluents, in fish caught downstream from the pulp mills as well as in various bleached paper products such as diapers, coffee filters and milk cartons.[2] Because of the high toxicity of dioxins, the EPA report raised the issue of bleached pulp on both public and governmental agendas throughout the world. Regulatory processes were initiated in pulp producing countries and consumers, essentially the European market, began to ask for chlorine- free paper.

Prior studies noticed that Sweden came to lead the way in the new green market for non-chlorine pulp that emerged after the dioxin alarm in the late 1980s.[3] Two alternative bleaching technologies – where chlorine (Cl_2) was replaced as bleaching agent – entered the market: elemental chlorine free (EFC) and total chlorine free (TCF).[4] Oxygen delignification, the core technology to implement the alternative bleaching technologies was first developed and commercially operative in Sweden. It was also Swedish mills that developed and commercialized TCF-pulp. Moreover, the replacement of chlorine-based bleaching was very fast in the Scandinavian countries while it was rather slow in North America.[5] This paper deals with the question why Swedish firms came to lead the way in the transition to alternative bleaching processes and production of chlorine-free pulp and paper and we will contrast the Swedish development with experiences from the U.S. Unlike prior studies we will seek more historical explanations to why Swedish firm came to move ahead U.S. firms in the transition towards chlorine-free bleaching, even though the dioxin alarm affected both countries simultaneously. We will specifically study the pre-conditions for the rapid technological transformation within the Swedish pulp industry, a knowledge development that was initiated much earlier than previous studies has revealed. By using a unique archive source material that includes the Swedish pulp- and paper

[1] Jerkeman (2007).
[2] Norberg-Boom & Rossi (1998).
[3] Smith and Rajotte (2001).

[4] Popp et al. (2011).

[5] Reinstaller (2005), (2008); Popp et al. (2011).

industries environmental R&D projects since the 1970s, we will be able to study the underlying motives for technological change in-depth. Both industry level- and firm level motives for advancing alternative bleaching processes will be explored.

Differences in the regulatory approaches between the countries and a stronger market pressure for the Nordic pulp producers have been highlighted as major explanations to why Swedish firms moved faster towards chlorine-free pulp production compared to the industry in North America.[6] Essentially, events on the German market have been regarded as very important for how Nordic pulp and paper producers reacted on the dioxin alarm. In 1991 the Greenpeace magazine "Das Plagiat" was published in Germany and was outwardly a copy of Der Spiegel. The magazine was printed on chlorine-free paper and contained a series of articles on the risks of using substances containing chlorine in the manufacture of paper. Das Plagiat had great impact on the German public and the German pulp and paper buyers, and the Swedish pulp and paper producers could not ignore the development on their main export markets.[7]

However, as argued by Reinstaller (2005), the series of events in the late 1980s and the rise of "green consumerism" in the key markets for the Nordic producers cannot explain the divergences in diffusion patterns of the alternative bleaching processes. Instead, Reinstaller stresses the importance of differences in the regulatory approaches as well as deviating perceptions and interpretations of the dioxin threat by firms and consumers in the two countries.[8] Moreover, the technology for pulp and paper production is known for being a mature technology and the chlorine-based bleaching process had been the dominant bleaching technology since the 1950s.[9] Thus it could not possibly change overnight albeit demand for chlorine-free products came to be very strong in the late 1980s and the early 1990s. By focusing on initial pollution control strategies in the Swedish pulp and paper industry in contrast to the U.S., this paper highlights circumstances that fostered initial technological approaches that had implications for the potential to respond to the dioxin alarm and subsequent regulatory measures. By doing so, we will shed new light on the critical importance of how events in the past may influence firms' ability to respond to sudden and unexpected challenges stemming from environmental regulation and 'greener' market demand and requiring rapid technological changes. These events particularly include R&D strategies undertaken by firms in the

past and the extent firm- activities interplayed with the national strategies for environmental regulation under which the firms operate.

[6] Harrison (2002); Reinstaller (2005), (2009).
[7] Jerkeman (2007); Popp (2011); Reinstaller (2009).
[8] Reinstaller (2005).
[9] Norberg-Boom and Rossi (1998).

3

2. THE PULP AND PAPER INDUSTRY AND THE CHLORINE ISSUE: A SHORT BACKGROUND

Sweden and U.S. are key players in the ensemble of pulp and paper producing countries. Today, U.S. is the second largest producer of paper after China, while Sweden is the sixth largest. Moreover, U.S. is the world's largest producer of pulp while Sweden is the fourth largest.[10] Additionally, U.S. is the second largest exporter of paper in the world and the biggest exporter of pulp, while Sweden is the sixth largest exporter of paper and the fourth largest exporter of pulp. Swedish pulp and paper production is however far more dependent on exports than the U.S. – about 50 percent of the Swedish paper production is exported.

As mentioned in the introduction, the dioxin issue was raised on the global agenda after the US EPA announcement in 1987 that dioxins had been detected in pulp mill effluents and in various paper products. At the time, the volume of imports of pulp and paper was larger in U.S. than its exports. Despite the globalization of the U.S. economy, exports in pulp and paper was only around 6 percent in the early 1970s and had increased only slightly up to the mid 1990s – to about 10 percent.[11] The inverse relationship was true for Sweden. In 1984, imports of pulp and paper were negligent.[12] In 1986, the German market accounted for 24 percent of the Swedish pulp export followed by Italy, UK and France. Germany was also the largest export market for newsprint, closely followed by UK which was the largest export market for other publication paper than newsprint.[13]

The chlorine used in bleaching not only affects the mill's wastewater but also persist in the final paper product. Removing elemental chlorine from the production process thus not only prevents pollution stemming from the production process but also such pollution diffused in society by paper products. The manufacturing process for producing bleached chemical pulp consists of two main processes, boiling and bleaching, where bleaching is

one of the most environmentally intensive aspects of paper production. The aim with chemical pulp production is to extract fibres for paper production from wood, where they are imbedded in lignin. To break down wood into lignin and fibres, wood chips are boiled in a digester with either alkaline sulphate (i.e. the Kraft process) or acid liquor. The bleaching occurs in stages, generally alternating between acid and alkaline stages. The acid stages increase the whiteness of the pulp while the alkaline stages remove any residual lignin and alkali from the pulping

[10] Swedish Forest Industry Federation (2011).
[11] Norberg-Bohm & Rossi (1998).
[12] Skogsstatistisk Årsbok 1986, tab. 15.9.
[13] Skogstatistisk Årsbok, 1989, Foregin trade, tab. 10.3.

stage.[14] The use of elemental chlorine (Cl_2) as bleaching agent became dominant in the 1950s.[15]

Previous research has reported that two alternative bleaching technologies, elemental chlorine free (EFC) and total chlorine free (TCF), were developed and diffused as a response to the dioxin alarm.[16] A complete replace of chlorine (Cl_2) with chlorine dioxide gas (ClO_2) is known as the ECF-process. By replacing Cl_2 with ClO_2 the levels of absorbable organic halogens (AOX) are greatly reduced. The TCF-process in turn completely eliminates the use of both Cl_2 and ClO_2 and instead typically Hydrogen peroxide (H_2O_2) and/or ozone (O_3) is used as substitute bleaching agent.[17] The development of ECF and TCF was aided by improvements in oxygen delignification in a pre-bleaching stage.

The direction of technological development is affected by decisions taken in the past and influenced by society's institutions. Therefore – to understand why Swedish mills developed oxygen delignification and made it commercially operative as well as were the first to develop and commercialize TCF – it becomes important to understand the framing of the environmental regulatory approach and the establishment of technological trajectories. Drawing on the literature of path dependency, we will give a brief overview of the institutional context in Sweden and the U.S. in terms of environmental regulatory approaches and technological strategies. In the following section we will deal with the chlorine issue and in the last section we will sum up and discuss our results.

3. TECHNOLOGY DEVELOPMENT, ENVIRONMENTAL POLICY, AND FIRM STRATEGIES

3.1. Environmental regulation and technological change

It has been suggested that environmental regulations can substantially determine the direction of technology development[18] and they are moreover seen as the primary driver for innovation.[19] Previous research has noticed different regulatory approaches and modes of corporate response and compliance strategies between Sweden and the U.S.[20] The reason why these different pathways can be noticed is an empirical question and has to do with different national contexts in terms of political culture, institutions, knowledge, direction of R&D, including also, the national environmental regulatory

[14] www.skogsindustrierna.se [Swedish Forest Industry Federation, approached July 4 2013]; Popp et al. (2011). [15] Norberg-Bohm & Rossi (1998).
[16] Popp et al. (2011).
[17] Popp et al. (2011); Reinstaller (2005).

[18] See e.g. Yarime (2007).
[19] Popp et al. (2011) p 1253.
[20] Lundqvist (1980); Auer (1996); Harrison (2002).

framework and associated relations between the regulators and polluters. Both countries were (together with Japan) early adopters of environmental regulation, where Sweden was the first country in the world to establish an environmental protection agency in 1967. Sweden developed a cooperative mode of the environmental protection system[21] based on flexibility in compliance measures and a functioning dialogue between regulators and industry[22], while the U.S. practiced a legalistic style and a political toughness with poorer relations between the policy makers and industry.[23] In contrast to the U.S., Swedish firms invested predominantly in pollution prevention and internal process control technologies[24] while U.S. firms invested heavily in end-of-pipe facilities.[25]

The literature on technological path dependency assumes that historical events that seem minor at the time can be amplified by positive feedback in ways that drive the selection of technology down an unanticipated trajectory.[26] Modern and more complex

technologies often display ‘increasing returns’ to adoption; the more experience that is gained with them, the more they are improved. When a new technology begins to emerge it becomes progressively more ‘locked in’ by ‘chance’ or ‘historical events’ forming an outcome not necessarily the best alternatives, easily altered or totally predictable in advance.[27] The Swedish pulp and paper industry and the Swedish regulatory approach early on came to favor internal- (in-plant) over end-of-pipe measures and performance standards[28] – a strategy that stands in contrast to the U.S. where the regulatory approach became heavily reliant on the design (Best Available Technology, BAT) or specification standards that preferably could be met by end-of-pipe abatement measures.[29] Literature on technological path dependency has noted that once a pathway is established, the technology development is driven along a certain direction even though more superior routes are available.[30] Initial technological strategies to deal with pollution can therefore have serious implication for firms’ options and ability to adapt process technology to deal with new, uprising environmental problems. This since technological development requires much information, and the acquisition of information is a costly activity.[31]

Apart from that firms are restricted by high development costs in advancing new technologies, technology innovations are moreover intertwined with cultural evolutionary processes that may

[21] Lundqvist (1980); Rotstein (1994); Karlsson (2012). [22] Lundqvist (1971); Bergquist et al. (2012).
[23] Wallace (1995).
[24] Söderholm & Bergquist (2012).

[25] Harrison (2002).
[26] See e.g. Arthur (1989); Rosenberg (1994); Liebowitz and Margolis (1995).
[27] Arthur (1989).
[28] Söderholm and Bergquist (2012).
[29] Norberg-Boom & Rossi (1998).
[30] See e.g. Rosenberg (1994).
[31] Rosenberg (1994) p 14.

emerge at the sub-national, national and transnational levels.[32] Rycroft & Kash (2002) state the link between culture and institutions and technological innovations is most clearly distinguished at the national level. The influence of culture and institutions on

path dependence is however important also at other levels. At the national level, distinct national institutions (e.g. firms, government laboratories and universities) have evolved into sophisticated national innovations systems (NIS) where cultural norms and culturally based institutions contribute the context within which the previously distinct institutions continuously create and integrate the knowledge that makes it possible to repeatedly develop new and enhanced complex technologies.[33] From this perspective, the development of environmental technology cannot only bee seen as a lengthy process of trial and errors and 'historical events' that eventually results in a technology entering the market. Since national cultures and institutions tend to be deeply embedded[34] they are hard to modify, even when new technological opportunities appear.[35] Dosi (1982) uses the term "technological paradigm" to refer to the presence of technological trajectories. The origin of the technological paradigm stems from the interplay between scientific advances, economic factors, institutional variables and unsolved difficulties on established technological paths. Within this context, public policies plays on important role related to the search of new technological paths. The regulatory approach of a country influences the technology strategy chosen and has implications for firms' willingness to innovate.[36]

3.2. Regulatory frameworks in Sweden vs. U.S.: a brief overview

The Swedish Environmental Protection Act was implemented in 1969, and it represented the first uniform framework for regulation of emissions to air, water pollution, noise and other disturbing activities from industrial plants in Sweden. The Act had a pre-history that dates back to the *Public Health Act of 1874* and the *Water Rights Ordinance of 1880*. After step-wise additions of the regulatory frameworks, the Swedish government in 1963 appointed an expert committee assigned to investigate the issue of all interference from stationary plants. A proposal was presented in 1966[37] which came to form the basis for the *Environmental Protection Act* (hereafter EPAct) passed by Parliament in 1969. In the years before the final bill was passed, the construction of a modern system for environmental protection began in Sweden. Thus, in 1967 the *National Environmental Protection Agency*, a unified body for almost the entire area covered by the EPAct, was founded. The

[32] Rycroft & Kash (2002). [33] Freeman (1995).
[34] e.g. North (1993).
[35] Rycroft & Kash (2002). [36] Dosi (1982).

[37] SOU 1966:65

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Environmental Protection Agency was an amalgamation of several existing agencies including the Water Inspection (1957) and the Air Pollution Control Board (1963).[38]

The EPAct was based on plant-by-plant licensing; firms had to have their plans for construction or alteration of production plants assessed according to several criteria specified in the Act. The so-called Franchise Board of Environmental Protection (hereafter FBEP), administrated the licensing system and was in practice a court, with experts from both industry and the Swedish EPA. Unlike the U.S., Sweden came to regulate both water and air pollution under the same Act and the licensing process thereby integrated. Moreover, the regulatory approach was in practice based on performance (emission level values) rather than on technology-based standards, and these were negotiated with each plant owner, sometimes over ex-tended periods of time. [39] The licenses had to be reassessed and renewed every 10 years on the basis of what was considered Best Available Technology (BAT) at the time. As a general rule, the industrial polluters were required to take all precautionary measures, and tolerate such restrictions on their activities as could be reasonably demanded. In practice BAT referred to the least polluting technologies that proved practicable in other industrial plants of the same type, either in Sweden or in other countries.[40] BAT was used as a reference for achievable emission level values, where emission levels normally set the target for the licence (not prescriptions of using a certain method). As the system also aimed at favoring internal (pollution prevention) process changes the system needed to be flexible in terms of compliance strategies.[41]

In the U.S., modern environmental regulation dates back to the 1960s, which is when the first major federal legislation was enacted and the EPA was shaped. Three years after the Swedish Environmental Protection Agency was established, the US EPA began its operations with the responsibility of maintaining and enforcing national standards under a variety of environmental laws. The laws of importance to industry include the Clean Air Act (CAA), which passed in 1963 but really took shape first in the reauthorization and amendments of 1970, and the Water Pollution Control Act of 1972, later called the Clean Water Act, CWA. Of importance to the U.S. pulp and paper industry, due to its particular problems with water pollution, is the CWA. The CWA regulates the pulp and paper mills' discharges by using a two-pronged approach. First, the EPA issues uniform technology-based guidelines for comparable sources, which in the next stage are

incorporated (typically by state governments) in individual facilities permits. In 1992 however, the EPA merged development of air, water, and sludge regulations for the pulp and paper industry under the 'cluster rule'.[42]

[38] Westerlund (1971); Lundqvist (1971). [39] Bergquist et al. (2012).
[40] Lundqvist (1980).
[41] Harrison (2002).

[42] Harrisson (2002) p 71.

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In contrast to Sweden, heavy reliance has generally placed on the design (Best Available Technology, BAT) or specification standards (which stipulate duty holders exactly what measures to take) rather than on performance (emission level) standards.[43] The North American system also relied on air and water quality standards, allowing certain concentration of pollution in the surrounding air and water with respect to health aspects. [44] Legally, the environmental quality standards dominate the technology-based standards, but in practice, technology based standards have been emphasized.[45] It has also been viewed that the emphasis on technology-based standards avoids the potentially greater time and cost associated with developing, administrating, and complying with different geographically-specific pollutant discharge limits that must be tailored to meet ambient water quality standards.[46]

The North American paradigm for pollution control contrasts to the Swedish regime that instead has emphasized internal process changes, based on plant-by-plant judgments and plant negotiated performance standard.[47] The U.S. system also represented a much stricter command-and-control regime compared to the Scandinavian countries including Sweden. It was a direct regulation that permitted little flexibility in terms of compliance measures.[48] American environmental regulatory rules are generally far more detailed and are enforced more legalistically resulting in more frequent and much lager regulatory sanctions than in countries with a more cooperative regulatory style.[49] It is also obvious that the regulatory frameworks have been embedded differently in Sweden and the U.S., essentially with respect to the influence given to the States in the U.S. regulatory enforcement. Compared to Sweden, it is clear that U.S. environmental policy had a more difficult birth than the Swedish, with generally adversarial legislative approach and practices.[50]

The regulatory history and past compliance strategies of industries and government has had, as we will see, important implications for how regulations have been approached. Not the least inter-firm and state-firm collaborations in R&D formed the basis for the early regulatory response to the dioxin alarm in Sweden. In the U.S., the policy process proceeded slower and was more incremental, formed by scientific uncertainties, problems for the EPA to define the technology based standard and by industry interest to avoid costs from implementing more radical technologies.

[43] Gunningham (2009). [44] Lundqvist (1980).
[45] Powell (1997) p 3.
[46] Powell (1997).

[47] Harrison (2002).
[48] Gunningham (2009) p 4.
[49] Gunningham et al. (2003) p 80.
[50] For instance, the Clean Air Act set ambitious national goals for air quality, and in order to guard against "agency capture" of the American EPA, the congress used the "hammer clause" which gave the EPA a strict compliance deadline for its implementation, a strategy that industry considered to be unreasonable. Wallace (1995) p 114.

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4. THE PROCESS OF TRANSITION TO CHLORINE-FREE PULP AND PAPER

Dioxins were already prior to the mid-1980s known as a highly toxic, carcinogenic substance, but it was not known that dioxin was formed in the production of bleached pulp. This was discovered when the US EPA in 1983 initiated a national survey that in 1985 detected dioxins down streams from pulp and paper mills. To determine the specific cause of dioxins in pulp and paper manufacture, the US EPA, the American Paper Institute (API) and the NCASI (National Concil of the Paper Industry for Air and Stream Improvement) thereafter, in 1986, agreed to undertake the "5 Mills Study". The study was released in 1987 and concluded that bleaching was the primary source of dioxins in pulp and paper mills.[51] Environmentalists learned about the agreement and in December 1986, Greenpeace initiated a Freedom of Information Act request seeking all available information on the pulp mill dioxin problem. Information leaked to Greenpeace which, in 1987, released a report alleging an EPA cover-up. Only a month later, the New York Times ran a front-page story reporting that traces of dioxins had been detected in paper

products.[52] And in 1988, the "104 mill studies" in turn was initiated. By that time, the Swedish authorities had already begun regulatory action.[53]

4.1 The Swedish technological pathway: internal process changes through collaborative R&D platforms

The Swedish strategy for dealing with pollution problems was to accomplish emission reductions through internal process changes – an approach that contrasted to the U.S. What concerns the Swedish pulp and paper industry, this concept can be traced back to the 1940s and 50s and the pioneering R&D activities then taking place in collaborative platforms established jointly by the Swedish pulp and paper producers. Previous studies have shown that industry collaboration in environmental R&D as such became a key feature in the Swedish pulp and paper industry's green reconstruction, and a number of green R&D platforms were gradually established during the 1900s.[54] While the first collaborative initiatives of the industry sector to deal with pollution problems actually took place already at the turn of the 20th century, as a response to local pollution resistance (especially the odor problems), the R&D activities thereafter increased in tandem with the development of environmental policy up to the 1960s. During this novel period, attention was foremost directed towards improved

[51] Norberg-Bohm & Rossi (1998), Powell (1997).
[52] Powell (1997), p 23 ff.
[53] Powell (1997) p 34.
[54] Söderholm and Bergquist (2012), Bergquist and Söderholm (2011).

efficiency and reduced fiber emissions, while more resolute efforts aiming for decreased discharges began in the 1960s. At the time of the enforcement of the EPAct, collaborative environmental R&D efforts were further accomplished in cooperation with environmental authorities.[55]

Important collaborative platforms for the greening of the Swedish pulp and paper industry in the 1960s were: a) the *Swedish Pulp and Paper Research Institute*[56] (STFI), founded by the forest industry in collaboration with the state already in the mid-1940s; b) the state-industry funded *Institute for water and air protection* (IVL), founded in 1966; and c) the *Forest Industries' Water and Air Pollution Re- search Foundation* (SSVL), founded by the forest industry in 1963. Both STFI and IVL have their background in the Swedish system of collective research institutes in order to strengthen the Swedish

industrial competitiveness, where the financial framework was determined by multi-year contracts between the state and a foundation formed by the industries concerned.[57] While the original idea of STFI was to pursue research on forest products in close cooperation with the Royal Institute of Technology in Stockholm, and to advance methods for their rational refinement and exploitation, the motive for establishing the two latter platforms in the 1960s was the recognized need for effective collaborative efforts in environmental R&D to manage costs and risks related to emerging stricter environmental requirements.[58]

Even though STFI was not established to address pollution issues, it ended up doing so as improved material utilization and process control became important strategies to combine production expansion with pollution prevention from the late 1960s and onwards. And from the mid-1970s to the 1990s, research in the field of pulp bleaching was carried out with high intensity at STFI. This was linked to the fact that the bleaching process was the point of the pulp mill where the material that could not be brought to the chemical recovery or over to the paper production, left the factory as bleach plant wastewater.[59] It was known already in the 1970s that the bleaching process accounted for a very high percentage of total emissions of oxygen-consuming substances, as well as that the bleach plant emissions contained toxic substances.[60]

The state-industry funded IVL, and a related consulting company, the IVL-company, was founded in 1966 and reflects an on-going mobilization, both within the government and the industry, to enhance knowledge on the relation between industrial production and environmental problems and to identify effective solutions. By engaging in basic and applied research on the quantity, content, and

[55] Söderholm and Bergquist (2012).
[56] Today *Innventia AB*.
[57] Sörlin, Sverker. 2006. *En ny institutssektor. En analys av industriforskningsinstitutens villkor och framtid ur ett närings- och innovationspolitiskt perspektiv*. Näringsdepartementet.
[58] Bergquist & Söderholm (2011); Söderholm & Bergquist (2012).
[59] Eriksson, Lennart (2010) *STFIs öden och äventyr 1942-2010: fakta-minnen-reflexioner*, Spearhead production AB: p 272.
[60] See e.g., *Klorid i återvinningssystem*, 1974-76, Stockholm: SSVL (1977), p 23.

environmental impact of emissions, which was knowledge equally important to industry representatives and environmental authorities for the development of both efficient

pollution- abatement technology and efficient environmental legislation, IVL came to underpin the greening of the Swedish industry in the 1960s and 70s.[61]

SSVL was formed already in 1963 by the Swedish Pulp and Paper Association (SCPF) – past professional body for parts of the pulp and paper industry, now the *Forest Industries* – but expanded operations considerably at the beginning of the 1970s when it stood clear that the industry-specific problems faced by the pulp and paper industry were to big to be handled merely within IVL. A wide project organization was built up under SSVL with representatives from a number of private companies, research institutions, such as IVL and STFI, consultants, equipment suppliers and industry interest groups. The purpose of the wide project organization was to "get together" both research results and technological achievements, to get them assessed and evaluated properly in order to lower the risks for the individual mill. Problem-/project areas were selected by the SSVL-board (key industry representatives such as CEOs and technical managers) and involved what various plants had identified as important but which was not yet fully covered. A majority of the pulp and paper companies were generally represented in each of the different projects. Individual firms in turn supplemented the projects on a large scale and, together with equipment suppliers, provided access to factory floors, machinery, and personnel.[62]

The SSVL-projects primarily aimed at preparing background material and evaluate available environmental technologies, but also supporting the introduction of new technology.[63] Findings spread through a wide variety of reports which, according to a person with central insight and abundant participation in the SSVL-projects of the period (Hans Norrström, he was engaged by both IVL, STFI and the largest consulting firm of the pulp and paper industry) were well distributed to and utilized by the individual mills. [64] According to Norrström the pulp and paper industry took the projects very seriously as there was a concern over what the economic impact of the EPAct would be: for most, production went up steeply towards the end of the 1960s while emissions were large and in many cases increased. Thus: "We needed to get this to work."[65] In sum, the collaborative R&D platforms STFI, IVL and, not the least, SSVL, formed the basis of a major part of the green technology development undertaken by the Swedish pulp and paper industry from the late 1960s to the 1990s.

4.2. R&D and the bleaching process

[61] Bergquist & Söderholm (2011)
[62] Interview with Norrström, 8 June 2010, Stockholm. [63] *Miljö 90*, Final report, Stockholm: SSVL (1991):15. [64] Interview with Norrström, 8 June 2010, Stockholm. [65] Ibid.

From the mid-1970s, also the SSVL projects, as the STFI activities, focused largely on the field of pulp bleaching.[66] Process technically it was, of both cost and environmental reasons, about doing as much delignification work as possible in the boiler and in the subsequent oxygen delignification, and to adapt the subsequent bleaching after this. The large number of chlorine-based and non-chlorine based bleaching agents contributed to the area's major research width. The gradual removal of elemental chlorine (chlorine gas) as bleaching agent implied significant research efforts, as well as, finally, the issue of bleaching without chlorine.[67] In this context, the small Swedish company ASPA was a pioneer.

Already in the SSVL-project *Chlorides in recovery system* (1974-76), different ways to reduce the environmental impact of bleach plant wastewater were recommended although the main focus was the impact of chlorides in the recovery system. First recommended was to try to achieve as much delignification work as possible in the boiler and in the subsequent oxygen delignification, and secondly, to try to use as large proportion of chlorine dioxide in the bleaching process as possible.[68] Efforts to bleach pulp with chlorine dioxide had of economic reasons been initiated in Sweden decades before, such as in MoDo's laboratories and mills in the 1940s.[69] Thus, when the use of chlorine dioxide in the Swedish and Finnish production of bleached kraft pulp was mapped within the project in 1974, it was found that while Swedish mills usually used chlorine dioxide, Finnish mills did not.[70] Total project cost was 4 MSEK and it resulted in 37 interim reports and a final report in 1977. Apart from SSVL, among others STFI, the *Board for Technical Development* (STU) and *the Nordic Industrial Fund* contributed funds.[71]

In parallel was also the SSVL-project *Nordmiljö 80* (Nord Environment 80, 1975-78), which aimed to find ways for the rational observation of the forest industry with relevant and modern control methods. The project focused on pollution control, measurement and sampling appliances, as well as on system

[66] When the basic research of IVL and STFI primarily aimed at clarifying the biological effects and chemical composition of the bleach plant wastewater, SSVL had greater focus on process technologies for reducing emissions, although these areas of knowledge – which not least the organization of the SSVL projects bear witness of – are strongly connected with each other.

[67] *Klorid i återvinningssystem*, 1974-76, Stockholm: SSVL (1977); *Miljövänlig tillverkning av blekt massa*, 1977-81, Final report, Stockholm: SSVL (1982); *Miljö 90*, Final report, Stockholm:

SSVL (1991). See also Eriksson, Lennart (2010): 272.
[68] *Klorid i återvinningssystem*, 1974-76, Stockholm: SSVL (1977): p 13.

[69] Söderholm K. and Bergquist A-K. (2013) ”Growing Green and Competitive – a Case Study of a Swedish Pulp Mill”, *Sustainability*, 2013 5(5), pp 1789-1805.
[70] G. Annergren, E. Jansson, H. Makkonen H. Norrström och R. Rasimus (1974) *Kartläggning av svenska och finska blekerier,* Interim Report No. 10 within the project ”Klorid i återvinningssystem” (1974-76), Stockholm: SSVL (1974).

[71] Klorid i återvinningssystem, 1974-76, Stockholm: SSVL (1977), p 112.

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design for data collection.[72] Before the completion of this project completed, SSVL initiated a vastly larger project on bleach plants' actual environmental impact, *Environmentally harmonized production of bleached pulp* (1977-81). The project, which resulted in over 100 reports, was mainly funded by the pulp- and paper industry but also by contributions from IVL, STFI and STU. Government grants (through such organizations) amounted to about 13 of the total of 40 MSEK of the project cost.[73] In the foreword to the final report for this project, the proactive approach of the industry in this context is justified:

”Water protection in the Swedish pulp and paper industry has so far largely focused on reducing emissions of biochemically readily biodegradable and suspended material. [...] With the high environmental standards achieved by the vast majority of Swedish mills, a continued decrease in these parameters would only give a marginal improvement of the environment to a high specific charge. [...] Given the pulp and paper industry's economic importance and the residual emissions size, environmental work should, however, continue and focus on investigating the industry's emissions, other environmental impacts, and if so, find effective and economical methods to counteract it.”[74]

In the final report (1982) for the project it was found that of the 21 mills in Sweden at the time producing bleached chemical pulp, 10 had already installed or committed to install oxygen delignification plants. Only a total of 15 additional oxygen delignification plants were put in operation outside Sweden. Of the 27 mills for bleached chemical pulp outside Sweden in Scandinavia, only two Norwegian mills had oxygen delignification plants and two Finnish mills had aerated ponds.[75] By 1985, five U.S. mills had installed oxygen delignification system.[76] In this context it is justified to mention that the Swedish company MoDo already in the early 1970s constructed a pilot plant for oxygen

delignification.[77] This technology was in turn established in Sweden soon thereafter which is mirrored in the numbers above.

The attention paid to the bleaching process continued in several SSVL projects of the 1980s, and in the sub-project "Discharges from the bleaching of chemical pulp" within *SSVL 85* (1981-85) it was established that mills with bleaching sequences containing oxygen and a high percentage of chlorine dioxides in pre-bleaching, or oxygen bleaching with treatment of bleach plant wastewater in aerated ponds, responded to "highest environmental standards".[78] In the final SSVL-project of the 1980s, *Miljö 90* (Environment 90), as many as 200 pages are devoted to the bleaching process while the remaining three sub-projects only take up about 10-40 pages each.[79] *Miljö 90* started after a review

[72] *Nordmiljö 80*, Final report, Stockholm: SSVL (1981). See also *Miljö 90*, Final report, Stockholm: SSVL (1991): 41.
[73] *Miljövänlig tillverkning av blekt massa*, 1977-81, slutrapport (1982), Stockholm: SSVL, p 5.
[74] *Miljövänlig tillverkning av blekt massa*, 1977-81, slutrapport (1982), Stockholm: SSVL, p 5.

[75] *Miljövänlig tillverkning av blekt massa*, 1977-81, slutrapport (1982), Stockholm: SSVL, p 7. [76] Norberg-Bohm and Rossi (1998).
[77] Jerkeman (2007), p 13.
[78] *SSVL 85*, Final report, Stockholm: SSVL (1986).

[79] *Miljö 90*, Final report, Stockholm: SSVL (1991).

and prioritization of current environmental issues in July 1985, i.e., a few months before the US EPA in the autumn of 1985 reported that dioxins had been detected in fish caught near pulp and paper mills. The risks of dioxins however came to be a high priority in the Swedish and European environmental debate in the late 1980s. Hence, the content of dioxins in products and emissions were questions that came to be incorporated into the project.[80] IVL was very well represented also in this project as well as, in fact, the Swedish EPA with a few individuals.[81] In the next section follows examples of how this involvement of Swedish authorities in the SSVL projects, through the semi-governmental IVL and SEPA, provided policy-makers with necessary tools for the gradual tightening of ELVs and for sometimes stipulating ELVs based on novel process-internal technology not yet fully developed. SEPA further compiled several own reports in the 1980s and early 90s on the composition and effects of bleached pulp mill effluents.[82]

4.3 Dioxins and intense pressures for technological change? Sweden vs. the US

The risks of dioxin became a high priority issue in the European environmental debate in which a key question was whether the small residue of polychlorinated dioxins that could be traced in products based on bleached pulp could leak when exposed to moisture, such as a wet baby diaper. Another to the pulp industry related environmental issue which came to be debated simultaneously in Sweden, was the emission of pollutants in the Baltic Sea, where especially the emissions of the bleaching pulp industry were in focus.[83] FBEP took a first clear standpoint in the dioxin issue already in 1986 when delivering final conditions for a sulphate pulp mill, establishing that wastewater from the bleaching process caused significant local damage to water based organisms. An unusually high proportion of representatives from the industry sector, several of which were in the midst of their own licensing processes, were present as well as chlorine producers, consultants, equipment suppliers, research institutions and an additional number of SEPA representatives. FBEP established that:

”significant progress has been made in recent years in terms of different measures to reduce the emissions of chlorinated organic matter, including increasing the share of chlorine dioxide in the first bleaching stage as well as through improved process equipment and process control.”[84]

FBEP however at the same time announced that it expected even more R&D on the matter, especially on how to increase delignification in the cooking- and bleaching stages as well as on the possibilities

[80] *Miljö 90*, Final report, Stockholm: SSVL (1991).
[81] *Miljö 90*, Final report, Stockholm: SSVL (1991): pp 327ff.
[82] See e.g., *Biologiska effekter av blekeriavlopp*, Anders Södergren (Ed.), Report, Solna: Naturvårdsverket (1988), 134 pp.
[83] Waluszewski, Alexandra and Håkansson, Håkan (2004) “Das Plagiat” in Widmalm, Sven (Ed.) *Artefakter*, pp 219-244: 223.

[84] Documentation from the licensing of the Norrsundet mill in 1981-1987, Decision 1986-12-09, p. 44f, National

Archive of Arninge, E1:817-819, Sweden: Stockholm.

to switch to other bleaching chemicals. In this particular licensing process the FBEP actually advocated a specific abatement technology. The Board however at the same time emphasized that it should not be stipulated in the final conditions as the firm had both the right and the duty to use other methods if any shortcomings could be proved with this particular technology and/or if more effective methods were developed. In this way the Board maintained the regulatory strategy to permit flexibility in compliance strategies while at the same time requiring emissions to comply with the performance of state-of-the-art (BAT) technology.[85]

At the same time in the U.S., the policy process moved slower and the US EPA worked on defining the standard setting. Following a series news reports about EPA's cooperation with industry in 1987, the US EPA signed a decree to perform a comprehensive risk assessment of dioxins and furans considering sludge, water effluents and products made from pulp produced at 104 pulp mills. The agreement also required the EPA to propose regulation before 1993.[86] Interesting to notice is that the Office of Technology Assessment (OTA) in 1989 reported about the Swedish pulp mills compliance with more stringent standards when it comes to the emissions of chlorinated organics.[87]

By this time in Sweden, an emotional public debate on dioxins were in full swing. In 1987, Sweden's largest and oldest environmental organization, the Nature Conservation (SSNC), recommended consumers to choose unbleached products upon which the producers and distributors of a range of unbleached products, such as packaging- and tissue paper, began to provide them with SSNC's signature. In 1989, the association further launched two environmental classes (a low chlorine- and a chlorine free[88] level) for chlorine bleached paper qualities where brightness was important, such as magazine paper. In the absence of any national or international (at EU level) official emission limit that was considered harmless to the environment, the SSNC criterion got major impact.[89] In fact, the issue of chlorine free paper and unbleached products in this way became the issue that finally came to seriously initiate the environmental issue as a marketing issue for the Swedish pulp and paper industry.[90]

Also Green Peace had many members in Sweden (if not quite as many as SSNC), and in their "Pulp and Paper Campaign" during the second half of the 1980s, there was a major focus on Sweden, where the Swedish pulp bleach plants according to Green Peace accounted for about 99 % of the country's total emissions of chlorinated organics. As an activity within the campaign, Green Peace in 1986

[85] Ibid.
[86] For a detailed accounting, see Powell (1997).
[87] Powell (2007) p 12.

[88] The "chlorine-free" level was in fact allowed to contain 0.5 kg AOX/tonnage of pulp (Waluszewski and Håkansson, 2004, p 224).
[89] Waluszewski and Håkansson (2004), p 224.
[90] Eva Bingel, Claes Sjöberg och Charlotte Sjöquist (2002). *Från defensiv till proaktiv. Drivkrafterna bakom hållbar tillväxt*, Rapport, Stockholm: Svenskt näringsliv.

dumped 1.5 tonnages of dead fish in front of an office entrance to one of the largest producers of bleached pulp in Sweden. And a few years later Green Peace conducted yet another action against the use of chlorine as a bleaching agent in the production of white paper products when, in collaboration with the small pulp-producing Swedish mill ASPA, producing an exact copy of the weekly *Der Spiegel* printed on paper containing no shred of chlorine-bleached pulp.[91]

When the citizens of Sweden during the summer of 1988 also came to experience severe algal blooms, as well as an excess mortality of an already endangered seal population, the chlorine issue became an even hotter topic of debate, not least in media.[92] One article by the chief physician at a regional hospital was published in Sweden's largest daily newspaper, *Dagens Nyheter*, on August 2 in 1988, entitled "Dioxins are a likely cause of the seal death and the disease process resembles AIDS". The article states that it is found that the seal death is "likely" to be due to the contamination of dioxins where pulp bleaching constitutes "one of the now largest known" dioxin sources in Sweden. The article further states that "it is well known that Swedish children during breastfeeding far exceed tolerable daily intake [of dioxins]".[93]

The dioxin issue together with the pollution of the Baltic Sea and the big seal death in the summer of 1988 in fact constitute key explanatory factors behind the fact that environmental issues in general got their big break among Swedish citizens during the second half of the 1980s, which not least the "Environmental election" to the Swedish Parliament in 1988 bear witness of.[94] The environmental debate and mobilization of the environmental movement after the mid 1980s was much stronger than what Sweden had experienced in the 1960s. At the same time in the U.S., the absence of both a green market demand and a pronounced anti-dioxin mood in the public induced a different perception of the problem within industry. Gaining knowledge to the problem through scientific research into what would be the best technology was one mean to influence EPA's decision, but also a way to explore possible solutions on the basis of the established technological paradigm.[95]

When it comes to regulation the Swedish parliament in 1988 adopted a proposal which stipulated that industrial emissions of chlorinated organic compounds must be reduced to 1.5 kg AOX/tonnage of pulp (normal emission level was about 4 kg/tonnage of pulp at this time).[96] The FBEP had however chosen to stipulate this level (with effect from January 1 1992) in the final conditions for a mill already in 1987, although it was based on a technology that was not yet developed. Still, the FBEP

[91] Waluszewski and Håkansson (2004).
[92] Waluszewski and Håkansson (2004) p 223.
[93] Hardell, Lennart ”Säldöden liknar aids : Dioxiner är trolig orsak till säldöden och sjukdomsförloppet påminner om aids”, *Dagens Nyheter* (DN), 1988-08-02.
[94] About the “Environmental election” in 1988, see e.g. Giljam, Mikael and Holmerg, Sören (1990), *Rött blått grönt*, Stockholm: Bonniers.
[95] Reinstaller (2005) p 1380.
[96] Waluszewski and Håkansson (2004) p 223.

“expected” the technology[97] to be developed within a relatively short time and SEPA in turn confirmed it was already “about to be implemented” at a number of Swedish mills.[98] The example reflects the great insight of the environmental authorities in the industry’s on-going environmental development and investment projects, but also how the environmental authorities in fact stipulated technology development. This is also confirmed by an anonymous FBEP official with direct experiences of pulp and paper licensing processes in the late 1980s:

“The Board listened eagerly to the results of the investigations made by both the authorities and the industry and if we could identify prospects for a certain technological development, we granted probation periods and stipulated [performance standards] based on expected technological development and thus in fact stipulated technological development.”[99]

Fact is the same year (1988) the Swedish Parliament adopted a proposal which stipulated that industrial emissions of chlorinated organic compounds must be reduced to 1.5 kg AOX/tonnage of pulp, the Swedish government imposed the most stringent requirements on emissions from bleaching ever been presented, a maximum of 0.5 kg AOX/tonnage, on one of Sweden’s smallest producers of market pulp, Aspa. In 1987, Aspa had submitted a license application to expand capacity, and the mill’s sensitive location on a lake that served as drinking water for several communities had contributed in referring

the question to the government.[100] The method which already in the spring of 1989 would allow such low emissions, and the fact is – after further development work at Aspa and only a year after (in 1990) – a pulp bleached without chlorine, was the so-called Lignox process.[101] The process was based on knowledge of the use of oxygen, hydrogen peroxide and chlorine dioxide in the bleaching process, developed within SSVL-projects since the 1970s (and partly within even earlier collaborative platforms).[102] ASPA was thus the first mill to develop and commercialize TCF-pulp, however, on the basis of decade-long efforts within collaborative semi-governmental R&D platforms (of which the company had taken part) to achieve environmentally friendlier bleaching methods through increased efficiency and reduced use of chemicals by internal process changes.[103] ASPA was further not the only Swedish mill to produce chlorine-free pulp in 1990: the MoDo mill Domsjö soon followed with the so-called MoDo Crown product, also based on the increased use of oxygen and

[97] The new technology involved a combination of oxygen and chlorine dioxide in the bleaching process. [98] Kinneryd (2010) Ch. 10.

[99] Personal interview with anonymous Franchise board official with experiences of pulp and paper licensing processes of the late 1980s and onwards, Stockholm, 8 June 2010.
[100] Waluszewski and Håkansson (2004).
[101] The Lignox process: oxygen-bleached pulp is treated with hydrogen peroxide at high temperature after the removal of heavy metals with a complexing agent. Subsequent final bleaching takes place with peroxide and chlorine dioxide.

[102] See e.g. *Miljövänlig tillverkning av blekt massa*, 1977-81, Final report, Stockholm: SSVL (1982). See also Waluszewski and Håkansson (2004).
[103] This was initially, already in the 1940s, motivated by economic reasons but soon also environmental.

peroxide in the bleaching process.[104] The Lignox process was in turn explained and evaluated in the final report for *Miljö 90* (1991) whereupon knowledge of the process spread to the entire industry as well as to environmental authorities.[105] In the same report it was further established that: “In short, all Swedish pulp mills will have introduced oxygen delignification”. [106]

Meanwhile, in 1993 the US EPA announced a proposal based on a technology-based approach that involved: 1) substituting elemental chlorine with chlorine dioxide or other

bleaching agents (e.g., peroxide or ozone) and 2) reducing the extent of chlorine bleaching required to achieve a given quality of product through alternative means of pulp delignification (i.e., extended cooking or oxygen delignification prior to chlorine bleaching).[107] The U.S. pulp and paper industry strongly opposed the proposal and after receiving critical comments from both industry and environmental groups, the EPA released further revisions. The new standard was proposed in 1996 and the regulation was eventually finalized in 1997.[108] Studies report that the US EPA deliberately chose a standard which could be met by employing only full substitution for chlorine gas with oxygen gas, but no oxygen delignification. U.S. mills thus didn't have to incur the expense of installing oxygen delignification like their Swedish competitors which, according to Harrison (2002), saved the U.S. industry 1 billion U.S. dollars.[109] Noteworthy is though that when the US EPA determined the standard, one third of the U.S. Kraft mills had already installed oxygen delignification.[110] Only two U.S. mills had pursued more radical innovations. The first one was Louisiana Pacific, who adopted TCF in 1995, and did so to comply with the CWA. The Louisiana Pacific mill was one of few Kraft pulp mills that hade never installed secondary waste water treatment. Thus, when faced with the demand to reduce emissions, TCF appeared more attractive here than at mills which had already installed end-of pipe technology.[111]

In this regard, it is important to acknowledge that the lifetime for equipment in the pulp and paper industry is 15-30 years. As the prior U.S. strategy had been to invest in end-of-pipe, it fundamentally affected the assessment and costs of different technologies to reduce the discharges of dioxins or other effluents. Mills that had not installed secondary treatment plants thus found it more attractive to invest in TCF.[112] According to Norberg-Boom and Rossi (1998), the regulation proposed by the EPA in 1997 thus only required incremental innovation rather than moving industry to new technological

[104] Söderholm and Bergquist (2013).
[105] *Miljö 90*, Final report, Stockholm: SSVL (1991): see e.g. section 5.3. [106] *Miljö 90*, Final report, Stockholm: SSVL (1991):19.
[107] Powell (2007) p 4.
[108] Norberg-Bohm and Rossi (1998) p 231.
[109] Harrison (2002) p 73.
[110] Harrison (2002) p 73.
[111] Norberg-Bohm and Rossi (1998) p 235.
[112] Norberg-Bohm and Rossi (1998) p 239.

trajectories.[113]

Quite a few Swedish mills however produced TCF bleached pulp already by 1994[114], and the remaining mills so-called elementary chlorine free (ECF) bleached pulp. And this development put Swedish pulp and paper mills in the forefront internationally.[115] The long term collaborative R&D efforts within platforms like STFI, IVL and, not the least, SSVL, were of central importance to this development. The knowledge development and -diffusion taking place here formed the basis for a major part of the green technology development undertaken by the Swedish pulp and paper industry from the late 1960s to the 1990s. Important prerequisites for Swedish mills to make the final steps towards EFC and TFC were further the early choice of the Swedish pulp and paper industry and Swedish government to try to achieve reduced emissions from the bleaching process through internal process changes as well as industry's early choice to focus on reducing the use of chlorine gas as bleaching agent.

5. DISCUSSION

Oxygen delignification, the core technology to implement alternative bleaching technologies (where chlorine is replaced as bleaching agent) was first developed and commercially operative in Sweden. It was also Swedish mills that developed and commercialized total chlorine free (TCF) bleached pulp. This paper has shown that it was no coincidence that this development took place among Swedish pulp and paper producers. Long before environmental authorities begun suspect that pulp bleaching was a considerable source for dioxins, the Swedish pulp industry was well aware that the bleaching process accounted for a very high percentage of total emissions of oxygen-consuming as well as toxic substances. This is one of the reasons why Swedish pulp mills usually had chlorine dioxide implemented in the bleaching process already in the early 1970s.

The technology evolution towards ECF and TCF can be traced back to the proactive collaborative green R&D activities initiated by the Swedish pulp and paper industry even before modern environmental regulation was implemented in Sweden in 1969. These activities were, as we have shown, related to the industry (as well as the authorities') early strategy to focus on reducing the environmental impacts through internal process changes, which guided the development into certain technological development path. In the same token, the U.S. development followed a different

[113] Norberg-Bohm and Rossi (1998) p 230.
[114] The majority of the Nordic mills that had switched to TCF in 1994 were of Swedish origin. Only two mills in Finland and two mills in the U.S. had then opted for TCF (Reinstaller, 2005, p

1373).
[115] Reinstaller (2008).

technological trajectory since the U.S. regulatory approach fostered more of end-of-pipe solutions compared to the Swedish approach.

Previous research has emphasized the importance of the strict environmental regulation implemented in Sweden in the early 1990s, as well as the corporative, plant-by-plant regulatory style. According to Popp et al. (2011), competition among major industry players to satisfy consumer demand for chlorine free paper further played a vital role in the initial development of chlorine-free technologies. We have shown in this paper that the Swedish authorities required the Swedish pulp and paper producers to push the technology development beyond 'of the shelf' (BAT) technology already from the mid-1980s, which is earlier than noticed in previous studies.[116] This was possible since the Swedish EPA through the collaborative R&D platforms had knowledge of "around the corner" technology. Because of this, the ECF and TCF technology was principally already developed when Swedish consumers and the German export market started to ask for chlorine-free paper. Knowledge on alternative bleaching processes was spurred by both a strong regulatory action and proactive firm-collaborative R&D initiatives, which fundamentally aided the transition to TCF and ECF in Sweden. The public debate and demand for chlorine-free paper however played a vital role for the swift adoption and fast diffusion of the technology when it was at hand.

As much as the Swedish trajectory was influenced by its' technological paradigm to focus on internal process changes, the U.S. regulatory approach was consistent with the dominant abatement technology in the U.S. pulp and paper industry. Moreover, the absence of a wide public debate in conjunction with the institutional regulatory style considerably delayed the process of substituting chlorine in the U.S. industry. The U.S. pulp and paper industry strongly opposed the regulation proposed by the EPA in 1993, and a less stringent rule was announced in 1997, excluding the oxygen delignification stage.

This paper has highlighted the critical importance of events in the past in explaining firms' ability to respond to sudden and unexpected challenges requiring rapid technological changes, stemming from environmental regulation and/or 'green' market demand. These events include firms'/industry sectors' R&D strategies undertaken in the past and how these have interplayed with national strategies for environmental

regulation. It is perhaps no news that the U.S. and Sweden approached industrial pollution issues differently already in the 1ate 1960s, or that development subsequently has differed between the countries. The great influence of initial corporative and authoratitive approaches on long- term technology development trajectories is however not as well known.

[116] See e.g. Reinstaller (2005) and Popp et al (2011).

21

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From:
To: Minister, Env
Cc: Premier; brendan@brendanmaguire.ca
Subject: Northern Pulp"s Focus Report
Date: November 7, 2019 10:41:40 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Environment Minister of NS
Gordon Wilson

I wish to express my opposition to Northern Pulp's plan to discharge their mill's effluent into the Northumberland Strait. The idea of simply moving the discharge from Boat Harbour to the Strait solves nothing. The mill ruins a vast amount of fresh water to begin with and then would dump it into an ocean environment. This is all the result of wholesale destruction of our forests. The tradeoff between all this destruction and the environment cannot continue. It is not sustainable. I want us to protect the environment so that Earth will be able to sustain us. Allowing a foreign company, jobs or no jobs, to partake in the destruction of our province should not be the mandate of the government. As an earth scientist I urge you to protect our environment and work with others to diversify our economy in other ways.
I await your words and action soon.

Yours Truly,

Spryfield, NS

From:
To: Minister, Env
Subject: Citizen input re: Northern Pulp
Date: November 7, 2019 10:28:49 PM
Attachments: A"se"k.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Honourable Minister Gordon Wilson and the Department of Environment:

Please find attached a PDF of my citizen input regarding the *Focus Report for the Replacement Effluent Treatment Facility Project* and the pending decision about the future of Boat Harbour and Northern Pulp.

We Nova Scotians appreciated an opportunity to express our opinion on this notorious issue.

Sincerely yours,

Cc:
Chief Andrea Paul
Premier Stephen McNeil
Tim Houston
Gary Burrill
Keith Irving

Dear Honourable Gordon Wilson, Minister of the Environment:

I am writing in response to the Government of Nova Scotia's offer to receive citizen input [until November 8, 2019] regarding the environmental assessment *Focus Report for the Replacement Effluent Treatment Facility Project*—Northern Pulp's effluent proposal to send their mill's toxic waste into the Northumberland Strait in a pipe that as I understand also crosses the water supply for the the Town of Pictou.

I am absolutely against this proposal.

Enough harm and damage has already been done to the Pictou Landing First Nation, the Town of Pictou, the wider area, all life in range, the water. The health, access to safe sources of traditional food, destruction of habitable environment, loss of economic opportunities—the list goes on and on and on, along with the cost to the public health system alone—all affected as the Mill has toxified the air, land and water of the region for over 50 years. And now, with this latest proposal, this foreign corporation wants to go even further afield to do its dirty work. Water is sacred.

Yet, the *actual cost* of 'doing business' is never ever fully and accurately accounted for, is it? Why is this? And did public money also go into producing the *Focus Report for the Replacement Effluent Treatment Facility Project*? If so, why? When are these sleazy backroom deals with successive mill corporations going to stop?

The Time is now—to put an end to the Mill and its toxic relationship to provincial governments of every stripe —a classic symbol of decades of deceit, corruption and criminal abuse of public funds along with a shameful legacy of hurt to our Indigenous peoples and utter environmental destruction of the ancestral territory.

The Government of Nova Scotia negotiated an agreement with the Pictou Landing First Nation which included *The Boat Harbour Act* (Bill 89 2015) and *The Boat Harbour Remediation Project*. The Act is "Respecting the Cessation of the Use of the Boat Harbour Effluent Treatment Facility for the Reception and Treatment of Effluent from the Northern Pulp Mill." *Period*. And "On and after the earlier of **January 31, 2020, . . .**the use of the Facility for the reception and treatment of effluent from the Mill must cease." [My **bold**]

The Boat Harbour Act in no way qualifies its purpose or its timeline. The fact that the Mill management did not get its act together to work within the timeline is *their* issue, not ours as all Treaty people of Mi'kma'ki. And not your department's issue either for that matter.

Further, with *The Boat Harbour Remediation Project* including the remediation design planned, environmental assessment and "opportunities for public input and consultation during the assessment", the complete cleanup of the once pristine A'se'k estuary "should begin in 2021." Again, this has not been qualified by 'It will happen when the Mill comes up with an acceptable plan.'

Your website states: "**Nova Scotia Environment focuses on climate change, protecting our environment and advancing our ambitious environmental goals.**" Nothing Northern Pulp does fits under this set of foci. And the rampant clearcutting of Nova Scotia's forests that feeds Northern Pulp for its product [and some electrical generation, along with the biomass plant in Port Hawkesbury, the chips being sent to Europe and those recently sent to China] is absolutely unconscionable— to all the living of the forests—and when our forests are so desperately needed as significant contributors to restraining our carbon footprint as carbon sinks. Have you seen the 100 series highways throughout the province these days, congested with semis hauling load after load of hardwood toothpicks? Hasn't this urgent Time of the Earth warranted the provincial government to have a say in how private owners (as well as the Crown) steward their forests? Clearcutting with tree harvesters, replanting a monoculture for the next round of clearcutting, spraying with pesticides, by anyone, is a crime against our province and our planet. It must be stopped.

It is time for the Department of Environment to act for the majority of the people it serves.
It is time you look into the Precautionary Principle as a guiding one in your deliberations and decision making.
It is time to work with all relevant departments [as is alluded to in your new Bill 213] to revision our economy, to one of de-growth, weaning Nova Scotia off of an extractive economy, all the destructive enterprises that the province so heartily embraces.
It is time to transition the economy and all vulnerable workers [leave no one behind] to living wage, green jobs while restoring and enhancing the environment and lowering our carbon footprint.

I am not talking an all or nothing path of action here. Political will (not willful ignorance) coupled with genuine understanding of our planet's existential emergency and a keen desire to work with all Nova Scotians to solve the problems of our time, *together*, can make the necessary needed changes—with the right attitude. We can do this.

I have talked to our Liberal MLA repeatedly about Boat Harbour. He assured me that the Premier promised the Pictou Landing First Nation that the The Boat Harbour Act would be honoured; that the Premier was committed to honouring the January 31, 2020 deadline and would keep his promise to the Pictou Landing First Nation.

Will he?

Will you?

Aloha,

From:
To: Minister, Env
Cc: Premier; brendan@brendanmaguire.ca
Subject: Northern Pulp"s Effluent Treatment Plant
Date: November 7, 2019 10:17:44 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson

I am writing this evening to comment on the revised plans of Northern Pulp's effluent treatment facility.

I am afraid that **NO** revisions of Northern Pulp's effluent treatment facility could make the idea of any further effluent going into the Northumberland Strait acceptable to me. It is unfortunate that this has already occurred for fifty years and in the process destroying Boat Harbour and the livelihood of the Pictou Landing First Nation.

Fishermen's associations from the three Maritime provinces oppose the project and the Friends of Northumberland Strait as well.

Many, many, many people I know and have spoken of this with also are strenuously opposed to any further operation of this mill which is not even a Nova Scotian company but one owned by a wealthy Indonesian family who would have few concerns for our environment. Yes, the mill employs 330 jobs but the profits go outside of our province leaving us with an environmental disaster.

I am writing also this evening for my daughter whom shares my concerns but is a busy young mother trying to find a moment to write you. Her name is and she is committed to caring for the Earth to leave it a healthy place for her children to grow.

The money spent over the years to keep this mill in operation could have done more to help the people of the region and perhaps establish another industry. An industry that did not stink and destroy the land and also our beautiful forests.

Someday I hope we stop the destruction of this most valuable asset to fight Climate Change - TREES!

Pulp mills in BC are closing let this mill join them and begin the repair to our land!

Yours truly,

Spryfield, Nova Scotia

From:
To: Minister, Env
Cc: info@ecologyaction.ca
Subject: Northern Pulp"s Proposed Strait Contamination
Date: November 7, 2019 9:59:57 PM

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Antigonish, N.S.

November 7, 2019

Gordon Wilson,

Minister of the Environment

Province of Nova Scotia

Good evening Minister Wilson,

I am writing to you as a resident of the Town of Antigonish and a holder of Pictou County property (Bailey's Brook) to express my alarm regarding Northern Pulp's intention to contaminate the Strait which we have spent a lifetime enjoying and benefitting from its resources.

Examining your comments regarding Northern Pulp's plan and your consequent support of the project has generated much concern, particularly in this area.

Having read much of the Focus report, your defense of Northern Pulp's undertaking appears to be insupportable and contrary to the best interests of the province. The negative consequences of this proposed massive contamination of the Strait supported by the provincial government appears to many of my neighbours both here in Antigonish and Pictou County as a blatant disregard for our wellbeing and a capitulation to interests given higher priority by you and your government.

However, a legislative response by you and your government that would result in the immediate termination of this lethal threat to our present and future wellbeing would be considered as a very redemptive (environmentally and politically) move.

Awaiting your legislative response,

From:
To: Minister, Env
Subject: Northern Pulp's Environmental Assessment for their pipe proposal
Date: November 7, 2019 9:15:40 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From: .com
To: Minister, Env
Subject: Northern Pulp proposal
Date: November 7, 2019 8:44:40 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. Please reject this proposal in its entirety. This project will have serious negative environmental effects on the land, air and sea. It will create human health risks; damage Nova Scotia's tourism and fishery sectors and ruin ecosystems in this region. The vibrant wetlands, coastal and marine ecosystems and diverse wildlife at risk from this ill-conceived proposal are the very life-support systems we should be protecting and restoring in the current climate and nature emergency.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Mount Hanley, NS

From:
To: Minister, Env
Cc: Premier
Subject: Northern Pulp
Date: November 7, 2019 8:17:34 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

The plan to dump effluent water into the Northumberland Strait will cause irreparable damage to the ecosystem and will infringe on the sovereignty of First Nations in the area. Fishing is a vital industry for Nova Scotians and a way of life for Indigenous peoples whose rights to do so have been affirmed by the courts. As the population grows increasingly environmentally and socially conscious, this decision will reflect poorly in the coming years.

Environmental responsibility is paramount - and is intertwined with the ongoing need for reconciliation with First Nations and Indigenous Peoples in Canada. This decision will be on the minds of young and old Nova Scotians alike - we need to build a sustainable future. Please don’t make the decision to jeopardize our life giving water systems.

Sincerely

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From:
To: Minister, Env
Cc: Premier
Subject: Northern Pulp
Date: November 7, 2019 8:17:34 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

The plan to dump effluent water into the Northumberland Strait will cause irreparable damage to the ecosystem and will infringe on the sovereignty of First Nations in the area. Fishing is a vital industry for Nova Scotians and a way of life for Indigenous peoples whose rights to do so have been affirmed by the courts. As the population grows increasingly environmentally and socially conscious, this decision will reflect poorly in the coming years.

Environmental responsibility is paramount - and is intertwined with the ongoing need for reconciliation with First Nations and Indigenous Peoples in Canada. This decision will be on the minds of young and old Nova Scotians alike - we need to build a sustainable future. Please don’t make the decision to jeopardize our life giving water systems.

Sincerely

Get Outlook for iOS

From:	
To:	Minister, Env
Subject:	To the Honourable Gordon Wilson Minister of the Environment Re: environmental crisis in Pictou County, Nova Scotia
Date:	November 7, 2019 7:36:11 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Hello Minister of the Environment

I am writing today to tell you in writing that I oppose Northern Pulp's plan to pump effluent into the Strait .
We need an end to this toxic legacy, the Northern Pulp Pipeline cannot , should not proceed.

We are in a climate emergency now and all eyes are on the decision makers, you are the minister of environment you need to act to save the environment
I cannot understand how in these enlightened times, knowing what we know this is still allowed to transpire. It's really disgusting and not progressive and devastating for future generations .

Sincerely

Bedford, NS

Helping businesses get noticed online !

From:
To: Minister, Env
Subject: Say no to Northern Pulp!
Date: November 7, 2019 7:29:58 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

I value and appreciate the uniqueness of Pictou County. It's an amazing place to enjoy nature. However the pulp mill and the effluent are things that are not attractive to the county's appeal. I wouls love to see the town of Pictou and areas surrounding it to revive. Dealing with the mill and the effluent will help solve these challenges in my opinion.

Sincerely,

From:
To: Minister, Env
Subject: Northern Pulp Effluent
Date: November 7, 2019 6:27:54 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Re: Northern Pulp Nova Scotia Corporation Effluent Treatment Facility
Date: November 7, 2019 5:25:49 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

A healthy Northumberland Strait area is vital for the fishery and for the quality of life of many Maritimers. Don't cave in to big industry any longer. Send a message that you care!

Sincerely,

Dartmouth

From:
To: Minister, Env
Subject: Public input to Northern Pulp Effluent Treatment proposal
Date: November 7, 2019 4:46:24 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife. At the same time, rejecting this proposal should not be an excuse to keep the Boat Harbour treatment facility open past the January 2020 deadline.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Antigonish, NS
Canada

St. Francis Xavier University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.

From:
To: Minister, Env
Subject: Northern Pulp dumps effluent in the Northumberland Strait? NO NO NO!
Date: November 7, 2019 2:55:03 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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To: The Hon Gordon Wilson
Minister of the Environment

My family and I wish to register our strongest opposition to allowing Northern Pulp, having polluted before, to pollute again, spewing effluent in the Northumberland Strait.

Jobs are involved, of course, but we believe we are smart and creative enough to find new jobs for people as well as protect the work of fishermen and others in the Strait.

With regard

Karsdale
November 14 2019

From:
To: Minister, Env
Subject: Stop Northern Pulp Pollution
Date: November 7, 2019 2:49:05 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I am writing you today to express my deep concern over Northern Pulps plan to continue dumping waste into the Northumberland Strait.

This plan risks the viability of nearby fisheries.

This plan violates the right of the indigenous communities of our province who have suffered enough under the reign of white colonialism.

This is your chance to prove that you and your government are committed to keeping promises in regards to the environment. We will hold you accountable.

I urge you to use your position of power to help make the decisions that people like me can't. Make the right decision for our people and our planet. Do not allow this pollution to continue.

Sincerly,

From:
To: Minister, Env
Subject: Northern Pulp Effluent Release
Date: November 7, 2019 2:17:43 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

This email is to urge you to not let Northern Pulp release any more effluent into the Northumberland Strait. These are important ecosystems and we cannot continue to pollute them and ignore the invaluable services that they provide, not only intrinsically and to the natural world, but to the health and well-being of our citizens and built communities. With the recent climate strikes, youth movement, and the "World Scientists' Warning of a Climate Emergency" paper that was just released and signed by more than 11,000 scientists, now is not the time to be making poor environmental decisions that will contribute to the ongoing environmental crisis and will continue to degrade the natural systems that both current and future generations depend on.

We absolutely cannot be continuing with a business as usual scenario. We need to diversify our economy and shift towards green solutions. Do not allow Nova Scotia to be a province that is stuck in the past--Northern Pulp has been polluting our environment for far too long. We need to move forward and diversify our economy. Please listen to the people who care about the citizens and natural environment of this beautiful province and do not allow Northern Pulp to continue to contaminate our air, fresh water, and marine environments.

Thank you,

From:
To: Minister, Env
Subject: Northern Pulp Concerns
Date: November 7, 2019 1:59:28 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Minister Wilson,

I am writing today to express my tremendous concern regarding Northern Pulp's plan to continue to dump effluent into the Northumberland Strait. This plan quite clearly risks the viability of the nearby fisheries and infringes on First Nation's sovereignty. It flies in the face of your government's recent attempt to paint itself as environmentally aware.

Permitting such ecosystem degradation is unthinkable. I live on the Northumberland Shore and my community relies on this ecosystem to sustain ourselves. Considering the future of my home suffering the potential impacts from continued support of the Northern Pulp helps me empathize with our neighbouring Indigenous community who have suffered these atrocious environmental impacts for years.

Please take the appropriate steps for our province, and do not permit this multinational corporation to continue to pollute our waters.

Yours sincerely,

From:
To: Minister, Env
Subject: Another letter
Date: November 7, 2019 1:56:33 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Mr Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

My children play in that water they have grown up in that area and I am disgusted this was ever an option

Thanks

From:

Minister, Env

Subject: Northern Pulp Effluent

Date: November 7, 2019 1:36:43 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Dartmouth, NS,

--

Artist and Art Educator

Check out my art at

From:
To: Minister, Env
Subject: Northern pulp concerns
Date: November 7, 2019 1:30:44 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Minister Wilson;

I am writing today to express my great concern regarding Northern Pulp's plan to continue to dump effluent into the Northumberland Strait. This plan quite clearly risks the viability of the nearby fisheries and infringes on First Nation's sovereignty. It flies in the face of your government's recent attempt to paint itself as environmentally aware.

Permitting such ecosystem degradation is unthinkable. Your government is 2 years away from facing the electorate, and I guarantee that we will hold you accountable for these decisions.

Please take the appropriate steps for our province, and do not permit this multinational corporation to continue to pollute our waters.

Yours sincerely;

From:
To: Minister, Env
Subject: opposition to continuing Northern Pulp pollution of air, land and water
Date: November 7, 2019 1:28:33 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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The Honourable Gordon Wilson,
Minister of the Environment

Members of KAIROS Halifax are greatly concerned about Northern Pulp wanting to continue their toxic legacy by proposing to have a pipeline that will pump up to 90 million litres of toxic pulp effluent a day into the Northumberland Strait.
We support the rights and needs of the people of Pictou Landing First Nation for the closure of Boat Harbour as an industrial waste dump as legislated on January 31st, 2020.
We are against Northern Pulp's plan to pump effluent into the Strait. The Mi'kmaq are against it; the fishers in the area are against it; and we are against it.
Thank you for listening and responding to the voices and health and safety needs of the people of NS.

on behalf of KAIROS Halifax

From: Minister, Env
To: Environment Assessment Web Account
Subject: FW: RESPECT your mother
Date: November 8, 2019 8:19:54 AM

-----Original Message-----
From: @gmail.com>
Sent: November 7, 2019 9:24 PM
To: Minister, Env <Minister.Environment@novascotia.ca>
Subject: RESPECT your mother

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

NOW IS YOUR TIME to make an impact and a difference in our world. Please use your power and speak for us all to do what is right for our Mother Nature.

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:25:05 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I am not a scientist but I live on the North Shore in Bayhead. My family and neighbours fish for their livelihood in the Strait. They also manage oyster leases. These industries have sustained several generations and can continue to do so into the future. Every day I delight at the birds and other wildlife along the Northumberland Strait. We know how rare and precious this ecosystem is. Visitors marvel at it some of them come to stay. I cannot reconcile the â?onothing to worry aboutâ? scenario drawn by Northern Pulp in its project proposal with lived reality. How stupid or desperate does this company think we are? The effluent has poisoned Boat Harbour. Dumping the effluent into the Strait will poison it. Running a pipe through Pictouâ?Ts watershed, good chance of poisoning it. And no matter where the effluent goes, the toxic air emissions continue. The Premier was right to pass the Boat Harbour Act. Poisoning the land and people of Pictou Landing First Nation must stop. This company has had five years to find a solution. Dumping its effluent into Northumberland Strait must not be allowed. I urge your government to reject Northern Pulpâ?Ts effluent proposal. Sincerely yours, Name: Email: @gmail.com Address: Municipality: Bayhead Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 63 y: 37



Environment Assessment Branch, Nova Scotia Dept of the Environment, Hon.Gordon Wilson, Minister

902-424-6925

From:

Pictou, NS

@gmail.com

Dear NS Minister of the Environment,

My name is and I live in Pictou. I am a deeply concerned citizen of Pictou who is alarmed by the proposal for a new "treatment" for effluent from Northern Pulp. I am also 100% opposed to the extension of Boat Harbour.

1. The EA that Northern Pulp submitted lacks information. However, the information they submitted (that is meant to ease our minds) is actually very disturbing. The size of the document was surely meant to confuse, but in it are a few huge red flags.

This idea of an effluent pipe (treatment?) flushed into the Northumberland Strait is a vile suggestion in all ways. Here is why:

1.If the effluent was even only warm/hot water, it would very soon change the Northumberland Strait forever. Forever. That body of water is a major food source, as well as our greatest tourist attraction. The amount of money that would be lost as the ocean degraded would be astronomical. The fisheries industry collapse, the tourism industry collapse, property values plummeting, rising issues in health and welfare, unwanted climate changes...and other issues that would spin out from these major problems. **No amount of quick money in the present is worth any of these problems that would arise.**

2. But then, along with that warm water comes chemicals. That this pipe would be traveling through the source of drinking water for the town of Pictou is frightening in the extreme. Pipes break. I have much lived experience and I have seen many companies over the years build pipes and they have always broken and polluted our resources in disastrous ways. Again, **no risk to our drinking water should ever be allowed.**

Boat Harbour:

What happened to A'sek (Boat Harbour) was nothing but environmental racism. Disgusting. The PLFN was lied to...but they would have said a resounding NO if they had been told the truth.

The truth of the company Northern Pulp lies in Boat Harbour. Look at Boat Harbour. That is what the company was satisfied doing, and successive governments allowed. I have no doubt that nothing has changed with this company. What they do on the cheap in order to make money for their shareholders is based in lies and is continuing right now in the form of the document under discussion .

Air Emissions:

I have lived in Pictou for 19 years. I was living here when, in 2014, Norrthern Pulp's precipatator completed its continued malfunction and failed. I am certain that the people of the town of Pictou and immediately surrounding areas **should have been evacuated at that time.** Our neighbourhoods were filled with blue haze, day in, day out. How much

pollution were we directly breathing in? A lot I would say, because it was so clearly visible. But the government was not interested in installing monitors in proper places. It took a grass roots organization to elicit the change necessary to save our population from further harm. I cannot forget this. I consider it as unforgivable as the lies that gave a green light to the creation of Boat Harbour.

Forestry:

I will be short on this subject, as Northern Pulp is being allowed to make short work of our deciduous biosphere. Pine and spruce replacements are pulp farms for their shareholders to make money on, but have no value to our heritage, lifestyle, health and well being or potential income. I don't like what NS calls forestry. It is easy slash and burn activity, the likes of which is now totally out of control.

So there you have it. Boat Harbour closing is law and as Minister of the Environment I expect you to honour it and make sure Northern Pulp honors it too. I also expect Northern Pulp to be given the red light for the pipe. No extensions.

Sincerely

Pictou NS
November 8, 2019

From:
To: Environment Assessment Web Account
Subject: Northumberland strait
Date: November 8, 2019 8:29:03 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please do not allow the kraft beach pulp mill, which will negatively impact the beautiful northumberland strait. Projects which have a negative impact on the ecosystem should not be allowed to continue, our ecosystems are already collapsing. It is our job to protect canada's wildlife and so far we have not done so. At the very least, a federal government environmental assessment should be done.

Thank you,
Nova Scotia

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Proposal
Date: November 8, 2019 8:33:07 AM
Attachments: EA-PDF-Nov. 8, 2019.pdf
EA Nov. 8, 2019.docx

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Braeshore, NS

@gmail.com

Environmental Assessment Branch
Nova Scotia Environment
PO Box 442
Halifax, Nova Scotia. B3J 2P8

November 8, 2019

To Whom It May Concern:

I am writing you today to ask you to make the right decision about Northern Pulp's proposal, about the pulp mill here in Pictou. Please reject their proposal and help shut down the mill.

I understand this is a bold move against the status quo and against the almighty dollar. It needs to happen.

Time is running out. We need brave politicians to think about the future, our children and grandchildren, those yet to come.

The Northumberland Strait is a fragile body of water and a wonderful gift to our world. Do not allow pulp waste the be pumped into it. It is ludicrous to believe that all the waste water Northern Pulp proposes to pump into the Strait will not have dire effects upon its ecosystem.

Would you like your family to swim and play a few metres from the end of the proposed pipe? Would you enjoy a lobster or fish dinner from species who live there?

Northern Pulp claims its emissions are not harmful. Why are respiratory issues so prevalent in this area? I have developed asthma since living here for the past 10 years.

Nova Scotia needs healthy forests, not the current forestry practices of growing pulp wood and clear cutting. Healthy forests require biodiversity. The current practices are destroying our woodlands; this is not sustainable.

I feel frustrated that this government stalls and promotes fear among its citizens. That is not healthy or helpful for anyone.

It takes strong leadership to say NO to Northern Pulp and YES to the future, the fishery, the environment and our children. Please reject Northern Pulp's proposal and help Nova Scotia care for our treasures and the future.

Yours truly,

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:33:18 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: There is a certain beauty out on the open water of our Northumberland Strait which cannot be underestimated as to how long that will quickly disappear with such a waste proposal put forth by Northern Pulp. To even consider putting a toxic, heated fresh water effluent pipe at the mouth of Caribou Harbor, from an outdated, broken down pulp mill makes no sense at all in these days of trying to address climate change philosophies. This toxic effluent pipeline is also proposed to run over town of Pictou water-shed areas?? With Northern Pulps track record of spills, lack of monitoring, failed air emission tests and being placed on the Canadian Environment Offenders Registry it further baffles me why this proposal is being considered. This effluent is to be dumped adjacent to rich fishing /spawning grounds, as well as Caribou-Munroes Island Provincial Beach Parks. We are supposed to be progressing on keeping our waters clean / safe, and since these are part of Canadas Oc ean Playground they should not be used as a dumping ground. How this proposal went for Federal reviews in the past, but is not earmarked for one yet, causes further concern it is not being addressed properly. Let Canadas Fisheries and Oceans depts. as well as marine biologists / scientists do the studies to ensure the information Northern Pulp provided is verified and accurate. Both these reports by Northern Pulp were put together in a hurried fashion with lots of missing information still. Air emissions from this pulp mill also need to be addressed so it is brought up to a proper operating standard. Premier MacNeil and Honorable Minister Wilson please reject this effluent treatment project and enforce Northern Pulp to abide by the stipulations in their current Industrial Approval. Also honor the Boat Harbor Act and let the First Nations, as well as people of Pictou County, begin to heal from one of the worst cases of environmental racism / pollution known in Canada. Thank- you for your time. Name: @hotmail.com Address: Halifax, NS Municipality: Halifax Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 19

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:35:24 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Minister Wilson,I live in Tatamagouche on the Northumberland Strait. I want to let you know that I am strongly opposed to Northern Pulpâ?Ts plan to pump effluent into the Northumberland Strait. Please ensure that this proposal is stopped, and no extension is given to Northern Pulp. Name: @gmail.com Address:
Municipality: Tatamagouche Postal-Code: Phone: Fax:
email_message: Privacy-Statement: agree x: 71 y: 23

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:39:45 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I am writing in relation to the Focus Report on Northern Pulpâ?Ts Proposed Replacement Effluent Treatment Facility Project. This plan will impact the air, land, water and marine habitats along the Northumberland Strait, and will have devastating impacts on Pictou Landing First Nation residents. I have great empathy for those who will lose their jobs however there are other creative ways to support these people: providing financial support, a good package, re-training, etc. I live in Lunenburg County and many of my neighbours make a living in the forestry industry. They are concerned about their future if Northern Pulp closes. So it is imperative that support be provided for them as well. We are in the midst of a climate crisis. We cannot continue this path. Closing Northern Pulp would represent a significant contribution to Nova Scotias commitments. Name: Email: @gmail.com Address: Municipality: Lunenburg Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 21

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:42:09 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I oppose all proposals to discharge effluent into the ocean Name: @gmail.com Address: Hailfax NS Municipality: Halifax Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 93 y: 30

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:44:26 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: My grandchildren swim in the Northumberland Strait, a few kilometres from the pipe. Continuing the same practice of dumping effluent shouldnâ?Tt even be a consideration. Show some tough leadership and protect future generations. Hard to believe I have to offer this argument. Name: Email: @gmail.com Address: Municipality: Melmerby Beach Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 65 y: 25

From:
To: Environment Assessment Web Account
Subject: Northern Pulp
Date: November 8, 2019 8:51:18 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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To whom it may concern,

I am writing to show my support for Northern Pulp to go ahead with the waste water project.
I feel NP proposal shows water quality within 5 meters of the diffuser will meet Canadian marine guild lines as well the temperature will be within 1 degree Celsius in the same area .
This report also has third party environmental experts assessing no significant impacts are expected on any fisheries or fish habitat as a result of this project. There for this project needs to be completed to ensure the jobs and the spin off jobs this mill creates in the province in an environmentally sound way Are allowed to continue. Thank you for taking the time to listen to my opinion.

Ltd

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:52:00 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Nova Scotia Needs Forestry-its the lively hood of Nova Scotia. A lot of people depend on it. it will put a lot of people out of work. Not just the people that work in the woods, but the business that depend on the wood industry are all over the province! Name: Email: @hotmail.com Address: Municipality: Hemford Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 44 y: 15

From:
To: Environment Assessment Web Account
Subject: Water
Date: November 8, 2019 8:52:04 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

I am writing to voice my concern about the environmental affect of treated effluent from the pulp mill, being dumped into the Northumberland Strait. We must protect our water at all costs. It is abhorrent that government would even consider allowing this to happen. Please take action to ensure our waters are not contaminated - for the good of current and future citizens.

This area is home to renowned local beaches and parks like Melmerby, Chance Harbour, Caribou, Waterside, Rushtons, Brule, Malagash, Fox Harbour & Pugwash.

Respectfully,

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:56:38 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Boat Harbour can be solved if the will is there. Where is the will. Please step up to the plate. Look to our future, your future. The job you are doing involves stewardship we hope you clearly understand this concept as you represent the people of this small province. Thank you for you time and personal attention to this extremely important matter. Name: Email: @gmail.com Address: Municipality: ECONOMY Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 74 y: 25

From:
To: Environment Assessment Web Account
Subject: Northern Pulp
Date: November 8, 2019 8:57:20 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

I am write to support Norther
Pulp and the future of Forestry
in Nova Scotia.

Construction will have minor impacts on marine species and habitat; they will be localized and generally “reversible”, which means habitat and population will re-establish naturally.

Within 5 meters of the diffuser, the difference between the treated wastewater and ocean temperature will be less than 1°C.

For additional protection Northern Pulp has selected a thicker than required pipe, in addition to establishing an automated leak detection system which will be installed in the Pictou watershed area.

No history of ice scour was found at the planned location of the diffuser port located outside of Caribou Harbor in 20m water depth.

The project will have no impact in terms of accumulation of materials around the diffuser. Northern Pulp engaged independent consultants to consider, study and report their findings to the Nova Scotia Department of the Environment on the impact their project may or may not have on the environment

Ltd
Transportation

From:
To: Environment Assessment Web Account
Subject: EA Northern Pulp
Date: November 8, 2019 9:03:53 AM
Attachments: EA Northern Pulp.docx

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Please find attached a letter with my concerns on the Environmental Assessment on Northern Pulp

Trucking Ltd

Portapique, NS

@nncweb.ca

Attention: Hon. Gordon Wilson

I am writing to you in regards to the Environmental Assessment on the proposed wastewater treatment facility at Northern Pulp. I would like the Nova Scotia government to approve the plan.

I have worked in the forestry industry for over forty years, starting out as a woods worker and now I own my own trucking company. I have been in business over thirty years, most of those years trucking from the companies that have operated the mill in Abercrombie.

I have read the focus report and feel Northern Pulps new effluent plant will be operating with in Environmental regulations that many pulp mills of Canada are using. I feel the forestry industry and the fishing industry can coexist. The fisheries in Pictou County seems to be thriving very well with the system in place now, it would only improve with the new wastewater treatment plant.

If Northern Pulp closes there would be major job loses, not just three hundred plus at the pulp mill but hundreds in the trucking industry, log haulers, chip trucks, trucks transporting paper, service trucks in the woods, heavy equipment movers. Job losses in the forests industry would devastate small rural communities. Tax revenue from these job losses would also be major, many would have to head West as there aren't many new jobs for the great number of people that will receive layoff slips.

To keep my trucking company going I shop local at many shops for parts for my truck, trailer and loader. Get welding done at local shops, repairs done at local garages, buy tires locally. If you take several hundred trucks off the roads in Nova Scotia because Northern Pulp isn't running, that's going to affect a lot of other industries that are indirectly involved in the forestry industry.

Northern Pulp's proposed treatment facility will be operating with in environmental regulations in Canada, they should be granted permission to move forward with the new treatment plant.

Kind Regards,

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:08:51 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: We need forestry in Nova Scotia... the cost of lumber materials is too expensive and if we keep and mill our own trees it would be great Name: Email: @gmail.com Address: Municipality: Milton Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 55 y: 18

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:12:23 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: This is the Sydney steel mill and tar pond all over again. Time to break free of the 1900â?Ts era of billowing smokestacks and polluted waste pouring of of sewer pipes. Close Northern pulp. Deal with the huge unemployment with Government programs, in 10 years new economies will arise Name: @gmail.com Address: Municipality: Bedford Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 79 y: 29

From:
To: Environment Assessment Web Account
Subject: Northern Pulp"s Focus Report-Replacement Effluent Treatment Facility Project
Date: November 8, 2019 9:12:51 AM
Attachments: Nothern Pulp letter of support.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Hon. Gordon Wilson; Minister of Environment,
Please refer to the attached letter of support for Northern Pulp's replacement effluent treatment facility.
Thank you

Canadian Woodlands Forum
Office:
Mobile:
www.cwfcof.org

Mark Your Calendar!

- **2020 Spring Meeting. April 1-2, 2020. Moncton, NB**

Canadian Woodlands Forum
FORUM
Forum canadien
des opérations forestières

Hon. Gordon Wilson
Minister of Environment
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

Dear Minister,

With reference to the Environmental Assessment focus report now before your department concerning the Northern Pulp wastewater treatment facility, I would like to first thank you for your department's diligence and thorough review of the facts and information in rendering a decision.

As someone who has worked in the forestry sector for over 38 years, I have been able to contribute to Nova Scotia's forestry sector and have enjoyed a very rewarding and worthwhile career as a professional forester supporting my family here in NS.

Currently I work for the Canadian Woodlands Forum which is a not for profit membership based forestry association; we work and provide knowledge exchange services to the members of the fiber supply chain, including forestry contractors, suppliers of equipment and the forest product companies in order to maintain a profitable and competitive forestry sector. I outline this to remind you of the significance and importance that Northern Pulp provides to the economy and the integrated wood fiber supply chain in the province. The level of concern to what will happen to Northern Pulp by our members, especially the small forestry contractors and landowners across the Atlantic region is at an all time high; it has suppressed investment and created an extreme sense of uncertainty among the business owners in this province. In short, I ask that you accept the Focus Report for the proposed state-of-the-art wastewater treatment facility that will reduce the environmental footprint, create and sustains jobs, deliver significant economic benefits locally and provincially, and ensures the continued operation of Northern Pulp.

The Focus Report submitted to your department highlights that the proposed wastewater treatment facility will be industry leading and significantly reduce their environmental footprint.

The fact that the treated wastewater from Northern Pulp has been flowing into the Northumberland Strait for over 50 years, supporting a vibrant fishery speaks to the ability to find common solutions for all sectors to co-exist. With their plan to re-route the treated wastewater to a different location further out into the Strait, third party environmental experts have assessed that no significant impacts are expected on any fisheries or fish habitat as a result of this project.

I would ask that you approve Northern Pulp's Environmental Assessment so we can continue to build a sustainable forest industry here in Nova Scotia.

Thank you for your time and consideration,

Sincerely,

Canadian Woodlands Forum

From: @dal.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:23:33 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Northern Pulp has been operating in a non sustainable way for decades. This must cease. Promises to the indigenous community must be kept and the fishery must not be further harmed. The current proposals do none of these things securely. Name: @dal.ca Address: Municipality: HALIFAX Postal-Code: Phone: Fax: email_message: Privacy-Statement: agree x: 63 y: 27

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:24:02 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Dear Minister for the Environment Gordon Wilson, I am writing to you regarding Northern Pulps focus report for their replacement effluent treatment facility project. The effects of clear cutting and glyphosate spraying runoff into streams, lakes, rivers and the strait. The air emissions and burning of sludge are already not acceptable. The new effluent system that would be piped out into the strait will be worse than the boat harbour system which is a colossal failure. Proposing the effluent pipe over a water shed area is just a ridiculous plan. Burying a discharge pipe into Caribou Harbour which becomes non accessible when repairs are needed. Ice damage, storms etc. Effluent contaminants pollute reproductive areas and all living species in the area. Effluent also becomes airborne in the windy weather affecting Caribou Island, Munroes Island and Pictou Island. Plumes of effluent will also be moving and effecting transient species in the Northumberland Strait. In closing I hope we can move forward for a clean healthy environment. #NO PIPE IN OUR STRAIT! Name: Email: @hotmail.com Address: Municipality: pictou Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 58 y: 20

From:
To: Environment Assessment Web Account
Date: November 8, 2019 9:24:58 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please, please! Keep your word January 31,2020 agreement!!

Sent from Mail for Windows 10

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:26:17 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: To Hon. Gordon Wilson I am writing with my support for the minister to approve the new treatment facility being proposed by Northern Pulp. As manager of my families 1000 hectare woodlot in Cumberland County, the Northern Pulp mill so important to the work we do with our woodlots. Without that market for pulpwood, our firewood, saw and stud log, and small sawmill business will suffer greatly. Thank you for reading my comment on this important issue. Name: @eastlink.ca Address: Municipality: River Philip Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 32 y: 23

From:	@mail.mcgill.ca
To:	Environment Assessment Web Account
Subject:	Proposed Project Comments
Date:	November 8, 2019 9:27:01 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: As a current pharmacology and toxicology student at McGill University, I am impressed by Northern Pulpâ?Ts environmental vigilance regarding the replacement effluent treatment facility project. The new facility uses state of the art technology that satisfies the most vigorous federal pulp and paper laws being proposed. Effluent dilution ratios are 3 times higher than the initial model due to great mixing conditions. The effluent undergoes a 100-fold dilution by the time it is two meters away from the pipe. This high dilution factor ensures effluent will not impact plants, animals, fish, shellfish or any other marine life. The effluent temperature has no potential to warm up the Northumberland Strait as the temperature is less than 1Â°C above background 2 meters from the pipe. Furthermore Northern Pulp conducted a baseline Human Health Risk Assessment which will insure safety of all people including the Pictou Landing First Nations. Name: @mail.mcgill.ca Address: Municipality: Greenfield Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 49 y: 13

From: @wajax.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:32:04 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: If the science says thatâ? Ts this new project is environmentally feasible I believe that it should proceed, I believe that this mill is an economic driver for the province. We need these jobs to stay in Nova Scotia, if the mill was to be forced to shut down the forest Industry in whole would be affected . Name: @wajax.com Address: Municipality: Antigonish Postal-Code: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 36 y: 27

From: @groupesavoie.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:32:05 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I personally support the Effluent Treatment Facility Project for many reasons, I will use this tribune to support a few. Both as citizen and industrial, we should make sure that our actions/practices are sustainable to allow futur generations the benefit of adding value to available ressources. In this case the futur of fishing and forest industry are at stake. The study showed with computer models that the ETF resulted in no anticipated adverse environmental impact. This information should comfort people who where worried about the futur habitat of the aquatic fauna. As for the the construction of this facility the study shows that risk would be mitigated at all levels making this project a safe alternative for the community. By fostering such a project the gouvernement would allow the industries to pursue their mandate of creating sustainable wealth out of the available ressources hence supporting public infrastructures. Name: Email: @groupesavoie.com Address: Municipality: Saint-Quentin Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 70 y: 37

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:35:49 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: It is imperative that an extension be granted for the use of the Boat Harbour Facility to allow time for Northern Pulp to construct the new one. There is too much riding on this not to do so. Name: @eastlink.ca Address:
Municipality: Antigonish Postal-Code: Fax: ### ### - ####
email_message: Privacy-Statement: agree x: 63 y: 14

From:
To: Environment Assessment Web Account
Subject: Northern Pulp"s Focus Report
Date: November 8, 2019 9:41:00 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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The whole concept of introducing poisonous contaminants into the food chain is nonsensical. The proponent has no plan to clean the town's drinking water aquifer if a spill should contaminate it, because there is no way to do this! So they say it won't happen. The only way to ensure that the Town's drinking water supply is not threatened by or actually contaminated by pulp mill effluent is to not run the pipeline caring the waste through the drinking water shed. They proponent straits that in fifty or hundred years after the useful life of the pipe it should be just left there to continually risk exposing the Towns drinking water to contamination, because it would be to environmentally damaging to remove the pipe. The whole concept is nonsensical. Put a stop to this; from the start it has been a fools earned.

Pictou resident since 2001.

From:	@gmail.com
To:	Environment Assessment Web Account
Subject:	Proposed Project Comments
Date:	November 8, 2019 9:42:10 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: In early April, 2019 I was on a business trip travelling the coastal highway through Pugwash, Nova Scotia, with the Northumberland Strait in full view as we drove. It was the day after a major rain storm in NS. The shoreline waters of the Northumberland Strait were very brown that day with silt being carried off the land to the sea in every size of ditch, stream and river along the North Shore of NS. It was shocking to see...clear evidence of a major enviromental problem for the Northumberland Strait ecosystem...land origin siltation created mostly by shoreline development and farming on both the PEI and NS sides of the Strait. Forcing Northern Pulp to close will not fix this problem. Based on the evidence provided by the experts in the Focus Report and elsewhere, it would be an absolute travesty for the NS economy and every Nova Scotian, if our government forced Northern Pulp to shut down. Questions we should ask ourselves: Where will the millions in lost tax reven ues come from needed to clean up Boat Harbour, fund our health care system, fix our roads, educate our children, if we force Northern Pulp to close? Where would we as Nova Scotians prefer to get our toilet paper from... forest fibre from NS or forest fibre from the destruction of the Amazon Rain Forest? Name: @gmail.com Address: Municipality: Barton Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 25

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:49:51 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Dear Minister for the Environment Gordon Wilson, I am writing to you regarding Northern Pulps Focus report for the Replacement Effluent Treatment Facility Project. My personal opinion is that at this time when we are so focused on a clean healthy environment with climate change on the news constantly to even consider such a proposal is ridiculous! To put a pipe in the Northumberland Strait would be going backwards to the start of the industrial age. Has Boat Harbour not already shown us the effects. Effluent released into the Northumberland Strait would still be contained in the general area. I would like to have no pipe in the strait and for Northern Pulp and our Government to do the right thing. Respect our environment! #No Pipe, No more dilution solutions. Name: @hotmail.com Address: Municipality: pictou Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 33 y: 25

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:50:03 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I am writing to oppose Northern Pulps proposed Effluent Treatment Facility. I am a fourth generation fishermen out of Caribou. I am fishing my fathers gear who died young from cancer and am surrounded by ten other gears that are being fished by sons and nephews of other men who died too young from cancer. During our lobster season May and June the winds are predominantly from the south west which is the direction of the pulp mill, the pollution blows directly over us. This mill is killing us! Although this type of treatment facility exists elsewhere, it does not exist anywhere similar to the Northumberland Strait. We have a very unique ecosystem that can not handle the proposed volume of treated effluent. The temperature, the introduction of 70-90 million liters daily of fresh water, the solids plus all the chemical unknowns will be too much for such a shallow body of water. We have a strong fishery and are constantly made to do better to protect our environment. This strong industry should not be under threat by something we know will destroy it. When reviewing the Focus Report it was once again proven that Northern Pulp did not do what they were told in the Terms of Reference. There are still many unknowns, many questions not answered. They have no plan, they do not care about our fishery, our waters or our health. They were told to find a new route and they didnt. The proposed pipe plan is still running across a watershed area and many parcels of privately owned land, including mine. This is completely unacceptable and another slap in the face from Northern Pulp. If the proposed pipe is approved, the damage done will be irreversible and will not be able to be cleaned up when a spill happens. They have a history of negligence, it is time to protect our future. Our community has suffered long enough! I DO NOT support any extension to the Boat Harbour Act and I DO NOT support any effluent pipeline in the Northumberland Strait. We are depending on our government our elected officials to make the right decision and reject Northern Pulps proposal. Name: Email: @eastlink.ca Address: Municipality: Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 67 y: 15

From:
To: Environment Assessment Web Account
Subject: Replacement Effluent Treatment Facility Project
Date: November 8, 2019 9:51:26 AM
Attachments: Letter to Minister of Environment.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please pass on my attached letter letter to The Minister of Environment, Hon. Gordon Wilson.

Brookville, NS

Nov 8, 2019

Re: Environmental Assessment of Northern Pulp's "Replacement Effluent Treatment Facility Project"

To the attention of:
Hon. Gordon Wilson
Minister of Environment

Dear Sir;

I am writing in support of Northern Pulp's plans to build a world class wastewater treatment facility. I want to discuss the issue of credibility leading to trust.

Northern Pulp had owned and operated the pulp mill and woodlands for only a couple of years before the effluent pipeline broke and almost 50 years of mistrust broke with it. With the yoke of mistrust (that it had no part in) hanging around its neck the new owner was able, in a short period, to take one giant step in environmental improvement, namely in air emissions.

While comparative analyses to 22 Canadian kraft facilities show the pulp mill's wastewater effluent environmental performance to be very typical against industry parameters, the same cannot be said about its air emissions.

In fact, the **"nose knows"** that a **tremendous improvement has been made in air emissions.** The data shows that Total Reduced Sulphur and Sulphur Dioxide emissions are amongst the lowest in the industry. This as a result of major capital expenditures and operational improvements made by Northern Pulp.

I have noticed the great improvement in air quality and so have my friends noticed. In fact, most have forgotten air emissions were ever a problem.

That's evidence of a credibility improvement in a few short years.

With capital investment and sound management of a world class wastewater treatment facility, I am confident that credibility and trust will improve even more in an equally short period of time.

I respectively ask you to approve this science-based project.

Sincerely

From: @hotmail.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:52:02 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: The mill should be closed. The peple of Nova Scotia have no faith in provincial environmental assessments. The Moose River gold mine is a prime example of the deceptions put forward in the assessments basically pandering to big mining companies. The destruction of the Northumberland fishery is not worth the mill jobs. There are no forests left in Nova Scotia currently. The wood is not there to feed the mill. The truck drivers hauling wood can get highway jobs. There is currently a shortage of truck drivers in NS anyway. Shut it down, no more bogus Environmental assessments. Plus we need our, the publics, forests to regenerate as a carbon sink to meet our climate targets. Let us see the big picture and close this antiquated pollution pit. Name: @hotmail.ca Address: Ellershouse, Hants County, NS Municipality: Ardoise Postal-Code: Phone: email_message: Privacy-Statement: agree x: 61 y: 20

From: @dhse.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:54:00 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: - Choose - Comments: To: Hon. Gordon Wilson, Minister of Environment We support Northern Pulp Paper Excellence as an important industry for NS. 1. Donâ?Tt be vindictive. Set past wrongs aside. Expecting Northern Pulp to rise to an exceptionally clean standard for NS and the world is reasonable. Northern Pulp has shown its commitment to do just that. The scientific studies and fact-based requirements are clear and Northern Pulp is 100 on board with the implementation of these requirements. 2. â?~Nova Scotia Needs Forestryâ?T is a positive sign not a protest sign. Rural NS jobs are very dependent upon the forest industry. In order to carry out the 2018 Lahey Report on Forest Management recommendations we need a use for â?~pulp woodâ?T which is part of and actively grows in the multi-aged forest described. 3. Nova Scotia does not need to be a backwater province. Industry makes us strong. NS will be avoided by industry if we do not accept the fact-base science which clearly shows Northern Pulp compliance ability. NS taxes are highest in the country. Letâ?Ts show we can accept industry and make NS a great place for people to work and provide taxes for the government to distribute. Canadaâ?Ts economy is resource based and our province cannot pretend it is not. Name: @dhse.ca Address: Municipality: Tatamagouche Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 73 y: 22

From:
To: Environment Assessment Web Account
Cc:
Subject: Support for Northern Pulp building a state-of-the-art wastewater treatment facility
Date: November 8, 2019 10:00:33 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

To: Hon. Gordon Wilson, Minister of Environment

Northern Pulp Paper Excellence is an important industry for NS and we support the building of a new wastewater treatment facility.

1. Don't be vindictive. Set past wrongs aside. Expecting Northern Pulp to rise to an exceptionally clean standard for NS and the world is reasonable. Northern Pulp has shown its commitment to do just that. The scientific studies and fact-based requirements are clear and Northern Pulp is 100% on board with the implementation of these requirements.

2. 'Nova Scotia Needs Forestry' is a positive sign not a protest sign. Rural NS jobs are very dependent upon the forest industry. In order to carry out the 2018 Lahey Report on Forest Management recommendations we need a use for 'pulp wood' which is part of and actively grows in the multi-aged forest described.

3. Nova Scotia does not need to be a backwater province. Industry makes us strong. NS will be avoided by industry if we do not accept the fact-base science which clearly shows Northern Pulp compliance ability. NS taxes are highest in the country. Let's show we can accept industry and make NS a great place for people to work and provide taxes for the government to distribute. Too many jobs in NS are government jobs. This spells economic disaster. Canada's economy is resource based and our province cannot pretend it is not.

Thank you,

Tatamagouche, NS
Phone:
Email: @dhse.ca

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:00:52 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Northern Pulp is an integral part of Nova Scotia forestry. Technology exists to safely treat effluent for release in all types of waterways across Canada and the world. Use these scientific methods to make Northern Pulp and other industries viable operations in our area. Name: Email: @eastlink.ca Address: Municipality: Milton Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 54 y: 21

From:
To: Environment Assessment Web Account
Subject: Comments on Northern Pulp Focus Report
Date: November 8, 2019 10:03:52 AM
Attachments: CCF11082019_0001.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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See letter attached with a few thoughts on the Northern Pulp Focus Report/Proposed wastewater treatment facility.

Kind Regards,

Brookfield Lumber Company Ltd.

Brookfield Lumber Company Ltd

P.O. Box 36
Brookfield, N.S., B0N 1C0
Telephone: (902) 899-7818 Fax: (902) 673-3161

November 8, 2019

Attn: Hon. Gordon Wilson
Minister of Environment
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

Dear Mr. Wilson,

I am writing in support of Northern Pulp. I grew up in the Forestry industry. I am a Nova Scotia landowner and I earn my living from the Forestry sector. I have worked with Northern Pulp for many years. They have proved to me, as a landowner, that they can be trusted. They stand behind their commitments and go above and beyond to meet and exceed all standards and regulations guiding the forestry industry. They employ real people who believe in what they do, who care about the environment and who care about the forestry and fishing sectors.

Business revolves around supply and demand. If there is a demand for a product, it will be made somewhere. There is a demand for the products Northern Pulp produces which in turn places a demand for Nova Scotia's natural resources, Nova Scotia mill by-products, and various supporting industries. As Nova Scotian's, why would we want this supply to be met in another province or country? We need jobs here in Nova Scotia.

Northern Pulp has already made many improvements over the years to reduce their environmental footprint. They have the science to show that they will be one of the most environmentally responsible mills in North America if this proposed wastewater treatment facility is approved. We as Nova Scotian's should be proud to have a mill that will have state-of-the-art, industry leading technology and processes right here in our province.

In summary, I encourage you to approve the Environmental Assessment submitted by Northern Pulp. Nova Scotia needs this for its economy, its forests and fisheries. Northern Pulp/Paper Excellence has shown its commitment to this province, to its investment in this wastewater treatment facility and to the environment. We need to approve this project and stand behind it and Northern Pulp, with pride, because we will have one of the most environmentally responsible mills in North America.

Kind regards,

Brookfield Lumber Company Ltd.

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:04:29 AM

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Project: replacement_effluent_treatment_facility_project Comments: These are my concerns regarding Northern Pulps focus report. 1. I fail to see how Northern Pulp can predict the impact of the effluent on sea life and the fishery. How can we be certain of the composition of the residues in the effluent - whether theyll be consistent over time, and additionally the temperature which we already know will be warmer than that of the waters at the diffuser. There are likely to be variations in composition and temperature. It looks like Northern Pulp will be doing its own monitoring. Does that make sense? And given what we now know about the increasing warmth of ocean waters and their impact on aquatic species, making the assumption that the release of warm effluent will have no impact is too great a risk. Look at what has just happened with the open pen Atlantic Salmon in Newfoundland after just a small rise in temperature this autumn. Two and a half million salmon dead. If you combine warm effluent with already warming waters, especially if we have an unusually warm period, who can predict what m ight happen? And, given that water temperatures are rising and not expected to remain at current levels, there could be mass die-offs as many aquatic species are known to be extremely sensitive to water temperature and at the very least may do poorly or be unable to reproduce. Likewise, some species are very sensitive to toxins and even to disturbance of the ocean floor. 2. The diffuser of the effluent pipe is planned to be situated in a place where Pictou fishermen say they currently fish. I have seen a plot of fishing locations put together by commercial fishermen and the closest past locations of traps and other gear was quite close to the planned placement of the diffuser. How can we be sure that the effluent isnt going to contaminate shellfish and other aquatic species, leading to the ruination of the fishery in that area? And, we must realize that any news of contamination in even a restricted area of the Nova Scotia coastline will have a very negative impact on *all* Nova Scotia seafood sales - especially export sales to buyers who dont really know one part of Nova Scotia from another. We are having to accept assumptions of projected effluent composition. How can we be sure that these will be accurate and that there wont be changes over time? What happens if there are failures in the system that would result in the release of con taminants? Once again, it looks as though Northern Pulp will be monitoring itself. Does this seem like such a good idea? 3. Regardless of how well designed and constructed, this pipe will be subject to intense disturbance during storms, especially in winter. Ive seen examples of other objects and structures located in that area that have been damaged or moved great distances by turbulence and ice. What will happen if the pipe is damaged or moved? Will the mill cease operation until such time as the system is repaired - for however long that takes? 4. The effluent pipe is planned to cross over a watershed serving the area water supply. Isnt this terribly risky? What happens if there is some kind of catastrophic leak or rupture? 4. This mill has had a serious impact on the people of the area, especially Pictou Landing First Nations. Boat Harbour has been contaminated. People have been subjected to poor quality air for decades. The pulp mill could have done much more to clean up its act at any point in the past, but any efforts, such as they were, made little improvement. People from that area have been inundated with terrible air quality for decades and even now, the air quality in and around Pictou is dreadful. It seems that there has been very little concern about the impact of poor

quality air -- and longterm effect of whatever is released in that air. How can we expect things to suddenly change and that there will be more care and responsibility going forward? It seems that ship has sailed long ago. For the above reasons and more, I consider the proposed plans to be unacceptable for the granting of an environmental assessment approval. Name: @gmail.com Address: Municipality: Annapolis Royal Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 53 y: 17

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:06:00 AM

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Project: replacement_effluent_treatment_facility_project Comments: The highlights of the Wastewater Treatment Facility Project, Focus Report, suggest positive environmental consideration. A few of the highlights supporting a positive view include:--Third party environmental experts have assessed no significant impacts expected on fisheries or fish habitat. -The ocean water quality within 5 meters of the diffuser will meet Canadian Marine guidelines. -No history of ice scour found at the planned diffuser port location in 20m water depth. Along with the environmental concerns, we must address the economic impact and the role Northern Pulp plays at the local and provincial levels in economic contributions and employment opportunities. Since 1967, the mill has supported many full-time employees and their families, as well as indirect jobs through numerous vendors, couriers, freight/transport companies, and of course, extremely important, the forestry sector. The growing number of Nova Scotia Needs Forestry signs across the province, strongly support the importance of Northern Pulp mill operations. In closing, The Replacement Effluent Treatment Facility Project, the continuing economic contributions both local and provincial, and the strong support of community programs indicate Northern Pulp is committed to moving forward addressing environmental concerns while supporting our economy and achieving a balance that can work for all. Name: @ns.sympatico.ca Address: Municipality: Trenton Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 45 y: 35

From:
To: Environment Assessment Web Account
Subject: ETF Environmental Assessment
Date: November 8, 2019 10:06:25 AM
Attachments: Focus Report Letter _Nov 8 2019.pdf

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Dear Environment Minister,
Attached is my response to the request for the replacement effluent facility at Northern Pulp.
Thank you

Comments on the Focus Report

November 8, 2019

I am writing in relation to the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project. My name is and I live in Three Brooks. My house is on the shore of Caribou Harbour. Spring through fall, in and on the water every day.

live close to the harbour and spend much of my time on or in the water I feel quite passionately against the pumping of pulp effluent into the Northumberland Strait and I urge you once again to reject the proposal.

I am writing this letter with emphasis on 3 of the terms of reference.

Term of Reference *"2.3 Submit data regarding the* ***complete physical and chemical characterization*** *of NPNS' raw wastewater (ie., influent at Point A for the Project),* ***to support the assessment of the appropriateness of the proposed treatment technology****. The influent characterization results must be compared against the proposed treatment technology specifications."*

The proposed treatment facility falls short of acceptable with respect to AOX removal (concentration measurements and lack of AOX degradation) and dangerous nitrogen and phosphorous loads that could lead to eutrophication and possible harmful algal blooms (HABs).
The proposed treatment facility is **not appropriate** because it will not sufficiently remove AOX which is composed of toxic organic chlorides including PCBs and chlorinated dioxins and furans. Nor does the facility remove excess nitrogen and phosphorous which can lead to eutrophication and ultimately harmful algal blooms (HABs).

1. **AOX Removal**

AOX is a term for a general group of organic compounds that contain 1 or more halogen atoms (in the case of bleached pulp effluent the halogen is predominately chlorine). In general, the compounds in this category are hydrophobic meaning they will adhere to fatty tissue, sediment or plant life.

Retention Time Comparison:
One of the factors affecting the amount of AOX in the water is the length of time the effluent is allowed to settle, often referred to as retention time. The authors use Point A for untreated effluent and use Point C (Boat Harbour influent) to represent the treated effluent (page 24 of the Focus Report, Figure 2.3-1).
Point C has a much longer retention time (8.5 days) which allows for the settling out of the heavier molecular weight AOX compounds compared to the proposed new ETF (less than 13 hours - Focus Report page 45). Given this fact, one can conclude that the AOX concentrations entering the marine environment from the proposed ETF will be higher than KSH predicts, and that the risk presented by such substances is greater than predicted. It is important to note that the higher the flow, the less retention time is available, which is counter to cleaning up the effluent.

Lack of AOX Degradation:
In Appendix 2.3 page 6 the authors claim the AOX is degraded into Cl- ions and carbon dioxide by photochemical and biological processes

This claim is not tenable. By the authors' own admission there can be up to 663 kg/day released into the Northumberland Strait (Focus Report, Table 2.4-3). Any AOX that can be degraded is done so during the retention time. This time is longer, as discussed above, in the current system than it will be in the proposed process. In fact, the authors show (Appendix 2.4, page 13, Table 1-5) that the concentration of AOX is lower in the current system (87 kg/day) than what was produced by Veolia (less than or equal to 225 kg/day). The RWS study shows 663 kg/day so the AOX released at the outfall could be more than half a metric tonne per day.

They claim that proof of the degradation is that the values for chloride ion are much greater at Point A than in the raw water (Appendix 2.3, page 6). The values for chloride are higher at Point A because chloride is produced during the bleaching process using ClO_2 as the bleaching agent which is what is used at Northern Pulp. The high chloride results are what we would expect based on the bleaching chemistry. Not because the AOX is degraded.

Persistent Organic Pollutants, Bioaccumulation and Biomagnification
Most AOX are toxic to marine and human health and some are considered Persistent Organic Pollutants (POPs). Persistent organic pollutants are organic compounds that do not degrade by chemical, biological, or photolytic processes.
Under the United Nations environmental program the Stockholm Convention lists 12 original, plus 16 newly classified compounds as Persistent Organic Pollutants (POPs). (1)
Included in the initial 12 are hexachlorobenzene; polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans and PCBs which are also found in the pulp effluent.
Because of their persistence and lipid solubility they tend to bioaccumulate. POPs have been found in the deep ocean so they do not just disappear no matter how dilute the concentration.(2)
The chlorinated dibenzo-p-dioxins (CDDs) that are eaten by marine organisms biomagnify in the food chain. The half-life in the human body for the family of

compounds known as CDD is anywhere from 5 to 15 years. (3) The ETF project entails continuous release of these harmful compounds into the Northumberland Strait. They will bioaccumulate over time and create an escalating risk as the flow continues year over year. This fact alone dictates that dilution is not the solution for pollution when it comes to chemicals that bioaccumulate.

Incorrect Sampling Technique:
The sampling reported in the Focus Report (Appendix 2.3 Pg 104 of 541 Job#B9C9662 , Pg 368 of 541 Job#B9E4451, Pg 413 of 541 Job#B9E4487, Pg 497 of 541 Job#B9E4476 , pg 541 of 541 Job# B9E4405) was done using HDPE containers. Sampling for halogenated organic compounds is typically carried out using amber glass bottles (4, 5) because the AOX molecules of interest are known to adhere to surfaces that are less hydrophilic. They stick to plastic, organic tissue (like plankton, fish and plants), sediment and HDPE. We would expect the AOX numbers to be higher if they used the proper glass bottles for sampling.

Nitrogen and Phosphorous
In Appendix 2.4 at page 10 the authors admit there is a large variation in the phosphorous content of the untreated effluent (0.12 to 5.8 mg/l) and they will not be able to attain the decreased level. Rather, they used the value from Point C (1.5 mg/L where the effluent has already settled for 8.5 days). Point C is once again not representative of actual effluent content and it is clear the phosphorous content will be variable and high.

Excessive amounts of nitrogen and phosphorous lead to algal blooms which deplete the area of oxygen and create "dead zones" in the ocean where many species can no longer live or thrive. The algal blooms can produce toxins which lead to health issues for marine life and ultimately to humans who ingest them. Algal blooms containing toxins are referred to as harmful algal blooms (HABs). Different ratios of nitrogen to phosphorous will encourage different species of algae growth. This phenomenon is not completely understood and is a current area of research. Not all algae contain toxins at all times but it is unpredictable and can change at any time. Alexandrium spp. and Pseudonitzschia spp. are both known to be present in the Northumberland Strait. (6) They have been known for producing paralytic shellfish poisoning and the neurotoxin domoic acid respectively. When conditions are not favourable for algae growth they remain in the environment as cysts. When favourable conditions arise they grow. Nitrogen and phosphorous in the effluent will surely lead to an increase in the number of blooms. With an increase in the number of blooms there is a chance that the HABs will also increase.

2. Baseline studies for fish and shellfish

"9.1 ***Complete baseline studies for fish and shellfish tissue*** *(via chemical analysis) of representative key marine species important for commercial, recreational and Aboriginal fisheries in the vicinity of the proposed effluent pipeline and diffuser location."*

It is important to note not all of the chemicals present in the effluent are tested nor are the chemical components of the effluent fully understood. The following statement is from a *Canadian Environmental Protection Act* Priority Substances List assessment report(7):
"Although approximately 250 individual compounds have been characterized in bleachery effluents, they have been estimated to represent only 10 to 40% of the total low molecular weight materials present."
I am not confident that we truly know the effect of the chemical mixture on biological systems and therefore cannot confidently predict the risks associated with effluent exposure.

It should be noted that "not detected" does not mean the substance is not present. They are known to be generated during the pulping process and the amounts of each individual substance changes based on the type of wood that is used. Some toxins are capable of accumulating in fish up to 25 000 times the concentration in water.(7) Given that the proposed treatment facility only removes about half of the organic chemicals that will be released into the Northumberland Strait, we need further investigation into the long-term health effects before the risks can be predicted accurately.

The experiments used to determine the effect of stress (toxins, temperature, salinity, pH, turbidity, etc.) on an organism have come a long way since the early 1990s. Consequently, the Acute Lethality test (LC50) should no longer be considered sufficient. Sublethal exposure may still affect the physiology and gene expression of the fish and/or shellfish and more work is required to understand this. We know many of the halogenated organic compounds affect the reproductive and immune systems, and can lead to developmental disorders or cause cancer. Gene expression experiments help gain a better understanding of the exposure effects on protein and enzyme production which gives us an idea of how the effluent will influence the function of biological processes. Popesku et al (8) look at the effects of pulp effluent (3 Kraft and 2 Thermomechanical) on gene expression of the neuroendocrine brain of fathead minnows. They conclude that pulp effluent does inhibit spawning by females by decreasing the levels of key enzymes in the hypothalamus. They conclude that effluents contain neuroactive substances that have yet to be characterized which is made more difficult because of the complex mixture that composes pulp mill effluent. The paper by Brockmeier et al (9) use gene expression to investigate exposure of mosquitofish to kraft pulp mill effluent on the Fenholloway river and demonstrates endocrine disrupting properties of the pulp mill effluent. They found 121 genes upregulated (over-expressed) and 91 genes downregulated by effluent exposure. Sixty-two of the genes are involved in metabolic pathways and are consistent with experimental results of the fish exposed to androgens. They conclude the effluent is responsible for masculinizing the female mosquitofish.
In order to understand and assess the risk presented by the effects of effluent components, further gene expression profiling experiments must be performed on fish and shellfish that are exposed to the effluent at concentrations consistent with what will exit at the diffuser as final effluent, and not once it is diluted. The results should then be compared to those from unexposed samples from the same species.
While the toxicity of each individual compound can be taken into account, as I mentioned in my comments on the EARD, the cumulative **effect of the mixture of toxins** in the

effluent on sea life and ultimately human health is unknown and the risk cannot be assessed with the information as summarized in the Focus Report and EARD. (10)

3. Assessment of impacts on Human Health

9.2 Commence a Human Health Risk Assessment (HHRA) to ***assess potential project-related impacts on human health****. The risk assessment must consider human consumption of fish and other seafood, consumption of potentially contaminated drinking water, exposure to recreational water and sediment, outdoor air inhalation, and any other potential exposure pathways. The analysis must inform the identification of contaminants of concern and updating of the receiving water study.*

In Appendix 9.2, Table A.6a the dioxin 2,3,7,8-TCDD is flagged as a contaminant of potential concern in the seafood ingestion pathway and is present in the effluent sought to be discharged at the outfall for the proposed ETF. This compound, 2,3,7,8-tetrachloro dibenzo-p-dioxin (2,3,7,8-TCDD), is the most toxic of the dioxins known. It is believed to cause liver damage, increased risk of diabetes and abnormal glucose tolerance along with possible reproductive or developmental effects as demonstrated in animal studies and may increase the risk of cancer in people. (3) As a CDD it is included in the POP as designated by the Stockholm convention mentioned above.

In Appendix 9.2, Table A-4 the authors maintain that total phosphorous is not a parameter considered to be of potential human health concern.
"Phosphorus is a required dietary mineral. Phosphorus exists in the environment as phosphate anion, where it acts as a nutrient, and has not been associated with adverse effects in humans. Human health concerns are primarily related to increased productivity (eutrophication) in aquatic systems, which is outside the scope of this human health risk assessment (CCME, 2004)."

The conclusion is not accurate: Eutrophication is an issue. Various levels of nitrogen and phosphorous will lead to algal blooms and potentially **harmful** algal blooms (HABs). (11, 12, 13, 14, 15)

Comments on Table: Understanding Water Measurement Units

As a final point, I have attached a revision to the Table found at page xix of the Focus Report as Appendix 1 to these comments. In my view, the time analogy presented in that table is misleading and fails to properly depict the presence and significance of various compounds in the effluent. The Dillon table suggests that the presence of certain compounds is miniscule and they are therefore harmless. This is dangerous and misleading as the risks from many of these substances is very high even at extremely low concentrations. My revised table provides a better summary based on molecules per litre and molecules per day of these substances. I provide further explanatory comments following my revised table.

Conclusion

Thank you for taking the time to read this letter and please consider that we could potentially be destroying the sensitive aquatic ecosystem of the Northumberland Strait and rendering it uninviting for aquatic species and human recreation if the current proposal is granted. We could also be poisoning and/or killing the fish and thereby poisoning ourselves. I beg you to ensure the proper and current experiments are performed before pulp effluent is pumped into the strait. It is my opinion that the limits of allowable toxins and effects of said toxins are not well established and some risks remain unidentified, while others are much more significant than predicted in the Focus Report and EARD.

References:

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9. Brockmeier EK, Jayasinghe BS, Pine WE, Wilkinson KA, Denslow ND (2014) Exposure to Paper Mill Effluent at a Site in North Central Florida Elicits Molecular-Level Changes in Gene Expression Indicative of Progesterone and Androgen Exposure. PLoS ONE 9(9): e106644. doi:10.1371/journal.pone.0106644

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Appendix 1

	Symbol	Multiplying Factor	Exponent Form	Parameter Measurements	Units	Part per	**molecules per L** (assume ave molecular weight of 300)	**molecules/day** (assume ave. molecular weight of 300 and 85 million litres per day)
Base Unit	*Base unit*	1	1.00E+00	gram/litre	g/L	1 part per thousand	2,047,000,000,000,000,000,000	174,000,000,000,000,000,000,000,000
deci	d	0.1	1.00E-01	decigram/litre	dg/L	1 part per ten thousand	204,700,000,000,000,000,000	17,400,000,000,000,000,000,000,000
centi	c	0.01	1.00E-02	centigram/litre	cg/L	1 part per hundred thousand	20,470,000,000,000,000,000	1,740,000,000,000,000,000,000,000
milli	m	0.001	1.00E-03	milligram/litre	mg/L	1 part per million (ppm)	2,047,000,000,000,000,000	174,000,000,000,000,000,000,000
micro	u	0.000001	1.00E-06	microgram/litre	ug/L	1part per billion (ppb)	2,047,000,000,000,000	174,000,000,000,000,000,000,000
nano	n	0.000000001	1.00E-09	nanogram/litre	ng/L	1 part per trillion (ppt)	2,047,000,000,000	174,000,000,000,000,000,000
pico	p	0.000000000001	1.00E-12	picogram/litre	pg/L	1 part per quadrillion (ppq)	2,047,000,000	174,000,000,000,000,000

For the purpose of this exercise I used an average molecular weight of 300. The calculation is shown below.

As you can see, in the mg/L range, the number of molecules per litre is in the billions of billions order of magnitude! My point is that a part per million is not as dilute a solution as the time analogy would imply. So, even if we assume the best case scenario after "cleanup" is correct, the amount of AOX is estimated to be approximately 1.02mg/L (which calculates to 87kg/day) from Table 2.3-3 we can expect somewhere around 2 billion billion halogenated molecules per litre (that is 174 trillion trillion halogenated molecules per day).

The number of molecules present in a given mass is dependent on the chemical structure (number and type of atoms that make up the molecule), therefore, an average molecular weight of 300 was used. Typically, in chemistry terms, we refer to that as 300 grams per mole (or 300g/mol).
If molecular weight is half of the assumed value, ie half of 300 is 150, the final number of molecules per litre would be doubled. Conversely, if the molecules were larger, say a MW 600, then molecules per litre would be halved.

Calculation:
Molecular weight: 300g/mole
Avogadro's number: 6.022×10^{23} molecules/mole (this is a constant)

molecules/gram: 6.022×10^{23} molecules/mole ÷ 300g/mole = 2.007×10^{21} molecules/g
molecules/mg: 2.007×10^{21} molecules/g x 0.001g/mg = 2.007×10^{18} molecules/mg
molecules/L in a 1 ppm (mg/L) solution:
2.007×10^{18} molecules/mg x 1.02 mg/L = 2.047×10^{18} molecules/L
molecules/day in a 1ppm (mg/L) solution at a flow rate of 85 million L/day (peak flow, page 38 Focus Report):
2.047×10^{18} molecules/L x 85,000,000L/day = 1.74×10^{26} molecules/day

From:
To: Environment Assessment Web Account
Cc:
Subject: Focus Report Response
Date: November 8, 2019 10:07:55 AM
Attachments: Focus Report Response.docx

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please find attached my response to the Northern Pulp Focus Report.

Dartmouth, NS

Dartmouth NS

Nov.7, 2019

Environmental Assessment Branch
Nova Scotia Environment
ea@novascotia.ca

I am writing in response to the Northern Pulp Focus Report on the Proposed Effluent Treatment Facility Project. I am a resident on Dartmouth, NS, and have spent a lot of time in the Pictou, Caribou and Pictou Island area over the past 20 years. Close family friends are residents of Caribou, and I frequently spend time with them there. In addition, I am a visual artist and art professor, and have carried out artistic research and artmaking in Caribou and on Pictou Island.

I wish to respond to the following sections of the Focus Report:

Overland effluent pipeline corridor: system monitoring and control (2.7.1.2.2) and leak detection (2.7.1.3) in the Report prepared by Wood Canada Ltd for Northern Pulp), Appendix 2.1 in particular.

In regard to system monitoring and control, detailed information regarding a proposed alarm system that would be initiated when abnormal pressure and temperature conditions are detected has not been provided. It is not clear how conditions of concern (pressure and/or thermal changes, in addition to pipe failures) would be detected, how any such detection would then initiate an alarm, and what system of response to these conditions would then be implemented. Given the length of the proposed pipeline, the proposed route over watershed, wetland and other areas with sensitive habitats, this information should have been provided in great depth and detail.

Specifications regarding the Leak Detection system and technology to be used in leak detection have not been provided within section 2.7 of the report. Wood Canada states that “Final technology selection for the leak detection system will be completed during the detailed design” (page 11). This process of detailed design would presumably be done at a point in time when public and stakeholder consultations and government approvals were concluded, providing for no transparency or scrutiny of the design. This is unsatisfactory for a proposed project with such impact.

The proposed pipeline would be over 8km in length and be placed in watershed, wetland and forest lands between Abercrombie and Caribou. Pipeline failures (leaks, ruptures) would have serious and negative effects on the flora and fauna in these zones.

Northern Pulp's existing (and much shorter) pipe has failed on a number of occasions, with leaks occurring on (leased) private lands. The corporation's past practices in regard to leak detection, alarms, reporting and transparency have been inadequate. In light of this history of leaks, Northern Pulp has a serious responsibility to provide detailed information about the system that they propose to use for leak detection for this much longer pipeline. They have not provided this information in the report.

In conclusion, I recommend that the undertaking by Northern Pulp be rejected, because the information provided in the Focus Report on issues of pipeline condition alarms and leak technology systems is inadequate. Northern Pulp has had many years, in addition to financial and other resources and incentives, available to it in establishing a responsible and well-managed resource-based industry in the region. At this time, they have been required to provide a through and satisfactory Focus Report. It is my view that they have failed in providing such a Report.

Respectfully submitted,

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:11:13 AM

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Project: replacement_effluent_treatment_facility_project Comments: The province and community need Northern Pulp. This business has a far reaching effect on Nova Scotians that goes beyond what is reported. The closure will have a negative effect for many years. The new treatment facility will reduce the environmental impact. We need Northern Pulp. Name: @hotmail.com Address: Municipality: Falmouth Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 55 y: 21

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:11:27 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Dear Minister Wilson, Please help put an end to this toxic legacy. The Northern Pulp Mill has been poisoning us for too long - this is a pressing concern for the environment as well as human health. Nova Scotia, and indeed all of Canada, has always been valued for its natural beauty. It is in search of new land that European settlers first arrived here, and it is the connection with the land that is the core of many Indigenous communities. Without this land we do not really have a country, and we are currently on track to poison the very lakes, rivers, oceans and forests that feed and support us. Let us not become so shortsighted by greed as to ruin our one and only home. The world is starting to move towards a new, sustainable future. Do not let your compatriots fall behind - take a stand with us, and say NO! to the Northern Pulp pipeline. Name: @gmail.com Address: Municipality: Halifax Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 82 y: 24

From:
To: Environment Assessment Web Account
Subject: Northumberland Strait
Date: November 8, 2019 10:12:42 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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I am urging you to have a federal environment assessment on dumping bleach into the Northumberland!!!

Charlottetown PEI and Northport NS

From: @northernpulp.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:13:07 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I have read the focus report and I believe that the findings have proven that the proposed effluent treatment facility will not cause any permanent harm to the environment. Studies were completed with third party environmental experts and the science supports this project. Because of this, it should be allowed to move forward. Name: @northernpulp.com Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 74 y: 25

From: @groupesavoie.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:13:09 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I Support the project of new effluent system. First, it is prooven that this project will have no or very few impacts on fisheries and environment. Northern Pulp is a Major wood industry, and many sawmill in Nova Scotia like Group Savoie in Westville for our case depends directly from Norther Pulp operations to survive. That project is very important and necessary for the whole Wood economy of the province and will meet the requirements for fisheries and environnment. Name: @groupesavoie.com Address: Municipality: Saint-Quentin Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 49 y: 24

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:14:18 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Are you seriously asking if weâ?Tre ok with millionaires poisoning us while we watch?! This is a f ed up world weâ?Tre living in. No we donâ?Tt want this poison in the water can yâ?Tall do something about it or no? If not, can we find a woman with a strong vagina who cares about the earth more than men with old loose hanging balls do?! Thanks! Name: Email: @gmail.com Address: Municipality: Coquitlam Postal-Code: Fax: email_message: Privacy-Statement: agree x: 76 y: 26

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:14:52 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: This mill was not built with long term intentions. There have been multiple shortcuts throughout their time, and these shortcuts will only continue if we allow them to continue their practices. How much have youthe government and the mill hid from our community? This is not acceptable. How long was the last pipe leaking before it was reported? This will happen again. I no longer want to breathe in whatever the mill is spewing out. I want to be able to go to the beach and eat fresh seafood. Name: @gmail.com Address:
Street Municipality: New Glasgow Postal-Code: Fax: ### ###
- #### email_message: Privacy-Statement: agree x: 54 y: 26

From: @groupesavoie.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:23:33 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I agree wholeheartedly with this project as Northern Pulp is a major player in the wood industr. If they were to go away it would affect many other companies and put their lives in danger. Name: @groupesavoie.com Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 46 y: 20

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:24:38 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: This is a well developed, scientifically sound project that will greatly reduce the environmental impacts of Northern Pulp and the lumber industry that depends on it. Forest industries are vital to Nova Scotiaâ?Ts prosperity. But more important, a young, healthy, growing forest that is sustainably harvested and that soaks up carbon dioxide from the atmosphere is vital to a healthy Nova Scotia environment. And such a forest is only possible if there is healthy industry to use the mature forest crop to make the products we all need. Name: Email: @gmail.com Address: Halifax, N.S. Municipality: Halifax Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 70 y: 22

From: Environment Assessment Web Account
Subject: Northern Pulp EA
Date: November 8, 2019 10:24:48 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is and I've lived in Pictou for the last 70 years and I'm concerned about Northern Pulp's Effluent Treatment Facility Proposal.)

The air emissions from Northern Pulp are a great concern to me. They have failed to miss the limits set out in their Industrial Approval many times. In June, their stack tests failed one of their three tests and only passed thanks to the average of those three tests being under the limits set in their Industrial Approval. Testing on the power boiler, the stack from where these results came, are only done four times a year. Seeing that they are given a pass even though they failed one of the tests makes me wonder how many failures are going undetected. I also believe that Northern Pulp's air emissions are causing cancer to a lot of nearby residents.

Northern Pulp's plan for their new effluent treatment facility includes burning 'sludge' in that power boiler. This company has had a history of failing to meet their limits, their mill is over 50 years old and was only designed to last 25, they are not monitored enough to make me feel they are under the targets laid out in their Industrial Approval consistently and if this project is approved, they plan to add to those air emissions. The air that we breathe in Pictou County is bad enough, I don't see a plan to add more pollution to a mill that already seems taxed in its capabilities is a smart move and I don't approve this project.

I also believe that pumping their liquid effluent through Pictou's water shed area could be a disaster not to mention the damage it will do to the fishing area in the Northumberland Strait. Only a fool with no foresight would allow this.

It is going to cost us a fortune to try to clean up Boat Harbour, imagine the cost to clean up the Northumberland Strait if it would even be possible.

I am therefore firmly against this project.

Thanks,

Pictou
email: @eastlink.ca

From:
To: Environment Assessment Web Account
Subject: NPNS Focus Report
Date: November 8, 2019 10:28:22 AM

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Hon. Gordon Wilson

Treated water from northern pulp has been flowing into the northumberland strait for over 50 years. For 50 years the fishing industry has successfully fished the strait.

A third party environmental experts have assessed that no significant impacts are expected on any fisheries or fish habitat as a result of this project.

Sections V and Vi, atmospheric environment, surface water, and harbour physical environment all have " no significant adverse residual environmental effects."

Section XXXViii states that there are 89 mills across Canada that are just like northern pulp. Exactly the same process as northern pulp.

Section XXXix states that NPNS is a very typical kraft mill.

NPNS is a very important part of our economy and is the very base at witch the forest industry stems from.

With this being said I believe a "yes" for the treatment facility and pipe line is the only reasonable answer that I can see. The focus report points at yes in all direction.

Thank you for your time.

Sent from my iPhone

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:30:20 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I have reviewed the Focus Report submitted by Northern Pulp and strongly believe that the Environmental Assessment should be approved. Third party research shows that no significant impacts are expected on any fisheries or fish habitat as a result of this project. Northern Pulp has already made a number of changes over the years to reduce its environmental footprint, and if this project goes ahead, we as Nova Scotians can be proud to have one of the most environmentally responsible mills in North America, right here in our province, and supporting our local economy. Name: @eastlink.ca Address: Municipality: Hilden Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 55 y: 29

From:
To: Environment Assessment Web Account
Subject: Northern Pulp environmental assesment
Date: November 8, 2019 10:40:27 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister,
I'm a oyster Fisher man I fish carbour harbor commercial and I have oysters leases right in the harbor that are stock with hundreds of thousands dollars that I'm been growing and working for 2001 and I aslo fish commercial in near by harbors so I have high concerns for my livelihood that is all I have and I'm going for suspended operation which I'm been working for last few years now it finely going alot of paper work and dealing with government agencies so hope you take all this into your highs attention I'm still a your man I can supply work for local people your truly

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From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 10:41:13 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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I'm 100% against the idea of running a pipe into the Northumberland Strait of pulp effluent. The days of a Kraft process Pulp Mill are behind us, the owners should be modifying this mill to a modern system of pulp mill, not transferring the waste from one area to another as this is not improvement.
What is stopping the mill owners from "Magic Piping" the raw effluent straight into the discharge pipe bypassing the poorly engineered "Treatment System"? Have controls been proposed to measure the levels of toxicity and volume of effluent going into the treatment system and into the effluent pipe?
Do our environmental laws Provincial and Federal meet the task of keeping such waste regulated properly and up to a modern standard?
Is the engineering of this treatment based off of the original mill design of a redundant system process capable of running at 100% capacity at all times or the actual reality off both product lines running at 100% with the mill running at 200%?
Honestly, with the predicament that former Premier John Hamm has put the NS taxpayer in, we should just settle with the mill and pay them off. Shut this environmental and financial disaster down, pay the debts, and clean the sites up and learn from the mistakes from the past.
No, we should not even consider the idea of this effluent pipe going into our Strait. The destruction will be devastating to our environment and economy.

Caribou Island
Nova Scotia.

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:45:03 AM

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Project: replacement_effluent_treatment_facility_project Comments: The risk is too great, too many unknowns for the fishing and lobster industry. Also the main water supply is at risk. It is time to end this toxic mess and keep your promise to the Pictou Landing First Nations and to the people of Pictou who have to breathe in these toxins on a daily basis. The cost is too high. You had your time and and now its time to start the cleanup of the toxic sludge you will leave behind. DO THE RIGHT THING, NO MORE BROKEN PROMISES! Name: @gmail.com Address: Chester Basin Municipality: Lunenburg Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 62 y: 25

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:48:43 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am new to the Forest Industry, working in the area of administration. Having worked in the industry for more than 6 months now, it is very obvious that Forestry is one of Nova Scotiaâ?Ts mainstay industries. This province has very few prevalent industries, and the thought of basically eliminating one of them by not approving this project would create an enormous impact on the Provinceâ?Ts economics, particularly in rural areas. I am in awe that the NS Government would even consider the possible shut down of such an important industry player as Northern Pulp. I have reviewed a summarized version of the Environmental Assessment that Northern Pulp submitted to the NS Dept of the Environment. It appears that the studies completed verify that there will be very little impact on the environment with the proposed Effluent Treatment Facility. The construction of a $130millon state-of-the-art treatment facility will not only eliminate any threat to the environment and significantly improve current processes, it will also provide millions of dollars in new jobs while ensuring the ongoing health of an important existing industry! I am also in awe that Northern Pulp has not just packed up and left the Province at this stage of the game. This is a company looking to further invest in a Province of only 1m people. I donâ?Tt see a lineup of companies doing the same! Having read the Lahey Report, the health of the provinceâ?Ts Forests depend on a market for low-grade wood fibre, and the major local consumer of this product is Northern Pulp. A large portion of Northern Pulpâ?Ts power requirements are generated from low-grade wood fibre, a low carbon renewable resource. Nova Scotia Power generates 60 of its energy from burning coal, a major pollutant emitting sulfur, mercury, lead, arsenic and large amounts of carbon dioxide into the atmosphere. Will the Province throw NPS out next? I am all for Forestry Management and Ecological preservation, but not at the expense of loosing a large corporation willing to compromise and invest millions to support sustainability! Name: Email: @gmail.com Address: Municipality: Petite Riviere Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 51 y: 24

From: @freemanlumber.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:51:56 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: The Environmental Assessment - prepared by third party environmental experts - clearly demonstrates that fishing, forestry, and the environment can co-exist. Only treated effluent will leave the site and within meters of the diffuser it is almost 100 diluted. The Project should be approved without delay and the Boat Harbour Act should be amended to allow adequate time for its construction. Name: @freemanlumber.com Address: Municipality: Bridgewater Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 45 y: 20

From:
To: Environment Assessment Web Account
Subject: No Pipe
Date: November 8, 2019 10:53:46 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is , I have been a long time vacationer to Pictou County and have been planning on moving there for years and opening up a business in Pictou one day soon unfortunately the Northern Pulp Mill has deterred me and my dreams of doing this for now.

I believe the province chose incorrectly when deciding that Northern Pulp's Effluent Treatment facility should be given a class 1 provincial environmental assessment. Seeing the amount of information that the public was supposed to go through in order to comments is evidence that this project should have given the public more time to wade through the information presented. From Nova Scotia's Environmental Regulations FAQ a "Class 2 undertakings are typically larger in scale and are considered to have the potential to cause significant environmental impacts and concern to the public. These types of developments include, but are not limited to, solid waste incinerators, petrochemical facilities and pulp plants. These undertakings require an environmental assessment report and formal public review which may include hearings."I do not understand how this class 2 shouldn't have been triggered in this case. It is a very large scale project (over $100M with a pipeline over 15kms long pumping up to 85 Million litres of effluent a day), plenty of potential to cause risk to the environment (Northumberland Strait marine conditions with the effluent, added air emissions, over disturbing mercury), 4000 pages of concerns in response to NP's EARD shows immense public concern and includes a pulp mill.Here we are though with the class 1 that was determined because this new ETF is being characterized simply as 'a modification to an existing facility' which begs the question, if Northern Pulp wanted to build a nuclear power plant, would that also receive a class 1 assessment? I guess so under this logic.Anyway, the project dictates that Northern Pulp must consult the public to keep everyone aware of their plan. I don't believe they have done this. They ran a couple of open houses that allowed the public to come and view where their pipe would lead (to the mouth of Pictou Harbour) and that the project would include an Oxygen Delignification plan. When they filed the pipe had a much different route and no Oxygen Delignification system. There has not been an open house in Pictou (original outflow pipe location) or Caribou (where they now plan to put the pipe) either with their original plan and there has been none open to the public with their actual plan. Northern Pulp's EARD had many omissions and that resulted in the Focus Report. The focus report also includes misleading information that there will be a oxygen delignification system with this project. When you look in Addendum 1.0 you see that there will not be one. There's a lot of bait and switch going on here.Even though Northern Pulp were given an easier path to building an ETF I feel that they are still trying to cheat that path. I believe Northern Pulp are not meeting the terms of the process because they know doing things properly would lead to conclusions that it should not be approved for their project. Thanks,

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From:
To: Environment Assessment Web Account
Subject: Northern Pulp Assessment
Date: November 8, 2019 10:53:50 AM

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Portapique, NS

web.ca

Attention: Hon. Gordon Wilson

I want the Nova Scotia Government to allow Northern Pulp to move forward with the new wastewater treatment facility.

I have read the focus report on the environment and attended meetings with regards to the installation of the proposed plant. The proposed plant will be releasing treated wastewater in a similar way as the many other pulp mills in Canada. It will be operating with in regulations set by Environment Canada and the Canadian marine guidelines. Studies have shown this new facility will have no significant impact on the fishing industry in the area.

I have had many jobs related to the operation of the mill over the years, starting in 1984 as a tree planter and picking cones to start seedlings in the many plantations in Cumberland County. Many hectares of land are replanted by Northern Pulp every year. My father raised children in Cumberland County working in the woods.

The forest industry is probably one of the main employers in rural Nova Scotia. For thirty years I have been part of a trucking company that has worked for the pulp mill both trucking wood and moving heavy equipment. The closing of the mill would put many out of work. We have spent a great deal of money over the last thirty years on equipment, parts, fuel and vehicles. This all adds to the Nova Scotia governments tax revenue. There are many companies working for Northern Pulp that are picking up parts, buying equipment and fuel in Nova Scotia.

A new truck, trailer and loader cost $ 340,000.00, to register that truck cost over $3500.00/year and then there is thousands of dollars spent on fuel, tires and parts and another $10,000.00 going to a Nova Scotia Insurance company for insurance coverage. One truck and one

company like ours may only have a small impact but when hundreds, of trucks, forestry machines and vehicles all of a sudden stop operating in Nova Scotia the government just lost a lot of tax revenue that funds schools, hospital and transportation and infrastructure and many Nova Scotians sadly will have lost their job.

I feel we can have it all, with Northern Pulp being able to move forward with their wastewater treatment facility our forest industry can continue to be successful. The mills environmental footprint will be reduced. The many small businesses that employee people in rural Nova Scotia can keep working and support Nova Scotia parts and equipment shops, welding shops and garages. The fisheries will not be impacted and can continue to fish in the straight. The government will continue to receive tax revenue from all the members that make up this industry. The environment is important and so are Nova Scotia jobs.

Regards,

From: @icloud.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:54:10 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Northern Pulp will invest in the best technology in use worldwide. Third party environmental experts have assessed that no significant impacts are expected on any fisheries or fish habitat as a result of this project. Approve the Environmental Assessment. This is in Nova Scotiaâ?Ts best interest. Name: @icloud.com Address: Municipality: Kentville Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 67 y: 24

From: @gmail
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:55:46 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson, Describe who you are i.e My name is and Ive lived in Pictou CO for 61years and Im concerned about Northern Pulps Effluent Treatment Facility Proposal. What is the criteria that the province looks at when it comes to accepting a companys proposal to start a project of this magnitude? I know there has to be guidelines and targets that are outlined so a company knows what is expected of them when they are making a submission to start a project in this province. I recognize these are guidelines and not a checklist since every situation would have a unique set of characteristics. How much does a companys integrity and their ability to complete a project properly when their integrity is taken into consideration? Northern Pulp have 14 failed air emissions tests, 2 Ash slurry spills, 8 directives, 5 ministerial order and 2 warning reports. They were put on Canadas Environmental Offenders Registry for their 47 Million Litre effluent leak in 2014 and their present Industrial Approval says they have to have a flow monitoring system in place to indicate if there were another leak. They are currently under investigation for yet another large raw effluent leak. If a companys track record is that bad with maintaining what they have, how can they be trusted with building something of this size in the first place? According to their current Industrial Approval, Northern Pulp were supposed to have a monitoring system in place that would notify them if there was a leak in their effluent pipe yet they had another large raw effluent leak that from the pictures and time it took to clean up, it looks like it was on par with the leak from 2014. What that tells me is either a they did not meet the terms of their Industrial Approval, b they werent monitoring it or worse c they had everything in place, discovered the leak and said nothing hoping to avoid the bad publicity. I dont believe Northern Pulp should even be considered for a project until the current investigation has been completed and based on their track record, I really dont believe they deserve to be given the chance to go forward with this project. Thanks, Name: @gmail,com Address: Municipality: river john Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 53 y: 25

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:58:25 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: this company has shown repeatedly that they can NOT be trusted. They have had ample time to prepare and have CHOSEN to not meet deadlines. Risking fishery jobs in three provinces for business as usual in the forestry sector would be foolish given that we KNOW we need to rethink our forestry practices anyways. No extension should be granted PLFN have w put up with the fallout from the companies lies long enough. Maybe if the mill closes I will be able to FINALLY visit friends in the area, the stench from the mill has prevented that. I have NO DOUBT that tourism would increase if the mill closed Name: Email: @gmail.com Address: Municipality: joggins Postal-Code:
Fax: ### ### - #### email_message: Privacy-Statement: agree x: 59 y: 24

From: @mac.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:00:03 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: If you allow this pipeline dumping, your grandchildren will never forgive you. Name: Email: @mac.com Address: Municipality: Halifax Postal-Code: : ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 73 y: 15

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:01:03 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Northern Pulp should not receive any extension to the Boat Harbour Act. They have demonstrated a profound, continuing negligence towards their surrounding environment. If the mill is forced to stop operations, taxpayer money currently spent to support the unviable mill ought to be used for work placement programs for affected workers. Presumably there will be good jobs created by the cleanup project. Name: @gmail.com Address: Municipality: Halifax Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 52 y: 22

From: @outlook.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:03:57 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I feel the new facility is a great step to help eliminate the environmental issues that were present with the first facility. Glad to see reports of how minute the impact will be with the new facility. Name: @outlook.com Address: Municipality: New Ross Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 43 y: 36

From: @ inc.com
To: Environment Assessment Web Account
Subject: Northumberland Strait
Date: November 8, 2019 11:07:03 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Hello,

The very least that needs to be done is a full complete and detailed environmental assessment BEFORE and effluent (treated or otherwise) is dumped into the ocean.

It could create a cascading and irreversible negative impact on our environment that could prove to be horrendously expensive to fix. An ounce of prevention is worth a pound of cure.

Having spent my summers in and around the area with grandparents who originally owned property in in Chance Harbour and which is still in the family, I am fearful of the continued damage to the area. We are ALL negatively impacted directly and indirectly.

In NS, we require good corporate citizenship that balances the environmental impacts with best practices and stakeholder value. Those living in the area are stakeholders, not just the shareholders and profit makers.

Thank you from a Proud Maritimer and 8th generation NS Scottish immigrant with deep Pictou County roots.

Halifax, NS

From: @outlook.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:08:07 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I would just like to state that I support the new ETF at Northern Pulp and the science that supports it.It is an acceptable means of treatment across the globe, so why not also here.The jobs provided because of the pulp mill are very important to Nova Scotians and many communities would love to have them.It is a much desired product and will be made elsewhere if not here.We deserve to keep it in our province. Name: @outlook.com Address: Stellarton Municipality: Nova Scotia Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 46 y: 22

From: @yahoo.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:11:13 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: My firm belief is that the mill must close on schedule at the end of January. The company had five years to come up with a responsible plan so its decision to submit an inadequate proposal at the last possible moment, allowing far too little time for proper review and consultation, is of no comfort. Its time to do the right thing - for the people of Pictou Landing, for our water and forests, and for future generations. Use whatever public funds are available to remediate the site, compensate the people whove been injured, and assist workers displaced by the closure - not to continue subsidizing an irresponsible and unsustainable industry. Thank you for considering my comments. Name: @yahoo.ca Address:
Municipality: Conquerall Bank Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 50 y: 19

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:13:14 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Please do not build a pipe to pump pollution into the ocean. This isnt Not in my backyard, its just common sense. No to pipe. Name: @hotmail.com Address: Municipality: Six Mile Brook Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 77 y: 20

From: @tcchamber.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:19:53 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: November 7, 2019 Re: Northern Pulp Focus Report Dear Minister Gordon Wilson, Thank you for the opportunity to comment on the Northern Pulp focus report for its proposed effluent treatment plant in Pictou County. The Truro Colchester Chamber of Commerce represents 470 member businesses and organizations in Truro and Colchester region and has been the voice of business for this area for nearly 130 years on matters of economic, political and social significance. Our membership represents multiple sectors including dozens of businesses directly and indirectly linked to the forestry industry in the province of Nova Scotia. The Chamber applauds your Department of the Environment for its stewardship role in protecting Nova Scotiaâ?Ts environment, however, there is an undeniable fact that if Northern Pulp were to cease its operations in the province there will be far reaching impacts on the industry. While considering the Focus Report, there must be an acknowledgement of the extensive impact of that the mill closure would have on livelihoods across the provinceâ?"well beyond the 340 direct jobs provided in Pictou. Accounts Payable from the Northern Pulp mill are higher in Colchester than any other county in the province. Such a closure will impact sawmills, woodlot owners, truckers, and incur the loss of the largest shipper out of the Port of Halifax. The loss to the provincial economy has been conservatively estimated at over $300M. Those within the industry who would be potentially impacted by the uncertainty over the future of the millâ?Ts operation in the province need answers to plan for the future as well. Many sectors of the provincial economy are on pause awaiting direction from the government while further weighing the uncertainty of a potential mill closure. Businesses are already foregoing investment impacting our economy. We ask your government to show leadership on this issue which is paramount to offer business confidence to invest in the province. Your department has provided Nova Scotians 30 days to share their comments as part of the environmental assessment process. We applaud your government for not extending this period to receive public comments to keep the process moving forward without more delays. On behalf of the Truro Colchester Chamber of Commerce and its membership, we ask you to not delay making a decision on the proposed effluent treatment plant, providing a determination on this issue within the allotted time frame after the public comment period ends. We would welcome the opportunity to speak directly with you on this issue. Name: Truro Colchester Chamber of Commerce Email: @tcchamber.ca Address: Truro, Nova Scotia Municipality: Truro Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 55 y: 24

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:24:56 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am in agreement with the Replacement Effluent Treatment Facility Project. The report shows Northern Pulp has taken exceptional care into the requirements of this new facility and to minimize any effect on the environment. Name: @ns.sympatico.ca Address: Municipality: Enfield Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 65 y: 26

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Submission
Date: November 8, 2019 11:25:11 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Good morning,

I am requesting the minister reject the submission by Northern Pulp for the following reasons:

1. They have not proven that there will not be an environmental impact.
2. Prior to the pulp mill, lobster was fished in Pictou Harbour, there are no lobster in Pictou Harbour 50 years later. I believe a pipe in the Strait will be catastrophic to the fisheries.
3. You will be moving the worst racist environmental disaster from the Pictou Landing First Nations backyard to their front yard. This is wrong!
4. You can't swim in Pictou Harbour because of the Mill, please don't do the same thing to Caribou Harbour. It is pristine and beautiful, and the home of thousands of birds and water life.

No pipe in our Strait is the correct response.

Thank you,

Pictou, NS

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:25:49 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: A foreign-owned pulp and paper conglomerate is effectively holding our economy hostage. On one hand there are the jobs at the mill and surrounding short-term economic benefit, on the other theres an entire ecosystem in the strait, ecotourism, the fisheries, etc. If the Minister bends to the will of this corporation, it sets the precedent that the province of Nova Scotia is a useless backwater that should be bought and sold. Your party will forever lose my vote and many others, and you will find yourselves cemented on the wrong side of history. Name: Email: @gmail.com Address: Municipality: Halifax Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 55 y: 39

From: @sasktel.net
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:26:21 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: we need to care for our environment Name: @sasktel.net Address: Municipality: Hendon Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 74 y: 15

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:26:47 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Northern Pulp hired a qualified consultant to lead the work requested by the department. Many studies related to the effluent treatment plant, the resulting treated effluent and the effects on the Strait water system of the release of the treated effluent have been completed. The scientific studies show no significant effect on the the air quality or the released treated water. We need to accept that these scientists are correct and as scientists they dont use the wording no effects but use no significant effects. The possible nutrient and mineral residuals released in the effluent output are the same as those found naturally in the trees and ground of Nova Scotia. The plant itself is the most modern technology available in the world today and have been proven effective in treating effluent and dissipiating it into a water body in many other parts of the world. The province has continually asked Northern Pulp to do more studies and added requirements many of which could only be done at acceptable times of year as to avoid affects on such things as bird nesting, fish habitat, ground conditions such wet ground. They have had to deal with multiple departments such as transportation. Therefore we need to support Northern Pulp in this effect to install this system and the province should give them the necessary time to install this plant. This requires an extension for the use of Boat Harbor which once again science suggests it would be better to have the Boat Harbor holding system active until clean up in 2021 then have it stagnant. Therefore I support the Province giving Northern Pulp an extension to get the new treatment plant operational and of the use of Boat Harbor until the facility and pipline are completed. Name: @ns.sympatico.ca Address: Municipality: New Ross Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 75 y: 32

From:
To: Environment Assessment Web Account
Subject: Minister Gordon Wilson EA submission -
Date: November 8, 2019 11:28:58 AM
Attachments: Minister Gordon Wilson EA submission - .docx
Importance: High

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please see attached letter from to Minister Gordon Wilson regarding comments for the proposed wastewater treatment facility.
Also advise if this email has been received or I'll have to try to fit comments on Nova Scotia site.

Thanks

Hopewell, N.S,

November 8, 2019

Dear Minister Wilson,

My name is Unifor Local and Local

I also worked for the Communications, Energy and Paperworkers Union for years servicing primarily all paper mills in Nova Scotia. Also I ran a woods contracting business for years, forestry is in my blood. I'm writing you today regarding the new effluent treatment facility proposal for Northern Pulp. I'm very pleased that the current owner has committed to make this huge investment in this mill. This proposal that I have reviewed in great detail is one which will provide this mill with the latest technology available to treat effluent. This proposal will secure the future of the hundreds of and the thousands of other workers across the province whose jobs depend on the continued operation of Northern Pulp. I'm certain this new treatment facility based on science and the latest technology available will meet or exceed any regulations in place. I'm also very confident that this new state of the art facility will not harm our environment, which is of upmost importance to me and . I believe this mill can co-exist with fishers, with First Nations and continue to play a vital role as a main economic driver for our community and province. This mill for over 50 years continues to produce a world class product, softwood bleached kraft pulp sold all over the world. I believe the future looks bright, the current owner acquired the mill in 2011 as a worker I have seen his commitment to the mill based on his continual reinvestment. He has demonstrated a long term commitment to the mill with a successful business plan in place. This project has been very complex and controversial, I'm however pleased that government's handling of this project is obviously being based on science and the current regulations. I have participated in trying to share and factually inform people of what is being proposed here.

I would like to comment on a couple specific points of this new effluent treatment proposal. First I really like with the new system when effluent leaves Northern Pulp it is treated effluent verses with the old system raw effluent had to be piped to Boat Harbour where it would take around 30 days to be treated and exit into the Northumberland Strait. This new system removes any possibility of raw effluent causing any environmental damage. Second the latest technology of the type of transport pipe selected is very impressive verses the pipe technology used from 1967. To have had the opportunity to hold a piece of the old pipe in one hand and had a piece of the new pipe in other hand, the visual and physical difference is of no comparison. The new pipe is of a far superior quality. Third and of most importance is that the science and technology of this project will secure Northern Pulp's future. This project will be another significant improvement to Northern Pulp's environmental footprint by allowing the mill to continue to operate and treat its effluent with the most advanced latest technology available.

In closing, my conclusion this project based on the details, studies, and science submitted should receive government approval to proceed and therefore allow Northern Pulp to continue to play a successful role as a main economic driver for Nova Scotia.

Regards,

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:29:33 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I urge the government to approve this project quickly. The new plant will use the best technology available. The capacity is oversized. There is no impact on plants, animals, fish or shellfish. Boat Harbour already discharges treated effluent into the Strait. This new system will be a big improvement. Name: @gmail.com Address: Municipality: Upper Chelsea Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 62 y: 23

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Submission
Date: November 8, 2019 11:30:45 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Good morning,

I am requesting the minister reject the submission by Northern Pulp for the following reasons:

1. They have not proven that there will not be an environmental impact.
2. Prior to the pulp mill, lobster was fished in Pictou Harbour, there are no lobster in Pictou Harbour 50 years later. I believe a pipe in the Strait will be catastrophic to the fisheries.
3. You will be moving the worst racist environmental disaster from the Pictou Landing First Nations backyard to their front yard. This is wrong!
4. You can't swim in Pictou Harbour because of the Mill, please don't do the same thing to Caribou Harbour. It is pristine and beautiful, and the home of thousands of birds and water life.

No pipe in our Strait is the correct response.

Thank you,

Pictou, NS

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:41:47 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I support the proposal for the new effluent treatment plant put forward by Northern Pulp. Employment both directly and indirectly and the economic spin offs that are generated by this company/industry are greatly needed in this county and in this Province. Name: @hotmail.com Address: Municipality: Trenton Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 23

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:42:11 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I married a girl from Nova Scotia, we have vacationed in Nova Scotia numerous times in the last 26 years. It is such a beautiful Province that it would be a terrible loss if the forests were not managed and protected properly. I know forrest products are a valuable and much needed renewable resource. Living in Florida seeing first hand what our Forestry Industry has done to improve every aspect of keeping our industry healthy profitable and providing wildlife and citizens a safe environment to flourish has made a major impact on the betterment of all Floridians and the millions of visitors.I am confident believing proper management of the forest industry of Nova Scotia can produce the same effects. Name: Email: @gmail.com Address: Municipality: Jacksonville Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 48 y: 21

From:
To: Environment Assessment Web Account
Subject: Northern Pulp concerns for Hon. Gordon Wilson
Date: November 8, 2019 11:46:04 AM
Attachments: Northern Pulp letter to Minister of Environment.docx

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** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please forward the attached letter about my concerns with Northern Pulp to Hon. Gordon Wilson, Minister of Environment.
Thank You

Wagner Forest NS Ltd.
@wagnerforest.com

November 8, 2019

Hon. Gordon Wilson
Minister of Environment
PO Box 442
Halifax, NS
B3J 2P8

Dear Hon. Gordon Wilson

I am writing to you about my concerns with Northern Pulp. The shutdown of Northern Pulp would be detrimental to myself, my family and all does who work in the forest industry in Nova Scotia. Not to mention all the spin off jobs the forest industry and Northern Pulp create in this province.
I myself have been working in the forest industry in this province since 1989 as a student and later and presently as a . My livelihood depends on good forestry markets like does that Northern Pulp provides for this province.
I implore you to approve the environmental assessment and extend the Boat Harbour Act deadline.
I agree with most people that in the past, Northern Pulp and its predecessors have not been good citizens of the Pictou area and of Nova Scotia. However, the present Northern Pulp is finally starting to do things right. Their plan to construct a state of the art wastewater treatment facility and a pipeline that will carry effluent away from Boat Harbour and into Caribou Harbour is definitely a step in the right directions. The wastewater treatment facility and pipeline discharge have both passed all environmental concerns including those of the fishing industry.
By doing this this will allow for the cleanup of Boat Harbour while the pulp mill continues to operate and save thousands of much needed tax paying forestry jobs and a tax paying mill for this province.
The environmental research has been done and is proving to be good and comply with both provincial and federal environmental standards.
In short please base your decisions on facts and not political ones. I am sure by doing this that all parties involved will continue to work and live happily together for years to come.

Yours Truly,

Wolfville NS

From:
To: Environment Assessment Web Account
Cc: info@friendsofthenorthumberlandstrait.ca
Subject: No Pipe in The Northumberland - Boat Harbour Must Close on Schedule
Date: November 8, 2019 11:51:32 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier McNeil,

I live in Caledonia Nova Scotia and I watch logging trucks drive through my community to the Northern Pulp Mill. Friends work in this industry as do the parents of my childrens' classmates. Of course I am concerned for their livelihood. I recognize that pressure from sectors of the forest industry for an extension to the Boat Harbour Act is increasing as the Boat Harbour closure date draws closer.

I want you and all MLAs to know that despite the importance of this industry to my community I support the closure of Boat Harbour to pulp effluent on 31 January, 2020.

Why?
- I know the history of broken promises to Pictou Landing First Nation. To break another promise would be adding to past wrong doings and would continue Nova Scotia's legacy of environmental racism.
- I know that Northern Pulp was aware they had a tight deadline, but did not begin designing a new effluent treatment facility for several years.
- I know that when Northern Pulp submitted their project for environmental assessment in January 2019, the company did not provide many essential studies and information requested by government departments, leading to further delay.
- I know that Northern Pulp is a long way from having a viable plan that will not harm the ecosystem or fisheries of the Northumberland Strait that are crucial to our province's economy.
- I believe the forestry experts who say that the forestry industry in Nova Scotia has a good future, even if Boat Harbour closes on schedule and Northern Pulp leaves the province.

You said it yourself, Premier McNeil, Northern Pulp is responsible for the decisions they have made over the past 5 years.

Pictou Landing First Nation is not to blame for Northern Pulp being so far from meeting the deadline. The community should not pay the price.

Premier McNeil, please continue to Honour the Boat Harbour Act you put forward in good faith almost five years ago, an Act that was unanimously adopted in the Legislature.

It was the right thing to do then. It is still the right thing to do now.

NO PIPE IN THE NORTHUMBERLAND STRAIT.
BOAT HARBOUR MUST CLOSE ON SCHEDULE.

Sincerely,

Caledonia, Nova Scotia

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 11:52:04 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is in Little Harbour Nova Scotia, 7.3km from the current effluent treatment facility for Northern Pulp, Boat Harbour.

I am of course writing to you in regard to Northern Pulp's plan to extend a pipe out into the Northumberland Strait, pumping pulp effluent into vital fishing grounds and more importantly, a fragile marine environment susceptible to even the slightest environmental change.

My concern is multifaceted.

1. Northern Pulp has a long history of environmental failures, putting profit margin over local communities health. Be it spills stumbled upon by the outlying community members, significantly exceeding emission targets, or the continued destruction of Boat Harbour, a facility that was supposed to have closed long ago.
2. Any upgrades made by Northern Pulp have had to be forced upon them by government and subsidized through provincial and federal tax payers. As such, it's impossible to trust that they will truly work towards a "world class" effluent treatment facility and once installed, continue to ensure the funds are in place to properly maintain that system without once again demanding full, or partial aid from government and tax payers.
3. The local pulp mill has had the backing of experts many times in the past, and that hasn't affected the multiple negative impacts it has brought to the county including a major environmental disaster and severe pollution that negatively affects the towns (mainly Pictou) abilities to run successful business.
4. The inherent risk to the Fisheries is an immediate concern. Maritime fishing is a brand and our top export, and as such, dumping industrial waste into any of our fishing grounds should be immediately prohibited. It is more then an assumption this will negatively affect our fishing industry, and I am comfortable in saying this because I know I and many others I have spoken to will no longer purchase seafood sourced or potentially sourced out of the Northumberland Strait.
5. The focus report doesn't do anywhere near a good enough job of detailing risks associated with the dramatic increase in solids that will be released through this pipe. Right now those same solids settle in the Boat Harbour basin, but in the future, according to NP's own data, far more will make it to the water. These solids absorb the chemicals from the pulping process, and much of it floats meaning far wider disbursement areas then what NP has forecasted (100m from the end of the pipe).
6. The focus report doesn't detail nearly enough the impact from burning the additional quantities of sludge in the power boiler on air quality, a boiler that the mill has often failed emission tests in the past, and that is not currently equipped with an ESP like most state of the art mills that exist. Pictou business has already suffered drastically

from the mills existence, one need only look at trip advisor reviews of local hotels, motels, and B&B's to know this. This will decimate business in the town.

All in all, it seems odd to me to have outline these fears. They should be common sense for most. One industry is not worth jeopardizing multiple other, more profitable industries (tourism and the fisheries), or more importantly, peoples health.

Thank you,

--

Vero nihil verius

From:
To: Environment Assessment Web Account
Subject: No pulp in strait
Date: November 8, 2019 11:52:04 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

To whomever it may concern,

Please protect the Gulf of St Lawrence from toxic effluent from Northern Pulp, What a terrible catastrophe that would be, This beautiful and very lucrative body of water is full of life. Please an assessment must be done. This proposed action by Northern Pulp is immoral and heinous. Make it stop if you can,

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:54:17 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Please stop this pollution of our legacy: wildlife, fish and fowl all use water as do people! Keep our waters and natural resources for years to come! I now live in northern QC but the East Coast is the land of my birth. I would like to see it kept healthy for generations to come. Name: Email: @gmail.com Address: Municipality: Eastmain Postal-Code: QC Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 54 y: 16

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:55:34 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I was diagnosed with breast cancer . Personally, I blame the pulp mill for the highest cancer rates, which we have in Pictou County. For years, there was a doctor locally that tried to broadcast about the cancer causing agents in the pulp mill and it went unnoticed by media and government. Please, keep your promise that the pulp mill in Pictou County only has until the end of January 2020 to clean up its act. Please do not allow them an extension as they had five years to plan for this. I have family that work in the woods, also at the plant itself, however, the cancer rates are also very high here in the county. Pictou County will survive without the pulp mill, but the Northumberland Strait will not survive if you allow them to put that pipe in the water with those deadly toxins straight into the areas that I and many others enjoy, there will be dead animals and marine life. You just have to look at Boat Harbour to know that it is a killer in the making. Please do as your government promised!! Name: @hotmail.com Address: Municipality: Westville Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 66 y: 19

From:
To: Environment Assessment Web Account
Subject: Comments of the Focus Report for Northern Pulp"s Effluent Treatment Facility
Date: November 8, 2019 11:58:03 AM
Attachments: Northern Pulp Focus Report Comments .docx

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Hi please see attached my comments on the Focus Report for Northern Pulp's Effluent Treatment Facility

Regards,

Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, NS, B3J 2P8

Please see below my comments on the ***Focus Report for a Replacement Effluent Treatment Facility Project by Northern Pulp Nova Scotia Corporation***

I am an environmental engineer from Pictou, NS; this project is of significant importance for me both personally and professionally.

I previously provided comments on Northern Pulp's Environmental Assessment Registration Document (EARD). Some of my concerns and questions have been addressed in the focus report, in particular those concerns relating to lack of baseline data collected for the EARD, however, I continue to have significant concerns about the environmental impacts of the project moving forward and I believe critical information required to properly assess the impacts of the proposed project are missing from the EARD and the focus report.

I implore Nova Scotia Environment to ***not approve this project as currently proposed and to require an Environmental-Assessment Report***.

I have the following comments / questions about the pipeline installation:

The terms of reference for the focus report requested more information on the proposed pipeline routing including maps / drawings of the new routing. In the focus report there is still much uncertainly surrounding the pipeline routing, including:

- The location where the pipeline is proposed to enter the marine environment has not been identified;
- Figure 2.1-1 shows approximate locations only for the project footprint and diffuser location; and,
- Table 2.1-1 notes that "*An alternate route was identified, as the design has not been finalized.*"

The pipeline routing provided in appendices 2.1 and 3.5 are preliminary and conceptual respectively; therefore it is unclear to me what the final pipe routing is.

Further to this, the letter from the NSTIR's Executive Director of Maintenance and Operations provided in Appendix 2.1 of the focus report only indicates that NSTIR will continue discussions with Northern Pulp regarding installation of the pipeline in the highway 106 ROW. There is no specific mention of the pipeline being installed in the ROW in the letter provided. It is possible that NSTIR will not allow the pipeline to be installed in the ROW as the pipeline may impact future ROW maintenance required by NSTIR or pose an environmental liability to NSTIR. I am concerned the project will be approved and the proposed pipeline routing will again be modified. A letter of intent or approval in principle between Northern Pulp and NSTIR should be provided prior to approval of the proposed project.

I do not believe the focus report addresses the requirements of the terms of reference to provide more certain information on the pipeline routing.

Additionally, the focus report indicates that *"…the anticipated crossing methodology for both wetlands and watercourses will likely be based on trenched technology (in the EARD, consideration was given to using trenched and trenchless technology, boring techniques (e.g., horizontal directional drilling), for both for wetland and watercourse crossings)…."*

I am concerned the project has decided to no longer utilize trenchless technologies to minimize impacts to wetlands. This is presumably due to the fact that the pipeline is no longer permitted to be installed in the shoulder of highway 106 and cannot avoid wetlands by veering more towards the centre of the highway as originally proposed. As stated in the focus report the project will result in permanent direct wetland loss. Section 0.1.7.3 of the focus report states that "*For the wetlands crossed by the pipeline trench, a conservative estimate of direct wetland loss has been identified based on the potential to affect the wetland within the 15 m work space, and for the portion of the pipeline adjacent to Highway 106. The remaining wetland area within the NSTIR ROW (east of the highway) is assumed to be potentially affected."* This seems to indicate that the report is calculating wetland impacts stopping at the ROW boundary. It should be determined what actual amount of wetland loss will occur as a result of the proposed pipeline installation.

For the marine portion of the pipeline the focus report states that *"The ice scours observed within the Caribou area occur within water depths ranging from 1 m to 9 m likely formed during the winter of 2018/2019. Ice scours were not observed within the area of the proposed diffuser. Of the 133 scours observed in the Caribou area, 15 had a maximum-recorded scour depth on the marine floor of 0.4 m. Ice scour depth information was required to determine the depth of burial of the pipeline. The results of the ice scour investigation indicate that burying the pipeline 3 m under the seabed in Caribou Harbour is appropriate, given the ice scour conditions present"*

The conceptual design of the pipeline proposed to be installed in Pictou Harbour indicates cover of 2m. The focus report indicates that ice scours up to 0.3m in depth were observed in Pictou Harbour. Why was less cover determined to be appropriate for this portion of the marine pipeline? Additionally the conceptual design for the marine pipeline notes that the it is unlikely that the effluent diffuser would be impacted by ice scour given the 20m water depth. What is the height of the proposed diffuser from the seafloor? Also I am concerned one year of field investigation does not provided not enough background information to made a conclusion that the diffuser will not be damaged throughout the life of the project.

I have the following comments / concerns about air quality

The focus report states that *"…ammonia, chloroform, total reduced sulphur (TRS), and hexavalent chromium were predicted to have infrequent ground-level concentrations above their respective criteria."* It should be noted that this is a comparison against air quality criteria from the province of Ontario. The report also notes that the occurrences of these exceedances is infrequent and the model is conservative.

However, the results of this air quality modeling further demonstrate the need for a full Environmental-Assessment Report. Table 0.1.1-3 which summarizes residual environmental effects related to the atmospheric VEC only includes lists emissions of H_2S / odour as a VEC associated with the activity to operate the ETF and power boiler. The impact of the contaminants noted above is not addressed in the focus report. Further the impact of these air contaminates are also not assessed in the human health

risk assessment (HHRA) provided in appendix 9.2 which only consist of "problem formulation" as the full HHRA has not been completed. A full Environmental-Assessment Report should be completed with a complete HHRA. In my opinion it is not sufficient to note possible air contaminates as a result of the project air quality modeling but not address potential impacts, instead indicating these are likely only resulting from conservative modelling.

I have the following comments / concerns about effluent entering the marine environment:

The report states that *"…any potential environmental effects on water quality during the operation and maintenance phase will be highly localized."* and *"that water quality at the end of the mixing zone for the three-port diffuser will reach ambient conditions within less than 2 m from the diffuser in terms of total nitrogen, total phosphorous, DO, pH, temperature, and salinity. Colour will return to baseline conditions within 5 m of the diffuser."*

What is the cumulative effect of absorbable organic halides (AOX) which include Dioxins? As per the Receiving Water Study background concentrations of AOX is n/a (assumed to be negligible). The treated effluent contains a concentration of 7.8 mg/L of AOX with a concentration of 0.05 mg/L at the end of the mixing zone 100m from the diffuser. Given the high volume of treated effluent discharge at 62,000,000 L / day and the 50 year projected lifespan of the project what are the long term impacts of AOX presence above existing conditions? This is of particular importance given that AOX are known to be persistent and accumulate in the environment.
(https://webarchive.nationalarchives.gov.uk/20110313212212/http://www.environment-agency.gov.uk/business/topics/pollution/39123.aspx)"

The response to my question in the focus report was to *"Refer to section 4.2 for comments concerning the receiving water study."*

The focus report does not address the cumulative effect of AOX. In fact the modeling only shows simulated effluent concentrations for a period of one month. It is unclear what the cumulative impacts to the marine environment will be over the lifespan of the project.

The focus report indicates that in order to achieve higher levels of sCOD reduction *"NPNS has plans to add oxygen delignification after the completion of the ETF…"* information on oxygen delignification is provided in addendum #3. This is irrelevant and misleading since this technology is not part of the scope of the proposed project.

A major concern I have pertaining to the proposed project is the lack of information on the decommissioning phase of this project.

The focus report notes that *"Northern Pulp will be responsible for: 1. Operation, maintenance, and inspection of ETF components, the effluent pipeline, and marine outfall and diffuser assembly; 2. Sludge management and operation of the facility's power boiler for incineration of sludge, including air quality monitoring; 3. Monitoring of effluent quality discharged to the receiving environment; 4. Ensuring the effluent pipeline system is operated in accordance with applicable regulations; 5. Maintenance of above and below ground facilities; 6. Emergency response; and 7. Awareness and education of local stakeholders, including members of the public and emergency responders."* There is no reference to Northern Pulp being responsible for decommissioning the ETF. ***Who is responsible for decommissioning the proposed ETF?***

The focus report does not address environmental impacts during the decommissioning phase of the project. The EARD noted the following in terms of the decommissioning phase: *"Decommissioning of the project would occur at the end of mill life following the completion of operations. Once the ETF or pipeline is nearing the end of a useful service life, a decommissioning plan will be developed and will be submitted for a separate review requiring NSE approval."*

No investigation has been completed to understand what level of contamination will be left behind at decommissioning phase. Is this project likely to create another major environmental contaminated site in Nova Scotia comparable to the Sydney Tar Ponds and the Boar Harbour Effluent Treatment Facility? Will the soils (including the earthen walls of the new spill basin) and groundwater around the ETF be contaminated as part of the proposed project?

The long term impact of contaminating the existing site through use of an on land effluent treatment facility should be investigated through a Environmental-Assessment Report to understand total impacts of the proposed project. It is unacceptable to view the proposed project simply as a modification to an existing treatment system.

A great deal of information is provided in the EARD and the focus report. Ultimately these reports are stating that there will be no adverse effects to the environment from the proposed project as the ocean will dilute all pollution entering the marine environment and that best practices will be applied during construction and operations to mitigate all potential environmental impacts.

However, given the scope of the EARD there are still large questions remaining for the project including:

- What is the socio-economic impact on lobster fisheries and tourism of the proposed project?
- What is the impact to the Pictou Landing First Nation (PLFN)? and,
- What is the long term environmental legacy resulting from the project after the mill / ETF is decommissioned?

It may be possible that the answer to the above questions is that there will be no lasting socio-economic impacts, no impact to the PLFN and no environmental legacy, but it is also possible that this project could have devastating socio-economic impacts to the Town of Pictou's fisheries and tourism industries, negative impacts to the PLFN and the proposed project could create a major contaminated site which ultimately Nova Scotia tax payers would be liable to remediate.

Again, I implore Nova Scotia Environment to ***not approve this project as currently proposed and to require an Environmental-Assessment Report***.

Respectfully,

From:
To: Environment Assessment Web Account
Subject: Fwd: NO PIPE
Date: November 8, 2019 11:59:52 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Sent from my iPhone

Begin forwarded message:

From: @gmail.com>
Date: November 8, 2019 at 08:32:17 AST
To: @hotmail.com" @hotmail.com>
Subject: Fwd: NO PIPE

---------- Forwarded message ---------
From: @gmail.com>
Date: Fri, Nov 8, 2019 at 8:03 AM
Subject: NO PIPE
To: <ea@ns.gov.ca>

To whom it may concern,

My name is I am a lobster fisher from in Cape Breton, and I'm writing in regards to the proposed pipe line.
I find it hard to believe that right now, when climate is so evident, that this pipe is even being considered. This pipe would add enormously to environmental disaster.
The effects of the pollution that would go into our waters is not something that could be reversed. The lobster and marine life that this would damage is so profound, I can't imagine anyone thinking this is OK.
Our waters are connected, our tides intermingle and this issue effects ALL of the maritime waters. Spawn travel far and wide with these currents, a livelihood and future for our young people that we CANNOT risk.
There has got to be another way, a way that pleases everyone and leaves as little damage behind as possible. No-one wants to see people without work, but we certainly don't want to see our future without marine life either.

Please do the right thing.
NO PIPE

Kinds Regards,

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:04:43 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Greetings, I am pleased to offer my comments on the replacement effluent treatment facility project. Canada is a country rich in natural resources, which means we have great opportunities, but also strong obligations. The debate surrounding this project is not uncommon in resource sectors. Too often we see opposition to upgrades, and environmental investments, that are essentially efforts to shut down productive and sustainable operations. The Focus Report shows that the third-party science clearly supports approval of this project. Investing in this new treatment facility will only further improve Northern Pulps environmental record, building on strong advances in recent years. We know clearly that the wider forestry industry depends on this mill, and that there are 2,700 jobs at stake, mostly in smaller and rural communities. Ive worked in industrial and resource policy research for more than two decades, and believe that governments must take the long view in matters like these. Forestry is one of our most sustainable industries, with the potential for a bright future. In an era when we are increasingly concerned about climate change, forestry is an essential tool to improve our record. Not only through the carbon-capture associated with forestry, but also by replacing other materials with much higher environmental impacts, such as steel, concrete, or cotton, for example. Additionally, ensuring the products produced by Northern Pulp are made here, in a country with strong regulations, is essential when considering the weak rules and enforcement around forestry elsewhere in the world. Northern Pulp already performs strongly compared to other similar mills in terms of environmental impact, and will do even better with this new facility. The strong environmental rules in place in Nova Scotia are essential to building sustainble industries. The Focus Report provides all the evidence needed to provide approval for this project. Sincerely, @gmail.com
Address: Municipality: Toronto Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 51 y: 29

From: @hotmail.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:06:36 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: As a Nova Scotian I am expressing grave concern about the unrecognized and immeasurable risks and socio-environmental impacts of the Focus Report on Northern Pulpâ?Ts Proposed Replacement Effluent Treatment Facility Project. It is illogical and irresponsible to consider the proposed contingency planning for potential contaminants in the Northumberland Strait, wetlands, and surrounding areas as acceptable in any way. The Impacts and Mitigation section of Focus Report, while inaccessibly lengthy and full of â?~conservative estimatesâ?T, lacks any substantial recognition or empirical measures of real environmental and ecological dangers. Without proof of absence of significant risk, without critical data around environmental safety, and insufficient evidence to assess damages and dangers, the environmental assessment is simply inadequate. Let us be very clear: this should be alarming to fishers, land protectors, community members and Ministers alike. Consider and act on evidence-based, ethical research and data that is not privately or corporately funded. Listen to scientists, fishers, harvesters and Indigenous land protectors, who are the real experts. Recognize well-established social and environmental determinants of health, which are lacking from the Focus Report. There an opportunity to re-direct a legacy of devastation. I stand with Pictou Landing First Nation Chief Paul, the Friends of the Northumberland Strait, the Clean Ocean Action Committee, the Nova Scotia Chapter of the Canadian Parks and Wilderness Society, the Ecology Action Centre, the , the Atlantic Salmon Federation, the North Shore and South Shore Nova Scotia Chapters of the Council of Canadians, the Sierra Club Canada, the Tourism Industry Association of Nova Scotia, the Harbour Authority of Caribou, the hundreds of thousands of Nova Scotians millions of other concerned Atlantic Canadians in rejection of the Northern Pulp Effluent Treatment Proposal. Name: Email: @hotmail.ca Address: Municipality: ST. JOHNS Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 32 y: 31

From:	Environment
To:	Environment Assessment Web Account
Subject:	Proposed Project Comments
Date:	November 8, 2019 12:08:48 PM

Project: replacement_effluent_treatment_facility_project Comments: I thought Canada was moving toward the future instead of a past consumed by greed that sees toxic waste dumped into communities and nature? The facility has been proven to be harmful, and the choice to do better, to stop such pollution, can have N.S lead the way against all corporations daring to take our air and water from us. Name: Email: Address: Municipality: Postal-Code: Phone: ## ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 79 y: 20

From:
To: Environment Assessment Web Account
Subject: Northern Pulp
Date: November 8, 2019 12:13:32 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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The government of Nova Scotia has already made the commitment to the people of Pictou and the PLFN . Please don't let this be another case of government not honouring their promises . You are well aware of the harm done to the people of this area and the area itself . Step up and do the right thing . No Pipe . No Extension .

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:22:52 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson, My name is I have lived in Pictou County all my life and Im concerned about Northern Pulps Effluent Treatment Facility Proposal. Premier Stephen McNeil stated that it would be wrong to move one disaster into a new location when he referenced Northern Pulps ETF proposal. Of course that wasnt a statement on whether Northern Pulps project was a disaster, simply that it would be wrong for the province to approve a project that could be characterized as creating a new disaster. Mr. McNeil also rightfully stated many times over that the company was given 5 years to come up with a plan and that was more than enough time. Not only did the 5 year plan give ample time to Northern Pulp but this wasnt an arbitrary date picked out of thin air. The Jan 31, 2020 Boat Harbour closure date in the Boat Harbour Act also falls on the last day of Northern Pulps current Industrial Approval. Northern Pulp were slow to get moving on their attempt to complete the project. When they filed their EARD in February, they stated that they would need an extension until they built their ETF or they would have to shut down. That ask is for an indefinite extension as Northern Pulps plan to build an ETF that pumps effluent described by their own technical engineer as being worse than what comes out of Boat Harbour, would set up the risk to move the disaster that is Boat Harbour and make it a disaster in the Northumberland Strait. My family and I recently started boating recreationally out of Pictou Harbour in the summer and as we come out of the harbour we notice the effluent hugging the shore line. You really have to be in it to understand, but the smell of the black treated effluent is absolutely putrid. This is treated effluent that has had 30 days of settling and polishing in the Boat Harbour basin. This settling will not happen with the new ETF. The effluent will no longer hug the shoreline, it will be in the middle of the prime fishing grounds of the Strait. Not to mention the air emissions which are also absolutly unbearable some days. If it is particularly bad, we dont even bother launchin g our boat that day. Northern Pulp cannot be given an extension. That would break the deal that was made in good faith and written into law between the PLFN and the province that saved Northern Pulp from having to close in 2014. They also cannot be given an extension because they dont have a sound plan for a new ETF so it may never be built. Northern Pulp cannot be given an indefinite extension. Northern Pulp have been given ample opportunity over their time owning the mill to ensure it runs properly. At some point you have to admit it cant be done. Thanks, Name: @gmail.com Address: Nova Scotia Municipality: Scotsburn Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 69 y: 14

From: @live.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:23:53 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Donâ?Tt send NS jobs away find a solution Name: @live.com Address: Municipality: Aylesford Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 76 y: 25

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 12:25:05 PM
Attachments: Environmental Assessment Response.docx

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien
Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

I am I am a commercial fisherman from Prince Edward Island who has prosecuted fisheries in the Northumberland Strait as a licensed captain since . I worked as a crewmember for years before that. I have served on the advisory board for the fishery which takes place along the Nova Scotia shore. As well, I am a board member and Secretary Treasurer for the Harbour Authority.

I am extremely concerned about effects this project will have on the commercial fishery. Presently, the mainstay of the Northumberland Strait fishery is the lobster fishery. The marine ecosystem is a delicate balance which can be easily upset by external factors. The external factor which I am referencing specifically is the introduction of 80-90 million liters of 32 degree FRESH water to this ecosystem on a daily basis. That adds up to over 32,000,000,000 liters in a year. Lobster larvae are especially sensitive to fresh water in the water column and it will immediately affect their survival. We as an industry cannot agree to this being an acceptable risk. This fishery involves three provinces and thousands of jobs which are at very real risk if the balance is upset. The Northumberland Strait is almost a closed ecosystem . There are gyres at each end of the strait which in effect means that the water for the most part moves east and west with the tide, but the actual water change is not substantial. Any contaminants which are introduced tend to stay in the system.

As well a great deal of the income over my year career on the Northumberland Strait has been derived in the area around Pictou Island and the shores of Nova Scotia from Cape George to Cape John from the scallop and herring fisheries. The scallop and herring fisheries are a vital part of the tool box as a commercial fisherman. Herring spawn in the area of the proposed outfall and any deterrence introduced by salinity changes or particulates from the effluent can greatly harm a stock already approaching dangerous levels. Are we willing to risk the health of this fish stock?

There are many more points in this proposal which I could address but am basing my comments on how it will directly affect me and my family. It is incredible that we are even having this conversation in 2019. It is not 1919! The fishery in the Northumberland Strait has a bright future which could be snuffed out by pretending that allowing a pipe into the Strait will have little or no effect. We as a fishing industry are just now recovering from the effects of the construction of the Confederation Bridge. For once common sense and the environment need to win out over politics and money. As a government you need to make the right decision.

It is very unfortunate that Northern Pulp has chosen to make this an either/or decision. They have pitted neighbour against neighbour and industry against industry. They should have introduced the option of a closed system long before the Boat Harbour closure was imminent.

Respectfully,

Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

I am I am a commercial fisherman from Prince Edward Island who has prosecuted fisheries in the Northumberland Strait as a licensed captain since . I worked as a crewmember for years before that. I have served on the advisory board for the fishery which takes place along the Nova Scotia shore. As well, I am a board member and Secretary Treasurer for the Harbour Authority.

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It is very unfortunate that Northern Pulp has chosen to make this an either/or decision. They have pitted neighbour against neighbour and industry against industry. They should have introduced the option of a closed system long before the Boat Harbour closure was imminent.

Respectfully,

From:
To: Environment Assessment Web Account
Subject: Northern Pulp language (addendum)
Date: November 8, 2019 12:25:28 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

The language of vagueness does not belong in a scientific document:

As with my previous submission, I have chosen to address this pipe-into-strait issue from a 30,000 feet level. I leave the complexities of the science to the domain of others more qualified than me.

Word usage in scientific writings : "May" is a troublesome term and it does lower the quality of any study.
The word "may" is used to express what is possible, factual, or could be factual. The word "may" exists in this document far too often – so much that it greatly detracts from the credibility of the "evidence" presented.

The word "may" in any sort of document is a peculiar word – it is useful for the author and puzzling for the reviewer/ reader. It protects the author from any eventuality, and it could stand up in a court of law because a defendant could always argue that they never stated conclusively one way or another. If they cannot state something conclusively then the insertion of this one simply word - "may"- erects a giant wall of protection.
As a result, the word "may" is a modifier that at the same time effectually neutralizes the report's validity.
Ipsos facto, where ever in this report the word "may" appears, logically one must apply equal weighting to the replacement "may not".
--- --- ---

The hazards of a pipe into strait are well documented. It must be concluded that there is way too much risk associated with this proposed pipe-into-strait endeavor. Clearly, this pipeline proposal should be rejected outright.

Further, although the immediate focus in the proposed pipe-into-strait, the equally toxic issue of air quality affecting the health of its citizenry (particularly in the town of Pictou given the direction of prevailing winds) is of paramount importance. There is a sense that there is an *air of dismissiveness* about air quality.

Finally, how can one company, based in Indonesia, be permitted to destroy both forests and

waterways of our province Nova Scotia? If something drastic is not done by the Province about Northern Pulp, I suggest that the notion of having a “Department of Environment” would be and must be considered an utter joke.
I urge this government to do as no previous government has done in 50+ years in relation to this pulp mill.
Do what is right for our citizenry.
Recognize that the old ways of doing things is not acceptable. Turn the page.
The majority of this province would be in your corner.
The world is watching.

Pictou/ Halifax

From: @live.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:25:58 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: - Choose - Comments: We believe the effluent treatment plant is up to Canadian and worldwide standards for pulp and paper mills. To come down on one mill would only send the pulp market elsewhere and the other mills may not even be up to the standards that this mill will be. Name: @live.com Address: Municipality: Antigonish Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 52 y: 29

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:26:09 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Iâ?Tm strongly opposed to the plan to pump effluent into the Northumberland Strait. Name:
gmail.com Address: Municipality: Halifax Postal-Code:
Phone: Fax: email_message: Privacy-Statement: agree x: 77 y: 19

From:
To: Environment Assessment Web Account
Cc: info@friendsofthenorthumberlandstrait.ca
Subject: Northern Pulp Focus Report
Date: November 8, 2019 12:29:06 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

I am writing in relation to Northern Pulp's Focus Report for their Replacement Effluent Treatment Facility Project.

I moved to Pictou from Ontario
Many factors influenced my decision to make this move, not the least of which was my appreciation of the beauty of this spectacular province, particularly Northern Nova Scotia and Pictou County.

In
and I myself was diagnosed with level 3 melanoma. I decided that whatever time I might have left needed to be spent with my dear family and in the land of my heart and soul.

Shortly after I moved into Pictou I became aware of the toxic presence of Northern Pulp and the devastating effects it has had on the health and welfare of every living thing exposed to it's putrid waste output. Imagine my dismay upon realizing that the life-changing move that I made might put me at higher risk of cancer than I would ever have been had I stayed in Ontario.

My plea is therefore heartfelt and simple:
Honour the people, Premier McNeil and Minister Wilson. Honour the people whose lives and health and livelihood have been already affected irreparably by the damage already caused due to inefficiently managed toxic waste generated by Northern Pulp. Honour the people of Pictou Landing First Nation who have negotiated in good faith with successive governments and who look forward deservedly to timely clean up AND closure of the mill. Honour the lives of our children and our children's children. We ALL deserve to live in a society that does its very best to care for one another, our fisheries, our wildlife, to the utmost of their ability.

Sincerely,

From: @shaw.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:29:32 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Its time to reevaluate the pulp and paper industry and all its negetive impacts. The chemicals required to turn wood into paper is unreasonable and there are alternatives that are less detrimental to the environment. The need for white paper is also something that must be changed as the chemicals it takes to whiten pulp is also unreasonable. We are doing both of these things because we wont stop and question these past practices and say no more we can do better. Saying that something needs to be done because it is economically better is not a reason for the environment to take the hit and it should not be used in an environmental assessement as a reason to allow it to happen. This and all pulp mills can be retooled to use hemp instead of wood and we can all get use to yellow paper instead of white. Approving this projects and saying it is environmnetally ok is being blind deaf and dumb and go against all kindness we should have for all other living things we share the planet with. ITs time to do better and be real about our impacts. This impact does not have to happen and it can be stop with courage and excepting the truth about it. We will still grow food and people can still be sheltered and we can still have fish so no one will be worse off for this project to not happen. You cant approve it and say you did the best you could do. It is on you. You dont get to hide behind a title or department it is you that says yes or no. Try saying no it gets easier and life will get better. Name: Email: @shaw.ca Address: Municipality: Squamish BC Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 40 y: 29

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:32:30 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Dear Premier McNeil and Mr. Wilson, I am a resident of both East Hants in the winter months and Pictou County during the summer season as we have a summer residence in Caribou River. For the past decade our family been enjoying the waters of the Northumberland Straight. The entire region surrounding Pictou is very beautiful except for the disgusting pollution that the Northern Pulp Mill has been depositing into the air and water surrounding the region. Each trip to the summer cottage constantly reminds of us what the local residence must endure year around as the foul odor hits you miles before hitting Abercrombie. On a day with a low ceiling that foul smell even saturates the air some 15 kilometers as the crow flies away in Caribou River. This mill has been causing in my opinion great economic oppression for Pictou and the whole county. The Pictou Harbor waterfront is steeped in History being the entry point for many Nova Scotia familyâ?Ts starting with the Historic Ship â?oHectorâ? . The region is beautiful and it is a gateway between 2 provinces arguably strategically located between 2 of Canadaâ?Ts top tourist destinations. Pictou should be a stopping point and destination for many visitors to the region. It should enjoy the success that other similar waterfront towns and communities throughout the province do. With the shear number of cottage owners along the shore in Pictou County the harbor town should be booming all season long but there are empty buildings and evidence of failure all over the community. My family would love to frequent the local waterfront businesses but canâ?Tt tolerate the putrid smell of the mill across the harbor. I donâ?Tt buy into the idea that job losses will be as significant as what has been purported. Iâ?Tm sure that there will be some businesses and workers in the province that may lose their jobs due to failure to adapt but I donâ?Tt believe that â?oThere will never be another log processed in this provinceâ? . There are always solutions and other markets. I lived in Summerside some 35 years ago when the announcement was made that the CFB Summerside was closing and that community was sure it was to be the end as it was a massive employer and contributor to that local economy. It happened and within a few short years the economy around Summerside was bustling again and today is one of the Strongest in PEI. I have read most of the reports contained in the 2400 some pages that were submitted and all I can say is that quite simply lets not accept science based on what is promised ahead by those that stand to financially benefit but look in our rear view mirror at the science and performance that has been experienced in the past 53 years. Do we accept science that tells us that 5 meters away from 82 million liters of effluent will be almost undetectable? Do we even want to accept that risk? Can we afford to accept that risk? Does your administration want to go down in history as making one of the biggest ecological mistakes of our generation? Too much to lose â?¦â?¦too little to gain! Yours truly,
@hotmail.com Address: Municipality: Nine Mile River Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 13

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:34:31 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I am impressed with Northern Pulps efforts to improve their effluent system. I believe they achieved a stable balance between the company and the environment. These two can co-exist within a community. It is important to protect the thousands of jobs created here and also protect the surrounding community. Northern Pulp will achieve this balance with their new system. Please allow Northern Pulp to complete their work. Nova Scotia cannot afford to lose these jobs and the multitude of spin off jobs created by their existence. Name: Email: @hotmail.com Address: Municipality: Sydney Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 68 y: 13

From:
To: Environment Assessment Web Account
Subject: Northern Pulp"s Replacement Effluent Treatment Facility Project
Date: November 8, 2019 12:37:05 PM
Attachments: image003.png

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, NS
B3J 2P8

November 8, 2019

Re: Northern Pulp's Replacement Effluent Treatment Facility Project

Dear Minister

I am writing in response to Northern Pulp's *Focus Report on the Proposed Replacement Effluent Treatment Facility Projec*t. I am a property owner in both the Town of Pictou and Caribou Island and spend approximately half of the year at each of these properties. Whilst my concerns with Northern Pulp's plan to pump effluent in the Northumberland Strait are numerous and of equal importance to me, in this submission I will focus my comments on these areas:

- The unacceptable risk of ground water contamination this proposal creates for the Town of Pictou
- The increase in the current levels of air pollution and odours due to the Northern Pulp's operations in combination with the burning of sludge, the relocation of the activated sludge treatment system to Abercrombie Point and the venting of air as part of the transmission of warm effluent through the town

Ground Water Contamination Risks for the Town of Pictou

The wells in the Town of Pictou and Caribou watershed areas are the only viable sources of water for the town (Town of Pictou, 2019). Loss of this resource would have catastrophic environmental, health, social and economic impact on the town. Northern Pulp's unsubstantiated claim that the risk of contamination would be insignificant is based purely on theory and predictive modelling. At minimum they acknowledge that they plan on piping effluent containing what they refer to as "residual contaminants" through the town's watershed which clearly introduces a risk and no level of risk to our water resources is acceptable.

Northern Pulp's simple contention that a spill won't happen is not credible in light of the pulp mill's history of pipe breakage and contaminating spillage, the most recent being October 21, 2018 which was discovered not by Northern Pulp's monitoring systems, which they are required to utilize, but rather by a resident who was taking a walk. At this time of writing the extent of the contamination has still not yet been disclosed by Department of Environment as it is either unable or unwilling to do so. The Department stated it takes a year to complete its investigation (Tutton, 2019) but that year has come and gone and the public is still being kept in the dark, thus making it impossible for opponents of Northern Pulp's current proposal to address this very real concern in this submission.

Northern Pulp's proposal falls short of meeting the burden of proof that the proposed pipeline will be fail-proof and appears to over-rely upon monitoring to ensure safety from breakage and contamination of the environment. However monitoring is not preventative, it only reports after the fact that the contamination has occurred.

A Drinking Water Strategy for Nova Scotia: A Comprehensive Approach to the Management of Drinking Water (Nova Scotia Environment & Labour, 2002) states: "The Drinking Water Strategy reiterates our commitment to making the protection of our province's water our number one priority (pg. 5)." The Strategy further notes that, "each community is responsible for the safety of its drinking water (p. 16)" specifically "municipal and small public systems are responsible for the delivery of water in accordance with provincial standards and for meeting their requirements for due diligence – making sure the water they deliver is properly managed and protected (p. 17)." To assist municipal protection of watersheds the government adopted *Statement of Provincial Interest Regarding Drinking Water (1999, 2013*) which notes that "inappropriate development in municipal water supply watersheds may threaten the quality of drinking water (p.3)" and "planning documents must address the protection of drinking water in municipal water supply watersheds (p. 3)."

The Town of Pictou has fulfilled their responsibilities by rejecting Northern Pulp's Replacement Effluent Treatment Facility Project proposal of routing their pipeline containing effluent through the town's watershed, deeming any additional risk to the domestic water supply as unacceptable. The Town of Pictou's Source Water Protection Program will be jeopardized by the Department of Environment allowing warm treated effluent containing known contaminants to be pumped through our watersheds at the rate of up to 85 million litres a day. There are no contingency plans and no theoretical mitigation or remediation plans that can address the overwhelming impacts of a sudden loss of potable water to the town. To paraphrase Section 2 (b)(ii) of the Environment Act, it is the government's obligation to protect ecosystems by applying the precautionary principle requiring that the industry applicant proves, being doubt, that no harm will result, before undertaking projects that could be damaging to water resources. Northern Pulp has not met this burden as the documentation they provide is purely theoretical employing modelling based largely on unproven premises and the conclusions drawn well exceed the evidence provided.

References:

Municipal Government Act (1999, 2013). *Statements of Provincial Interest made under Section 193 and subsections 194(2) and (5) of the Municipal Government Act.* Retrieved from: https://novascotia.ca/just/regulations/regs/mgstmt.htm#TOC2_3

Nova Scotia Environment & Labour (2002). *A Drinking Water Strategy for Nova Scotia: A Comprehensive Approach to the Management of Drinking Water*. Retrieved from: https://novascotia.ca/nse/water/docs/NSWaterStrategy.pdf

Town of Pictou (2019). *Town of Pictou's Response to Northern Pulp's Environmental Assessment Registration Document Replacement Effluent Treatment Facility*. Retrieved from: https://www.townofpictou.ca/meetings-and-public-notices/town-of-pictou-response-to-northern-pulp-ns-environmental-assessment-registration-document/

Tutton, M. (2019). *N.S. group seeks data on effluent leak from Northern Pulp pipeline.* Retrieved from: https://www.cbc.ca/news/canada/nova-scotia/effluent-leak-northern-pulp-pipeline-1.5006939

Toxic Air Emissions and Air Quality

A Dalhousie University research team analyzed emissions data from a provincially operated air monitor located in Granton, N.S. and found that that air levels of three volatile organic compounds (VOCs) exceeded cancer risk thresholds (Hoffman, Guernsey, Walker, Kim, Sherren & Andreou, 2017). VOCs have been known to have harmful effects on human health and pose a significant health concern. The health effects of VOCs include increased rates of asthma, eye, nose and throat irritation, headaches, loss of coordination, nausea, damage to liver, kidney and central nervous system, and cancer (National Institute of Health, 2017).

Hoffman et al. compared emissions data from 2006-2013 to U.S. Environmental Protection Agency (EPA) cancer-risk levels as current Canadian standards of this nature do not exist. Three VOCS, 1,3-butadiene, benzene, and carbon tetrachloride, were found to routinely exceed acceptable cancer-risk levels. Carbon tetrachloride had the highest median concentration and exceeded its EPA cancer risk threshold for all samples. As with most scientific inquiry cause and effect cannot be determined with full certainty, so to assist in pinpointing the most likely source of the VOCs the authors analyzed air emission levels in tandem with wind direction and found clear seasonal variations of meteorological conditions and VOC concentrations. When the prevailing winds were blowing from the mill toward the Granton air monitor, the VOC concentrations went up, routinely exceeding the respective cancer risk thresholds. Based on this evidence they were able to draw the reasonable and defensible conclusion that Northern Pulp was the most likely source.

The researchers recommended data collection on these emissions continue especially in the Town of Pictou which has a larger population base and is in the path of the prevailing south west winds in the summer months when people are outside for longer periods and more likely to have windows open in their homes, thereby increasing exposure. Unfortunately despite an extensive history of known non-compliance in meeting the limits contained in Northern Pulp's Nova Scotia Environment Department industrial approval (2015), a fact that even the company itself admits (Withers. P., 2017), the air monitors were removed from Pictou County by the government so no further publically accessible information is available on the levels of VOCs or particle matter in emissions. This creates an unacceptable level off risk as it is an unknown and is unquantified and therefore no realistic prevention and mitigation strategies can be proposed.

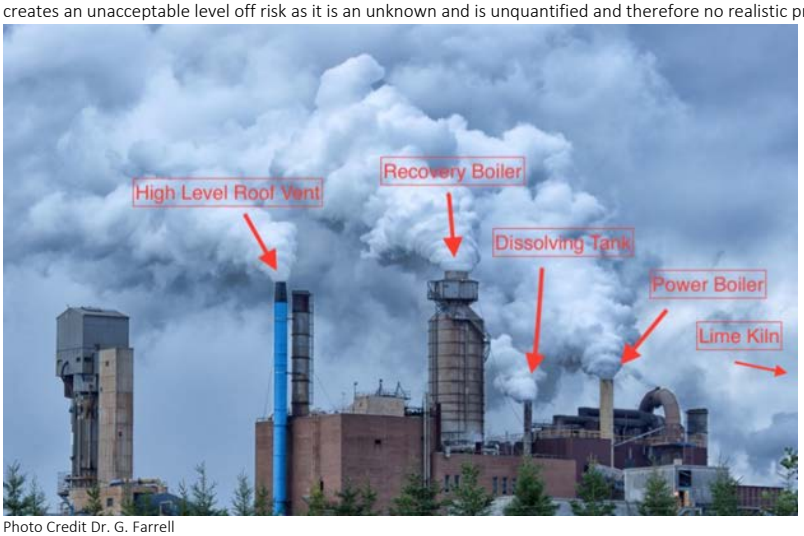


Photo Credit Dr. G. Farrell

In addition to the current toxic emissions of Northern Pulp, they propose to burn sludge in the Power Boiler but little data is provided as to how this would add to the burden of toxic emissions and affect the air quality, and in absence of air monitoring stations to provide publicly accessible data this creates another significant unknown.

The relocation of the activated sludge treatment system that would aerate and settle the effluent into a large tank on the mill's property at Abercrombie Point would add to the current unpleasant odours, in particular for the Town of Pictou as would the venting of air as part of the transmission of warm effluent through the town.

Air quality has deteriorated since the pulp mill began operation five decades ago with little reprieve unless the wind changes direction. The stench is undeniable. The long overdue addition of a precipitator unit has no noticeable effects on either emission levels or the unpleasant odours the mill spews out daily.

The Town of Pictou has stated that it does not support Northern Pulp's proposal for its Replacement Effluent Treatment Facility. Without consultation with the town's mayor and councillors, Northern Pulp has drafted a plan that will give the pulp mill easement through the town's watershed areas, despite the town's objections, and create an unwanted risk to the town's valuable water resources. As well this proposal further threatens the town's air quality which already suffers from Northern Pulp's emissions. Neither of these concerns has been adequately addressed in their submission.

References:
Hoffman, E., Guernsey, J.R., Walker, T.R., Kim, J.S., Sherren, K., & Andreou, P. (2017). Pilot study investigating ambient air toxics emissions near a Canadian kraft

pulp and paper facility in Pictou County, Nova Scotia. *Environmental Science Pollution Research International Journal.* Retrieved from: https://www.researchgate.net/publication/318381271_Pilot_study_investigating_ambient_air_toxics_emissions_near_aCanadian_kraft_pulp_and_paper_facility in_Pictou_County_Nova_Scotia).

National Institute of Health (2017). *Volatile Organic Compounds*. Retrieved from: https://toxtown.nlm.nih.gov/chemicals-and-contaminants/volatile-organic-compounds-vocs.

Withers, P. (2017) *$697 air pollution fine levied — then withdrawn — against Northern Pulp last year.* Retrieved from: https://www.cbc.ca/news/canada/nova-scotia/northern-pulp-pollution-fine-withdrawn-1.4297297).

Contamination of the Northumberland Strait

As a part-time resident of Caribou Island I cannot overstate my concern and dismay at Northern Pulp's intent to pour some 85 million litres of warm effluent into the Northumberland Strait daily. I do not attempt to address this egregious environment assault here as I know others more well-versed in the deficits and dangers of this approach have already weighed in and provided the scientific evidence to refute Northern Pulp's flawed proposal.

Finally, I want to note my objections to the cavalier approach the Minister has adopted to this serious threat to the Town of Pictou's water resources, air quality and the health and vitality of the Northumberland Strait by requiring Northern Pulp to submit to the least stringent level of environment assessment and meet only the lowest bar in environmental protection.

In conclusion, I urge the Minister to reject this ill-conceived proposal by Northern Pulp under Section 34(1)(f) of the Environment Act "because of the likelihood that it will cause adverse effects or environmental effects that cannot be mitigated". As stated in Section 2(b)(ii) "the precautionary principle will be used in decision-making so that where there are threats of serious or irreversible damage, the lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation." The risks to the environment are too great and Northern Pulp has not done its due diligence to fully determine the potential impacts of their proposal, or provide effective science-based mitigation strategies for the multitude of potential adverse effects associated with this project.

Kindly acknowledge receipt.

Sincerely

Pictou, N.S.

From: @northernpulp.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:37:16 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I would like to express my comments in favour of Northern Pulps new treatment facility project to be approved. I have been a unionized employee of the mill since at the age years old and have enjoyed my career here and Iâ?Tm looking forward to the finish line of retirement in a couple of years. As an employee who works in the area, I personally see the impact Northern Pulp has on the economy. I interact daily with suppliers, vendors and employees from both the mill and Woodlands side of the company and how they depend on Northern Pulp operating. Paper Excellence has continued to improve the mill and recently has spent millions of dollars on an annual maintenance shut down and are also committed to the large investment of building a new wastewater treatment facility. I would ask that Minister Gordon Wilson believe in the scientific data that was provided in Northern Pulpâ?Ts focus report and come to the conclusion this is a viable project based on good science and that will have very little environmental impact on the environment. Name: @northernpulp.com Address: Municipality: New Glasgow Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 64 y: 20

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:39:07 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Quite simply, if you would not drink a dipper full of the water you are releasing, do not release it. That is not treated water safe to put into our waterways. Name: Email: @hotmail.com Address: Municipality: Lockeport Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 47 y: 16

From:
To: Environment Assessment Web Account; ea@ns.gov.ca
Subject: Re: Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project
Date: November 8, 2019 12:40:08 PM
Attachments: -Response-to-FR-2019.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Madam/Sir -

I am writing regarding the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project.

I have grave reservations about the underlying scientific basis of the Focus Report and the subsequent reasoning and rationales based upon it. I would like to make a brief presentation about my concerns as they relate to the proposed effluent treatment plant.

I have attached a PDF containing my presentation for your consideration.

Sincerely,

p.s. I apologize if the two email addresses resulted in redundant submissions...

--

gmail.com
-> ***omne ignotum pro magnifico est***

Three Brooks, Nova Scotia

Environmental Assessment Branch
Nova Scotia Environment
Halifax, NS, B3J 2P8

November 8, 2019

I am writing this letter in relation to the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project. I have grave reservations about the underlying scientific basis of the Focus Report and the subsequent reasoning and rationales based upon it. I would like to make a brief presentation about my concerns as they relate to the proposed effluent treatment plant.

Background

I am a retired

and I moved to Three Brooks to retire near family who live in the area. We have visited the greater Pictou over the past 30 years, and part of the reason we chose this locale is water borne lifestyle the area provides; fishing, boating, kayaking, paddleboarding and so on. I was enchanted by the waterways in and around Caribou, Pictou and the Northumberland Strait.

My has fished from the wharf in Caribou since the early 1980's. He has built a livelihood which has provided he and his wife a modest lifestyle which allowed them to raise their children into successful adults. Both of have followed him into careers in fishing from Caribou after witnessing the quality of life the fishing can provide someone willing to work for and invest in themselves and their families.

As I implied above, I make use of the Caribou waterways for recreation. We live next to a tributary river to Caribou Harbour and during the warmer seasons we swim, swim our dogs, kayak, stand-up paddleboard. We bike along Caribou Island, out to the lighthouse for exercise and to enjoy the pristine environment that the Northumberland Strait provides. We also motorboat in the area, particularly across Caribou Harbour to Pictou Island where my brother-in-law's family has a small piece of land and to visit other friends that have multi-generational family retreats on the Island as well. Our passages there and back takes us right across the outfall area for the proposed Northern Pulp-NS (NPNS) effluent treatment plant.

My family uses of this area for work and recreation and thus I became interested in what was coming out the end of that pipe into Caribou Harbour and what impact it will have upon my family and our way of life.

Introduction

I have read the NPNS Focus Report. I have focused my attention on Sections 2.3 and 2.4 and the associated appendices of the Focus Report (FR) as I have some relevant scientific background. [see CV attached]

The Focus Report is clearly a supporting document, designed to buttress proposals made in the previously submitted Environmental Assessment and allay the concerns raised by the regulatory review process. The effectiveness of this document thus is dependant on the sturdiness and cohesion of the presented discussions and the relevance of the data used to support them.

Regrettably, I did not find the arguments and supporting data convincing. The presentation is a tangled logical confusion in which the authors mix the contexts and subjects of their arguments and seemingly use an over-abundance of jargon to confound the reader's understanding of the issues at play.

But I am not writing to complain about the style and format of the authors' scientific presentation - after all, writing scientific documents for public consumption is hard and distilling a jumble of technical issues to a straight-forward, cohesive line of thought ready for digestion by the public is a challenge.

Instead, I am writing to address what I see as fundamental flaws in the logical constructs of the presented arguments. These flaws make the arguments upon which they are based suspect and in need of thoughtful consideration within the context of the overall proposed project. Because, if the justification of a large and likely impactful public work leans heavily upon complex and technical studies then the regulatory bodies and the public should have confidence that these studies and the arguments based upon them are sound. I'm afraid that this is not the case here.

Review of Focus Report

Dilution through the diffuser of the effluent pipe is not an effective mitigation

A main thrust of the justification for releasing the treated effluent and all it contains into the receiving waters of Caribou Harbour is that once mixed with a sufficient amount of water the effluent's contents are no longer of concern, i.e. "Dilution is the Solution for Pollution". This approach rests upon the flawed impression that once 'stuff' is diluted below a threshold concentration that the 'stuff' is no longer there. This is just not true. The 'stuff' is still there.

To give a numerical example, If a flask contains one litre of a 100 mg/L concentration of a 1000 Dalton pulp byproduct, then there are ~859 billion molecules of that compound in the flask.[1] Pouring in another litre of water into the flask reduces the "concentration" of this compound to 50 mg/L but there is still 859 billion molecules in the flask. Dilution doesn't

[1] 100 mg of X at 1000 g/mol = 0.000001 moles of X contains 859 billion molecules of X.

destroy the byproduct. Dilution doesn't degrade the byproduct. Dilution doesn't necessarily even reduce the impact that those billions of molecules can have.

The regulatory limits are, after all, just arbitrary thresholds hopefully based upon the science of the day. In this case thresholds were set some 30 years ago. It has to be remembered the early 1990's was a time when the consequences of even dilute 'stuff' weren't broadly considered as having an impact by the public.[2] The times have changed and we, as a society, have come to understand that dilution isn't, in of itself, a remedy but merely a disposal strategy and this should be kept in mind.

Rather than a "*complete … characterization of NPNS' raw wastewater*" as directed by the Terms of Reference, the authors have "*... completed a characterization of the raw effluent…*" [NPNS FR, 2.3.1, p 63]

The Terms of Reference require:

> ***Terms of Reference*** [NS TOR, p 3]
>
> *2.3 Submit data regarding the complete physical and chemical characterization of NPNS' raw wastewater (ie., influent at Point A for the Project)*...
>
> *2.4 Submit a complete physical and chemical characterisation of NPNS's expected effluent following treatment by the proposed technology….*

The Focus Report authors have chosen to set aside the task of "complete physical and chemical characterization" of the raw and treated effluents as requested in the Terms of Reference [TOF, p. 3]. The authors have substituted the more convenient approach of creating a list of compounds, minerals and elements that they anticipate from the proposed treatment process and then search for these in the raw wastewater from Point A, the 'treated' wastewater from Point C and then water sampled from Caribou Harbour. [NPNS FR, App 2.3] One must conclude that technically the authors have not presented a "complete characterization" as directed by the Terms of Reference.

My general concern with this approach is that it is subjective in nature; the analyses depend entirely upon the authors' choices, rather than allowing the observations themselves to drive the studies. And so we are dependent upon the authors' competence, expertise and motives regarding what is important and what is not. Thus to take this report at face value then we have to lean upon the goodwill, credibility and veracity of the authors and *their employers*.

Regrettably, as has reported, NPNS hasn't always been transparent nor have their statements regarding possible dangers to the public from their operations or impacts to the

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[2] 30 years ago, smoking in public places was common. One could smoke in restaurants, bars and other public commons - one could still smoke in airplanes in flight! Today the public broadly understands that cigarette smoke, even diluted by the vast volumes of air around us, does have an impact. Every public building is marked with signs limiting where smoking in public can be done.

environment earned the trust of the public. [Hoffman, et. al.] The result of this process is that the reader must keep in mind that the author might well not have studied all the relevant byproducts of the bleach Kraft pulping processes that would impact the receiving waters of Caribou Harbour.

High molecular weight molecules of bleach Kraft pulping process are a significant byproduct and their impacts should not be dismissed merely because they are difficult.

A more specific concern of mine with the authors' strategy of characterization is that the chemical analyses focus on the smaller molecules typically found in bleach Kraft pulp effluent. These molecules are the chiefly components of the effluent that the proposed process has been shown to work well upon.

The authors don't address the challenging characterization of the higher molecular weight byproducts of pulping, beyond a general description of their makeup. These are largely made of incomplete breakdown products of the lignin biopolymers found in the source wood. The proposed processes don't work as well on these effluent components and, as a result, these larger molecules would out into the receiving waters of Caribou Harbour. See Endnote 1 for a brief, general overview of lignin and its breakdown via bleaching.

Afterall, as pointed out by the authors, these hIgh molecular weight compounds make up ~ 40% of the effluent load organic material (COD) [NPNS FR, App 2.3, p4] which works out to ~21,000 kg of the organic matter in the raw effluent every day.[3]

It has also been determined that most of the organic halides AOX found in pulp effluent are contained within the high molecular weight components. [Hewett, Bullock, Borton] These are the chlorinated byproducts of the bleaching process[4]. The broad scientific consensus is that many organic halides resulting from the bleach Kraft pulping process can be long-lived and possibly deleterious (see discussion of organic halides below).

Thus, the physical & chemical properties, rates of degradation and impacts on the flora and fauna of the receiving water from the high-molecular weight components of effluent are important information as we try to understand what impacts are to be expected from their introduction into the receiving waters and what mitigation, if any, is possible.

The Veolia expected performance of the proposed ETF are overly optimistic given the results of the lab study presented in the Focus Report.

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[3] In 2018, the annual average COD in the raw effluent was 723 mg/L. [NPNS Focus Report, Add 2, p4] Assuming an average effluent flow of 72,500 m^3/day [NPNS EA, App C, p 12] then the daily effluent flow will contain 52,418 kg/day of COD load, 40% of which is ~21,000 kg/day.

[4] The organic halides formation are a side reaction in the bleaching process, primarily due to the in situ formation of hypochlorous acid and its competitive reaction with the phenolic subunits that make up lignin.

In discussing the Veolia Report [NPNS FR, Add 2.4 p 8-11], the authors explain that their working model for the proposed BAS portion of the effluent treatment system looks only at the digestion of the soluble organic material or sCOD. The particulate organic material or pCOD is filtered out beforehand, 29% of the total organic matter in the effluent. The rationale given is that the particulate organic matter comprises biopolymers from lignin breakdown ('colour compounds') & biopolymers from hemicellulose degradation (fibres) and that these are "not easily biodegradable". [NPNS FR 2.4.2, p 34]

The model system found a maximum of 55% digestion of the soluble organic matter, leaving the undigested remainder of 45% to pass through the rest of the ETF system. But the authors then continue their numerical and physical analyses of the ETF using this remainder as the total amount of organic matter going through the system, the 'COD load', ignoring the pre-filtered particulate matter.

Clearly, in the real world system, both soluble and particulate organic material will flow through the BAS system to be treated. The particulate organic matter, being 'hard to digest' would most likely then flow through this process unchanged. And so, this omission of ~1/3 of the COD load in their calculations yields over estimation of the total efficiency of the digestion process in cleaning the effluent that flows into the system. This omission from their calculations also underestimates the amount of organic matter that will flow into the receiving waters of Caribou Harbour.

Doing the math and adding the filtered-out particulate COD back to the soluble matter wasn't digested by the BAS system, would result in more than a doubling of the total COD leaving the treatment system[5] and into the receiving waters. This wide discrepancy is not addressed in analysis of the bench-top, model system's performance, yet these overly optimistic results are used to project the efficiency of the entire proposed effluent treatment system.

The authors incorrectly imply that organic halides from bleach Kraft pulping processes are short-lived contaminants in the environment. [NPNS Focus Report, 2019, p1]

This position is in stark contrast to a broad swath of the published literature on the use and remediation of adsorbable organic halides (AOX) in this context. A brief review of the literature dealing with pulp and paper effluent resulting from bleaching processes yielded the common motif that organic halides so produced are long-lived (persistent), difficult to degrade (recalcitrant), candidates for bioaccumulation (concentration) and potentially toxic.

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[5] Given the sample's initial measured organic material or COD of 1300 mg/L, their model system processed only the soluble 760 mg/L, with the 540 mg/L non digestible organic matter filtered out. The model effluent treatment system yielded a maximum efficiency digestion of 55% resulting in a reduction of soluble COD to 350 mg/L. Adding the 540 mg/L of pCOD back to the effluent stream would a total COD leaving the BAS system as 890 mg/L, instead of the reported 350 mg/L.

In fact, the general agreement upon this is so broadly held that the deleterious characteristics of AOX are common points in the preambles of numerous papers on pulp effluent streams. A quick sampling of statements about this consensus regarding chlorinated byproducts of the bleaching of wood pulp is provided in Endnote 2.

Furthermore, the goal of degradation and/or removal of organic halides produced during the bleaching process is a topic of active research and interest for tertiary treatment protocols. See a list of published work over the last 5 years on this topic in Appendix 1. The NPNS Focus Report claims that

> "*chlorinated compounds formed during ECF pulp production technology will neither be recalcitrant with respect to breakdown in the environment nor resistant to biodegradation.*" [NPNF Focus Report, 2019, p6]

If this statement were accurate then there would be no need for all of the research listed in Appendix 1. Yet dozens of researchers are investing a good deal of hard-won money and years of their lives to designing technologies that remove organic chlorides from effluent streams.

Clearly these compounds are seen by others as a problem and there is an active effort to reduce their impact on receiving waters. The author's positions on soluble organic halides disagrees with much of the scientific literature in this area of study.

The Focus Report purports that the organic halides created as a by-product of the bleached Kraft pulping process are readily degraded by 'natural' processes.

The authors' assert [NPNS Focus Report, 2019, p5]

> *"Chlorinated organic compounds are synthesized and degraded in the environment by natural biological and chemical processes..."*

The existence of natural processes that use and degrade specific organic chlorides, even one quite similar to those produced in the bleach Kraft pulping process, in no way justifies the author's conclusion

> *"...chlorinated compounds formed during ECF pulp production technology will neither be recalcitrant with respect to breakdown in the environment nor resistant to biodegradation."*

The processes of degradation are quite specific and not necessarily amenable to rapid adaptation to new, albeit similar molecules. As discussed in the literature on microbial removal of organic halides from pulp mill effluent streams, [Bajapi 2001, Savant 2006], the use of very specific bacterial species in very specific conditions shows promise. But in general, microbial degradation is limited in the scope of molecules consumes and the efficiency varied depending upon reaction conditions and the wood source of the effluent streams. Similarly, Bhatt, et. all [Bhatt 2007] review a number of specific organic chlorides

and the specific processes, organisms and conditions via which these particular compounds are biologically degraded. These authors conclude

> "*Many of the chloro-organics that are not degraded by bacteria and fungi have the potential to persist in the environment and express their toxicity over extended periods of time.*"

The literature provides no evidence of generic or rapidly evolving natural processes that degrade organic halides. In fact, the detail, variation and specificity of the many literature discussions suggests that suitable natural processes for breakdown of organic chlorides are rare and that there are few, if any, general pathway exists or that organisms can readily adapt to different compounds.

The authors are much too optimistic that a natural process is readily available in the receiving waters to degrade the organo-halides produced by the proposed bleach Kraft pulping process. Their optimism is not supported by the broad body of scientific knowledge nor by any evidence presented in either the EA or the Focus Report.

The authors incorrectly imply that the compounds resulting from bleached Kraft pulp mills are well characterized and their extent of chlorination is known.

> "*Most of the reported compounds are either non-chlorinated or have low degrees of chlorination and are expected to be readily biodegradable.*" [Focus Report, NPNS 2019, Appendix 2.2, p1]

As has been repeatedly reported in the literature, the constituent make-up of bleached Kraft pulping effluent is complex and not well characterized in general. [Hewitt et.al, Karat] It has been found that the high-molecular weight components of the bleaching process represent a good deal of the measured organic halides and these fractions are not well characterized, [Hewett, Bullock, Borton] as discussed above. For example, from "Effluents from Pulp Mills Using Bleaching" [Priority Substances List Assessment Report No. 2, 1991]

> "*The chemical composition of bleached pulp mill effluents is variable and not well characterized. Approximately 250 compounds have been identified in bleachery effluents but many more remain unidentified. Thus, substantial quantities of chlorinated organic compounds, both of known and of unknown composition, enter the Canadian aquatic environment from bleached pulp mill discharges.*"

Thus, I would conclude that the Report's position regarding characterization of organic halides in pulp effluent are overly optimistic.

The logic by which the authors dismiss the persistence of organic chlorides is in conflict with the Focus Report thesis that the effluent is immediately diluted to insignificant concentrations within the receiving waters.

The authors' statement that

> "*Pulp mill AOX will ultimately be mineralized through photochemical and biological processes.*" [NPNS Focus Report 2019, Appendix 2.3, p 6]

conflicts with the logical presumption of the report's theme that the effluent is quickly diluted to 'legal insignificance'. Such a dispersal in the receiving waters of Caribou Harbour would preclude any further biological degradation, either aerobic or anaerobic, if we assume the dilution proceeds as predicted by the simulation models. As discussed above, the known biological degradation pathways have specific conditions and organisms involved. The chances that the specific organisms and the organic halides would be brought into proximity with appropriate reaction conditions is vanishingly small.

Similarly, degradation relying upon photodegradation would be similarly unlikely as relatively little of the water volume is at/near the surface at any time given the volume of the water body as a whole. The efficiency of photodegradation is fundamentally dependant upon the amount of high energy (shorter wavelength) light that reaches the molecule and the intensity of the UV radiation decreases with increasing depth in the water body. Shorter wavelengths have a far more deleterious effect on photosensitive materials than longer wavelengths and the total energy of shorter wavelengths tends to be absorbed within a few millimetres of the surface. [Broughton 2012]

If dilution is as efficient as suggested by the simulation results, then neither the biological nor photochemical processes are likely. The authors are in conflict with themselves here; either the dilution is complete - as proposed - or there are natural processes which will degrade the organic halides - as proposed. But these two positions are not compatible.

Discussion, Conclusion and Opinion

To my mind, the arguments presented in sections 2.3 and 2.4 of the Focus Report can be summarized as follows:

- everything is natural and thus harmless
- harmful things that do arise are not a problem
- problematic things are instantly diluted and are unimportant

That something is found in nature does not rule out that it's concentration through industrial processing and subsequent disposal are without concern. For example, lignin is a naturally occurring biopolymer, resistant to natural breakdown in the forest environment. Its concentration and chemical modification during the bleach Kraft pulping process results in an enormous quantity, some 20 tonnes per day, of byproducts whose disposal is a grave concern as discussed above.[6] Naturally occurring components of trees might be harmless as they stand in nature but the concentration of even seemingly harmless things by the

[6] One could just as readily say that Uranium is a naturally occurring element, found in vanishingly small amounts within pitchblende whose concentration and subsequent disposal presents a staggeringly complex and dangerous problem for humanity. The underlying premise is the same.

marvelous efficiency of industrial processing can create problems when we seek to return them to the environment in a manner for which the environment has not evolved.

Much of the authors' attempt to downplay the impacts of the various pulping process byproducts is undermined by their scientific presentations and the arguments based upon them, as discussed above. I won't belabour the points here, merely conclude that the problematic components in the effluent could well remain a problem after being released into the environment.

And, as discussed above, dilution is not in of itself a 'mitigation' for the release of these pulping byproducts into the receiving waters. Releasing tons of not-easily-digestible paper byproducts into Caribou Harbour each and every day is very likely to have impacts. This has consequences, consequences that are likely to be expensive for the locality, its economy and the province. These points should be kept in mind when reviewing NPNS's proposal.

My goal of understanding "what was coming out of the pipe and into Caribou Harbour" has been confounded by an admixture of baffling detail with curious omissions within the NPNS Focus Report. To my mind, the presentation in those parts of Focus Report on which I've focused make more of a sales document crafted to salve the conscience of those who would approve and regulate the proposed project. It would appear the authors hope that the sheer volume of printed paper will provide the reader with the calming sense that something of consequence has been done and that the conclusions thus presented must be sound or at least 'sound-ish' enough to support. Regrettably, these are conclusions I cannot reach based upon what has been presented.

What I can conclude is that the authors of the Focus Report are overly optimistic about the efficiency of their proposed system and overly dismissive of the likely impacts of the by-products that would be released into Caribou Harbour. The 'scientific' information as presented does little to assuage my concerns.

Next, the technology in the proposed effluent treatment place is now over 20 years old and has roughly the same efficiencies as the present Boat Harbour effluent treatment facility. While well established, the process does not include the modern tertiary processes that have been shown to significantly reduce the organic matter released into the receiving waters. As was discussed above, a number of such technologies have been shown to be effective at production scale. In fact, the Focus Report admits as much by suggesting that oxygen delignification might be added in the future.

Why should the province or the public accept a technology known to be technically deficient in light of the present modern scientific body of knowledge? Doesn't Nova Scotia deserve the best available technology? The province and its people have invested a good deal into the operations now owned by NPNS and will spend a good deal more in the near term to clean up after these operations. The public, in return, deserves that the proposed project at least makes every effort to reduce its impact using known technology.

Finally, I see the proposed solution as a tremendous risk to the regional economy. Pulp is not the only economic driver from this area. The area's "receiving waters" contribute substantially to the provincial economy. [See Endnote 3] Lobster is the largest single commodity shipped by both value and volume from Stanfield Airport, some $216 million and 11.5 metric tonnes respectively in 2018. The growth of seafood exports is a large reason for the construction of the new $36-million cargo handling facility to ease the freight bottleneck at the Halifax Stanfield International Airport.

And to forestall the idea that impacts on the province's fisheries would be localized, I remind the reader that in 2003 a single breeder cow in northern Alberta tested positive for bovine spongiform encephalopathy (BSE), more commonly known as mad cow disease. Within hours, most nations had imposed a ban on all Canadian beef products[7,8] costing, at its peak, $11 million dollars a day.[9]

This is all the more relevant considering that foreign governments are now searching for possible 'rationales' - real or not - to punish other governments that have disagreeable policies or actions; for example, the recent targeting of Candian soybeans.

Similarly, seafood is a product whose 'locality of origin' is going to be difficult to demonstrate in the marketplace. Once a reputation is formed, say "Nova Scotia has 'pulpy lobster'", it is going to be long-held and stubborn in a world dominated by social media. One need only consider the impact of one repeatedly discredited study linking autism to vaccines and its ramifications to see the risks.

As a result of my reading of the NPNS Focus Report, my conclusions regarding its last than robust scientific foundations and my reservations about the wisdom of risking one of the province's more lucrative economic activities to support a portion of another, I would council NS Environment to decline the approval of the NPNS ETF as proposed.

[7] https://www150.statcan.gc.ca/n1/daily-quotidien/031105/dq031105a-eng.htm
[8] https://globalnews.ca/news/1830438/timeline-canadas-2003-mad-cow-disease-crisis/
[9] https://edmontonjournal.com/news/local-news/a-brief-history-of-mad-cow-disease

Endnotes

1) Lignin are polymers important in the formation of cell walls, especially in wood and bark. Lignins lend rigidity and do not easily rot in natural conditions. These are big molecules within wood that routinely reach molecular masses in excess of 10,000 Dalton or 10 times the size of the industry's standard cutoff between light and heavy molecules.

As a biopolymer, lignin is unusual because it lacks uniformity in its linear makeup, being made up from a number of somewhat different building block molecules. In contrast, cellulose - the desired wood pulp - is a biopolymer chain made up entirely from the same molecule. Lignin is cross-linked haphazardly between the links in the chain of the polymer as a result, lignin forms a dis-ordered mesh. This mesh-like material fills the spaces in the cell wall between the uniform and rod-like cellulose, hemicellulose (a tree-branched structures of a few sugars that make up the cell walls), and other components, especially in vascular and supporting tissues within the plant.

Lignin is relatively hydrophobic (insoluble in water solutions) and rich in aromatic subunits, or chromophores, which leads to its 'colouring' of yellow to brown in solution and, indeed, within the pulp. The delignification process uses chlorine dioxide solutions to chemically 'attack' the aromatic regions of polymer. This 'bleaching' of the molecules alters the chromophores' ability to absorb light, making the molecule colorless in the visible spectrum.

Note that this is the same basic thing that happens to one's color dyed clothing when bleach is spilled upon them. The chromophores within the dye molecules attached to the fabric in your clothes are altered and so no longer absorb light in the visible part of the spectrum and the color fades

This bleaching process has the added benefit of breaking down the large lignin polymers into smaller polymers and molecules made up of only a few subunits, known as ' lignans'. The process ends up adding alcohol units into the polymers at the points of breakdown - among others. Adding in the 'water-like' alcohol groups increases the solubility of the smaller resulting polymers in water.

But this process is nowhere near 100% efficient. It leaves a random collection of various still large biopolymers, some in solution and some still attached to the cellulose pulp. Some of the smaller biopolymers have added alcohol units and some can have chlorine inserted into them - the later of these makes up much of the recalcitrant organic halides found in

2) A few examples of authors discussing the broad concern regarding chlorinated byproducts of the pulp bleaching process:

> *"Chlorinated organic molecules constitute the largest single group of compounds on the list of priority pollutants compiled by the U.S Environmental Protection Agency… The ability of chlorinated compounds to impart toxicity, bioconcentrate, and persist*

and consequently their ubiquitous distribution in the biosphere has caused public concern over their possible effects on the quality of life." [Bhatt 2007]

"*Adsorbable organic halides (AOX) are generated in the pulp and paper industry during the bleaching process. These compounds are formed as a result of reaction between residual lignin from wood fibres and chlorine/chlorine compounds used for bleaching. Many of these compounds are recalcitrant and have long half-life periods. Some of them show a tendency to bioaccumulate while some are proven carcinogens and mutagens.* " [Savant 2006]

"*Adsorbable Organic Halides (AOX) are among the toxic constituents generated from the recycled paper industry. The problems associated with AOX in the environment are their accumulation in the food chain and their persistence in nature.*" [Muhamad 2011]

"*Effluents originated in cellulose pulp manufacturing processes are usually toxic and recalcitrant, specially the bleaching effluents, which exhibit high contents of aromatic and halogenated organic compounds (e.g. residual lignin derivatives).*" [Chaparro 2010]

3) Receiving waters contribute substantially to the provincial economy:

In 2018, Nova Scotian caught lobster is the largest single commodity shipped by both value and volume from Stanfield Airport, at $215.7 million and 11,495 metric tonnes respectively, while total seafood export value equates to $232 million. ["Halifax Stanfield Helps Propel Nova Scotia Seafood Industry Exports to Record Volumes", News Release March 20, 2019]

"*With the recently ratified CETA agreement, demand for Nova Scotia seafood continues to grow in Europe. We also continue to see strong growth in Asia, particularly for live lobster exports," says Bert van der Stege, Halifax International Airport Authority (HIAA) Chief Commercial Officer. "In fact, China is our top market for live Nova Scotia lobster, with the volume of exports to this country increasing by 63 per cent over the previous year, double the average growth of all export destination countries.*"

https://halifaxstanfield.ca/2019/03/halifax-stanfield-helps-propel-nova-scotia-seafood-industry-exports-record-volumes/

The importance of seafood products to the Nova Scotian economy is readily apparent in that construction this August on a new $36-million cargo handling facility to ease the freight bottleneck at the Halifax Stanfield International Airport — another sign of the growing volume and importance of fresh seafood exports from Nova Scotia. [CBC News, "Booming seafood exports leads to $36M cargo expansion at Halifax airport", Nov 15, 2018]

https://www.cbc.ca/news/canada/nova-scotia/new-cargo-logistics-park-halifax-airport-1.4906860

As Premier Stephen McNeil said the new cargo facility will play a key role in helping Nova Scotia businesses bring more of their world-class products, including live lobster, to international markets. ["Breaking New Ground: Halifax Stanfield Begins Construction on Air Cargo Logistics Park to the Benefit of the Region", News Release August 20, 2019]

https://halifaxstanfield.ca/2019/08/breaking-new-ground-halifax-stanfield-begins-construction-air-cargo-logistics-park-benefit-region/

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LM Hewitt, JL Parrott, M. McMaster “A Decade of Research on the Environmental Impacts of Pump and Paper Mill Effluents in Canada: Sources and Characteristics of Bioactive Substances”*Journal of Toxicology and Environmental Health*, 2006, 9, 341–356.

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Appendix 1: Studies related to degradation of adsorbable organic halides in the effluent of bleached pulp and paper mill effluent.

I have listed, in reverse chronological order, the results of a search in Google Scholar for scientific papers published limited to the period 2015 - 2019 with the keywords "*degradation+adsorbable+organic+halides+pulp+paper+effluent+bleach+kraft*".

This is not an exhaustive survey. It is meant to demonstrate the prevalence of studies in the scientific literature regarding efforts to reduce organic halides in pulp effluent.

Vashi, H, Iorhemen, OT and Tay, JH. "Aerobic granulation: A recent development on the biological treatment of pulp and paper wastewater." *Environmental technology & innovation* Elsevier, 2018

Zhang, H, Nie, S, Qin, C, Zhang, K and Wang, S. "Effect of hot chlorine dioxide delignification on AOX in bagasse pulp wastewater." *Cellulose* Springer, 2018

Farooqi, IH and Basheer, F. "Treatment of Adsorbable Organic Halide (AOX) from pulp and paper industry wastewater using aerobic granules in pilot scale SBR." *Journal of Water Process Engineering* Elsevier, 2017

Yao, S, Nie, S, Zhu, H, Wang, S, Song, X and Qin, C. "Extraction of hemicellulose by hot water to reduce adsorbable organic halogen formation in chlorine dioxide bleaching of bagasse pulp." *Industrial crops and products* Elsevier, 2017

Chen, T, Li, Y, Lei, L, Hong, M, Sun, Q and Hou, Y. "Influence of residual black liquor in pulp on wastewater pollution after bleaching process." *BioResources* ojs.cnr.ncsu.edu, 2017

Toczyłowska-Mamińska, R. "Limits and perspectives of pulp and paper industry wastewater treatment–A review." *Renewable and Sustainable Energy Reviews* Elsevier, 2017

Yao, S, Gao, C, Zhu, H, Zhang, Y, Wang, S and Qin, C. "Effects of additives on absorbable organic halide reduction in elemental chlorine-free bleaching of bagasse kraft pulp." *BioResources* ojs.cnr.ncsu.edu, 2016

Dai, Y, Song, X, Gao, C, He, S, Nie, S and Qin, C. "Xylanase-Aidued chlorine dioxide bleaching of bagasse pulp to reduce AOX formation." *BioResources* ojs.cnr.ncsu.edu, 2016

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Nie, S, Wang, S, Qin, C, Yao, S, Ebonka, JF, Song, X and .... "Removal of hexenuronic acid by xylanase to reduce adsorbable organic halides formation in chlorine dioxide bleaching of bagasse pulp." *Bioresource …* Elsevier, 2015

Larsson, M, Truong, XB, Björn, A, Ejlertsson, J and .... "Anaerobic digestion of alkaline bleaching wastewater from a kraft pulp and paper mill using UASB technique." *Environmental …* Taylor & Francis, 2015

Kumar, S, Saha, T and Sharma, S. "… of pulp and paper mill effluents using novel biodegradable polymeric flocculants based on anionic polysaccharides: a new way to treat the waste water." *Int Res J Eng Technol* researchgate.net, 2015

Nie, S, Yao, S, Wang, S and Qin, C. "Absorbable organic halide (AOX) reduction in elemental chlorine-free (ECF) bleaching of bagasse pulp from the addition of sodium sulphide." *BioResources* (2015)

Kamali, M and Khodaparast, Z. "Review on recent developments on pulp and paper mill wastewater treatment." *Ecotoxicology and environmental safety* Elsevier, 2015

Hossain, K and Ismail, N. "Bioremediation and detoxification of pulp and paper mill effluent: A review." *Research Journal of Environmental …* pdfs.semanticscholar.org, 2015

Ashrafi, O, Yerushalmi, L and Haghighat, F. "Wastewater treatment in the pulp-and-paper industry: A review of treatment processes and the associated greenhouse gas emission." *Journal of environmental …* Elsevier, 2015

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:46:04 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I grew up on the Northumberland strait. Childhood memories of being at the beach or on the water via fishing boat are some of my fondest. The economy in Nova Scotia depends on the fishing and tourism industry not just in pictou county but province wide. To even think about doing anything that could potentially harm this is unfathomable. The Northumberland strait is the lifeblood of pictou county and should be conserved and protected for future generations. #nopipe Name: @gmail.com Address: Municipality: Yarmouth Postal-Code: ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 60 y: 19

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:46:52 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I feel a solution has to be reached to satisfy both the mill and fishermen. We canâ?Tt afford to lose this mill. This would ruin the forest industry in Nova Scotia. We canâ?Tt afford to lose the tax dollars generated by the forest industry. I feel the province should kick in a few bucks to help fix the problem. Name: @hotmail.com Address: Margaree Valley Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 87 y: 13

	sment Web Account
Su	Submission in opposition of Northern Pulp
Date:	November 8, 2019 12:48:50 PM
Attachments:	Northern Pulp Opposing.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Please see attached letter:

Dear Premier McNeil and Mr. Wilson,

I am a resident of both East Hants in the winter months and Pictou County during the summer season as we have a summer residence in Caribou River.

For the past decade our family been enjoying the waters of the Northumberland Straight. The entire region surrounding Pictou is very beautiful except for the disgusting pollution that the Northern Pulp Mill has been depositing into the air and water surrounding the region.

Each trip to the summer cottage constantly reminds of us what the local residence must endure year around as the foul odor hits you miles before hitting Abercrombie. On a day with a low ceiling that foul smell even saturates the air some 15 kilometers as the crow flies away in Caribou River.

This mill has been causing in my opinion great economic oppression for Pictou and the whole county. The Pictou Harbor waterfront is steeped in History being the entry point for many Nova Scotia family's starting with the Historic Ship "Hector". The region is beautiful and it is a gateway between 2 provinces arguably strategically located between 2 of Canada's top tourist destinations.

It should be a stopping point and destination for many visitors to the region. It should enjoy the success that other similar waterfront towns and communities throughout the province do. With the shear number of cottage owners along the shore in Pictou County the harbor town should be booming all season long but there are empty buildings and evidence of failure all over the community. My family would love to frequent the local waterfront businesses but can't tolerate the putrid smell of the mill across the harbor.

I don't buy into the idea that job losses will be as significant as what has been purported. I'm sure that there will be some businesses and workers in the province that may lose their jobs due to failure to adapt but I don't believe that "There will never be another log processed in this province". There are always solutions and other markets.

I lived in Summerside some 35 years ago when the announcement was made that the CFB Summerside was closing and that community was sure it was to be the end as it was a massive employer and contributor to that local economy. It happened and within a few short years the economy around Summerside was bustling again and today is one of the Strongest in PEI.

I have read most of the reports contained in the 2400 some pages that were submitted and all I can say is that quite simply lets not accept science based on what is promised ahead by those that stand to financially benefit but look in our rear view mirror at the science and performance that has been experienced in the past 53 years.

Do we accept science that tells us that 5 meters away from 82 million liters of effluent will be almost undetectable? Do we even want to accept that risk? Can we afford to accept that risk? Does your administration want to go down in history as making one of the biggest ecological mistakes of our generation?

Too much to lose ……too little to gain!

Yours truly,

_____

Nine Mile River
Nova Scotia

Premier Stephen McNeil and NS Minister of Environment Gordon Wilson

Re : Opposing Northern Pulp Submission

Nov 8, 2019

Dear Premier McNeil and Mr. Wilson,

I am a resident of both East Hants in the winter months and Pictou County during the summer season as we have a summer residence in Caribou River.

For the past decade our family been enjoying the waters of the Northumberland Straight. The entire region surrounding Pictou is very beautiful except for the disgusting pollution that the Northern Pulp Mill has been depositing into the air and water surrounding the region.

Each trip to the summer cottage constantly reminds of us what the local residence must endure year around as the foul odor hits you miles before hitting Abercrombie. On a day with a low ceiling that foul smell even saturates the air some 15 kilometers as the crow flies away in Caribou River.

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Do we accept science that tells us that 5 meters away from 82 million liters of effluent will be almost undetectable? Do we even want to accept that risk? Can we afford to accept that risk? Does your administration want to go down in history as making one of the biggest ecological mistakes of our generation?

Too much to lose ……too little to gain!

Yours truly,

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:53:26 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: As a student living in Pictou County, I am very aware of the debate over Northern Pulp and their proposed Effluent Treatment Plant. The mill has been sending effluent to the strait for over 50 years and there does not seem to be an effect on lobster. I believe that the effluent will be better than before because they will be using newer technology. The first part of the report also shows this mill compared to others in Canada. It looks like they do a good job and it should only get better with a new system. I also think that we need to keep jobs in Pictou County for young people. Without these jobs, more of us will need to move away. We need more money for doctors and schools. I hope that the mill is able to keep running. I think that is the right decision for Pictou County and Nova Scotia. Name: @gmail.com Address: Municipality: Stellarton, NS Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 48 y: 18

From: @mail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:57:03 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Honour the Boat Harbour Act and the closure date in January 2020. Have Northern Pulp pay the medical expenses for health issues in affected communities that are linked to the exposure of the mills emissions and effluents. Have Northern Pulp pay for a rigorous and thorough ecological restoration of the lands they have clear cut, as well as the water and air they have contaminated. Northern Pulp must ensure a non bias, ecologically scientific action plan to ensure the ecological restoration of clear cuts, far more than the existing reforestations of monoculture plantations of spruce. They must pay for jobs for scientists and local peoples affected and willing, to employ remediation measures to de detoxify and regenerate the degraded lands they have exploited. Name: Email: @mail.com Address: Wolfville, Nova Scotia Municipality: Wolfville Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 68 y: 18

From: @wagnerforest.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 12:57:56 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Pro Pipe build the pipe give the extension...dont let the rural economy of Nova Scotia go down the toilet. Name: @wagnerforest.com Address: Municipality: Postal-Code: Phone: Fax: email_message: Privacy-Statement: agree x: 84 y: 27

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 12:58:51 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Ladies and Gentlemen,

I am in the process of immigrating to Canada with Our family has an annual income of over $250,000 CAD, and, due to investments, expect that income to continue after immigration. Pointedly, our yearly income will soon be injected into the local economy wherever we decide to live.

Our family considered settling in the Pictou – Glasgow area, due to the low cost of living (we really just want to retire early!) and often picturesque neighborhoods, as well as the proximity to education for our children, but rural feel for us parents looking to slow down from our hectic US city lives. The air in Canada is also so clean that this is a serious draw for us city dwellers.

The pulp mill, however, has caused us to rethink our plans. In particular, we need to limit the exposure of our children to cancer-causing toxins in the water, soil, and air, which is a problem where we live currently, due to government activity 50+ years ago. The cancer rates of those living near the mill are, in fact, higher than the national average. And the area just isn't as pretty as it could be.

And the STINK, oh my…we have no words for it….I can't sleep with that kind of stink in my home….

As an American, I know that money is always Number One, so I won't ask you to put the health and wellbeing of your own people first. Or is that the real problem – that the victims aren't really your own?

Either way, I'm pretty sure that if Northern Pulp is forced to close and the place is cleaned up, (possible for fish and whales to return???), the local economy will pick up and grow immensely through tourism and the offering of a better quality of life. Yes, a short-term dip may happen if people lose jobs, but I suspect a good portion of those jobs will transfer to clean-up efforts, followed by tourism support.

If money is Number One, then Northern Pulp should be forced to close so the local economy can be allowed to grow. And that's my point: the mill is stifling the economy, not supporting it.

I hope the decision-makers can take the bigger picture into account and see they are being penny-wise and pound-foolish.

Best regards,

Westminster CO

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:01:44 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: 1.Northerrn Pulp has not met the terms of reference for the report. 2.They have not provided data to prove that project can be done safely. 3.On almost every key point NP has not provided a concrete plan on what will be done. 4.No definite pipe route, no leak detection on marine portion of pipe, no specified leak detection for on-land pipe have been specified, only options. Entirely unsatisfactory. 5.Many factual errors, including on simple points such as where fish are located and where people fish. 6.Risks of treated pulp effluent to marine environments are well recognized and the Southern Gulf of St. Lawrence is a sensitive ecosystem with endangered species and species at risk present. 7.Importance of fishing industry to communities and provincial economy cannot be dismissed - this effluent will affect the ecosystem and there is no guarantee that it will not negatively impact an already healthy fishing industry. 8.I ask the honourable Minister to reject this project Our Southern Gulf od St.Lawerence is an ecosystem that needs protection and respect. Dumping effluent into this body of water as suggested by Northern Pulp as a solution to dilute their polluted waste is unacceptable. We can no longer hide behind veiled ignorance and act as though dilution is the solution to pollution - it is not. The science is clear, and our biosphere is degrading at a rate which may very well soon make survival impossible for human beings protecting and respecting the ecosystems we still have is the most important decision we can make. Respecting and honouring our Treaties with Indigenous people is one way to move forward in a constructive and positive way that will benefit us all in the long run. Thank you for considering my comments. Name: @hotmail.com Address: Municipality: Lanark Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 52 y: 22

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 1:04:51 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 11:42:36 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 11:16:31 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 11:05:14 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

It is time to respond to the environment and it's protection like adults. The dangers are obvious and ignoring them is irresponsible.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 10:51:31 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Children are the rainbow of life. Grandchildren are the pot of gold.

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 10:36:45 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Halifax NS

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 10:21:09 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

I am a Pictou County land owner and have had many discussions on this topic over the last few years. What it comes down to is that we are in a lose lose situation for the Nova Scotian and Pictou County economy, no matter which way this pans out. Either the pulp mill closes and we lose good people from the community, or the fishing industry suffers once again, affecting the fishing community. Knowing there is no good economical option, we must do what is right for the environment and the health of our residents.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 9:47:40 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Friends of Nature Conservation Society

Chester, NS

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 9:45:39 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I am a retired water resources engineer who has worked in the environmental assessment process on several major projects for the provincial government in another province. I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment.

I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Dartmouth, NS

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 8:36:34 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

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Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Sent from my iPad

From:
To: Minister, Env; ec.ministre-minister.ec@canada.ca; min@dfo-mpo.gc.ca; Colwell, Hon. Keith (DFA)
Subject: Responding to Northern Pulp"s Proposed Effluent Treatment Facility Project and Focus Report
Date: November 8, 2019 12:21:59 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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The Honourable Jonathan Wilkinson, Minister of Fisheries, Oceans and the Canadian Coast Guard
The Honourable Keith Colwell, Minister of Agriculture, Fisheries and Aquaculture of Nova Scotia
The Honourable Gordon Wilson, Environment Minister of Nova Scotia
The Honourable Catherine McKenna, Environment Minister of Canada

Dear Ministers,

I am writing in relation to the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project. Specifically, I am writing to express sincere concern about the unrecognized and immeasurable risks and socio-environmental impacts of Northern Pulp's Focus Report on Proposed Replacement Effluent Treatment Facility Project. Your positions around this proposal is significant, and ultimately you hold a lot of power in regards to the health, safety and future of Atlantic Canadians.

It is irresponsible to consider the proposed 'contingency planning for potential contaminants' in the Northumberland Strait, wetlands, and surrounding areas as acceptable in any way. The Impacts and Mitigation section of Focus Report, while inaccessibly lengthy and full of 'conservative estimates', lacks any substantial recognition or empirical measures of real environmental and ecological dangers. Without proof of absence of significant risk, without critical data around environmental safety, and insufficient evidence to assess damages and dangers, the environmental assessment is simply inadequate.

Let me be very clear: this should be alarming to fishers, land protectors, community members and Ministers alike.

Consider and act on evidence-based, ethical research and data that is not privately or corporately funded. Listen to scientists, fishers, harvesters and Indigenous land protectors, who are the real experts. Recognize well-established social and environmental determinants of health, which are lacking from the Focus Report.

There an opportunity to re-direct a legacy of devastation in Nova Scotia's North shore. I stand in solidarity with Pictou Landing First Nation Chief Paul, the Friends of the Northumberland Strait, the Clean Ocean Action Committee, the Nova Scotia Chapter of the Canadian Parks and Wilderness Society, the Ecology Action Centre, the Atlantic Salmon Federation, the North Shore and South Shore Nova Scotia Chapters of the Council of Canadians, the Sierra Club Canada, the Tourism Industry Association of Nova Scotia, the Resource Management of Nova Scotia Environment, the Harbour Authority of Caribou, the hundreds of thousands of Nova Scotians and millions of other concerned Atlantic Canadians.

We call on you to reject the Northern Pulp Effluent Treatment Proposal.

Sincerely,

From:
To: Minister, Env
Cc:
Subject: Northern Pulp Mill. Please DO NOT ALLOW!
Date: November 8, 2019 12:17:27 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Minister Gordon Wilson,

Please, please, please do not allow the pulp mill in Pictou to build a pipe to disperse it's effluent into Northumberland Strait. Can we not learn from history that no distance is far enough for what we put into our oceans not to come back to us? How many beaches and shorelines have to be ruined, how many fish and mammals of the ocean have to die before we admit that when we put toxins into the ocean we are responsible for the fate of these things?

I understand you are trying to save jobs, but it is at the cost of people's health! People who are sick cannot work! We need to create sustainable businesses and jobs! This solution will not provide these. (And I do understand about job losses, my father worked in a paper mill!)

The money that would potentially be spent on this pipeline would be put to such better use finding a way to clear the toxins in an environmentally safe way. We have come so far with new science and new technology, please encourage it's use in finding ways to create the things we want (paper) without destroying the things we need. (Our beautiful ocean)

Thank you for your time, and I hope you make the right decision, the environmentally right decision, since you are our environment minister.

Sent from my iPad

From:
To: Minister, Env
Subject: Northern Pulp Effluent Treatment Facility
Date: November 8, 2019 11:53:56 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Environment Assessment Web Account
Subject: Letter regarding Effluent Treatment Facility
Date: November 8, 2019 1:09:12 PM
Attachments: Scanned from a Xerox Multifunction Device.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Please find attached letter regarding Effluent Treatment Facility in Pictou County.

Sincerely,

Chance Harbour, NS

November 8, 2019

The Honourable Gordon Wilson
Minister of Environment
PO Box 111
Church Point, NS
B0W 1M0

Via E-Mail: EA@novascotia.ca

Dear Minister:

I am writing a response to Northern Pulp's report for a proposed replacement Effluent Treatment Facility (ETF).

The ETF proposed facility for Abercrombie Point is, in all material respects, no better than the existing EFT in Pictou Landing.

The big differences are that the Pictou Landing ETF, which after treatment enters Boat Harbour, a 2 square kilometer body of water. It allowed the pulp effluent to cool, settle, etc.. for 17-18 days before entering the Northumberland Strait.

Contrary to original claims made in the 1960's, Boat Harbour's marine was destroyed within two years of its 1967 opening. The waste water temperature, organic wood fibre solids and the spent industrial chemicals killed the marine life in the estuary environment. The dramatic change in Boat Harbour, necessitated the addition of the settling ponds, the aeration machines and numerous other technologies to help with remediation of the Mill effluent during the 1970's. Ultimately, the destruction of the Boat Harbour's environment became the sacrificial body of water so that the Northumberland Strait environment would not be devastated.

The new proposed 2019 ETF will have waste water entering the clarifier at 62,000 cubic meters per day (@ minimum Mill operation). The clarifier will be filled within the stated capacity within 5 hours of operation and will have 700 litres per second waste water entering and exiting during the minimum Mill operations. The five hour fluid retention will occur with sweeping and skimming to remove solid debris occurring within constant turbulence of in flowing waste water. This constant in flow will do little to assist in sedimentation or permitting wood fibres to float toward a skimmer. The clarifier is 56 meters in diameter... by comparison, the old ETF, a much more vast body of trapped water, allowed 17-18 days to accomplish the settling of sediments and the 17-18 days duration for

bacteria to digest water soluble debris. So it is difficult to be assured that a 5 hour treatment process could be an improvement over the existing ETF process.

The new proposed ETF, has an upper capacity of waste water flowing at 82,000 meters^3 per day which fills the clarifier within 3.8 hours and would have 970 litres per second flowing in and out of the clarifier catchment. If the Mill operates at the upper capacity, as stated, there is a maximum retention time of less than 4 hours to scrub away/remove solids and sanitize with massive waste stream.

The COD level in Northern Pulp's waste water, as stated per AMEC 2010 study is in the 100th percentile of Canadian mills. Dillion Consulting and other third party testing were working as direct clients of Northern Pulp to assist in preparing the Focus Report response. One could suggest they may have had a client bias... older studies are legitimate evidence that further technical review is essential.

They reference the use of new bacteria in the proposed ETF, the true environmental implication needs full and complete "independent" arms length review.

Historically, little money has been spent on capital modernization of the equipment within the Mill to reduce waste water. The dewatering of the pulp fibre is accomplished with the 1950s – 1960s rollers and air blowers. The process is more than 52 years old, yet the new ETF will have little or no time to accomplish the purification of this industrial waste water... The COD levels, suspended solids, and the BOD loading will get piped to the Northumberland Strait far away from the visible sight of the Mill management and the proposed ETF process operators.

The proposed ETF pipeline route will run by the highway, through Pictou's watershed and enter the Northumberland Strait via the Caribou Harbour. The Mill management have not proposed any valves to close off flow within the pipeline should the emergency arise.

The water temperature of this effluent will be 30-35 °Celsius – all year long. The high density polyethylene piping is efficient at insulating the piped fluids. Thus, very hot water entering the pipe on the Mill site is going to exit the pipeline 15 kilometres at the same hot temperature. The thermal impact to fish and shellfish will be deadly.

The Northumberland Strait current flow is 6 knots / hour. The pipeline will discharge 62,000,000 to 82,000,000 litres of hot contaminated water daily. The waste water containing 10 milligrams/litre would deposit 620 kilograms per day of solids. At 100 milligrams/litre will result in 6,200 kilograms per day. The old ETF was receiving approximately 700 milligrams per litre, which represents 43,400 kilograms per day of waste solid pollution. This is a significant impact on the oxygen levels for all marine life. No wonder Boat Harbour estuary died within two years. Thus my point is, a 50 or 100 meter radius around the diffusers is huge under-estimation of the killing zone for the pipeline and the proposed marine dumping.

The referenced diffusers on the proposed pipe, will be ineffective and there is an extremely high likelihood, given the extreme volume waste, it's pressure etc., that they will fail within one or two years. Once installed, if the assessment is correct, they will not be replaced, as there is no requirement or planned inspections.

Northern Pulp confirms it does not know the size of the effluent phlegm and they are monitoring it until production begins. Millions of hot waste water containing spent chemicals and wood solids are going to be pumped into a valuable fishing habitat. Yet Northern Pulp really doesn't understand the fate of this pollution.

If a pipe does break, they will not know until it is too late. A horrifying reality.

The impact on the shellfish industry and indeed the fishing industry in this area will be catastrophic. The impact on residences and tourism of the Caribou area, Pictou County is also overlooked. The odour of off gassing chemicals trapped in the liquid effluent, the dead fish, the water discolouration, the sediments, etc... will impact businesses, property owners, tourism, the marine life, water recreation, etc...

No reference is presented on the impact of proposed ETF on residences of Abercrombie Point and adjacent Abercrombie residences, on the Northern Pulp employees (this site is the "New" Pictou Landing ETF ground zero).

The fact remains that this Northern Pulp bleached craft mill is old and antiquated. Although built and opened in 1967, its US design predates this significantly.

It is currently beyond 2x its economic life cycle and has not had any consistent or required reinvestment for upgrades / replacements.

Given its age, it is clear from Northern Pulp's response they are not capable of monitoring and/or controlling their effluent emissions.

Mr. Minister, I urge you to not approve Northern Pulp's ETF. The environmental and social consequences will be devastating and will truly destroy the future potential of Pictou County by keeping it locked in the past.

The impact on the province by willfully turning a blind eye and issuing a permit will be profanely negative to its reputation.

Northern Pulp's filing reinforces Northern Pulp's and their owner's, culture and practice of misrepresentation, disrespect, continued vagueness, and zero tolerance of criticism or questions, concerning their practices. It is truly offensive and not the actions of a socially responsible organization.

The long-term economic viability of this plant is a real issue and future funding by the Province and its tax payers is unwarranted.

From: Minister, Env
To: Environment Assessment Web Account
Subject: FW: Northern Pulp dumping into the Northumberland Strait CRM:0404269
Date: November 8, 2019 1:09:37 PM

NP comments

From: @novascotia.ca>
Sent: November 8, 2019 11:20 AM
To: Minister, Env <Minister.Environment@novascotia.ca>; Bignell, Laura M <Laura.Bignell@novascotia.ca>; Musgrave, Kevin J <Kevin.Musgrave@novascotia.ca>
Subject: FW: Northern Pulp dumping into the Northumberland Strait CRM:0404269

@gmail.com

***No Action Required*:**

The enclosed correspondence is being forwarded to your department for information purposes only.

Sincerely,

Executive Correspondence Team

Received: Fri Nov 08 2019 09:20:26 GMT-0400 (Atlantic Standard Time)
To: ECO/OP Premier;
Subject: Northern Pulp dumping into the Northumberland Strait

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Hello Minister Wilson,

I'm writing to voice my concern about the plan from Northern Pulp to keep dumping into the Northumberland Strait. Why are you allowing this, and not holding them more accountable? Why is this not stopped immediately?

We are in the middle of a climate crisis, and this is unacceptable; this kind of disregard for the environment is what got us here in the first place. Further, the decisions you make could hurt your future electoral aspirations, as I know I will not vote for you if you allow this to keep going.

Please help our province, the ecosystems and our future generations, and do not allow this company (or anyone else) to pollute our water.

Thank you for your time,

From:
To: Minister, Env
Subject: Northern Pulp
Date: November 8, 2019 11:09:01 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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I am writing today to express my great concern regarding Northern Pulp's plan to continue to dump effluent into the Northumberland Strait. This plan quite clearly risks the viability of the nearby fisheries and infringes on First Nation's sovereignty. It flies in the face of your government's recent attempt to paint itself as environmentally aware. Permitting such ecosystem degradation is unthinkable.
Your government is 2 years away from facing the electorate, and I guarantee that we will hold you accountable for these decisions. Please take the appropriate steps for our province, and do not permit this multinational corporation to continue to pollute our waters. Yours sincerely,

From:
To: Minister, Env
Subject: Northern Pulp
Date: November 8, 2019 10:19:21 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson - you may be tired of reading all the messages entitled Northern Pulp, but please don't stop.

I hereby formally register my opposition to the Abercrombie Point pulp disposing of its effluent in Northumberland Strait, PIctou Harbour, Caribou Harbour, Boat Harbour or any other body of water where there is life.

The only way I would back down from that position would be if I could see with my own eyes the staff at the mill actually drinking water from the outflow. And I mean that I want to see them hold their cups under the disposal pipe, with no trick about substituting water (as happened when the mill was estabiiahed decades ago), or catching when the mill is flushing plain water through pipes or any similar guise.

If a multi-billion dollar company - with five years heads-up for planning - cannot come up with a better idea for disposing of its waste, then it should not be allowed to operate in Nova Scotia.

Nor should it continue to receive any funds from provincial taxpayers. The money would be better spent finding new and better employment for the mill workers, if, as they predict, their jobs hinge on dumping poison in the strait.

Otherwise, the cost would be two-fold - funding the fishery which will take a loss, and still funding the mill. Not sensible at all.

"If you want to bake an apple pie from scratch, you must first create the universe..." Carl Sagan

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 1:10:23 PM
Attachments: Nova Scotia Department of Environment - Northern Pulp Focus Report Feedback.pdf

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** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please see attached my comments/concerns regarding the proposal from Northern Pulp and the subsequent Focus Report.

Thank you.

Best regards,

@hotmail.com

Environmental Assessment Branch, Nova Scotia Environment
P.O. Box 442,
Halifax, Nova Scotia B3J 2P8
Via E-mail at ea@novascotia.ca

RE: Northern Pulp Effluent Treatment Facility FOCUS REPORT

Good morning,

My name is and I am writing to you today to once again express my concerns regarding the Northern Pulp Effluent Treatment Facility plan with increased trepidation regarding the indication that effluent from this facility will be pumped via a pipeline that passes through/beside the Town of Pictou's watershed land and then dumped into the Northumberland Straight.

I am a resident of Pictou having moved here almost seven (7) years ago. I have spent much of my career in the business world and one component of my work has been establishing whether the RISKS associated with a project are acceptable. It is a common and necessary business practice to assure that **if and when the risks are greater than the outcome**, a project will not move forward. I believe in this case where a pipe being constructed to carry effluent – the chemical makeup of which is not 100% known (according to the Environmental Assessment document submitted by Northern Pulp as well as the Focus Report) - creates a scenario where the risks associated with this project ARE NOT worth the potential outcome.

I responded to Northern Pulp's EA submission and I don't feel all my concerns were addressed. Seeing an answer like "This question will be relayed to NSE" is not an answer to a question, it's sending the question somewhere else and whatever the results of that question/concern being sent to NSE does not show up in the focus report and is unlikely to be made public.

Northern Pulp's Focus Report states outright that the construction of the pipe through the wetlands **will cause damage** and they will have to compensate for that damage but they provide the Environment Minister with zero information about the scope of that damage and the adverse environmental impact, thereby not meeting the terms of reference by enabling the minister to make an informed decision.

The fact is that at times pipes leak and sometimes break. We have been made aware of two leaks in the current system at Northern Pulp in the past several years. The conditions where a pipeline is installed, the person(s) installing the pipeline and the actual pipe itself are all subject to the real risk of leakage and potential environmental damage.

Unfortunately, the new proposed leak detection system will still not detect small chronic leaks which could go on for an extended period. Additionally, the effluent will not be treated even as well as it is now because it will not have the cooling and polishing/settling that takes place now.

It has been over a year since the last leak was reported – by a third party – and there is still nothing reported to the public regarding the investigation. This is unacceptable and frankly the optics of this do not reflect well on the Department of Environment – some would say that the details are not being released until after this decision is made. That is not a government working for the people transparently. Transparency was a word often used when campaigning however it has not been adequately put into practice on this matter as well as other projects around the province. However, we are currently focusing on Northern Pulp's proposal.

Pipe leaks are only one of numerous problems - not the least of which include pumping this toxic effluent into the ocean and increasing already toxic air emissions which are not adequately dealt with in the Focus Report. Some feel that the quality of the air is a separate project and can be dealt with later, however that is not realistic. If you approve this plan and DO NOT KNOW the quality of the air and the effect on Human Health, history has shown that the Department of Environment will not adequately monitor and enforce regulations in this regard. The small improvement made to the quality of air a few years ago was largely due to the pressure which the Clean the Mill Facebook group was able to exert.

From my perspective let's look at some of the parties that will be impacted by this project when something does go wrong – and looking at the history of this company (as well as previous owners), something will.

1. **Fisheries**
   The risks associated with this project include extensive damage to the ecosystem in the Northumberland Straight. This will directly impact the livelihoods of fishermen and fisherwomen in three provinces directly (Nova Scotia, New Brunswick and Prince Edward Island). This industry is a multi-billion-dollar business which exports seafood internationally. Just imagine what would happen if this pipe went in and the effluent is harmful to the marine life. Mad cow disease took decades to recovery from and it doesn't take much imagination to see what would happen to this industry.

   We have the most pristine cold waters. In 2017 the value of our seafood exports was $2.0 billion. Infrastructure at Halifax Stanfield Airport has begun to increase with holding areas for lobster and with 3-5 air cargo shipments to China per week, as well as flights to Seoul, Korea.

   Northern Pulp constantly talks about their "spin-off" jobs. Fisheries also has "spin-off" jobs – it is another product that requires the same structure to export. Let's not forget those.

2. **Tourism**
   The Tourism sector also brings billions into this province mainly due to our clean oceans, beautiful beaches and magnificent scenery – not to mention the friendly people. Why would we want to put this at risk? Even taking into account the number of "spin-off"

jobs Northern Pulp states, the RISK is not worth it. The Tourism industry employs thousands of people in Nova Scotia and has far more economical impact than the 277 jobs at Northern Pulp. This company is part of Paper Excellence who have a horrid record on the environment internationally.

In addition, there is the "spin-off" revenue that is brought to the many cities and towns that the tourists visit – and spend their money. Nova Scotia is "**Canada's ocean playground**". If there is an incident in the waters of the Northumberland Straight**, there will be no recovery.**

3. **Local Real Estate Market**
   If such a break would occur, there is also the potential for the real estate market to die completely in this area of Nova Scotia - for homes and cottages. I personally will have to consider selling both my home in Pictou and my cottage on Cape John should a decision be made to move forward on this project. If and when there is a breach in the pipe effecting either the Pictou watershed or the Northumberland Straight, this would render both properties unsaleable and that is not a risk I am willing to take. I also expect that should this occur, the Nova Scotia government will have liability to its citizens in this case – after all these would be preventable damages.

4. **Town of Pictou residents**
   Now that the plan has been filed, the matter of the pipe and where it is planned to be constructed and where it will dump the effluent is known. There are many better qualified people who can and I am sure will speak to the chemical nature of the effluent (what is known at least) however I can speak to the fact that the pipe is to be constructed close to the watershed for the Town of Pictou. We have just come to the point of having clean water in our town, thanks for grants from both the Federal and Provincial governments as well as rate adjustments to the town residents. This has been a multi-year and multi-million-dollar project and in NO WAY should any risk be taken with regards to clean water in our town.

   The Town of Pictou heard about this via the media, like everyone else. As a major stakeholder in this situation this is unacceptable and again finds Northern Pulp not true to their word. There has also been NO information sessions on this project held in the Town of Pictou which to me is quite telling.

   Nothing in the Focus Report was changed to address this concern.

5. **Pictou County residents**
   There is also the consideration of the quality of air. This part of the province has suffered enough regarding this – every citizen should be able to open their windows on a nice warm day and the reality here is that we can't. This should not be the case in Nova Scotia. It has greatly affected the businesses in our town – many who have left since visitors want no part of this.

Several local medical doctors have recently written concerning the quality of the air here

Their full letter can be found at https://nsadvocate.org/2019/03/06/letter-northern-pulp-wealth-over-health/?fbclid=IwAR3JOvaYq1ncax-lvZNPzsv3P29IFunDd-qN6I7NQxCKGXSPKzvlhmhMvVs – however here is a brief excerpt regarding the particulate matter coming into the air from the pulp mill:

> *"In 2013 the WHO declared PM 2.5 carcinogenic to humans. Once in the air it can stay in the air for days to weeks and it can travel hundreds to thousands of miles. The new precipitator installed on the recovery boiler addresses a percentage of the PM2.5. The main boiler has no precipitator, but has scrubbers. These mechanisms require constant maintenance to operate with high efficiency. The results of the operating efficiency should be transparent and made public and tested more frequently."*

I would also refer you to an article from Dalhousie University that was published earlier this week on the cancer-causing impact of the air emissions released from Northern Pulp, which can be found at https://www.halifaxexaminer.ca/province-house/dalhousie-researcher-breaks-silence-over-pulp-mills-cancer-causing-air-emissions/?fbclid=IwAR1vhmxpQra7s5kcivyS0NC9fJRiunR2399AcW-DTdPm_WPogPFhwjwag3I

There is nothing in the Focus report that addresses this concern.

6. **Pictou Landing First Nations**

The Boat Harbour situation which the people of the Pictou Landing First Nations have been dealing with for over 50 years must come to an end. This is one of the worst cases of Environmental Racism to occur in our county and it is well past time for it to come to an end. On that note, I do not believe any extension should be granted to Northern Pulp. The Boat Harbour Act was legislated in 2015 for closure on Jan 31, 2020. Northern Pulp did not file its Environmental Assessment to the Province of Nova Scotia until January 31, 2019 - only one year from the legislated closure - not enough time to get approval and start purchasing and construction to meet the deadline. Their plan should have been filed well before this. As the Minister of the Environment at the time ruled, it **lacked a significant amount of information** that created the need for the Focus report.

Nova Scotia has been standing proud with regards to its dealings with our First Nations and has made some great progress in recent years. This is the time to support the Pictou Landing First Nation people. Actions speak louder than words.

Summary

I am surprised that in 2019, the talk of actually pumping effluent into the ocean is a prolonged conversation. What happened to plain old **common sense?** Nothing should be dumped into the ocean. Nothing. Simply because there are other situations/locations who may still be dumping into bodies of water is an inadequate excuse to do it.

It is time to protect the environment and the people of Nova Scotia. It is time to stop corporate welfare in this province. Northern Pulp employee who has been speaking publicly on this matter (see CBC coverage on this topic) has indicated that his employer has "deep pockets". I would suggest if the mill had wanted to continue its operation here, those deep pockets could be used to create a **closed-loop process** where there is zero environmental impact (or close to it). I have heard arguments all about how it doesn't exist however if Northern Pulp can source studies on mills that have never opened, then surely they can discover the science to plan and implement a closed-loop solution. I believe that what is really the real barrier is the cost of doing it to Paper Excellence.

Recently, it has become regular news that paper mills are struggling. Many Pulp and paper mills in North America are taking downtime due to market price, full warehouses and the demand for paper decreasing by almost 8% per year. Why would the province of Nova Scotia – and the taxpayers – want to invest so heavily in an industry which is dying and at the same time, risk our other industries – namely Fishing and Tourism.

In my opinion, current government can create a **new legacy** by doing the right thing here and ending the use of Boat Harbour and ensuring that another environmental disaster does not occur in the Northumberland Straight. I recommend not approving this Focus Report.

#nopipe #noextension

Thank you for your time and consideration of my comments and concerns.

Pictou, Nova Scotia

From:	Minister, Env
To:	Environment Assessment Web Account
Subject:	FW: Stop Northern Pulp Polution CRM:0404265
Date:	November 8, 2019 1:10:28 PM

From: Correspondence Prem <Correspondenceprem@novascotia.ca>
Sent: November 8, 2019 10:46 AM
To: Minister, Env <Minister.Environment@novascotia.ca>; Bignell, Laura M <Laura.Bignell@novascotia.ca>; Musgrave, Kevin J <Kevin.Musgrave@novascotia.ca>
Subject: FW: Stop Northern Pulp Polution CRM:0404265

File #: PNS-04724-Y1V8T5

Email Address:

No Action Required:

The enclosed correspondence is being forwarded to your department for information purposes only.

Sincerely,

Executive Correspondence Team

---------- Original Message ----------
From:
Received: Thu Nov 07 2019 14:48:05 GMT-0400 (Atlantic Standard Time)
To: ECO/OP Premier;
Subject: Stop Northern Pulp Polution

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I am writing you today to express my deep concern over Northern Pulps plan to continue dumping waste into the Northumberland Strait.

This plan risks the viability of nearby fisheries.

This plan violates the right of the indigenous communities of our province who have suffered enough under the reign of white colonialism.

This is your chance to prove that you and your government are committed to keeping promises in

regards to the environment. We will hold you accountable.

I urge you to use your position of power to help make the decisions that people like me can't. Make the right decision for our people and our planet. Do not allow this pollution to continue.

Sincerly,

From:	Minister, Env
To:	Environment Assessment Web Account
Subject:	FW: Comments on Northen Pulp Focus Report
Date:	November 8, 2019 1:12:09 PM
Attachments:	BRN3C2AF46228E4_0000003551.pdf

From: @scotsburnlumber.com>
Sent: November 8, 2019 8:36 AM
To: Minister, Env <Minister.Environment@novascotia.ca>
Subject: Comments on Northen Pulp Focus Report

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Name: _____

Address _____ N.S

E-mail:_ _____ hotmail.com

Signature _____

RE: Northern Pulp Environmental Assessment Focus Report

Attention: Hon. Gordon Wilson, Minister of Environment

As an employee / family member of Scotsburn Lumber Ltd. Our mill has been running successfully since we restarted operations in 2012. We currently operate on a two shift basis and process about 90+ MMBF per year. Our operation is vitally dependant on Northern Pulp. Currently, 65% of the studwood we process ends up either as sawmill chips, hogfuel or sawdust and shavings. We sell the product we make at Scotsburn throughout Canada and the United States. If we have no market for our residual products then we will be in a very dire situation. Our industry is very interconnected where each section is critically dependant on the other for material for success. The loss of the largest pulpmill in the province that currently purchases over 90% of the sawmill chips would be a devastating blow to our industry..... one that would be difficult if not impossible to overcome. The vast majority of studwood that our sawmill uses comes from private land in Nova Scotia. If there is little or no market for studwood and pulpwood in the province then the 60,000+ landowners will be negatively impacted by this decision.

We have had the opportunity to review the Focus Report for the new Environmental Treatment Facility (ETF). It is my understanding that this facility will be world class that will meet and exceed all Provincial and Federal environmental regulations. The current Boat Harbour ETF through benchmarking by 3rd party experts shows that Northern Pulp is currently operating as an average to above average facility when compared to like facilities throughout Canada. The new facility will be an improvement on this.

I trust that the science presented through the Focus Report will allow the future construction of a new ETF for Northern Pulp. I know that the Forestry and Fishing sector has co-existed for the last 50+ years and both have had long term success. I see in the focus report that fishermen are setting traps close to the outfall of Boat Harbour. If there was truly an impact on fishing I know that this would not occur. The Focus Report was prepared by 3rd party experts and show data that indicate no significant adverse environmental impacts have been predicted for this projects construction or future operation.

We all want Boat Harbour restored to its natural state. We need the government of N.S. to keep the commitment to clean up this area, at the same time allow Northern Pulp the time to construct their new ETF facility before clean up begins. Failure to do so will cause irreparable damage to the forest industry as a whole in N.S.

Name: _____

Address:_____

E-mail:___ Com

Signature: _____

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Name: _____

Address: NS

E-mail: tmail.com

Signature _____

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Name: _____

Address: _____

E-mail:_ mail.com

Signatur _____

RE: Northern Pulp Environmental Assessment Focus Report

Attention: Hon. Gordon Wilson, Minister of Environment

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Address: _____ eet, New Glasgow NS

E-mail: _____ .com

Signature: _____

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E-mail:_ gmail.com

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Name: _

Address: Salt Springs. NS.

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From: @dal.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:12:55 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I support the Replacement Treatment Facility Project for a number of reasons. Some of the reasons I will list below. I trust that Northern Pulp did their due diligence in the Focus Report provided to the government. With the initial amount of studies needed for the Focus Report there was a 5 year deadline. As the years went on more and more studies where added. These take time and an appropriate amount of time should be allotted to do proper testing. Also with many obstacles halting these studies this should be taken into consideration. In order for the human race to co-exist with each other shouldnâ?Tt we work together to solve this without either side â?~losingâ?T. If the mill stays open then absolutely there should be an environmentally safer way to treat the pulp. They are working on that but need a little more time to do it properly. If the mill closes you will see more damage to this province than the state Boat Harbour is in now. There are other pulp mills that function more eco friendly to the environment and oceans. This is what Northern Pulp is trying to do but in an unreasonable time line. Save all the people in this county and province from economic and environmental disaster not just one side or the other. This can be done if we all work together. Name:
Municipality: Churchville Postal-Code:
Fax: ### ### - #### email_message: Privacy-Statement: agree x: 71 y: 18

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 1:13:32 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

To: Premier Stephen McNeil and Minister for the Environment, Gordon Wilson,

My name is I live on the Eastern Shore just north of Musquodoboit Harbour. I came to Nova Scotia as an immigrant in the 1970s. I pretty soon learnt that this economy is driven by fisheries, forestry and tourism, and that I'd chosen one of Canada's 'have not' provinces to make my home. And so, I know for government it is always an ongoing challenge to secure jobs for voters and their families. However, I'm shocked at the cavalier way in which your government chooses to interpret your fiduciary duty to Nova Scotians when it comes to environmental management. I am constantly shocked by the devastation I see of clearcut forests wherever I travel in and over the province. I'm frustrated by the waffle and doubletalk I witness related to the Northern Pulp effluent issue.

I cannot countenance that you would find it acceptable that the marine life of the Northumberland Strait can withstand the impact of 31 billion litres PER YEAR of its repulsive effluent. Yes, there are jobs in the plant and there are forestry jobs. Over the years various governments have made some serious errors in judgement as regards the fisheries too. Where have all the cod gone? No, I'm not laying that on your doorstep, nor the open net fin fish farms let in by your predecessors. But what I'm saying is that it is time to take courageous action and reconfigure this economy around authentically environmentally sustainable initiatives and jobs. You cannot expect citizens diligently to sort and select through their garbage to reduce our impact on the environment and then go ahead with allowing clear-cutting and spewing Northern Pulp effluent into our ocean.

Under your current leadership Nova Scotia is not exactly contributing to the protection of the biospheres surrounding us, nor is it slowing down its contribution to disastrous climate change. It's never too late to do the right thing.

Imagine if as much effort had been pumped into exploring and creating green economy job opportunities as you've had to pump into this old tech harmful white elephant. Glossy paper manufacture is NOT where the world economy is heading.

--

_____

Nova Scotia, Canada

From:
To: Environment Assessment Web Account
Subject: Response to Northern Pulp Focus Report
Date: November 8, 2019 1:15:28 PM
Attachments: Northern Pulp Response fall 2019.docx

Date: Nov 8, 2019

To: Environment Assessment Branch,

Reference: Response to the Focus Report on Northern Pulp's proposed replacement effluent treatment facility project.

Dear Minister:

I have reviewed (within the time frame provided) the revised focus report provided to Northern Pulp by Stantech (Expanded Air Dispersion modeling study File 121416276 Sept 27, 2019) and have concerns about the information or lack of information provided.

My main focus of my response is the intended use and disposal of the AST sludge in the Power Boiler commonly known as a Biomass boiler, Hog fuel boiler or Bark burner. For the intent of this response, I will use the term Power Boiler for consistency.

My background is a degree in Mechanical Engineering from the Technical University of NS (1983) and a 34 year career in the boiler and pressure vessel industry ranging from boiler & component design, manufacturing and servicing, inspection and regulation. I am familiar with this particular unit.

Is this bio sludge really a fuel or a just hazardous waste?

First, with the information provided in their Focus report, I find inconsistencies in their use of the wording quoted 4.1.2

"It is emphasized that biosludge is considered by Environment and Climate Change Canada (ECCC) to be a non-hazardous fuel, and the combustion of biosludge in an industrial boiler (such as the biomass boiler) is not considered a form of incineration". This is consistent with guidance published by ECCC (ECCC 2016), "incineration does not include industrial processes where fuel derived from waste is fired as an energy source, such as industrial boilers"

At the time of this response, I was not able to find the supporting documents quoted especially the last portion referencing;

"incineration does not include …. such as industrial boilers".

I was able however to find wording in the Gov of Canada website that references the CWS (Canadian Wide Standards) which has a similar quote where incineration;

" does not include industrial processes where fuel derived from waste is fired as an energy source as a matter of incidental to the manufacture of the primary product."

My question remains whether this bio sludge qualifies as a fuel and thus qualifies as exempt from more stringent controls when considered as incineration of a waste product especially when part of their model includes information about the burning of sewage due to lack of information on this.

An EPA Federal Register Vol 56 … report Dated Feb 21, 1991 … 40 CFR Parts 260,261,264,265 etc. RIN 2050-AA72 Titled "Burning of Hazardous Waste in Boilers and Industrial Services" Which speaks specifically about not permitting an existing boiler to burn such waste which is "not a fuel"

The report further describes that to be considered a fuel, it must contain at least 5,000 Btu's / lb. I was not able to ascertain from the information provided in the Focus report that the sludge meets or exceeds this limit as it is being mixed to enable combustion. Is it a fuel or waste product?

Operations

My second concern is the existing inconsistent operation inherent in burning solid fuels. The recovery boiler operates with fixed input rates input however the biomass currently burned in the Power Boiler is by its nature inconsistent both in heat and moisture content. Addition of bio sludge into the Power Boiler will further complicate the operation, as fuel input and mixing would not be stable.

Early in my career I was involved with a very high tech incineration system that was not able to meet the stack emissions and noise standards. This unit also had a wet scrubbing system and a multiple stage fluidized bed combustion cycle. We were only able to pass emissions under ideal operating conditions and the project was eventually decommissioned. So with purpose built equipment barely able to meet the standards in the 1980's, how will this very antiquated Power Boiler & wet scrubber react once REAL data is measured? If it is found to not meet emissions standards, how could this be mitigated with such basic technology as found in this boiler.

After recently hearing the synopsis of the scientific study provided by Emma Hoffman titled " Pilot Study Investigating Ambient Air Toxics Emissions Near Craft Pulp and Paper Facility in Pictou County NS", my concerns seemed justified that even with modern scientific analysis and results, this project my still proceed without a top level Environmental review and that her findings are not being recognized.

Not only does unknown stack emissions present a risk to neighboring communities and the town of Pictou, Occupational Health and Safety should be aware that anyone working at the Mill near the tons of ash produced in the boiler that has to be disposed of will likely be exposed to unburned or improperly burned remaining toxins. Will this be disposed of in the existing landfills?

There is also no mention in their focus report relating to planned upgrades to the Power Boiler feed system to ensure even mixing of the fuel and sludge to ensure optimum combustion such as found in the fluidized bed technology utilized at Point Aconi power plant. Are there any plans to ensure the existing wet scrubber can process the additional stack emissions?

I ask that you reject this proposal for the following reasons:

1. The information provided does not prove that there will be no adverse human health or environmental effects that can be mitigated with the existing Power Boiler and scrubbing system.

2. The proposal shifts from one pollutant type and location (Boat Harbor) to the atmosphere where additional toxins are created in the combustion cycle thus creating a new unknown!

Rejecting this proposal could initiate an Engineering opportunity to create a world leading solution to this issue, creating new technologies and an updated plant to eliminate the pollutants at source and not dealing with contaminated waste!

As a closing note, the first line on following sign in Pictou Landing quotes: “Safeguarding our Environment is our Goal”



Respectfully yours,

Dartmouth, NS

From:	UA Local 244
To:	Environment Assessment Web Account
Subject:	Fw: Northern Pulp Focus Report
Date:	November 8, 2019 1:16:01 PM
Attachments:	npfocusreporteanov2019.pdf npeafocusmarch2019.pdf 2019.docx tocusreportea.docx nppremiereanov2019.pdf

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** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please see attached UA Local 244's support for Northern Pulp's replacement Effluent Treatment Facility.

From: UA Local 244
Sent: Friday, November 08, 2019 1:09 PM
To:
Subject: Northern Pulp Focus Report

UNITED ASSOCIATION
of Journeymen and Apprentices of the
Plumbing and Pipe Fitting Industry of
the United States and Canada

Mark McManus
General President

Patrick H. Kellett
General Secretary-Treasurer

Michael A. Pleasant
Assistant General President

Founded 1889

UA Local Union:

Letters should be confined to one subject

Subject:

St. Andrews
Antigonish County, Nova Scotia,
Phone /Fax
Email: @ns.sympatico.ca

Hon. Gordon Wilson
Minister of Environment
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8
EA@novascotia.ca

November 6/2019

Honourable Mr. Wilson,

Re: Northern Pulp Replacement Effluent Treatment Facility.

Attachments:
UA Local 244 March 9/2019
January 22/2019
- Submission on Focus Report
Premier McNeil Letter of Concern February 18/2019
(attachments included to avoid repetition)

After reviewing the Focus Report we are impressed with the amount of hours and expertise that went into producing this document. Northern Pulp and their Contractors have done an excellent job on this Focus Report for the Replacement Effluent Treatment Facility.
Veolia, the Swedish Company supplying this process equipment and technology is a world leader in effluent treatment.

Please add this letter to support Northern Pulp's proposals on Effluent Treatment and other improvements outlined in the Project Overview.

The new Effluent Treatment Facility is an 18 month to 2 year project for the Construction Industry. This would be a very welcomed Project for the Tradespeople in Northeastern Nova Scotia.

Currently there are no Industrial Construction Projects in Nova Scotia and very few in the rest of Canada.
British Columbia is struggling to save the Forest Industry in that Province with more than twenty mills currently shutdown or in major layoff positions. The Forest Industry is in a crisis.

The nature of the Construction Industry is for Tradespeople to travel to any Province that has work.
With environmentalists declaring war on all Industrial Projects in Canada big Projects are almost non-existent.
Alberta and Saskatchewan are prime examples of artificial crises modes with their inability to get pipeline access to the East and West Coasts.
Canada could be booming from Coast to Coast.

Meanwhile in the great Province of Nova Scotia we are trying to close a viable Pulp Mill with nothing to replace it but Employment Insurance, Welfare and Poverty.

A crisis is a lot easier to create than prosperity is . You just have to review the dismal record of Government sponsored make work projects over the past 50 years.
Speaking of compounding the crisis mode, Suppliers to the only other operating mill in Nova Scotia were informed that if Northern Pulp goes down there will be across the board cuts at the other Mill**. No competition.**

One can only hope that this information package will satisfactorily address all the questions and concerns the Environmental Assessment Branch may have.
Northern Pulp deserves the required permits to proceed with cleaning up the Mill.

I was surprised that there is no mention of the required extensions on the use of Boat Harbour. Without an extension there will be a severe economic hardship with the Forest Industry being the first victim.

The way I see it, the choices will soon have to be made by Premier McNeil and Chief Paul.
We all know that sometimes you have to be careful for what you wish for.
Big decisions have an attached level of blame for financially unpopular decisions.

I wouldn't want to be the one to get the blame for the hard times and poverty that will ensue if Northern Pulp is forced to close for any reason.

In closing, the Environmental Process was designed to provide a balance between Industry, the Environment and the Economy.
The low point on the scale was over 50 years ago. The high point started when Northern Pulp purchased the Abercrombie Mill and proceeded to clean it up.

Here is to a WIN WIN outcome on your deliberations.

Sincerely,

UA Local 244

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Mark McManus
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Patrick H. Kellett
General Secretary-Treasurer

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Assistant General President

Founded 1889

UA Local Union:

Letters should be confined to one subject

Subject: **Antigonish County, Nova Scotia,**

Email: **@ns.sympatico.ca**

March 9/2019

Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, NS, B3J 2P8
Fax: (902) 424-6925

Replacement Effluent Treatment Facility Project.

Attachments

- Term Employees Employed at Northern Pulp 2018
- No Plan B Possible Forestry Sector - Northern Pulp/Paper Excellence Canada

The following comments are submitted on behalf of the Membership of UA Local 244 Antigonish Plumbers, Pipefitters, Welders, Instrument Technicians and Apprentices.

Our comments include concerns of the entire Construction Industry Management and Labour.

My name is of UA Local 244.

I am a Red Seal Steamfitter - Pipefitter by Trade.

My first Industrial Job was the Pulp Mill currently owned by Northern Pulp.

Most of our comments will refer to negative socio economic issues.

Northern Pulp is a Company that puts 2.1 Billion Dollars Per Year into the Provincial Economy.

We have an experienced Construction Industry to build the new Effluent Plant.

We will leave technology and scientific comments to the Professionals in those areas.

The Construction Industry has not been included in any of the negatively affected Groups, that would lose jobs.

The attached "Term Employees" indicates Trades People who worked directly for Northern Pulp during 2018 when extra help was needed inside the Mill.

That totals 180 Employees and $1,409,715.52 for the year. This has continued over the 52 years that Mill has been there and in most years the numbers were much greater . This number does not include other Trades People and Employees of Contractors who were employed in the Mill. The new Effluent Plant would be an 18 Month Project.

A Brief History

Many of the Senior Nova Scotia Tradespeople worked at the Mill in 1965-66-67 during Construction.

Fishing was so bad up in River John, Tatamagouche, Wallace and Pugwash Areas that many fisherman from the Area joined the Construction Unions and only a very few left the Mill during Construction to go fishing .

The hourly rate for Pipefitters at the time as $3.80 per hour and that was more than a Lobster Fisherman could make at the time.

To this day a large number of Fisherman are Tradespeople in the Construction Industry when Fishing Seasons are closed.

For about the first 30 years or more the effluent was black going into Boat Harbour and black going out into Pictou Harbour from where it went out into the Strait. Not that it was a good thing but the Fishing Industry has been thriving during the past 52 years without negative effects from the Mill.

Recently a Fisherman Friend told me that the prevailing water flow in the Strait goes up and around Prince Edward Island. That would mean the effluent from the Mill would also be going the same direction and there has been record lobster catches up around the Prince Edward Island Causeway in recent years.

Plan B - There is none!

Any long term Nova Scotia Taxpayer would remember how successive Governments of all the Party's spent massive amounts of Taxpayer money on "Make Work Projects" that produced little or nothing. Probably in the billions.

Northern Pulp wants to Clean Up the mess they inherited when they bought the Mill in 2011. Whether it was previous Owners or previous Governments that wanted to run Boat Harbour. None of it should of happened the way it did.

That is all in the past and Northern Pulp is not responsible for it.

Everyone needs to face up to the fact that Rural Nova Scotia has not been doing well for many years. Northern Pulp is the Key Player in a highly integrated supply and demand system that the whole economic system benefits from.

Everyone loses when a major Industry shuts down.

Even those who would think of it as a win would soon realize:

- their taxes are going up,
- they can't sell their property for half of what it is worth,

- Hospitals will become First Aid Stations,
- Schools would close because the last of your Family Members will have to move away to find work.
- Poverty, Employment Insurance and Welfare will all dramatically increase.

I repeat THERE IS NO PLAN B and there never has been one.

There is a Plan A however. Leave good enough alone!

Grant Northern Pulp an extension on the use of Boat Harbour until the new Effluent Plant is up and running. The Nova Scotia Government should pay the Natives in Pictou Landing a negotiated amount for their inconvenience.

There is a Win Win Solution for every problem if enough effort is put forward.

I agree that the Residents of Pictou Landing and Surrounding Area have been negatively affected by the whole Boat Harbour fiasco for Fifty Two years. I also agree that it should be closed but to me it looks like successive Governments have signed up to be responsible for everything. The current Government has taken an aggressive approach with Northern Pulp by cancelling a legal agreement with Northern Pulp to operate Boat Harbour until 2030.

The cancelling of that Agreement in 2014 reduced the length of the Lease by 10 years and 11 months.

In 2015 the Government tried to force and unrealistic Industrial Approval on Northern Pulp. Northern Pulp appealed and it went to Supreme Court. On the first day of Court the Government backed off on the issues under appeal, however this would of cost the Company many hundreds of thousands of dollars in legal fees and preparations.

The Boat Harbour Act also became Law in 2015 along with the five year deadline.

Most if not all of this was done with no consultation with the Mill. Without getting into all the details Northern Pulp has had their hands tied by several Branches of Government before the arbitrary deadline was put in place and it still continues with the Government pointing the finger at Northern Pulp that you should be ready.

My take on the cancellation of the Boat Harbour Lease to Northern Pulp Ten Years and Eleven Months early could leave the Nova Scotia Government fully responsible for all expenses and lost profit incurred by Northern Pulp.

Not to mentions the complete demolition and cleanup if Northern Pulp is forced out of Business.

At one of the earlier Open House meetings Chief Andrea Paul spoke about the closure of Boat Harbour. Some of the Environmentalists in the room started pushing for the closure of Northern Pulp. Chief Andrea Paul got up and said we never asked for the Mill to be Shut Down we just want Boat Harbour cleaned up.

I have no idea how this has evolved to a point where two people, Premier Stephen McNeil and Chief Andrea Paul have the authority to Shut Down a huge portion of a very fragile economy.

The best solution for everyone would go something like this..

The only way to avoid Northern Pulp from being shut down is to grant an extension of the operation of Boat Harbour until the new effluent plant at Northern Pulp is up and running.

The Government of Nova Scotia signed off on a deal to close Boat Harbour and dictated a date of closure without consulting the Industries effected.

The Government has been in negotiations in regard to compensation for the closure of Boat Harbour so they are on the hook.

The Agreement on the closure date for Boat Harbour was made between the Government and Pictou Landing Chief Andrea Paul.

I know Pictou Landing is not a rich community and they do deserve to be compensated if the Government does not live up to the closing date of January 31/2020.

THE NOVA SCOTIA GOVERNMENT IS LIABLE

The question is, do they want to be liable for destroying several Industries with the Shut Down of Northern Pulp or pay Pictou Landing Residents what it is worth to extend the Boat Harbour closure date until the new effluent plant is complete.

Either way the Natives would see the closure of Boat Harbour.

The new effluent plant proposed by Northern Pulp will have a positive effect on the Environment as well as Employment and the socio economic situation in the Province.

In a CBC Interview with the Premier in Sydney over Christmas there was some suggestion that if Northern Pulp closed we would still have one Mill in the Province. That other Mill has already cut Producers to the bare bone as it is, just imagine if there was no competition. I expect the Forest Industry will speak for themselves on that issue.

It is time that common sense comes to the table. Northern Pulp wants to clean the Mill up to world class standards.

Sincerely,

UA Local 244

January 22/2019

To Whom It May Concern,

I am a Member of UA Local 244 Plumbers, Pipefitters and Welders Antigonish.

Since its beginning, myself and Members of our Local Union have had many opportunities for employment whether it was construction upgrades or the yearly shutdowns at the Mill, Northern Pulp. Our Local was also involved in the original build.

Many Families of all Trades can say the same thing about the economic benefits of working there.

Years ago they began dumping effluent into Boat Harbour which was much more likely to have negative impacts on the surrounding waters. Over the years, the effluents became less harmful as protests against the mill mounted. Today, the latest technology allows the effluent to be treated to the point where if held in a glass bottle is almost "clear" compared to the black discharge of 50 years ago. My point is, instead of protesting against Northern Pulp, why not applaud them for the attempts at bettering the effluent being released. Hundreds of millions in tax dollars have been collected each year by our Government from the operation of this Mill. Imagine the billions of dollars that have been generated Provincially and Federally since day one which benefitted almost every single person in this Province.

I ask our elected members where do you get hundreds of millions in lost wages and tax dollars if this Mill closes.

Maybe the protestors would sing a different tune if elected officials announce a 5 or 10 % tax increase to supplement the loss of Northern Pulp to go along with the loss of revenue from Sable Offshore.

Help this Province and our Country by supporting our Pulp Mills and also Alberta by endorsing Mills and Pipelines. You all know the economic benefits.

In closing, I do want to stress that protesting isn't a bad thing. Maybe instead of protesting to close plants and stop pipelines from being built they could help find ways to improve how they are built working with Companies instead of against them.

A Country does not run without money or resources. It is time we open our eyes and grasp what is before us.

Regards,

There is no doubt that all human endeavours have an impact on our environment. Human beings, and all mammals, for example take in air and remove the oxygen from it thus increasing the percentage of CO2 in the atmosphere.

Every industry has an effect on the environment. We cannot shut down an industry simply because there are perceived negative effects on the environment. Agriculture and yes fishing and all food production has some negative effect, in someone's view, on their environment.

What we need to strive for is improvement not an unattainable perfection.

From what I have seen this "old" mill is vastly improved from where it was when this company took over.

I remember just 3-4 short years ago driving from Truro to New Glasgow and coming over Mt. Thom and seeing the plume from the pulp mill stretching from the mill to my left to as far as I could see to the right. That is now a thing of the past. The only visible plume from the stack now does not appear to extend beyond the pulp mill property. It will be noticed that on colder days the plume will be marginally longer. This is the nature of steam condensing. Steam is water in another form i.e. non toxic to organisms.

So one major issue dealt with very effectively at a cost of I believe some 37 million dollars. That is equivalent to over a month's production at this mill, not a month's profit but simply the gross value of the finished product.

I would love to see this mill running with a zero or even positive effect on the environment. I would also like to give my granddaughter a unicorn for her birthday.

Lets face reality the current effluent system needs to be modernized to improve how it impacts the environment. (See above re improvement vs perfection)

I am shocked that the government broke a contract by legislating new terms unilaterally. Legal and correct and just are not interchangeable terms. Negotiations on a change to the contract should have been done in an honest, honourable, and legitimate manner.

Boat Harbour Act S, 4 (2)
The enactment of this Act is deemed not to be a repudiation or anticipatory repudiation by Her Majesty in right of the Province of the lease agreement dated

December 31, 1995, between Her Majesty in right of the Province and Scott Maritimes Limited, as extended by a lease extension agreement dated October 22, 2002, between Her Majesty in right of the Province and Kimberly-Clark Inc.

Essentially what this section says is "This is not a brown bear, it is a bear which is brown.

I call on the Pictou Landing First Nation to work at correcting this injustice. All of the First Nations peoples of Canada and indeed all of the Americas have endured a too long history of broken promises.

Given this history, I do not believe that any First Nation should support a situation where what was, and in fact is still being done in many ways to their Nations and peoples is done to any other party.

Too many people look at changing the way things are done as a process much like turning on a light. I have been a small part of many large projects and one thing I have learned is that there are essentially two ways of doing projects.
1. Do it fast and hope for luck or
2. Take a reasonable time and do it right.

I commend Northern Pulp and all of the associated contractors for following #2 despite the knowledge that they risked a total mill shutdown.

This matter could have been negotiated properly in 2015 rather than hastily enacted legislation 18 days to be exact. A midpoint of the contract and the legislation would have been, if my math on dates is still working, 31 July, 2022.

I strongly suggest that the Province of Nova Scotia negotiate a repeal of the Boat Harbour Act and negotiate a reasonable amendment to the contract entered into freely.

I understand the frustrations of the Pictou Landing First Nation. They just want to look forward to a future without this blight on their lands. That being said I sound to them a warning. A severely economically depressed Pictou County does not serve their long term interests. Secondly, by supporting the government on the Boat Harbour Act they have put in jeopardy any and all agreements they may have now or in the future with the Province of Nova Scotia and possibly even any agreements with the Federal Government. To paraphrase a famous saying; First they came for Northern Pulp but I was not Northern Pulp so I did nothing, then...

When we allow our governments to rip up legal contracts in 18 days with a single

page document which contains phrase which is an oxymoron our entire society is at risk. If we allow this to stand no one is in any position to plan for the future of either ourselves or our children or our children's children.

In summary the Boat Harbour Act is a farce of epic proportions.

This effluent treatment plant will be a vast improvement over the current status quo.(Again see above re: improvement vs perfection. It meets or exceeds the requirements in all but the virtually unattainable.

I hereby request that the Pictou Landing First Nation become seriously involved in a reasonable resolution of the current untenable situation. Lest you be next and a precedent of dishonoured contracts is used by this or some future government to the long term detriment to your Nation.

The planning has been essentially complete, there is no way that this improvement can be implemented in the next 3 months. We are at a stage where reasonable negotiation involving The Corporation, the Government, and the First Nation and the subsequent repeal of the Boat Harbour Act will lead to a win/win and a return to the rule of the Law of Equity.

I would be happy to assist in any way to assist in an equitable resolution.

Respectfully submitted

Harold (Hal) James Legere
2nd Class Power Engineer
and proud Nova Scotian
Do not remove my name from this submission

UNITED ASSOCIATION
of Journeymen and Apprentices of the
Plumbing and Pipe Fitting Industry of
the United States and Canada

Founded 1889

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Assistant General President

Letters should be confined to one subject

UA Local Union:

Subject:

St. Andrews
Antigonish County, Nova Scotia,

Email: **@ns.sympatico.ca**

Premier McNeil
One Government Place, 7th Floor
1700 Granville Street
Halifax, Nova Scotia
B3J 1X5

February 18/2019

Dear Premier McNeil,
The attached Letters are signed by individuals mostly from the Guysborough, Antigonish and Pictou Countys who are concerned about the potential loss of Northern Pulp.

The Mill has been a Major Employer for the Construction Industry every year for the past 54 years.

The proposed effluent Plant is an 18 month project for us.

The Forestry Industry in this Province involves every Sector of the Economy.

Northern Pulp wants to clean up the Mill with an 18 Month Industrial Construction Project.
Please remove all roadblocks and Grant and Extension so they can start Construction.

Sincerely,

CC EA Assessment

UA Local 244

From:
To: Environment Assessment Web Account
Subject: The Northern Pulp propose project must be rejected.
Date: November 8, 2019 1:16:36 PM
Attachments: caribou.PNG
caribou 2.PNG

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November 2019

I am writing to you to ask you reject the proposal by Northern Pulp to dump 63 million and as much as 85 million litres per day of effluent into the Northumberland Strait.

I cannot believe that in 2019 we are even considering allowing a foreign company to destroy an ecosystem that provides such solace to so many, in harmony with a lucrative fishing industry. I want you to feel how devastating your decision could be on this area and the people that call it home.

The Northumberland Strait changes daily. Conditions differ depending on the wind direction, the tide and the ice. I have seen firsthand how extremely sensitive to wind and weather and the resulting silt has on lobster and crab fishery in this area. Northern Pulp studies are for 2 DAYS.

4.1 Baseline Marine Studies

Conduct baseline studies for the marine environment (such as marine water quality and marine sediment) in the vicinity of proposed marine outfall location.

Marine Water Quality

Seawater sampling of selected analytical chemical compounds from Caribou Harbour and the Northumberland Strait was undertaken on behalf of NPNS by Stantec Consulting Ltd. on May 24 and 25, 2019. The purpose of the sampling was to build a baseline database of seawater composition in and around NPNS's proposed effluent outfall for the replacement ETF. *(Northern Pulp Environmental Assessment Report)*

The majority of NP studies were conducted in May and June at a time when the Strait is calmer. We are able to fish those waters in 45 foot boats. No significant data is shown for the winter months when Ice and winds prevail. Northern Pulp MUST SHOW SAMPLING FOR 365 CONSECTIVE DAYS minimum in order to determine what the effect dumping 1,717KG per day of Suspended Solids into the Northumberland strait will have on it long term.

3.0 FACILITY DESIGN, CONSTRUCTION AND OPERATION AND MAINTENANCE 54

TSS (Total Suspended Solids)

The TSS loading used in the RWS is conservative and remains unchanged. TSS at 48 mg/L at the design flow of 85,000 m_3/day equates to 4,080 kg/day, while the Veolia guarantee

for TSS is = 1,875 kg/day and the 2018 BHETF annual average discharge was 1,717 kg/day. *(Northern Pulp Environmental Assessment Report*

1,717KG Suspended Solids per day. That bears repeating. This the amount per day that NP intends to hold on site should there be a system failure.

3.0 **FACILITY DESIGN, CONSTRUCTION AND OPERATION AND MAINTENANCE** 56
Northern Pulp Nova Scotia Corporation
Focus Report - Replacement Effluent Treatment
October 2019 | 17-6461
3.4 Spill Basin
Maintaining an empty spill basin is a priority to ensure it is available in the event of an emergency.

3.0 FACILITY DESIGN, CONSTRUCTION AND OPERATION AND MAINTENANCE 58
If the spill basin is full, it
will typically take less than 3.5 days to empty it at the highest summer flow rates.
Emptying it at any other time of the year would take less time.

The best determinate of what can happen to the area surrounding Caribou Harbour during the building process and the ensuring dumping of suspended solids into the strait is what happened to Caribou Harbour in 1979. I remember when the adjacent area formerly known as Little Entrance was permanently filled in by a storm in 1979 making Munroes Island no longer an island. The story of Munroes island is documented in The Memory Factory, Caribou Harbour. This was a project funded by the Social Sciences and Humanities Research Council of Canada. *http://memoryfactory.sitemedia.ca/chapter/pictou-lodge/*

QUOTE :"Two channel entrances once defined Caribou Harbour, the Big Entrance between Caribou and Monroe's Island where the PEI ferry passes through, and the Little Entrance at the eastern end of the harbour. In 1979, a massive storm swept already encroaching silt into Little Entrance and closed this second passage permanently.

The 100 ft wide channel was the deepest point in Caribou Harbour separating Munroe's Island from the mainland.

In 1937 construction began at Caribou Harbour on a ferry terminal to serve traffic between Nova Scotia and Woods Island, PEI. Some say that the project's dredge was dumped too close to shore creating more silt. Construction of terminal altered the sediment patterns along the northern side of Munroe's Island and also affected the Little Entrance."
(This research was supported by the Social Sciences and Humanities Research Council This project was developed by Katherine Knight of York University

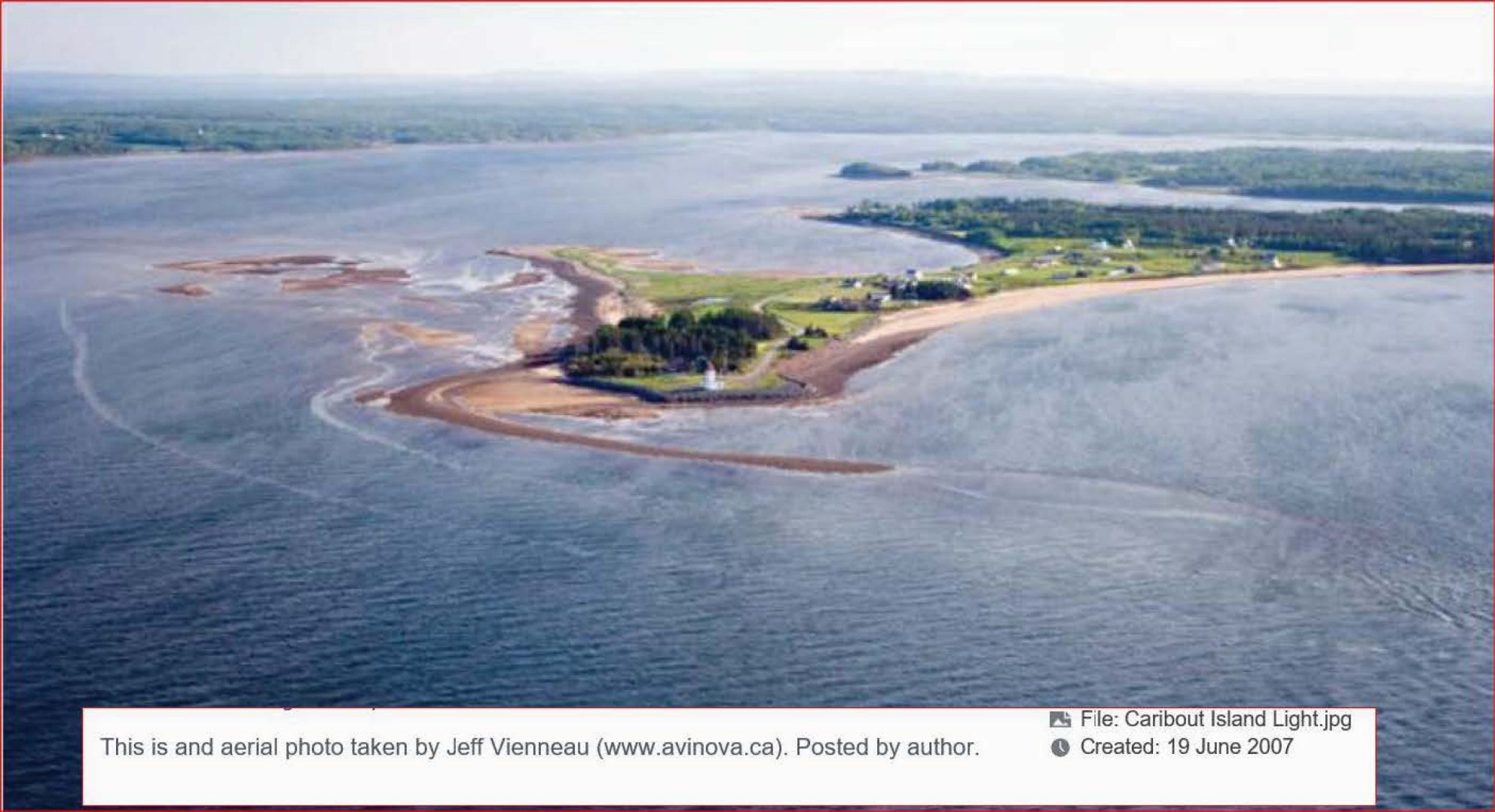
Nothing less than a full rejection of the Northern Pulp Effluent project is acceptable. No extension should be given. Northern Pulps' own EP report states that they knew about the closing of Boat harbour since 2015.

QUOTE:" ***2.1.3*** **The Boat Harbour Act**
In June 2014, there was a leak of untreated effluent due to a breach in the transmission pipeline from NPNS to the exisng BHETF. This leak prompted conversaons between the Province and Pictou Landing First Naon (PLFN), eventually culminang in a commitment to close the BHETF and remediate the area. The introducon of the ***Boat Harbour Act****, which received Royal Assent on May 11, 2015, prohibits the use of the provincially-owned facility for the receipt and treatment of effluent from NPNS aer January 31, 2020."* *(Northern Pulp Environmental Assessment Report)*

They say when you know better, you do better. WE SEE BOAT HARBOUR....we see the millions that is going to cost to clean it .....we know better. DO NOT LET BOAT HARBOUR HAPPEN AGAIN. Not to our Strait.
We are counting on you to do the right thing.

Scotsburn, Nova Scotia

@gmail.com



This is and aerial photo taken by Jeff Vienneau (www.avinova.ca). Posted by author.

File: Caribout Island Light.jpg
Created: 19 June 2007

From:	@ns.sympatico.ca
To:	Environment Assessment Web Account
Cc:	Houston, Tim; Burrill, Gary; MLA West Hants;
Subject:	CAPE response to Replacement Effluent Treatment Facility for NPNS
Date:	November 8, 2019 1:16:49 PM
Attachments:	CAPE response to Replacement Effluent Treatment Facility.odt

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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November 8, 2019
Environment Assessment Branch
Nova Scotia Environment
PO Box 442
Halifax, NS, B3J 2P8
Good afternoon Minister Wilson,
Please find attached comments from Citizen Action to Protect the Environment (CAPE) regarding the Replacement Effluent Treatment Facility Project for Northern Pulp Nova Scotia Corporation.
Please confirm receipt of this letter.
Thank you,

CAPE

Citizen Action to Protect the Environment

Hants Co., NS

November 8, 2019

Environment Assessment Branch
Nova Scotia Environmental
PO Box 442
Halifax, NS, B3J 2P8

Good afternoon Minister Wilson,

Thank you for the opportunity to respond to the proposed Replacement Effluent Treatment Facility Project for Northern Pulp Nova Scotia Corporation. The following comments are on behalf of members of the registered Hants County-based society, Citizen Action to Protect the Environment (CAPE). We advocate for the protection of our environment and the wise use of our natural resources.

We have numerous concerns about the lack of specific details in several sections of this proposal, but due to time constraints we have focused our comments on three main topics. Our primary areas of concern are: Contaminants of Potential Concern (COPCs), Tourism, and Forestry.

Contaminants of Potential Concern

Although our CAPE members, who reside mainly in Hants County, don't live in the immediate vicinity of Northern Pulp, we have a vested interest in the outcome of this proposal. We have to agree with the fishermen that there is serious concern about the safety of water in the Strait if this effluent is allowed to be dispersed through the pipe. There are already pollutants in the proposed discharge area and it is important to recognize the cumulative effects of adding the toxins from NPNS's effluent. We find it unacceptable to consider adding an estimated 25 billion liters of toxic effluent into the Northumberland Strait every year. Instead we believe our government should be working with industries and municipalities to decrease the chemical and nutrient inputs from industries, agriculture and municipal wastewater systems.

After reviewing the Human Health Risk Assessment...Section, we believe there is a need to include PFAS in the list of contaminants of potential concern (COPCs). We recently became more aware of this large group of synthetic chemicals/pollutants called per- and polyfluoroalkyl substances (PFAS) with the potential to impact health, and their link to paper mills in the US. Environment Canada and Health Canada concluded that PFAS chemicals are highly persistent, mobile in the environment, can accumulate in living organisms, and also have the potential to cause immediate or long-term harmful effects on human health and the environment. Some of the potential health effects of PFAS exposure include probable links with high cholesterol, thyroid disease, pregnancy-induced hypertension, ulcerative colitis, and kidney and testicular cancer. There is also a positive association between exposure and dyslipidemia, immunity, and renal function in children.

In December 2018, Health Canada set new guidelines and Maximum Acceptable Concentration (MAC) levels for two of these PFAS chemicals in drinking water- perflourooctane sulfonate (PFOS) and perfluoroctanocic acid (PFOA) at 0.0006 mg/L or 0.6 ug/L.[1]

To provide a margin of protection from exposure to PFOA and PFOS from drinking water, the US Environmental Protection Agency (EPA), has established the health advisory levels at 70 parts per trillion, or 0.07ug/L.[2] The Australia Department of Health has a similar standard. It also specifies that when PFOS co-occurs with perfluorohexane sulfonate (PFHxS), the drinking water quality value should be applied to the sum of the concentration of PFOS and PFHxS.

The authors of a recent (Nov, 2018) review of pathways of human exposure to PFAS cites the European Food Safety Authority (EFSA) as estimating that "fish and other seafood" account for up to 86% of dietary PFAS exposure in adults. [3]
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6380916/

Recently through a Freedom of Information Act (FOIA) request to FDA, Environmental Defense Fund obtained documents previously not made public that show US paper mills using PFASs may be a significant source of contamination to water and potentially to air and compost.[4] While this may not be the case here in NS, testing for PFAS needs to be a requirement before any effluent is discharged.

We consider that if the effluent is dispersed through the pipe as proposed, the risk for fish and/or seafood in the Northumberland Strait to be contaminated is enormous. We would not only be jeopardizing a $3 billion industry, but at the same time losing a major source of food, a source of nutrition that has been depended upon for centuries. We find it unbelievable to consider putting it at risk!

It seems common knowledge that guidelines for maintaining a healthy environment are constantly changing and becoming more stringent as we become better informed about the detrimental effects of certain substances (e.g. lead in drinking water). It is extremely difficult and expensive, if not impossible, to repair an ecosystem after the damage has occurred. Preventing illnesses and diseases is easier and more cost-effective that trying to cure chronic conditions and cancers that have developed over time.

Our NS Environment Act states in Section 2(b)(ii) "the precautionary principle will be used in decision -making so that where there are threats of serious or irreversible damage, the lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation." Since crucial information about the safety and effects of the effluent on both habitat, and short and long-term well-being of marine, plant, and human life is lacking or unknown, this requires that the precautionary principle be used.

1] https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-perfluorooctane-sulfonate/document.html

2] https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos

3]Sunderland, E.M., Hu, X.C., Dassuncao, C. *et al*. A review of the pathways of human exposure to poly- and perfluoroalkyl substances (PFASs) and present understanding of health effects. *J Expo Sci Environ Epidemiol* **29,** 131–147 (2019) doi:10.1038/s41370-018-0094-1

4] http://blogs.edf.org/health/2018/05/21/pfas-paper-mills/

Tourism

The tourism industry in NS has great potential. It is currently worth more than $2.5 Billion and growing. Nova Scotia has recently been praised as a unique destination by Travel Lemming Destination Awards. It is ranked 2nd on the list of the top 30 for 2020 and number one of North American destinations. It received praise as “full of natural beauty, historical buildings, and some of the **best seafood** you'll find anywhere” (The Chronicle Herald, Nov.6/19).
This potential should not be risked by adding pollutants to the marine life habitat with disposal of effluent through the pipe, nor by burning toxic sludge that we believe would increase the presence of air emissions from the NPNS mill.

Forestry

The possible closure of the Northern Pulp mill due to the effluent disposal crisis has resulted in the defense that the government cannot permit the loss of high paying mill jobs, forest harvest contractors and trucker jobs. The argument reduces to a conflict between environmental protection versus economic concerns. We have been disappointed that past decisions have valued economics over the environment.

Both the Bancroft-Crossland Report and the Lahey Report have concluded that the scientific and logical position that the current industrial extraction model of forest management is unsustainable, and that these practices must be halted in order to reset forest practices. Both reports call for regime changes. The closure of the mill, if it were to occur, or if restrictions were placed on NPNS’s harvesting, would provide the space and the impetus for such change.

There is a precedent for such restrictions. The fishing industry in Nova Scotia, also a natural resources extraction industry, has gone through such a transformation (regime shift): the cod moratorium. Many hundreds of plant-based processing jobs and fishing jobs were lost. Many communities lost their major employers. The years have passed and fishing remains a viable and even healthier industry than it was. It is a different industry now and still evolving. Some fisheries have earned environmentally sustainable certification status.

This regime shift in forestry would give more value to ecological benefits. Forests, that are truly sustainably managed, could be a strong tool in addressing our Climate crisis. This is a much better legacy to be leaving our children and grandchildren, than another situation with unexpected ramifications like Boat Harbour. We have confidence that closing the mill won't be the end of the forestry industry. In fact, having fewer clearcuts might entice more tourists and over time result in increased economical benefits.

We stand in solidarity with the Pictou Landing First Nation and the fishing and tourism industries of the Gulf of St. Lawrence and Northumberland Strait in opposition to the proposed Northern Pulp Replacement Effluent Treatment Facility Project and call on the Nova Scotia Government to reject this plan outright.

Respectfully submitted,

CAPE

From: @unifor.org
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:17:48 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Every effort should be made to ensure that this mill continues to operate. There is a plan in place to deal with environmental issues, and its a good one. I grew up in a mill town, and it provided for many families. Once they are gone its forever and so are those jobs. Name: @unifor.org Address: Municipality: North York Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 40 y: 20

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:18:27 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: The science is there to prove that the water will be safe for the oven and everything that lives in it. We need to be able to make this work for everyone involved. I donâ?Tt think people realize by saying if the mill has to close then so be it what impact it will have on everyone! The mill alone employs over 300 people and in a small town as pictou that will be devasting if the mill closes. And then all of the surrounding towns within Nova Scotia as it will impact over 2000 more people employed with the forestry sector, all of their families, their towns, etc... it will be a spiral effect envolving thousands of people. They say they can go find other jobs!! Where?? Is the government willing to dish out millions of dollars for people to go on unemployment, welfare, retraining people for jobs elsewhere! It would be devasting if this cannot be worked out and the mill closes, for everyone envilves. But who cares rite as long as there is no pipe! I see on the TV segment the nice new community building that is being built, where do they think the lumber came from to build it! And the boats that they have to go fishing in?? Where do they think the wood supply will come from now. Itâ?Ts a shame we all canâ?Tt work together. The science is there to prove that the pipe will work, no one can deny that! I hope this all works out in the end for everyone, I would hate to have to pack up and leave my family and home because we will no longer have jobs or income, but as long as the fisherman and native Americans get their way thatâ?Ts all that matters rite. There is no doubt that the ponds need to be cleaned up but it doesnâ?Tt mean the mill should have to close either. Name: @hotmail.com Address: Municipality: Baker Settlement Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 59 y: 27

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:25:18 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: As a property owner and tax payer of Pictou County for close to 20 years, I call upon Gordon Wilson, Minister of Environment for Nova Scotia to REJECT Northern Pulps proposal to construct an effluent treatment facility and transmission pipeline into the Northumberland Strait. I find it unfathomable that we are even in a position to have to fight this proposal which is flawed in so many ways. That Northern Pulp would show such disregard for the community by suggesting that they pipe heated effluent across fresh water tables and directly into a diverse breeding ground for fish, birds, and wildlife directly into an already over-taxed water system, that in this day and age we know is increasing in temperature and decreasing in oxygen. 1. How can we possibly consider this as a viable option when new information United Nations IPPC report as recent as Sept of 2019 highlights the critical state of our oceans. â?oWith current ocean research demonstrating that our waters cannot adjust, cannot adapt and are indeed suffering much like our forests are with the effects of climate change, how can we justify adding up to 90 million litres of effluent per day into an already-stressed ecosystem?â?

Moodys Cove, Pictou Landing 2. The diffuser system being proposed in a body of water that regularly freezes is a disaster waiting to happen! â?oSometimes the ice would drag them [navigation buoys] for miles. Buoy anchors are 2000 lb blocks with 500 lbs of chain on themâ? â?. Pictou County, NS 3. Northern Pulp should demonstrate their commitment to the entire community by investing in a closed loop system, not discarding it as a non viable option. â?oThe market profile does not say that changing production to a closed loop system would be unprofitable for NPNS .â? â?. Eco Justice The Provincial Government is charged with the responsibility to improve the life of its citizens. Donâ?Tt solve one problem by shifting it onto others within the community. Are you prepared to risk Nova Scotiaâ?Ts reputation for being Canadaâ?Ts Seafood export powerhouse and Canadaâ?Ts Ocean playground. This is what is at stake, not to mention the overall health and well being of the Pictou County community. Respectfully, Caribou Island, Pictou County Name: @gmail.com Address: Caribou Island Municipality: Pictou County Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 47 y: 16

From: @yahoo.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:27:01 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: - Choose - Comments: Ive written before today. I totally dislike this project!!!How I can be an influence, I dont know but I certainly dont want this problem to exist!!! Name: @yahoo.ca Address: : Blenheim Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 79 y: 24

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:28:27 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: After reading the extensive amount of information on the focus report for the new effluent treatment facility I have to believe the science. I feel that this facility will meet the regulations and the forestry and fisheries industries can co-exist as they have the past 50 years. Treated effluent has been flowing into the strait for 50 years without any harmful effects to the fisheries and with the new treatment facility and the proposed outfall being further out in the straight where the current is much stronger the mixing of the effluent will be much better than it is at the present time. Effluent will be unnoticeable at 5 meters from the diffuser. I believe this is a great improvement. This is the best technology at present and it is not like it is the first of its kind so I believe if the system is well maintained and operated Northern Pulp, fisheries and forestry industries can all enjoy a great future. Name: @gmail.com Address: Municipality: Westville Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 53 y: 27

From:
To: Environment Assessment Web Account
Subject: Fwd:
Date: November 8, 2019 1:30:56 PM
Attachments: image.png

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

---------- Forwarded message ---------
From: @gmail.com>
Date: Fri, Nov 8, 2019 at 1:28 PM
Subject:
To: @gmail.com>

November 2019

Northern Pulps proposal to pump effluent into the Northumberland Strait must be rejected because of the significant adverse effect that it will have on the Strait.

I was born and raised in Pictou county. I have fished the waters of the Northumberland Strait for 30 years. There was a time when we did not think much about the effects our actions had on the ocean. We see now firsthand how fragile the ocean is. We now work with DFO to preserve an ecosystem, an industry and a way of life. We have reduced our lobster trap numbers from 300 to 280, stopped fishing single trap trawls and are increasing the carps size. We have also increase the web size of our herring nets to allow the small fish to go free. In recent years we have seen the Northumberland Ferries Limited and the town of Pictou implement sewage systems, so that they no longer dump their sewage into the ocean . Land owners along the Strait have built sea walls to stop erosion and the accompanying sediment. And these changes are working. The last several years have seen an increase in lobster catches in our area. Sustained scallop seasons.

Proving that our oceans and fishery are sustainable is very important to the world. Dumping industrial waste into the ocean does not constitute Sustainability. This is a step backwards for Nova Scotia ...for Canada.

"Our Oceans, Our Future
As Canada's Minister of Fisheries and Oceans, it gives me great pleasure to present Canada's Oceans Strategy. This far-reaching policy framework will make Canada's vision for modern oceans management a reality.

As a country bordered by three oceans, Canada is truly an oceans nation. Today we see an ever increasing number of demands on oceans and their resources. While traditional fishing and marine transportation continue to be of prime importance, they are now joined by other uses, such as aquaculture development, oil and gas exploration and development, recreational and commercial fishing, and eco-tourism. Canada's oceans also support important features of Canada's social and cultural identity. Managing these demands is critical to the protection of the marine environment and the long-

term sustainability of Canada's oceans and their resources.

On January 31, 1997, the Government of Canada brought the Oceans Act into force, making Canada the first country in the world to have comprehensive oceans management legislation. The Act authorizes the Minister of Fisheries and Oceans Canada to lead the development of a national oceans management strategy, guided by the principles of sustainable development, the precautionary approach and integrated management."

source: Robert G. Thibault
Fisheries and Oceans Canada, Oceans Directorate, Canada's Oceans Strategy, 2002, Cat. No. Fs23-116/2002E, Ottawa - Ontario: Fisheries and Oceans Canada 2002, iii

,

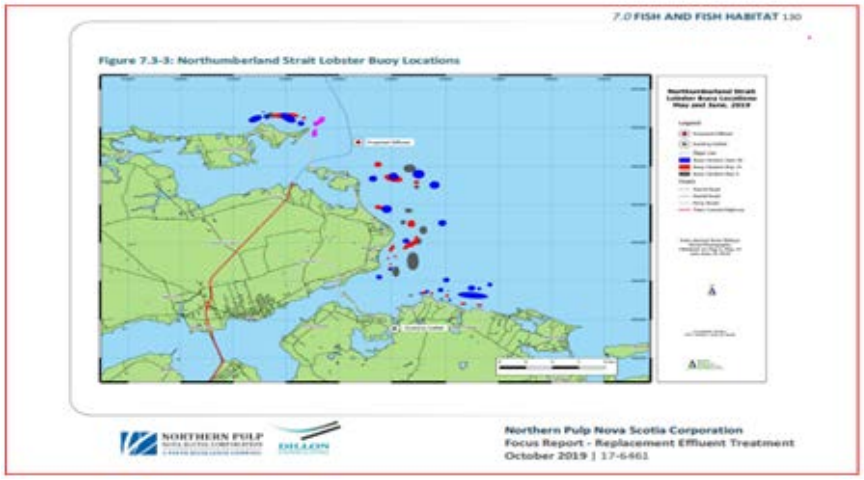
My fishing grounds are the waters along Caribou Island. It is an extremely fragile area. It is extremely sensitive to water temperature changes. If we get a Nor-Eastern the water becomes brown with sediment. It takes several days for the sediment to clear and fish to return. Northern Pulp proposes to dump up to **85 million litres of effluent per day** on this area. The area will never have a break / never be given a chance for it to recover. *The long term effects of this have to be studied.* Taking only 22 samples in a short period of time does not predict long term effects.

7.0 **FISH AND FISH HABITAT** 123
Based on testing, modelling and the incorporation of mitigation activities, no significant residual impacts to marine water quality are expected to arise on any fisheries or fish habitat as a result of this project.

In total, 22 samples were
collected, eight from Caribou Harbour along the proposed pipeline route and 14 within the effluent mixing zone. (Northern Pulp Focus Report)

The sediment from the construction of the pipe alone will be catastrophic. We have witness firsthand the significant adverse effect that the construction of the Confederation Bridge, in 1993,had on the fishery. It has taken about twenty three years for lobster stocks to return up to 90km away. This was a finite project, with a recovery time. The proposed NP is a constant 4,080 kg/day! Every day!

About one quarter of my lobster fishing gear is within a mile from the proposed "diffuser" site. Northern Pulp's report indicates that no one fishes in this area. Perhaps the areas were observed during high tide when only the buoy staffs are visible, Or perhaps it is the companies use of the term "cluster buoys", which is not a fishing method. Regardless myself and more than a half a dozen other fishermen fished everyday just off the Caribou lighthouse and up the Caribou harbour. This is not noted on Figure7.3-3 of Northern Pulps Focus Report



The pink indicates the areas not noted as fishing areas that pertain to me. This is just lobster. We fish herring and rock crab in this area as well. This is somewhat irrelevant because almost the entire fleets' fishing grounds will fall within the fall out zone of the outfall . The scallop grounds fall in this area as well.

I've always had a since of pride about living in Nova Scotia, Canada. I've felt that we were moving forward towards a greener country. Northern Pulps proposal to dump effluent into the Northumberland Strait is a step backwards. **I am asking you to Reject the proposal on the grounds that the significant adverse effects cannot be mitigated.**

Scotsburn
Nova Scotia ,Canada


397

From:	Environment
To:	Environment Assessment Web Account
Subject:	Proposed Project Comments
Date:	November 8, 2019 1:32:38 PM

Project: replacement_effluent_treatment_facility_project Comments: As a woodland owner with a long-term focus and an interest in sustainable practices, I look to information such as the direction provided in the Lahey Report. This report discusses the importance of a market for low-grade wood fibre, a major consumer of which at the moment is Northern Pulp. At present, Northern Pulp allows affordable thinning of our landholdings which improves the health and fire safety of our forests and is highly supportive of silviculture programs which helps to ensure that we will have healthy and viable forests for the next generation. As such, we hope that Northerns proposed effluent treatment plan is given full consideration. Name: Email: Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 52 y: 22

From:
To: Environment Assessment Web Account
Subject: Northern Pulp ETF Environmental Assessment Focus Report
Date: November 8, 2019 1:32:41 PM
Attachments: submission to Minister re NP.docx

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Attention: Minister Gordon Wilson, Premier Stephen MacNeil and Department of Environment Staff.
Please find attached a report submission regarding the above subject.

Pictou, NS
Fisherman

Re: Northern Pulp's ETF proposed project and Focus Report

Dear Minister Gordon Wilson, Premier Stephen MacNeil and Nova Scotia Environment Department,

I am writing in relation to Northern Pulp's Replacement Effluent Treatment Facility Project Focus Report. I am a commercial fisherman out of Caribou, NS. A business owner, father and husband.

Section 7.0 Fish and Fish Habitat

I have been a commercial fisher for 32 years and have owned a commercial fishing business for 24 years. I hold licenses for lobster, herring, squid, scallops, mackerel, smelts and swordfish. Lobster being my main source of income, then herring and scallops. I fish lobster and herring along the proposed route, within the diffuser end, and the surrounding area. *Figure 1 Chart of Caribou Harbour showing proposed route and location of the diffuser end in Section 7.0 Fish and Fish Habitat* is basically a chart of where I fish lobster and herring (and beyond the page as well) In short, the effluent will be released DIRECTLY INTO where I set my traps everyday. Northern Pulp claims that the continuous daily discharge of pulp effluent will do no harm to the lobster and lobster larvae, yet they failed to produce a study that proves this. *Section 7 of the Terms of Reference of the Focus report 7.3 states:*

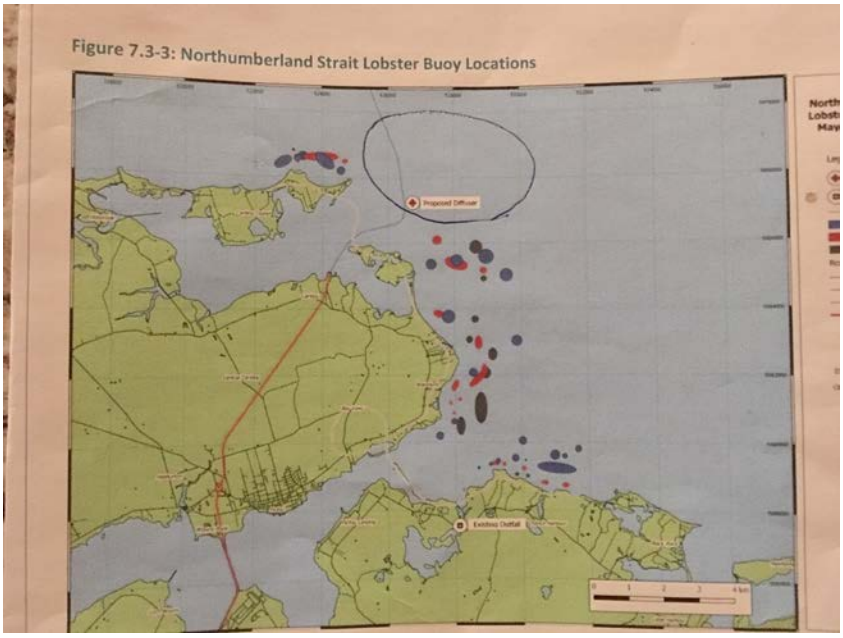
> **Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants……**

Northern Pulp failed to conduct this report. Exact wording from focus report:

> **"No studies completed on Lobster Larvae, Herring eggs or Phytoplankton. Future studies could include toxicity testing, specifically on larval lobster and herring eggs to evaluate sublethal effects on these species."**

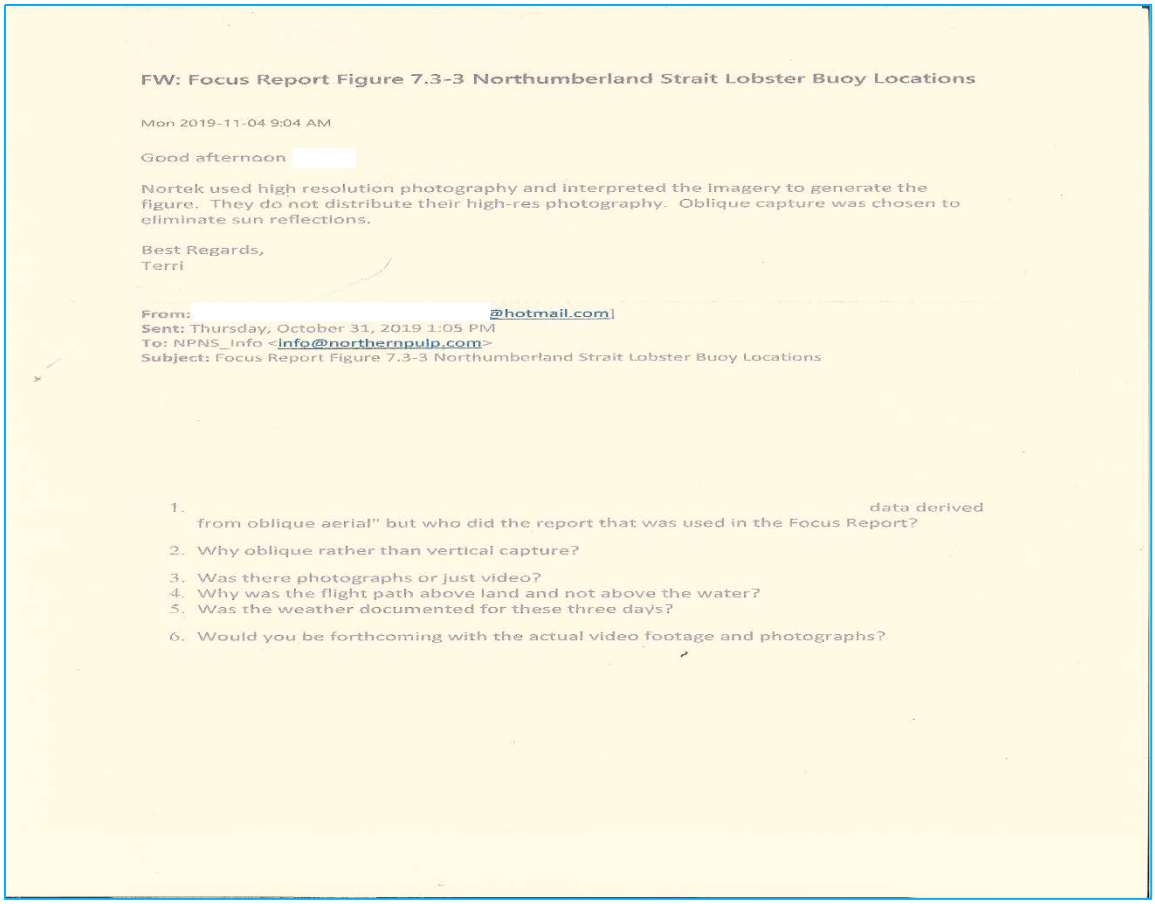
Having been a lobster harvester for over three decades gives me an in-depth knowledge of their life cycles and habits, yet Northern Pulp never asked for our input regarding species. Lack of consulting with key stakeholders in relation to this proposal proves absolute disregard for the fishing industry. We have taken extreme measure to protect and conserve the juvenile American Lobster over the years and continue to modify those measures to ensure a healthy, and sustainable future fishery.

Figure 7.3-3 Northumberland Strait Lobster Buoy Locations



The above figure is an outright gross misrepresentation of the facts, an obvious misleading document. Northern Pulp had a survey boat hired to do work in the pipe route and diffuser area for the month of May, which coincides with our lobster season. This survey boat had to daily, navigate around our buoys, getting in our way of setting our traps, almost colliding with us on foggy mornings. Why didn't they request the survey boat to take note and document where buoys were present in relation to the pipe route and diffuser outflow area. Instead, they hire an airplane to fly over land and take oblique pictures! It is difficult to see my own buoys when they are a boat length away from me in the water, yet Northern Pulp figured they would get a good view of them 1000 feet above the land! Figure 7.3-3 shows no buoys where Northern Pulp wants there to be no buoys. But there are buoys there, lots of them, proving this report to be a falsehood.

had a telephone conversation with Terri Fraser, Project Manager at Norther Pulp and a conversation via email. Terri told on the phone that where there are no color coated ovals, big dots and little dots on Figure 7.3-3 there are no buoys. Below is the email thread. Take note: Terri Fraser "Oblique capture was chosen to eliminate sun reflections"



FW: Focus Report Figure 7.3-3 Northumberland Strait Lobster Buoy Locations

Mon 2019-11-04 9:04 AM

Good afternoon

Nortek used high resolution photography and interpreted the imagery to generate the figure. They do not distribute their high-res photography. Oblique capture was chosen to eliminate sun reflections.

Best Regards,
Terri

From: @hotmail.com]
Sent: Thursday, October 31, 2019 1:05 PM
To: NPNS_Info <info@northernpulp.com>
Subject: Focus Report Figure 7.3-3 Northumberland Strait Lobster Buoy Locations

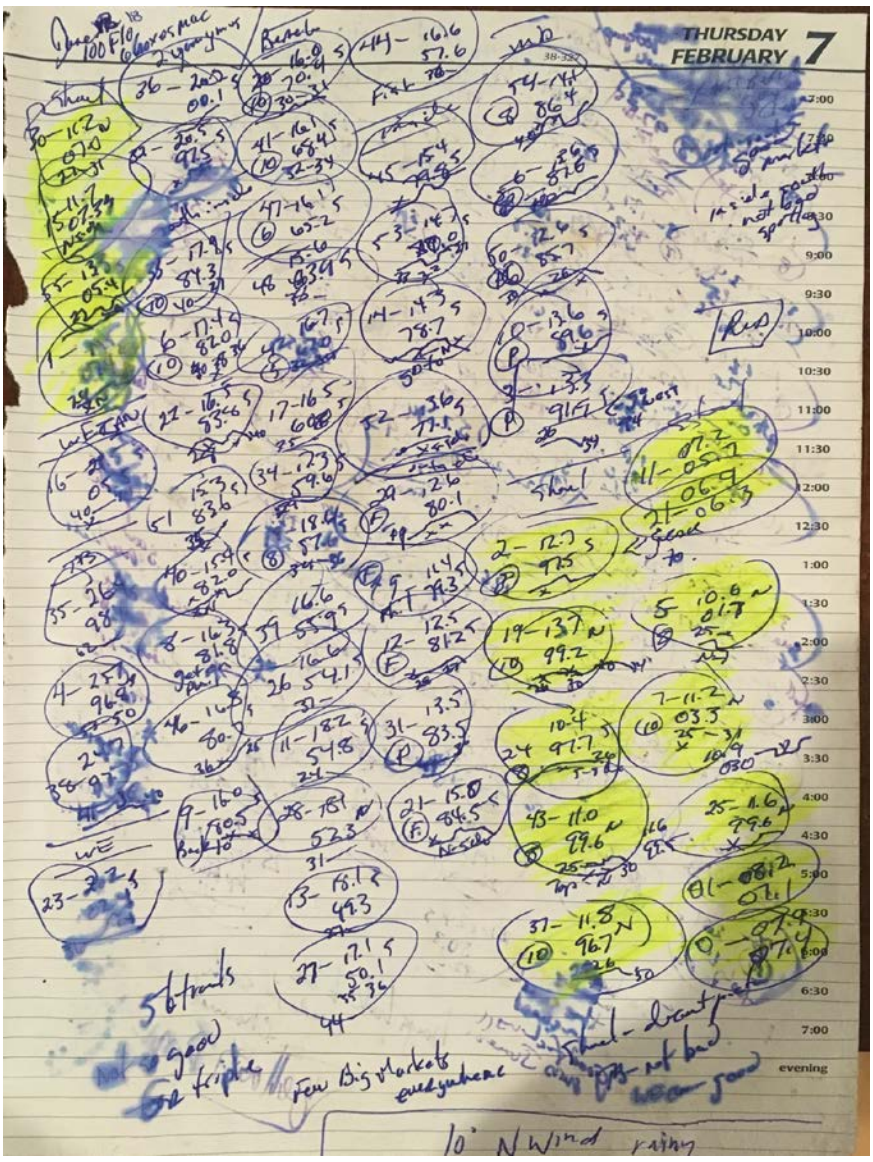
1. data derived from oblique aerial" but who did the report that was used in the Focus Report?
2. Why oblique rather than vertical capture?
3. Was there photographs or just video?
4. Why was the flight path above land and not above the water?
5. Was the weather documented for these three days?
6. Would you be forthcoming with the actual video footage and photographs?

I take notes every day while fishing and part of those notes are the weather. The days noted on Figure of 7.3-3 the weather was, as follows, according to my record:

May 6, 2019 – 12:00 noon 8 degrees, Northeast wind and overcast with sunny breaks
May 24, 2019 -12:00 noon 7 degrees, South wind and rain
June 18, 2019 – 12:00 noon 10 degrees, North wind and rain

So, I ask you, why would they have to take oblique capture to avoid sun reflections, when there were no sun reflections on those days?

The following picture is a page out of my ledger book. It is June 18th, one of the three days Nortek flew overhead and allegedly saw zero buoys where indicated on Figure 7.3-3. The highlighted coordinates are within the outflow location and according to the scale within 1000 metres of the outflow location; in the exact location Northern Pulp is claiming there were no buoys on June 18. You will note that I have 16 highlighted trawls, representing 80 traps under the water and 32 buoys. Please note I am, by far, NOT the only fisherman in this area.



I was so shocked by Northern Pulp's attempt to mislead the Province with this false lobster buoy figure that it compelled me to send an email to Minister Wilson's office asking if someone from your department would come down and take a sail on my boat and I could show you the receiving water area. That prompted Mark Theriault from the local Department of Environment to call me and said he would go out on my boat. He has not as of today. It is extremely important that anyone who is reviewing this project get a firsthand look at this area. I wanted to make note of the invitation in this response.

requesting a boat trip
Wed 2019-10-30 2:05 AM
To:minister.environment@novascotia.ca <minister.environment@novascotia.ca>
Good Morning the Honorable Gordon Wilson,

My name is …… I am a commercial fisherman out of the Northumberland Strait and my home port is Caribou NS. I have until November 8 to submit my comment on Northern Pulp's effluent treatment project under the public comment period. Section 7 and Figure 7.3-3 Northumberland Strait Lobster Buoy Locations. This figure is showing no buoys in the outflow location. This is invalid. [redacted] told me that I should take pictures of my daily ledger of coordinates and send them along with my submission. Firstly, I do not know how to do that, however I am certain she could assist me. Secondly, why do I have to prove to department where I fish when a company is lying about it. Why do I lose sleep every night because a company decided to fudge reports. The best way I can show you the area is for you, or someone from the department to come on my boat for no more than an hour and I can sail you to the exact spot of the outflow areas and explain where we all fish. I am requesting this as a last resort to save my livelihood. I am disturbed at the fact that when the survey boat was out in May, myself and other fisherman had to wait to throw our trolls off the boat because the survey boat was in the way. Three days out of the season we had planes circling us taking pictures. And now, when I look at this report, they say that there was no fishing there? It would be super easy for your department to come out for a field trip and I can physically show you the area!! November 8 is almost here. Could someone call me back please and we can discuss this:

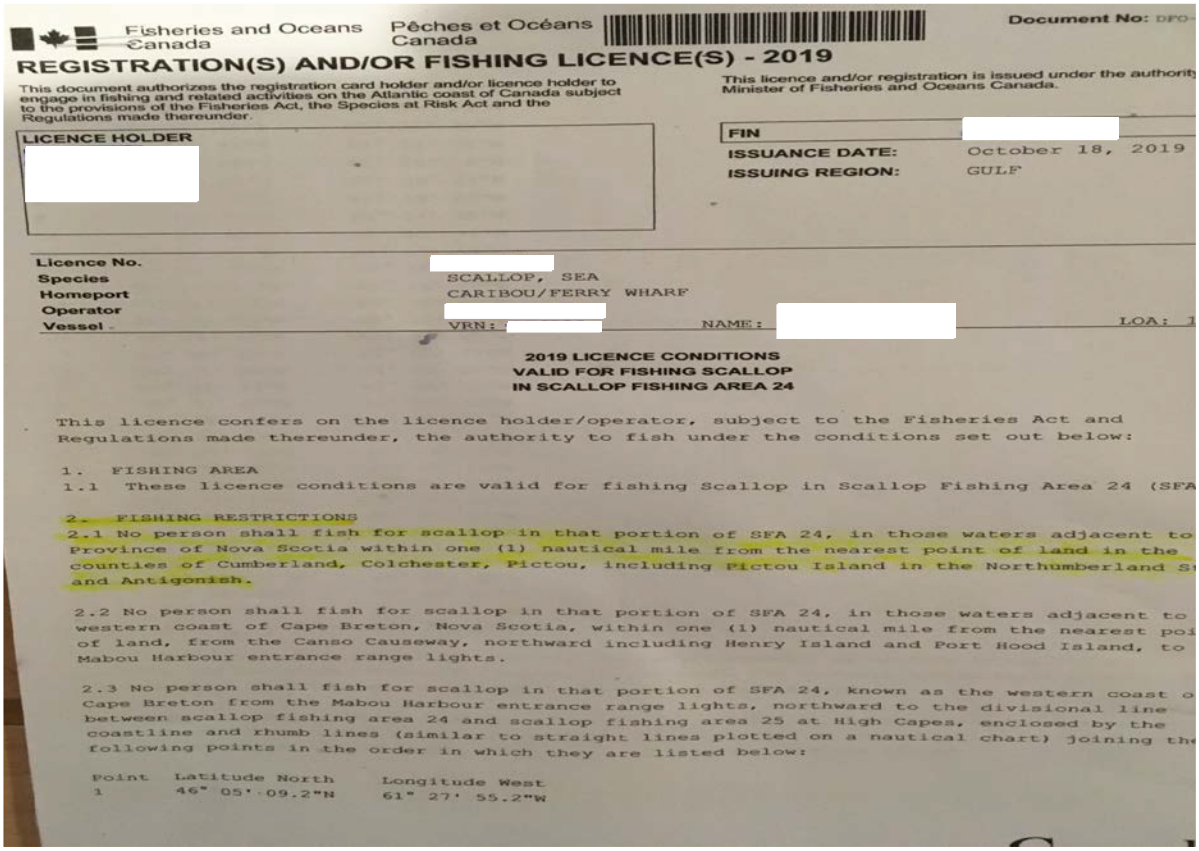
Sincerely,
A fisherman desperately trying to save his business,

Page 120 of section 7.0 Fish and Fish Habitat last paragraph reads:

> **The proposed treated effluent pipeline traverses the Scallop Buffer Zone, SFA 24, set in place in order to protect lobster nursery habitat. The placement of the pipeline diffuser was chosen to minimize the impact in active fishing areas.**

So, I am trying to wrap my head around Northern Pulp's attempted logic…. putting the diffuser in active fishing areas minimizes impact to fishing areas? And digging and excavating more than 40,000 cubic meters of soil within the scallop buffering zone, a protected area, is considered "minimizing impact"?? The following paper is my Registration and Fishing Licence for 2019 for Sea Scallop by Fisheries and Oceans Canada the highlighted portion is the Fishing Restrictions stating:

> **2. FISHING RESTRICTIONS**
> **2.1 No person shall fish for scallop in that portion of SFA 24, in those waters adjacent to the Province of Nova Scotia within one (1) nautical mile from the nearest point of land in the counties of Cumberland, Colchester, Pictou, including Pictou Island in the Northumberland Strait and Antigonish.**



Fisheries and Oceans Canada / Pêches et Océans Canada

Document No: DFO-

REGISTRATION(S) AND/OR FISHING LICENCE(S) - 2019

This document authorizes the registration card holder and/or licence holder to engage in fishing and related activities on the Atlantic coast of Canada subject to the provisions of the Fisheries Act, the Species at Risk Act and the Regulations made thereunder.

This licence and/or registration is issued under the authority Minister of Fisheries and Oceans Canada.

LICENCE HOLDER [redacted]

FIN [redacted]
ISSUANCE DATE: October 18, 2019
ISSUING REGION: GULF

Licence No. [redacted]
Species SCALLOP, SEA
Homeport CARIBOU/FERRY WHARF
Operator [redacted]
Vessel VRN: [redacted] NAME: [redacted] LOA: 1

2019 LICENCE CONDITIONS
VALID FOR FISHING SCALLOP
IN SCALLOP FISHING AREA 24

This licence confers on the licence holder/operator, subject to the Fisheries Act and Regulations made thereunder, the authority to fish under the conditions set out below:

1. FISHING AREA
1.1 These licence conditions are valid for fishing Scallop in Scallop Fishing Area 24 (SFA

2. FISHING RESTRICTIONS
2.1 No person shall fish for scallop in that portion of SFA 24, in those waters adjacent to Province of Nova Scotia within one (1) nautical mile from the nearest point of land in the counties of Cumberland, Colchester, Pictou, including Pictou Island in the Northumberland S and Antigonish.

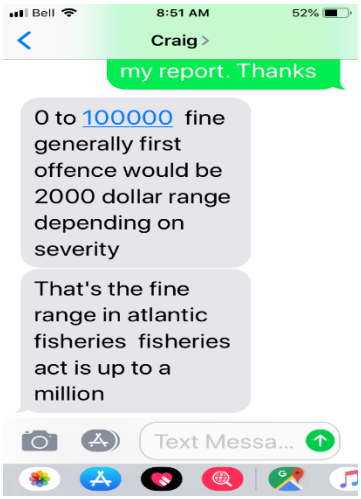
2.2 No person shall fish for scallop in that portion of SFA 24, in those waters adjacent to western coast of Cape Breton, Nova Scotia, within one (1) nautical mile from the nearest poi of land, from the Canso Causeway, northward including Henry Island and Port Hood Island, to Mabou Harbour entrance range lights.

2.3 No person shall fish for scallop in that portion of SFA 24, known as the western coast o Cape Breton from the Mabou Harbour entrance range lights, northward to the divisional line between scallop fishing area 24 and scallop fishing area 25 at High Capes, enclosed by the coastline and rhumb lines (similar to straight lines plotted on a nautical chart) joining th following points in the order in which they are listed below:

Point	Latitude North	Longitude West
1	46° 05' 09.2"N	61° 27' 55.2"W

If convicted of Section 2 2.1 of Licence the fine ranges from $0.00 to $1,000,000.00.

Please see attached photo of a screen shot of my text conversation with local DFO officer Craig MacDonald. I asked him what the fine is should you drag scallops inside the buffer zone.



In summary; I cannot drag my scallop bags on the ocean floor within one nautical mile of any body of land located on the Northumberland Strait or I could get fined two thousand to one million dollars.

Some of the limitations set out by DFO are as follows:

> *Prohibitions Scallop Dragging, no other human activities that take place in this area are incompatible with the conservation of the ecological components of interest.* Please refer to http://www.dfo-mpo.gc.ca/oceans/oeabcm-amcepz//refuges/sfa-zpp-eng.html

This is in place to protect the Juvenile American Lobster. The focus report reads in Section 7.3 Marine Environment Impact Assessment figures 3-11, 3-12, 3-13, and 3-14 and then it states that the outfall location is outside of this buffer zone. I would like to point out to you Minister Wilson, the pipe route where they plan to excavate thousands and thousands of cubic meters of the ocean floor is well inside the buffer zone, the marine refuge. The outfall location is also within the buffer zone as one (1) nautical mile equals 1.852 km. Northern Pulp and their consultants do not even have an understanding of one of the biggest and most important conservation measures ever undertaken by Fisheries in this region! And apparently, they do not know how long a nautical mile is!

In closing:

I have been fishing since I was 17 years old. I have been fortunate to have been able to get up every day and do a job that I love. I have had my fair share of struggles throughout the years of fishing. From learning the ins and outs of being a business owner and the responsibilities and stress that goes along with that to the constant fluctuation in market price versus inflation in

fuel, bait, gear etc. I have been through species closures and new limitations, all to protect and conserve our natural and delicate ecosystem……. we work hard and take pride in maintaining a sustainable future for our children and grandchildren. This also takes a considerable amount of financial sacrifice, a sacrifice that we are willing to take on. As a fisherman I contend with mother nature in ways that most would never understand; wondering sometimes if she is hungry enough to swallow me or give me the mercy to make it home to
We call it "a love of the game". Minister Wilson, I have been through rough sees that swallowed my boat whole, forcing me to swim through the roaring, dark sea and wait for rescue. I am a fighter, and I will fight for my livelihood.

My expenditures in the run of a year sometimes triple that of the average worker at Northern Pulp and each dollar spent goes back into our local economy. I provide a good living for my worker to support his growing family. Fishing has allowed me the pleasure of supporting local charities, schools and sports teams. The fisherman of Nova Scotia are the backbone of the economy and we don't need a Gardner Pinfold study to prove that. We harvest a food that is sought after globally and we do not deserve to be treated this way by this company, to have our whole lives turned upside down all for the sake of the mighty dollar of a foreign owned company. Having to prove that I fish where I fish because Northern Pulp, that is holding this Province hostage, took great measures to lie about it, is absolute ludicrous. It is revolting that Northern Pulp is outright threatening the fishing industry, the tourism industry, the forestry industry, our health, the health and well being of the people of Pictou Landing First Nation. The Northumberland Strait borders three provinces. You have a duty to prevent a catastrophic event from occurring. I am asking you to uphold that duty.

I am asking, with every fibre of my being, to **reject this project**.

Yours Truly,

From: @outlook.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:34:20 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: This project is crucial to the socioeconomic status of Pictou County, and Nova Scotia as a whole. Weâ?Tve coincided with this mill for over 50 years, as have 80 plus other communities in Canada. Replacing boat harbour also rights a horrible wrong to PLFN, which this project accomplishes upon completion. The government needs to grant an extension to boat harbour closure to complete this project for the greater good for the county and province. We need to trust the science and environmental impact assessment that has been conducted and hold the mill accountable to the regulations in place. I am one of the many young Nova Scotians who needs to work out of province for good paying work. To close the mill to appease the environmental lobby when a viable replacement to boat harbour is so close will only further alienate the hard working Nova Scotians whoâ?Tve moved or work away and would love to return some day. Extend the deadline, save NS forestry jobs and the mill. Name:
@outlook.com Address: New Glasgow, NS
Municipality: New Glasgow Postal-Code: Fax:
email_message: Privacy-Statement: agree x: 45 y: 33

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:39:58 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: In Support of Northern Pulp Workers I have worked in the forest industry lumber and paper mills, and represented workers in the forest industry for almost 40 years. I am writing in support of the workers at the Northern Pulp mill and all the workers dependant on the Paper Excellence mill. I have seen personally what happens in a small community when a mill closes and the jobs are lost in Port Alice BC the pulp mill went down nearly five years ago and that community hasnâ?Tt recovered, it may never. In Mackenzie BC in 2008 four mills went down, Abitibi shut its paper mill permanently and its lumber mill indefinitely, Canfor indefinitely idled its lumber mill and the Pope and Talbot pulp mill went bankrupt. Mackenzie has yet to fully recover. The impact on the communities is profound, schools closed, small businesses closed. Many people lost their homes those who didnâ?Tt saw the value of their home drop by more than half. Finally, people left the community to try to find work. The recovery in Mackenzie started in 2010 when Paper Excellence purchased the pulp mill and spent millions of dollars to bring it back online. Granted, the closures mentioned were economic in nature as opposed to environmental but the impacts on the people in the community are real and they are the same. Northern Pulp have already invested over 130 million into improving their environmental foot print in addition to the $200 million improvement to the effluent treatment upgrade. These systems run with strict environmental watchdog systems in place, continuous monitoring of the in and out flow, and stringent testing protocols, which are the norm with any effluent treatment system. This site will be no different than the over 80 sites in Canada with similar treatment systems. Northern pulp has addressed every concern raised in the initial public consultation comments and every question posed to them by Nova Scotia Environment using 3rd party opinions from experts in the field, scientific studies and actual facts, instead of emotion and self interest. This site now has a plan, a plan to move forward and continue to improve the environmental footprint that exists today. As the Minister of Environment for the province of Nova Scotia itâ?Ts up to you now to make your decision. And following the scientific review of the focus report, within the limits of the focus report terms of reference, there are no adverse effects or significant environmental effects which may be caused by the undertaking. Approve this plan, and get this project started and keep the forestry sector in Nova Scotia alive. Respectfully submitted, Email: @gmail.com Address: Municipality: Mission Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 62 y: 24

From:
To: Environment Assessment Web Account
Cc: info@friendsofthenorthumberlandstrait.ca;
Subject: Replacement Effluent Treatment Facility Project
Date: November 8, 2019 1:40:11 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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To The Honourable Gordon Wilson, Minister of Environment, Government of Nova Scotia

Dear Sir:

As a property owner and tax payer of Pictou County for close to 20 years, I call upon Gordon Wilson, Minister of Environment for Nova Scotia to **REJECT Northern Pulps proposal to construct an effluent treatment facility and transmission pipeline into the Northumberland Strait.**

I find it unfathomable that we are even in a position to have to fight this proposal which is flawed in so many ways. That Northern Pulp would show such disregard for the community by suggesting that they pipe heated effluent across fresh water tables and directly into a diverse breeding ground for fish, birds, and wildlife; directly into an already over-taxed water system, that in this day and age we know is increasing in temperature and decreasing in oxygen.

- **How can we possibly consider this as a viable option when new information (United Nations IPPC report) as recent as Sept of 2019 highlights the critical state of our oceans.**

  "With current ocean research demonstrating that our waters cannot adjust, cannot adapt and are indeed suffering much like our forests are with the effects of climate change, how can we justify adding up to 90 million litres of effluent per day into an already-stressed ecosystem?"
  Moodys Cove, Pictou Landing

- **The diffuser system being proposed in a body of water that regularly freezes is a disaster waiting to happen!**

  "Sometimes the ice would drag them [navigation buoys] for miles. Buoy anchors are 2000 lb blocks with 500 lbs of chain on them"
  Master Diver, Pictou County, NS

- **Northern Pulp should demonstrate their commitment to the entire community by investing in a closed loop system, not discarding it as a non viable option.**

> “The market profile does not say that changing production to a closed loop system would be unprofitable for NPNS .”
> — Eco Justice

The Provincial Government is charged with the responsibility to improve the life of its citizens. Don’t solve one problem by shifting it onto others within the community.

Are you prepared to risk Nova Scotia’s reputation for being Canada’s Seafood export powerhouse and Canada’s Ocean playground. This is what is at stake, not to mention the overall health and well being of the Pictou County community.

Respectfully,

Caribou Island, Pictou County

From:
To: Environment Assessment Web Account
Cc: @eastlink.ca
Subject: Northern Pulp EA - times have changed, allow new standards to be applied
Date: November 8, 2019 1:43:34 PM

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October 8,2019

NS Minister of Environment

Times have changed ....

I recently had an opportunity to visit an antique car buff, in Calgary, Alberta. During an enjoyable outing, we had a tour of the city downtown in his mint '67 Chevrolet Impala convertible. With the car top down, we gazed skyward with an unobstructed view of the high-rise skyscrapers of this modern city. This is a convenient vehicle for downtown sightseeing, but I must admit it was a bit un-nerving not to have the security of seat belts we are all so accustom to in today's modern car. That 1967 model was the first year cars had seat belts - only 2 lap belts for the front bench seat, no shoulder straps and no restraint of any sort in the back seat. But of coarse, the big car has a large block engine, plenty of horse power and, except for a muffler on the exhaust, no add on components or technology to deal with any form of pollutants or emissions. These were the standards of the day - little was incorporated in the cars design in the way of passenger safety or environment performance. The motor vehicle standards have certainly changed since that 1967 model, the year Northern Pulp started operating in Abercrombie.

As Pictou County youth in the 60's, I recall the standard practice to get rid house hold garbage was dropping it off, what ever it was, unsorted and in any condition, to municipal run dump sites along the shore of the river in New Glasgow, Trenton or in the wood in places like Chance Harbor. At these locations, fires burned was was combustible, rats ate was was consumable and ultimately the ashes, tin cans & bottles were dozed over the river bank into the waterways. Eventually, in the 70's and beyond, local governments introduced household garbage collection, sorting, composting, recycling and landfill. The solid waste standards have certainly changed since the 1967 town dumps, the year Northern Pulp started operating in Abercrombie.

The streams, rivers, harbours and straits of Pictou County not only received pollution from the many town dumps, they were also the receiving waters for all the raw sewage from every toilet, shower & sink in every town, village, home, cottage and camp along their shores. The standard of the day was to pipe all sewer, waste & effluent direct into our waterways. Eventually, in the 70's and beyond, local governments installed central sewage collections systems, introduced on site treatment regulations and built community treatment facilities to process sewage before it is discharged into those water ways. The waste water standards have certainly changed since the 1967 practice of dumping raw sewage in the waterways, the year Northern Pulp started operating in Abercrombie.

When the Abercrombie pulp mill was constructed in the 60's, it was done to the known technologies, standard best practices and regulations of the day. As in our local social & civil environment, since initial construction, many many changes have evolved in the standard practices, operating regulations and of coarse technologies, applicable to a pulp mill operation.

Over the past 50 years, Scott Paper, Kimberley Clark, Niena Paper & Paper Excellence have continually invested very large amounts on multiple significant improvements and enhancements at the Abercrombie facility in keeping up with these evolving standards, regulations & expectations.

The last remaining significant enhancement in the mills evolution is in the area of effluent treatment. The Boat Harbour lagoon treatment regime was the standard best practice of the 60's. Significant progress has been made in the past half century on the standard practices, operating regulations and process technologies applicable to Pulp mill effluent treatment. Northern Pulp have indicated they are willing to invest an enormous amount of their money and resources in a new state-of-the-art Effluent Treatment facility.

Since 1967, Local governments, communities, businesses, industries, utilities and the citizens of the northern region of Nova Scotia have implemented many improvements to the standard way in which we collectively pollute the air, manage our solid waste and treat our waste water. Northern Pulp has committed to do as we have all done- improve on the way in which effluent is treated. They should not be denied that opportunity.

Sent from my iPad

From:
To: Environment Assessment Web Account
Subject: Northern Pulp EA - focus report comment
Date: November 8, 2019 1:43:38 PM
Attachments: p10073.png
p10072.png

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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November 8 2019

Minister of Environment

RE: Northern Pulp Effluent treatment Focus Report
Northern Pulp effluent outfall into Northumberland Strait will join many existing local outfalls

Subject: Much has been presented in the media about public concern regarding an effluent outfall in the Northumberland Strait. After reading the focus report and investigating similar practices in the region, below are my comments in favour of permitting the project:

Northern Pulp has indicated their desire to upgrade the mills effluent treatment regime by constructing an entirely new modern treatment plant at Abercrombie. Once constructed, the plan is to abandon the existing Boat Harbour treatment facility from where all of the mills effluent has flowed into the Northumberland strait for 52 years.
The pulp mill project includes the construction of an outfall pipeline similar to multiple other existing local outfalls currently discharging effluent into the Northumberland Strait.

The construction of an effluent outfall to carry waste water into our local waterways is nothing new - I am aware of 5 other local sewer outfalls that are continuously discharging sewage waste water into Pictou County rivers and Northumberland Strait. (see map)

Locations of existing effluent outfalls into Pictou County waters



At each of these locations, the local municipalities, industries, harbour authorities and Indigenous Bands, with the approval of their constituents, owners, members and residents, have made decisions to construct their local sewage treatment facilities using technologies that result in a treated water effluent being discharged through outfalls into a local waterway. Under normal operating conditions, each of these outfalls are discharging treated waste water through outfalls. However, during abnormal conditions such as power outages or heavy rain events, many of these systems components may bypass resulting in raw human sewage being discharged directly into the local waterway.

Pictou Landing First Nation Waste Water effluent outfall near Boat Harbour



The construction and operation of these facilities is done to current wastewater regulation requirements, built using engineering design best practices, permitted to operate under enviromental guidelines using trained & competent operators.

Northern Pulp treatment facility design has planned in advance for the abnormal situation knowing that there will be power outages and not wanting to discharge untreated effluent, have included the expense for a holding basin. Unlike most municipal systems, this will allow for the retention of untreated effluent during power outages until such time operations return to normal and untreated effluent can then be recovered and put through the treatment plant before being discharged.
If Northern Pulp is permitted to build the new treatment plant, they are committed to construction and operation of the facility is done to current Pulp mill wastewater regulation requirements, built using engineering design best practices, permitted to operate under enviromental guidelines using trained & competent operators.
And if build, this new pipeline discharging effluent into the strait will join the five other government and industry sponsored outfalls doing the same.

Sent from my iPad

From:
To: Environment Assessment Web Account
Subject: Replacement Effluent Treatment Facility Support
Date: November 8, 2019 1:45:23 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Honourable Gordon Wilson and the Department of Environment,

I am writing in support of the Northern Pulp Replacement Effluent Facility Project and to encourage your department to approve this project.

Since these comments will be made public, I want to thank all those who dedicate their time to fighting for environmental protection along the Northumberland Strait. I think the level of interest in and understanding of our environment is increasing and that is largely due to people like them who invest their time and energy to protect our shared land, air and water.

This work, too, is done by your department in order to ensure all Nova Scotians can enjoy safe habitat and preserve the natural beauty of our province.

Where some groups or individuals have strayed however, is when the battle veers more toward achieving perfection than establishing a productive balance.

Indeed, your department is tasked with evaluating projects that must balance environmental impact with economic benefit. This is no easy task and is too complex for a quick debate.

I have been closely following Northern Pulp for more than five years. Every news story, documentary, radio interview and social media comment I can find - and there are many. I value the leadership role taken by Chief Andrea Paul and respect the work she has and is doing to right a historical wrong committed against her people. It is admirable and the people of PLFN deserve to be finally given the respect they deserve.

I am cautious of groups who know little except talking points, and often get the details wrong. Many relatively influential people have cited decade-old data in their social media posts about Northern Pulp being the dirtiest mill in Canada (this is not true; there have been millions in investment in the past few years that have produced great improvements in air emissions and water usage) among other misrepresentations of scientific process, or misinterpretations of data.

I am supportive of this project because of a few key facts:

- This project removes the need for Boat Harbour. It moves the effluent treatment away from their community. It keeps any untreated effluent on the mill site. This is an important improvement.
- This project uses already-established technology in use in pulp mills across North America. Port Alberni, BC uses this technology now and they operate safely and well within Canadian guidelines.
- Conditions can be established by NSE to include additional tests and monitoring, if

necessary. The department has that power.

- Rejecting this project on the basis of the previous submission and this Focus Report is to say that worries and fears supersede established practices and detailed third-party science.
- Rejecting this project also ignores the dramatic financial implications of putting hundreds of workers in rural areas, possibly thousands, out of a job. Consumer demand for lumber and paper products continues to be high. We can work to improve our forestry sector with an approval, but we lose that opportunity if we shut it all down now.

Through all of this, I have hoped the government would work with all parties to establish trust and find ways to minimize environmental impact while helping our forestry sector in NS thrive and be as clean and renewable as it can be.

My hope is that you will approve this project and continue to find ways Nova Scotia Environment can reassure opposition groups that our regulations are effective, and that our forestry sector, like our fishery, is a treasured and vital part of our livelihoods, our culture and our economy.

With thanks,

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From: @shaw.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:46:26 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Canadaâ?Ts environmental standards and enforcement with our forestry sector has led it to be among the cleanest in the world. The industryâ?Ts continuous improvements are important to take into consideration and should inform your decision making on this new effluent treatment facility. Nova Scotia Environment should rely on the best available science, contained in the report, to approve the project. The forestry sector is a leading industry in Canada, providing good jobs from coast to coast. The forestry sector has increasingly become a renewable sector, focused on sustainability and implementing the best available processes to reduce impact on the environment. Canada is a world-leader in forestry regulations and enforcement. Eighty-eight other pulp and paper mills across the country coexist and support their communities. NSE, under the Act must consider: The linkage between economic and environmental issues, recognizing that long-term economic prosperity depends upon sound environmental management and that effective environmental protection depends on a strong economy. This new effluent treatment facility meets the goal of balancing economic development with environmental protection. The third-party science contained in the Focus Report submitted by Northern Pulp contains the results of more than 20 different complex and detailed environmental tests. The project ought to be approved based on the science contained in the report. Name: @shaw.ca Address: Municipality: Vancouver Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 35 y: 34

From: @mcmaster.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:48:17 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: The ongoing Industrial Violence that Northern Pulp has perpetrated upon the lands and waters and Peoples of Asek, Mik Maw territory must come to an end. Honour the Boat Harbour Act and the closure of the facility this January 2020. Nova Scotia smdoes not need pulp Mills any longer nor does it need clear cutting. A hemp industry would be a huge boom for this province and you can literally make anything from hemp, including plastic and paper. Northern pulp must pay for medical expenses of Peoples affected with health conditions linked to the industrial contamination of the site and also apologize for the decades of lies. Northern Pulp must pay for ongoing employment of rigourly scientific and traditionally managed ecological restoration of the site. Name: @mcmaster.ca Address: Municipality: Halifax Postal-Code: : ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 64 y: 31

From: @northernpulp.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:54:34 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I have read the Focus Report and support the decision to build a new Effluent Treatment Facility. Name: @northernpulp.com Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 65 y: 16

From: @yahoo.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:57:04 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: This is a good proposal. Project should get the go ahead. Name: @yahoo.ca
Address: New Glasgow, NS Municipality: New Glasgow
Postal-Code: Fax: email_message: Privacy-Statement: agree
x: 77 y: 24

From:
To: Environment Assessment Web Account
Subject: attention Hon. Gordon Wilson
Date: November 8, 2019 1:57:25 PM
Attachments: letter.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Attention Hon. Gordon Wilson. Please accept this letter in reference to the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project

November 7, 2019

The Hon. Gordon Wilson
Minister of the Environment
Nova Scotia

Via email: ea.novascotia.ca

Dear Mr. Minister:

I am writing to record my opposition to the building of a replacement Effluent Treatment Facility to accommodate waste from the Northern Pulp Mill.

I have lived walking distance to Simpson Beach, outside of Pictou, for 17 years. During this time, I have experienced the presence of the mill as a smell that carries with the wind. The mill has defined our air quality, depressed our regional profile and worried all of us living in the vicinity. The Mill has defined Pictou as the place to avoid, leave and never invest in.

The Mill's current proposal to build a new effluent pipe in the Northumberland Strait near Caribou Harbor escalates the negative impact of Northern Pulp on our community beyond reason.

For 40 years the mill and it's various owners have transferred the burden of their industrial waste to the people and land of Pictou Landing. While all peoples of Pictou County have battled unacceptable air, the people of Pictou Landing have experienced constant degradation of water, land and culture through the Mill's use of Boat Harbor as a site of effluent treatment.

Promises broken and risk unilaterally assigned to Pictou Island are now clearly visible to all Nova Scotians.

There is no room in Pictou County in 2019 for a mill that has exhausted it's goodwill through lack of action on multiple issues over many years. Northern Pulp was slow to install air scrubbers, unrepentant in the face of spills and leaks the vicinity of Boat Harbor, unresponsive to community concerns, and vocal in predicting economic hardship if closed. Direct and in direct subsidies have enabled and encouraged the mill's persistent poor behavior. The well of trust has been drained.

Our children deserve and require a home province and leadership that looks beyond resource-based economies to establish a well-rounded future that invites newcomers, diverse economies and non-resource-based enterprises.

Only a resilient, sustainable and innovative Nova Scotia will surmount the challenges of climate change, an aging population and changing technologies. Now is not the time to endanger our fishermen's livehoods, threaten fishing grounds or

dissuade younger entrepreneurs. Now is not the time to promote aging technologies that support economies elsewhere.

I join others to say, “No pipe” and close Boat Harbour.

Reject this proposal.

Sincerely,

Pictou Co.
Nova Scotia

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 1:58:03 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Id like to see the proof that Northern Pulps proposed new effluent outlet into the Strait will not affect the lives and livelihoods of the people who live on its shores. And do the job losses if the mill closes compare to the job losses to fishing, tourism and general quality of life if the pipe goes ahead? Name: @ns.sympatico.ca Address: Antigonish Municipality: Antigonish Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 23

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 2:02:49 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Iâ?Tve been in the Forestry sector for 26 years now, and grew up in a small town that relied heavily on the industry. Iâ?Tve since see that town dwindle in population as one by one, most of the mills in the area shut down due to mismanagement of what is absolutely a renewable resource. Granted, Iâ?Tve also seen the environmental damage that the same mismanagement can do: whether it was the early days of clear-cutting, effluent spills, erosion, or the mountain pine beetle in BC. I believe recent practices are greatly improved. The mill I work at now in New Westminster, BC is actively participating in reducing its carbon footprint with cleaner fuels and capturing solar energy. Iâ?Tm proud that my workplace takes the environment seriously. I truly believe that Paper Excellence is making this attempt at Northern Pulp in Nova Scotia $130 million already invested in a switch to natural gas, with a promised $200 million to upgrade its effluent system. I believe Paper Excellence has addressed all relevant questions regarding its proposed plan, and from what I can tell, the scientific review of the focus report further addresses any concerns that are emotion-based. Yes, Iâ?Tm a union member and a member of the forestry sector, but no one can deny that the community there is in crisis over this issue. Iâ?Tve seen it, Iâ?Tve lived it. Iâ?Tve seen what losing good jobs can do to a community. The forestry sector CAN work hand-in-hand with those concerned about the environmental impact of making pulp. It can be done, and I believe Paper Excellence is making an honest effort to do so. I urge you to please consider the science behind the argument when making your decision, rather than the emotional arguments we often see in the news and on social media. As I said above, It can be done, itâ?Tll take work and maybe a bold decision, but it can be done. Regards Name: @hotmail.com Address: Municipality: Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 29

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 2:06:24 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Please do not approve Northern Pulps plan to dump their waste further out in the water. It is still toxic and out of sight should not be out of mind! Please do the right thing for our environment. Name: @gmail.com Address: Municipality: Halifax Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 47 y: 21

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 2:06:33 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Please do not recommend acceptance of Replacement Effluent Treatment Facility Project proposed by Northern Pulp. Diluting the toxic waste somewhere else is not a solution to outdated pulp processing technology. This is an approach that was outdated 30 years ago. Examples of land-based treatment of effluent are available in Europe, Scandinavia and US. Furthermore the pulp industry has skewed the entire Nova Scotia forest sector, degrading forest lands, creating carbon loss where there used to be carbon sinks, devaluing mature trees that have to be used for low-value pulp rather than high -value manufactured forest products. The Demands of the pulp industry and its control of the wood chip economy has many added-value forest product businesses uneconomical and removed the feed stock for these businesses. There is no sustainable, good value with beneficial employment in the future with the current Pulp model of the industry. As Nova Scotian taxpayers we have already wasted far too much in direct subsidies, fresh water and wood supply a prices far below their real value, all to support a n economically and environmentally destructive industry. Enough! Name: @eastlink.ca Address: Municipality: Truro Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 16

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 2:11:11 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

I am writing in relation to Northern Pulp's Focus Report for their Replacement Effluent Treatment Facility project.
My name is I currently live in Braeshore less than 10 km from the proposed pipe location. Because of this I hope my intimate familiarity of the impacted environment will serve as an asset in making your decision.

It All Started With a Busted Pipe:

50 years of environmental racism aside and numerous other pollution infractions, it was a busted pipe in 2014 that launched the recent Boat Harbour timeline and brought us to this current state. The solution, in effect, is to move upwards of 85 million liters of hot effluent per day across Pictou Harbour, over the town of Pictou's watershed to finally reside a shallow estuary called Caribou -- all less than 5km from a national campground, public beach, Pictou Lodge (a premier destination for weddings/ events) and, (as you know) one of the most lucrative fishing grounds in the Maritimes.

When we said that this was a dangerous idea because this effects a multi-billion dollar fishing industry, the response from the Mill was "No Pipe. No Mill". When we said were concerned because when this pipe breaks it's also : NS tax payers, PLFN, property owners, tourism businesses and everybody else that must deal with the ramifications – not Northern Pulp. And once again NP's answer to this dilemma was "No Pipe. No Mill".

NP had over five years to find a solution. But the only solution they settled on was basically to keep doing the same thing. And why not? They have zero risk if the pipe fails. So instead of finding a new product line that could support a closed loop system, we are instead going to continue with a dated environmental disaster all so that NP can make toilet paper for Asia. That's the best we can do in 2019?

Back to the pipe. Why I am worried:

1) In NP's focus report response, they state that the effluent has been going into the Northumberland Strait for over 50 years. The effluent dilution model on page 95 (figure 4.2-6) shows in a one-month simulation from 2016 that what leaves Boat Harbour hugs the coast line and backs up into Pictou Harbour. It gives no indication that the flow of effluent that leaves Boat Harbour goes very far into the Strait. That is a far cry from NP's present plan to pump their effluent directly into the Northumberland Strait. NP also talks about the effluent that leaves the diffusers reaching back ground levels within 20 meters. Even using NP's metric of 62,000 cubic meters (62 million liters) a day, that would mean that over 40 cubic meters of effluent would be pumped into that 20 meter range every single minute, 60 minutes an hour, 24 hours a day, 365 days a year. The only way I can see that small 20 meter box of effluent consistently reaching background levels with such a low rate of outflow of water in the Northumberland Strait thanks to tidal conditions that basically moves the water one way for six hours and then back for another six hours is if the effluent becomes the background. "Treated effluent" is what comes out of Boat Harbour now. According to what a Northern Pulp engineer said to NSE that was accessed by lawyer through a FOIPOP, the effluent coming from Boat Harbour now is better than what will be coming out of the new proposed facility. The flow charts in NP's response to the focus report (page 95 of focus report) that shows the concentration of effluent seems to mimic the charts on where you cannot eat mussels due to health concerns over Leukemia. "Treated Effluent" is effluent

2) Sending the total suspended solids - which are wood fibers that will NOT break down in the ocean EVER - will create an enormous insoluble blob and turn an already fragile ecosystem into a completely anoxic dead zone. This-- within 4 km of a public beach.

3) In 2018, there was another pipe leak. were the ones who discovered the leak (Google it) . No one will give answers on how bad it was because it's "still under investigation". How can NP build a much more complicated pipe system without knowing the cause of the most recent leak?

4) Most of Caribou Harbor is only about 5ft deep. This is especially obvious when you ride in on the PEI Ferry. You can see the wake breaking within a meter or two of the boat. Because it's so shallow, and the nature of the incoming tides, massive ice structures develop all winter long that hammer the coast line. How confident are we that this pipe can withstand this abuse not to mention the vulnerable diffusers? And if/when the pipe breaks, how will they fix it in the dead of winter when the entire harbor is socked in under the ice? Look again at page 20 the focus report . It says the Marine Geotechnical survey work was done in the summer. It also states that ice scour must be considered. Why wasn't the marine work done in the winter. Again – they had five years.

In summary, if NP is actually serious about his proposal, then we need a robust Federal Assessment especially when considering that other provinces are also jeopardized by this pipe. We also need to address the conflict of interest Nova Scotia finds itself thanks to the Indemnity agreements that leave it liable to pay NP for lost profits.

It all started with a broken pipe. And that is where it will end. Caribou Harbor will be a dead zone. The fishing industry and its reputation will be ruined. Caribou National Park will be empty. Why would anybody want to go to Pictou Lodge? Homeowners will be stuck in a toxic mess. Nova Scotia tax payers will be looking at another multimillion dollar clean-up… But don't worry, Northern Pulp will be just fine.

Please, stop this cycle and let Pictou County grow into a new future.

Thank you,

Braeshore, NS.

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From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 2:11:47 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: The Honourable Gordon Wilson, I am writing in regards to the focus report submitted by Northern Pulp for the Replacement Effluent Treatment Facility Project. I believe Northern Pulp has failed to address major concerns related to their proposed project during the focus report process and through their initial submission. They had previously committed to open communication and consultation with first nations, fishermen and fisherwoman, and communities affected by their operations with regards to their plans and how to mitigate any concerns or risks. Their lack of consultation with stakeholders other than those communities and entities whose messaging is outwardly biased towards supporting the millâ?Ts continued operation is alarming. It is a willing admission that they cannot satisfy those groups because this project will undoubtedly have a negative impact on those stakeholders. How is the fishing community to reach any conclusion other than their livelihood will be threatened as a result of this project when the outflow from Boat Harbour is a dead zone and the submission from northern pulp indicates the contents of the outflow at the new proposed location will be mainly unchanged, although at a much higher temperature more damaging. How are those businesses dependent on tourists in Pictou County and the north shore of Nova Scotia, and residents of Pictou County to reach any conclusion other than the continued operation of the mill will result in the continued production of the infamous odor and presence of cancer causing air emissions, as reported by Dalhousie University Researcher, Emma Hoffman. I believe Northern Pulp has materially overstated their net economic impact to Nova Scotia as their current existence and this proposed project suppress millions of dollars of potential economic activity. Most notably their messaging contends that forestry harvesters and woodlot owners in Nova Scotia will suffer the most with lost market for their product, and thousands of lost jobs, however, the Port Hawkesbury pulp mill has to import pulp wood from outside of the provinceâ?¦ Finally, I believe the scale of this submission and level of scientific evidenced in order to provide taxpayers with certainty regarding the assertions made by Northern Pulp cannot be evaluated in the short time period and resource limited period allocated by a provincial class 1 assessment, and therefore, as I have communicated in my previous submission to the Northern Pulp Environmental Assessment application, I believe a federal assessment is needed for this project before any form of approval could be permitted. See the below excerpt from my initial submission: ********** I believe this agency is required to perform a federal assessment of this project for the following reasons: - This project impacts components of the environment under federal legislative authority Fisheries Act, and impacted parties, such as the Province of Prince Edward Island, are unable to have their interests protected through a Nova Scotia Provincial Assessment, whereas a federal assessment would ensure all interests are protected by a thorough independent assessment. - The Boat Harbour remediation project, which has recently been committed to for a federal environmental assessment, is the result of the effluent that the pulp mill has produced. In their registered proposal they claim that the effluent will be a better quality than what went in Boat Harbour but also contradict themselves by saying that the contents of the effluent will not be known until the system is operational. This haphazard approach to registering this project does

not respect the environmental process and the ability for those concerned to properly assess the potential impact the effluent may have. - The regulations under which the mill is regulated, which permit fish deaths due to effluent exposure, are in direct contradiction with the Fisheries Act do not permit significant harm to species and larvae. Further, the impact of the chemicals in the effluent and non-chemical properties of the effluent, such as suspended solids, and temperate at the exit pipe cannot be sufficiently mitigated by saying that outside of a certain area the effluent will be diluted to an acceptable level. This is an acknowledgement that there will be a negatively affected area within the region of the exit pipe which is being placed in federally regulated fishing grounds. Further, the cumulative effects on spawning and ocean bottom cannot be assessed properly in the short window provided for by a provincial assessment. - The Pictou Landing First Nation has requested a federal assessment and as the main party impacted negatively by the mills operations, I believe their request should be respected as a matter of cooperation with aboriginal peoples.
********** Considering the status of Northern Pulpâ?Ts parent company as a serial environmental offender, globally and domestically, their representations in this report are at best generously biased towards their interests and at worst, are void of any scientific standing and should be considered misrepresentations. The sustainable use of natural resources to maintain those resources for future generations indefinitely should be the priority of this department. As such, I wish for you to reject this project, as from a sole environment perspective, there is no basis for reaching any other conclusion than this project will have a significant negative direct and indirect environmental impact. Regards, @gmail.com Address: Municipality: HALIFAX Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 65 y: 19

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 2:14:53 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: To Whom It May Concern: I am a fruit and vegetable farmer in Northern Nova Scotia and a life long citizen of this province. I am deeply concerned about the proposed replacement effluent treatment facility for Northern Pulp particularly the dumping of treated effluent in the Northumberland Strait. I believe the proposed pipe discharge will have unintended negative consequences on aquatic life and the marine ecosystem. It does not make sense to me to threaten a sustainable and well managed industry - the Northumberland Strait fishery - with the discharge from an industry with questionable management practices and a poor environmental record. I urge the Nova Scotia government to support the forestry sector to transition to more sustainable model of development and operation. Sincerely, Email: @gmail.com Address: Tatamagouche, Municipality: Tatamagouche Postal-Code: ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 74 y: 30

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 2:15:49 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

I am writing in relation to Northern Pulp's Focus Report for their Replacement Effluent Treatment Facility project.
My name is I currently live in Braeshore less than 10 km from the proposed pipe location. Because of this I hope my intimate familiarity of the impacted environment will serve as an asset in making your decision.

It All Started With a Busted Pipe:

50 years of environmental racism aside and numerous other pollution infractions, it was a busted pipe in 2014 that launched the recent Boat Harbour timeline and brought us to this current state. The solution, in effect, is to move upwards of 85 million liters of hot effluent per day across Pictou Harbour, over the town of Pictou's watershed to finally reside a shallow estuary called Caribou -- all less than 5km from a national campground, public beach, Pictou Lodge (a premier destination for weddings/ events) and, (as you know) one of the most lucrative fishing grounds in the Maritimes.

When we said that this was a dangerous idea because this effects a multi-billion dollar fishing industry, the response from the Mill was "No Pipe. No Mill". When we said were concerned because when this pipe breaks it's also : NS tax payers, PLFN, property owners, tourism businesses and everybody else that must deal with the ramifications – not Northern Pulp. And once again NP's answer to this dilemma was "No Pipe. No Mill".

NP had over five years to find a solution. But the only solution they settled on was basically to keep doing the same thing. And why not? They have zero risk if the pipe fails. So instead of finding a new product line that could support a closed loop system, we are instead going to continue with a dated environmental disaster all so that NP can make toilet paper for Asia. That's the best we can do in 2019?

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Northumberland Strait for over 50 years. The effluent dilution model on page 95 (figure 4.2-6) shows in a one-month simulation from 2016 that what leaves Boat Harbour hugs the coast line and backs up into Pictou Harbour. It gives no indication that the flow of effluent that leaves Boat Harbour goes very far into the Strait. That is a far cry from NP's present plan to pump their effluent directly into the Northumberland Strait. NP also talks about the effluent that leaves the diffusers reaching back ground levels within 20 meters. Even using NP's metric of 62,000 cubic meters (62 million liters) a day, that would mean that over 40 cubic meters of effluent would be pumped into that 20 meter range every single minute, 60 minutes an hour, 24 hours a day, 365 days a year. The only way I can see that small 20 meter box of effluent consistently reaching background levels with such a low rate of outflow of water in the Northumberland Strait thanks to tidal conditions that basically moves the water one way for six hours and then back for another six hours is if the effluent becomes the background. "Treated effluent" is what comes out of Boat Harbour now. According to what a Northern Pulp engineer said to NSE that was accessed by lawyer Jamie Simpson through a FOIPOP, the effluent coming from Boat Harbour now is better than what will be coming out of the new proposed facility. The flow charts in NP's response to the focus report (page 95 of focus report) that shows the concentration of effluent seems to mimic the charts on where you cannot eat mussels due to health concerns over Leukemia. "Treated Effluent" is effluent

2. Sending the total suspended solids - which are wood fibers that will NOT break down in the ocean EVER - will create an enormous insoluble blob and turn an already fragile ecosystem into a completely anoxic dead zone. This-- within 4 km of a public beach.

3. In 2018, there was another pipe leak. William Palmer and his wife were the ones who discovered the leak (Google it) . No one will give answers on how bad it was because it's "still under investigation". How can NP build a much more complicated pipe system without knowing the cause of the most recent leak?

1. Most of Caribou Harbor is only about 5ft deep. This is especially obvious when you ride in on the PEI Ferry. You can see the wake breaking within a meter or two of the boat. Because it's so shallow, and the nature of the incoming tides, massive ice structures develop all winter long that hammer the coast line. How confident are we that this pipe can withstand this abuse not to mention the vulnerable diffusers? And if/when the pipe breaks, how will they fix it in the dead of winter when the entire harbor is socked in under the ice? Look again at page 20 the focus report . It says the Marine Geotechnical survey work was done in the summer. It also states that ice scour must be considered. Why wasn't the marine work done in the winter. Again – they had five years.

In summary, if NP is actually serious about his proposal, then we need a robust Federal Assessment especially when considering that other provinces are also jeopardized by this pipe. We also need to address the conflict of interest Nova Scotia finds itself thanks to the Indemnity agreements that leave it liable to pay NP for lost profits.

It all started with a broken pipe. And that is where it will end. Caribou Harbor will be a dead zone. The fishing industry and its reputation will be ruined. Caribou National Park will be empty. Why would anybody want to go to Pictou Lodge? Homeowners will be stuck in a toxic mess. Nova Scotia tax payers will be looking at another multimillion dollar clean-up… But don't worry, Northern Pulp will be just fine.

Please, stop this cycle and let Pictou County grow into a new future.

Thank you,

Braeshore, NS.

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 2:20:57 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: If the studies show no environmental impact, I believe Northern Pulp should be given an extension, so they can put in a proper treatment facility, so both the fishing and forestry industries can co-exist together. And keep all the well paying jobs in Pictou County. Name: Email: @gmail.com Address: Municipality: McLellans brook Postal-Code: ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 29

From:
To: Environment Assessment Web Account
Subject: Northern Pulp ETF proposal Focus Report
Date: November 8, 2019 2:21:07 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is I live in Morristown, Nova Scotia, on the shores of St. George's Bay, and just down the shore from Northern Pulp at Abercrombie Point. I was born and raised in the Antigonish area. I left in my early 20s to live in western Canada and abroad, and did so for nearly 20 years. I returned home seven years ago to raise

I am submitting comments on Northern Pulp's Effluent Treatment Facility Proposal.

I believe that this proposal is just bad on many levels. The plan to dump 85 million litres of hot effluent daily into the Northumberland Strait (31 billion litres per year) is simply not a good idea. The Northumberland Strait is a delicate ecosystem that is already under a tremendous amount of stress from farms, sewage, fishing and other human related activities. Adding suspended solids and unknown toxins - Northern Pulp has not provided details as to what toxins would be present in its effluent- will only have harm to this ecosystem. I am not a scientist, but even I can see that the claim Northern Pulp has made that their effluent will have no significant impact on water quality of marine life is completely absurd. Where are the current studies on the effects of effluent on lobster larvae? There are none. Boat Harbour is an environmental disaster. Moving the effluent from one body of water to another is simply creating the situation for new disaster.

For each and every page of Northern Pulp's voluminous Focus Report, I am sure there are errors, omissions, questionable data, misleading statements, vague statements of possible effects to the environment of their plans, etc. Giving the public such a short time to review, analyze and comment on 2600+ pages of information is inherently unfair and onerous. I downloaded the document, and spent a bit of time reading certain pages. Most of the information I gathered about this report came from those who dedicated themselves to review, analyze and comment on various social media sites, and from reading investigative journalism. If it weren't for these dedicated people who have the health of their communities and families as their focus, I would not have been able to understand much of the technical aspects that the report was stating.

As we are becoming increasingly aware of the hard impacts that the climate crisis will have on Nova Scotia, it is time to stop using our resources as a source of pillage and plunder, as we have been doing since the first colonizers 500 years ago began chopping down the forests. Northern Pulp's continued reliance on glysophate, its control of the wood supply management for Nova Scotia sawmills, and its penchant, through WestFor, for clear cutting ("variable retention rates") needs to end. It is time to do forestry much, much differently than we have always done, with less harmful impacts that are better for the health of the environment, and, ultimately, the health of the people of Nova Scotia and the world.

When Northern Pulp filed its EARD in February 2019, they stated that they would need an extension on the use of Boat Harbour until they built they ETF or they would have to shut down.

They cannot be given an extension. That would break the deal that was made in good faith and written into law between the Pictou Landing First Nation and the Province, a deal that saved Northern Pulp from having to close in 2014.

The expectation of me, of many, many Nova Scotians, and most importantly, of the people of Pictou Landing First Nation is that Boat Harbour will cease being used for the reception and treatment of pulp mill effluent on January 31, 2020.
The people of Pictou Landing First Nation have suffered long enough. The worst case of environmental racism in Nova Scotia must end, as promised and as currently legislated.

Please think of the children of Pictou Landing First Nation that must every day live in the environment of Boat Harbour. Would you want the children in your life be subjected to such toxic air and water, each and every day? I know we all want our children to grow up in a clean, healthy and safe environment.

Thankfully, so far, I have been able to give this to my child. Don't the children of Pictou Landing First Nation deserve that too? I am writing this submission with them in mind.

I hope that the original deadline will be respected and upheld, and that there will be no attempt made to extend the January 31, 2020 deadline.

I request that this ETF proposal be rejected.

Respectfully submitted,

Morristown, NS

@yahoo.com

From:
To: Environment Assessment Web Account
Subject: Comments on Focus Report
Date: November 8, 2019 2:21:37 PM
Attachments: Response to Focus Report.docx

Hon. Gordon Wilson
Minister of Environment
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

November 7, 2019

Dear Hon. Gordon Wilson:

As the spouse of an employee at Northern Pulp and a long-time resident of Pictou County, I believe the early closure of Boat Harbour in January 2020 and or the rejection of the scientific fact based environmental assessment for the new wastewater treatment facility will have immediate and devastating effects on the community of Pictou County.

One only needs to drive through the town of Liverpool to see the economic impacts on a community that loses its major industry. A thorough review of the focus reports leads me to believe that the future Northern Pulp papermill will leave a smaller environmental footprint than some of the current naysayers: fishermen and PEI farmers.

The focus report states that engineers travelled the world, from Sweden to the US, assessing the impact of current effluent treatment processes. It notes that the engineers visited two locations in Sweden, a progressive and forward moving country in many respects, to collect as much data as possible concerning the quality of the effluent produced using the BAS™ treatment system. This proposed system has a proven track record with worldwide references for safe and environmental effluent processing.

A closure of the Northern Pulp papermill will result in an outward wave of brain drain from this province. Not only will my educated spouse be required to pursue employment in other provinces, but he is likely to take his family with him; myself a university degree, diploma's and pursuing a designation, and children scoring 90-100% in high school academics, one of which is in And not far behind, our oldest, only months from obtaining

If we are to uproot our family, (even if the forecast is a temporary closure of the pulp mill to allow for the construction of the treatment facility), there is a significant possibility that we will not return if we find ourselves settled in a new community. I suspect it will take years for Nova Scotia forestry to re-establish its high level of productivity should the mill re-open.

I am asking the Minister to approve the plan laid out in the environmental assessment / focus report and lead this community down a progressive, environmentally sound path toward continued prosperity for our province.

Respectfully,

New Glasgow NS

From:
To: Environment Assessment Web Account
Subject: Fwd: Northern Pulp
Date: November 8, 2019 2:27:27 PM

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---------- Forwarded message ----------
From: @yahoo.ca>
Date: Nov 8, 2019 10:17 AM
Subject: Northern Pulp
To: ea@novascotia.ca.The
Cc:

> Hello Minister,
>
> I wrote in the last time in detail to the last Minister describing our real life experiences with the construction of the Confederation Bridge, silt, short term and long term consequences, and how they differed 100% from Stantec's claims for that project.
> I am a former I am a member of the and I am a Commercial fisherman for the last 25 years for lobster, rock crab, Herring, mackerel and Scallops.
> We who fish in the central Northumberland Strait know and it's documented what we were told about everything will be fine during and after the construction of the Confederation Bridge. Stantec and others could have not been been more wrong. It wiped out our lobster fishery off of Point Prim 20 miles away from the bridge, our catches went from 25000 lbs plus per season to 5000 lbs. A lot of fishers lost their businesses within a few years. Within 10 years 45% of fishers on both the PEI side and NS and NB that fished within 20 miles of the Bridge were no longer in business. Only now 22 years later are catches rebounding.
> This Mill is an environmental disaster now with Boat Harbour, despite what all the experts said to PLFN and Pictou residents at the time in 1967. The province of NS(tax payers) are on the hook for this clean up that will be in the hundreds of millions of dollars. There are so many things that are wrong with this file that I could write for a week on this but I am sure that you are aware, about the spider web of conflicts of interest with past and present govt employees, MLA's, Ministers, deputy ministers even a Premier or two. The Public doesn't know half of it yet.
> The previous minister in the spring recognized the injustices that have been done on this file, and also the pathetic report that Northern Pulp has filed. Now we have another one before you as Minister. We as fishers had one big meeting with Northern Pulp 2 years ago, we raised a number of questions about the effects of the "treated effluent " on lobster larve. Two years later we are still waiting.....for an answer. They won't even say what's in it. Although we know chlorine dioxide is, and it will eat though steel pipes if in a closed loop system (which they admitted when I challenged them about about converting to a closed loop system like their Mills in BC and Saskatchewan.) They said chlorine dioxide will eat the pipes. So I said" let me get this straight, chlorine dioxide will eat through steel pipes, but it won't hurt lobster larvae ?????" Nothing but silence in the room of over 350 fishers. Then we asked about ice cover and dilution ?? They said "we never thought about that" ."we are not sure". Wow, and we are supposed to feel warm and fuzzy ??

Mr Minister , this company Paper Excellence has a Very shady record around the world with the environment. NS is just $ to them, they don't care about the environment or what's right. Just look at their recent spills and failed air emission tests in Pictou. The fishery in NS is HUGE, plus the PEI and NB, we cannot put it in jeopardy again. I am also we represent all 1260 lobster fishers on PEI. We market lobster world wide and a potential black mark on NS lobster will affect us, plus we have PEI fishers that fish the grounds off of Pictou Island. I myself fish herring off of Caribou harbour and have for 20 years. There is too much at stake. We have a natural resource that we have grown and protected, it is worth way more that the economic benefits of Northern Pulp, especially when you factor in what they have cost and will be costing the NS govt. This is a huge issue and it will not go away. The forest industry is even split on what to do with Northern Pulp. We know forestry will go forward without Northern Pulp. But if they and govt ruin the fishery, then it will affect lobster even in SW Nova and other areas with their markets around the world.

We proposed a closed loop system, but Northern Pulp refused to even look at it. It's all about $ to them. As soon as the free ride with govt is over they will pull up stakes and be gone.

Please Minister do the right thing. protect our environment and the lucrative fishery that thousands of fishermen and their families rely on.

Call me any time with any questions.

Thanks for your Time.

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Effluent Pipeline Proposal input
Date: November 8, 2019 2:30:21 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Environment Minister Gordon Wilson and Premier Stephen McNeil:

I am a current resident of Pictou County, having been born here, raised my family here, worked here my whole career and currently still living here in New Glasgow and owning a cottage and property along the Northumberland Strait. I have the following concerns re the proposed Northern Pulp 'pipe' waste solution for its effluent that currently goes into Boat Harbour.

Point One: Worst Case Scenario – Future Clean-Up Required

Pumping the effluent into the Northumberland Strait via the proposed pipe method is an environmental time-bomb with no possible method of containment or cleanup if (more likely when) it is found that there is a major impact on the environment. As we have come to find with the Boat Harbour 'solution' the clean-up will be complex and costly but at least the majority of the heavier contaminants are contained in the settling ponds and can be cleaned up to some extent. Under this new pipe proposal, this will not be possible in the middle of the Northumberland Strait if (more likely 'when') the inevitable out of control environmental repercussions are realized.

Point Two: Potential for Fishing Industry Marketing Backlash

The fishermen of the Northumberland Strait area will be directly affected in their historic fishing areas. The proposal lists temporary and permanent closures for fishermen around the outflow area and to create a no anchor zone. Although this impact alone is considered major to the local fishermen, it is minor compared to the possibility of a consumer backlash against fish being marketed from these (perceived or actual) polluted waters. It will only take a few media articles in Europe, China or the United States to 'paint' our billion dollar seafood industry in a bad light. This would impact all Atlantic Province fisheries and in my opinion is not worth the risk. We would be giving potential 'ammunition' to foreign governments who we have no control over who may wish to do our area economic harm.

Point Three: Tourism Impact

Tourism will be further affected (as we already have seen the impact on the town of Pictou with the existing smell from the Northern Pulp plant) with the impact of the discharge location near the Caribou Ferry Terminal connecting us with Prince Edward Island. This terminal is a major tourism entry point into Pictou County. There is a provincial park and nature preserve in close proximity to this proposed pipe outflow. Who will be excited to go into the waters to sail, swim, kayak, etc around this area when they know that possibly there could be pollution from a pulp mill in the water? Who will want to purchase

waterfront property and build homes or cottages along this area of the Northumberland Strait with this pollution spreading far and wide along the shores. This proposal will undoubtedly affect future tourism as well. The visibility of such a pipe (along the Pictou causeway or anywhere along the Trans Canada Highway connector to the Caribou Ferry Terminal) will be a clear negative to our tourism image. Our tourism industry is currently worth millions of dollars and with the right stewardship could be worth billions in the future with the deterioration of other environments in North America and Europe.

Point Four: Pipeline Route Risks

The proposed pipeline route comes very close to the Pictou town and Caribou water supply. The proposed method of monitoring the pipeline flow to detect leaks (pressure monitors) does not have a good track record in the oil pipeline industry (just look at the very recent oil pipeline spill on the keystone Pipeline in North Dakota). With the known track record of Northern Pulp in detecting pipeline ruptures to the Boat Harbour facility, we should put little faith in any assurances that the company might provide for this new proposed solution. There will be no fixing the damage to the local water supply if (when) a spill occurs along the proposed pipeline route to Caribou Harbour.

Point Five: Marine Life Impacts

The waste 'pipe' proposal poses major risk to harming marine life, marine habitat, species at risk/endangered/threatened that include migratory and marine birds, fish, vegetation, reptiles etc. The chemical characteristics of the proposed effluent have been reported to be "unknown" to Northern Pulp. Sufficient studies have not been carried out to access the impact. Meeting Pulp and Paper Effluent Regulations (PPER) doesn't prevent harm to marine life or marine habitat per Environment Canada.

Point Six: Degraded Air Quality

The proposal shows the plan to burn the toxic sludge in the power boiler. Air emissions are an issue today and health issues are already known to be above provincial averages today in Pictou County. This proposal should not be allowed to proceed given the 'knowns and unknowns' about the chemical characteristics of the sludge.

Point Seven: Spill Basin Risks

The proposed spill basin on the plant site is planned to only hold 35 million litres of untreated effluent (which is only 10-12 hrs of plant operation) before it goes into the downstream system. If (more likely when) a malfunction or critical event happens where does the excess go? With what we know about climate change warnings today, once in a century events are going to become more frequent and severe. The potential for out-of-control run-off from this site is in my opinion extreme. This proposed plant site setup does not appear to be designed to be robust enough. Additionally, the lands surrounding the proposed spill basin are known to be laced with mercury (a legacy of the now defunct Canso Chemicals plant). I worked at this chemical plant in the past and can personally attest to the extent of mercury contamination on the grounds surrounding the plant. I only had to stick a spade in the soil of the grounds behind the plant to watch the mercury collect in the bottom of the hole just dug. Building a 35 million litre containment basin on

top of it is just asking for trouble. Any excessive run-off from this area will leach mercury into Pictou Harbour and the Northumberland Strait.

In closing, given all the risks noted above, this pipe proposal should not be accepted.

Dated: November 8, 2019

Cottage owner on the Northumberland Strait
Resident of New Glasgow

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 2:31:33 PM

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Project: replacement_effluent_treatment_facility_project Comments: On review of information available on line and through media it is not possible for me to conclude that there is any other decision but rejection of the proposed effluent pipe. Northern Pulp concludes there will be no significant residual harm. One need only ask the Pictou First Nation about Boat Harbour to know otherwise. Dispersal merely widens the scope of harm. This time to The Northumberland Straight and the species who live there. Thankfully there are economically important species at risk, which should make the governments decision easier. I add my voice to the many asking for rejection. Until these industrial processes in the production of pulp can be done safely, they must be halted. I have little reason to be optimistic but I ask the government to make this bold and difficult decision, and start reducing harm and promoting recovery in the Nova Scotia Environment. Name: @ns.sympatico.ca Address: Municipality: Bass River Postal-Code: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 36 y: 19

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 2:31:34 PM

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Project: replacement_effluent_treatment_facility_project Comments: I have looked at treatment plants in other mills in Canada and around the world and these are passing their environmental standards. If Nova Scotia doesnt allow us to build this effluent system which is used all over the world, Not just pulp mills, then what business or industry will invest here Name: @gmail.com Address: Municipality: New Glasgow Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 27

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 2:31:56 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is and I've lived in Pictou for the last 7 years and I'm concerned about Northern Pulp's Effluent Treatment Facility Proposal.

Premier Stephen McNeil stated that it would be wrong to move one disaster into a new location when he referenced Northern Pulp's ETF proposal. Of course that wasn't a statement on whether Northern Pulp's project was a disaster, simply that it would be wrong for the province to approve a project that could be characterized as creating a new disaster. (From the fat into the fire so to speak)

Mr. McNeil also rightfully stated many times over that the company was given 5 years to come up with a plan and that was more than enough time. Not only did the 5 year plan give ample time to Northern Pulp but this wasn't an 'arbitrary date' picked out of thin air. The Jan 31, 2020 Boat Harbour closure date in the Boat Harbour Act also falls on the last day of Northern Pulp's current Industrial Approval.

Northern Pulp were slow to get moving on their attempt to complete the project. When they filed their EARD in February, they stated that they would need an extension 'until they built their ETF or they would have to shut down'.

Asking for an indefinite extension as Northern Pulp's plan to build an ETF that pumps effluent described by their own technical engineer as being worse than what comes out of Boat Harbour, would set up the risk to move the disaster that is Boat Harbour and make it the disaster in the Northumberland Strait.
Our beautiful Strait, a lucrative home to many living precious aquatic species and fishing and tourist industry, shared with other provinces.
They cannot be given an extension. That would break the deal that was made in good faith and written into law between the long suffering PLFN and the province that saved Northern Pulp from having to close in 2014. They also cannot be given an extension because they don't have a sound plan for a new ETF so it may never be built. Northern Pulp cannot be given an indefinite extension.

Northern Pulp have been given ample opportunity, financial assistance, profits, and time while owning and running the mill and entrusted to ensure it runs properly, efficiently and safely. At some point you have to admit it can't be done. Send this environmental disaster packing, and stand up for your people, and your environment over foreign profit.

Don’t let this disaster be your legacy
and our environmental destruction and devastation.

Thank you,

Sent from Yahoo Mail for iPhone

From: @northernpulp.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 2:37:39 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I wish to express my support for the replacement effluent treatment facility project at Northern Pulp. I am an employee of the mill for over 18 years and wish to continue to do so. I have friends and family in both the forestry and fishing industries and believe they can continue to mutually coexist. I have read a considerable portion of the focus report and while I do not pretend to understand it all, I believe this project will be a vast improvement over what we are using now. The activated sludge treatment process is considered state of the art for this type of effluent treatment. This project and the mills continued operation is a much needed economic boost to pictou county and nova scotia. I fear the closure of this mill would have a drastic effect on a lot of people and businesses in this area. I have talked to several people that have left mill towns after their pulp/newsprint mills have closed. they all say their communities have withered to a fraction of what they once were. I do not want to have to move my family from this province in search of work if the mill closes. I hope you will consider these reasons in determining an approval to this project. Name:
@northernpulp.com Address: : River John Postal-Code:
Fax: ### ### - #### email_message: Privacy-Statement:
agree x: 60 y: 23

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Input into Northern Pulp Pipeline Effluent disposal proposal
Date: November 8, 2019 2:45:37 PM
Attachments: Northern Pulp plan input Nov 8 2019.docx

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Dear Environment Minister Gordon Wilson and Premier Stephen McNeil:

Attached in this WORD document you will find my input re the Northern Pulp Pipeline Effluent disposal proposal.

Please let me know if this formal is not readable to your office and I will send you the raw text..

Thank you for the opportunity to give my input and I sincerely hope our environment and county will be spared from the mill getting the green light to proceed with the current proposal.

The mill has a lifespan and it is currently in its latter life. One should ask....how long can the mill internal equipment survive? Why spend a lot of tax payers money to prolong the life of an old mill whose boiler could blow up at any point? This info is not in my document attached but it is one that many people who have been in that mill are afraid of. It really does not have a place in the environmental impact of their proposal but the government should ask the company what the life of all components of this mill are.

New Glasgow Nova Scotia.

Concern about Northern Pulp's Effluent Treatment Facility Proposal November 8 2019

I as a resident of Pictou County for the past 40 years, living in New Glasgow and owning property along the Northumberland Strait, have the following concerns re the proposed Northern Pulp waste solution for its effluent that currently goes into Boat Harbour.

Pumping the effluent into the Northumberland Strait is an environmental time bomb with no possible method of containment or cleanup.

We need to have buy in from N,S. , PEI, N.B. and Quebec, as the waters of the Northumberland Strait and the Gulf of Saint Lawrence affect us all. The fishermen of all of these provinces will be affected if there is a consumer backlash against fish being marketed from polluted waters. This industry is worth millions of dollars and is a federal responsibility.

The fact that our Native nations are affected, as well as the fisheries and many provinces, should make the case that this situation calls for a full federal government environmental assessment.

Tourism will be further affected (as we already have seen the impact on the town of Pictou with the existing smell from the Northern Pulp plant) with the impact of the discharge location near the Caribou Ferry Terminal connecting us with Prince Edward Island. This terminal is a major tourism entry point into our county of Pictou. Who will be excited to go into the waters to swim, kayak,etc around this area when they know that possibly there could be pollution from a pulp mill in the water? This proposal will affect tourism. The knowledge and/or visibility of such a pipe will be a clear negative to our tourism image. Our tourism industry is worth millions of dollars.

There is no guarantee that a waste pipe will not be punctured at some point . If punctured, Pictou Harbour will be affected and there is no containment possibility.

Other points that are of concern to me from the Northern Pulp proposal are as follows:

The waste proposal poses major risk to harming marine life , marine habitat, species at risk/endangered/threatened that include migratory and marine birds, fish, vegetation, reptiles etc.

The proposal goes through the Pictou town and Caribou water supply. A provincial park and a nature preserve are within the effluent pipe footprint.

> Northern Pulp's pipe route raised a lot of concerns for me with their EA submission and seeing that they are sticking with the same basic pipe route as outlined in their focus report does nothing to alleviate those concerns.
>
> I do not trust Northern Pulp's ability to monitor a pipe line and I don't trust their leak monitoring detection system that was mentioned in the focus report does enough to protect the Town of Pictou's water. The focus report talks about 'compensation' should problems be unavoidable. 'Compensation' does little for me if I can't trust the water that I drink. Northern Pulp were supposed to have a leak

monitoring system on their current pipe but the massive raw effluent leak from October 2018 was not discovered by Northern Pulp, it was discovered by someone walking in the woods.

Northern Pulp's findings in their earlier EA submission found that their were no concerns. The need for the focus report was in part due to Northern Pulp not doing the proper work on species at risk, migratory birds, marine surveys, land surveys or water course surveys. I do not trust any of the new conclusions that they've come to because they demonstrated that they were just going to say that everything was fine anyway. The focus report also pointed out that present conditions are putting a strain on migratory birds. Adding more stress does not help that.

The marine portion of the pipe won't have any leak detection system. If there were a leak during that stretch we would not know it. Munroe's Island is supposed to be a protected area. I don't see how this project can be approved if there isn't a system to prevent a catastrophic event in that area.

The chemical characteristics of the proposed effluent is “unknown” to Northern Pulp.

Meeting Pulp and Paper Effluent Regulations (PPER) doesn’t prevent harm to marine life or marine habitat per Environment Canada.

The proposal shows the plan to burn the toxic sludge in the power boiler. Air emissions are an issue today and health issues are already known to be above provincial averages today in Pictou County.

This company has had a history of failing to meet their limits, their mill is over 50 years old and was only designed to last 25, they are not monitored enough to make me feel they are under the targets laid out in their Industrial Approval consistently and if this project is approved, they plan to add to those air emissions. The air that we breathe in Pictou County is bad enough, I don't see a plan to add more pollution to a mill that already seems taxed in its capabilities is a smart move and I don't approve this project.

The air emissions from Northern Pulp are a great concern to me. They have failed to meet the limits set out in their Industrial Approval many times. In June, their stack tests failed one of their three tests and only passed thanks to the average of those three tests being under the limits set in their Industrial Approval. Testing on the power boiler, the stack from where these results came, are only done four times a year. Seeing that they are given a pass even though they failed one of the tests makes me wonder how many failures are going undetected.

The proposed spill basin on the plant site is planned to only hold 35 million litres of untreated effluent (which is only 10-12 hrs of plant operation) before it goes into the downstream system. If a malfunction happens where does the excess go?

The proposal also lists temporary and permanent closures for fishermen around the outflow area and to create a no anchor zone.

The Waste proposal will be pumping effluent into the ocean after only processing it for 8 hours as opposed to the current waste system that takes about 30 days to process and reach the Strait.

Northern Pulp plans to build their new Effluent Treatment Facility on lands on and adjacent to the where Canso Chemical was situated. We know there is mercury in the bedrock in the area that Northern Pulp plans to build but the focus report lacks data on this mercury and the concerns that construction on this land would cause.

> During the decommissioning phase, Dillon Consulting found mercury-contaminated soil and bedrock up to 8 metres deep. Dillon Consulting are the same company Northern Pulp hired to do the design work and studies on their ETF project. With this key information missing, not only are the amounts of mercury that would be dug up unknown, so are accurate studies of what digging it up would do. Dillon Consulting should be very capable of presenting this information and they chose not to.

The Nova Scotia provincial government has many conflicts of interest going back decades between itself and the mill and should not be involved in the environmental assessment and the approval/rejection of a Boat Harbour Effluent Treatment Replacement Solution.

I would like all of these points to be considered and strongly suggest that a Federal Environmental Assessment is necessary. I believe a Federal EA would show this is not a proposal that can be approved to proceed. It has too much risk for our county and for the surrounding provinces.

Cottage owner on the Northumberland Strait
Resident of New Glasgow

From:
To: Environment Assessment Web Account
Subject: Comment on Northern Pulp EA
Date: November 8, 2019 2:47:45 PM
Attachments: -NP-EA-Response to focus report_20191107.pdf

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To whom it may concern,

Please find attached my comment concerning the Focus report of Northern Pulp concerning the proposed Effluent Treatment Facility.

Kind regards,

Bedford, NS

CANADA

This submission was prepared by a marine geologist with years' experience.

has had experience analysing geological and geophysical datasets with a specialisation in slope stability and gravity-driven sediment transport.

has enjoyed many days of recreational boating and fishing in Caribou Harbour. As such, he is very familiar with the coastline, seabed and tidal conditions of the area of the proposed effluent outfall pipe. This submission is and professional opinion on the proposed Effluent Treatment Facility by Northern Pulp.

Summary: the geological and geophysical data illustrate that there are too many risks to consider putting a pipeline along the proposed route. Contrary to demonstrating that this is a good candidate for the pipeline routing, the various data highlight multiple mechanisms by which damage could be sustained to the pipeline. These include gravity-driven slumping at the channel edges, greater than normal ice scouring and differential loading pressures on the pipeline due to sediment mobility.

The potential for such a failure to go unnoticed for a considerable period and thereby the effluent not being discharged by the diffuser system is significant. Furthermore, the failure would occur within Caribou Harbour and effluent would potentially remain resident in the harbour for a prolonged period causing considerable environmental damage.

The far-field modelling contains significant uncertainties resulting from limited calibration. The one month duration models show effluent concentration at the mouth of Caribou Harbour as well as impingement of the coastline of Munroes Island and Caribou Point.

Recommendations

Based on the data and analysis contained in both EA document and the Focus Report, it is not clear that a pipeline carrying effluent can be operated safely in the shallow waters of Caribou Harbour. Significant additional research and engineering is necessary to account for and mitigate the hazards posed by ice damage and seabed instability.

The numerical modelling requires significant additional calibration with measured data for the full range of hydrological and meteorological conditions in the Northumberland Strait. Given the risks involved and the potential detrimental impacts to ecosystems and human health, it is recommended that independent third party monitored peer-reviewed oversight of future modelling be conducted. Should the project eventually be approved and proceed, it is recommended that the pipe contain realtime monitoring that is publicly available so that any member of the public can be assured of the integrity of the pipeline at all times.

Were the proposal to proceed, a full federal environmental assessment under the auspices of the Impact Assessment Agency of Canada (formerly CEAA) to access the expertise of the Federal Government is recommended.

Introduction

The focus of this submission shall be on the offshore portion of the proposed pipeline in the region of Caribou Harbour. It is again highlighted that the timeframes for the comprehensive analysis of the data and information contained within the Focus Report is wholly inadequate both for the public and the relevant authorities tasked with assessing the viability of the proposal. For a meaningful assessment of the Environmental Assessment (including the Focus Report) by the regulator, the data should be analysed and interpreted independently to verify those made by the proponent.

The geophysical data demonstrate that the seabed in Caribou Harbour is a highly dynamic marine environment with a number of physical processes operating including:

- Ice scouring
- Slope failure along the edge of the dredged channel
- Shallow sediment de-gassing
- Mobile sediment waves

Two of these are discussed further below.

Ice Scour and Grounding

The Focus Report notes that: *"Caribou Harbour, and the nearby section of the Northumberland Strait, is susceptible to ice scour, predominately due to ice floes. To protect the proposed pipeline from damage due to impact or bearing pressure, the pipeline will be buried to a depth of up to 3 m. Burying the pipeline below the potential scour impact is the most effective measure to protect pipelines from ice damage."* (pg. 43)

The prospect of ice keel damage to the pipeline remains a particular concern and the data presented in the Marine Geotechnical Survey Report (Appendix 2.2, Section 5.5.2) warrants this concern. The report notes that while 15 mapped ice scours had a scour depth of ≥ 0.2 m in water depths of 1 to 6 m, 133 ice scours were mapped and an extensive area of ice grounding was mapped west of Munroes Island with pits of ~0.7 m.

The Receiving Water Study (Appendix 4.2, Section 2.1.2.7) presents data from a DFO helicopter ice survey in February 2013. These data showed that the ice thickness had a mean thickness of approx. 0.7 m. However, the ice keels regularly exceed 2 m in that same dataset (see top panel of Figure 17 of Appendix 4.2). Furthermore, ice thickness surveys conducted by DFO during that same period (28 February 2013) immediately north of Caribou Island documents significantly thicker ice floe thicknesses with keel depths approaching 4 m (Figure 1).

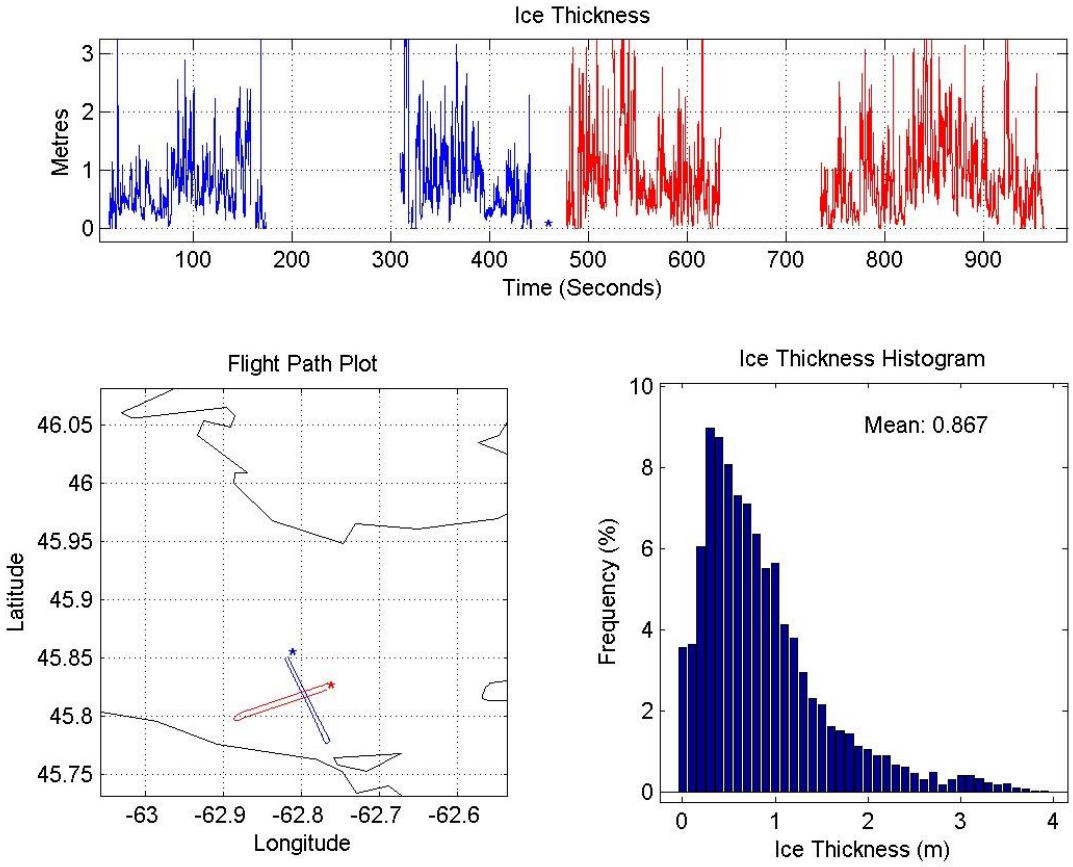


Figure 1: Ice thickness survey conducted by DFO in February 2013 immediately north of Caribou Island. The ice thickness is shown to exceed 3 m at a number of locations. (accessed from ftp://ftp.dfo-mpo.gc.ca/SeaIce/Helicopter_Data/Gulf2013/7%20Gulf%202013%20Pictou%20large%20floe/).

These data are consistent with the values and analysis of Obert and Brown (2011)[1] and the thickness of ice in the Caribou Harbour can approach the burial depth proposed for the pipeline.

There are a number of points of note here:

1. As noted in the Marine Geotechnical Survey Report, the ice scours surveyed were likely formed during the winter 2018/2019 season. As such, this represents a relatively small and time-constrained dataset. The accumulation of ice within Caribou Harbour within any given year is likely to be variable depending on wind speed and direction and tides among other factors. To truly engineer for the possible hazard to ice keel related damage, a more robust dataset is required.

[1] Obert, K.M. and Brown, T.G., 2011. Ice ridge keel characteristics and distribution in the Northumberland Strait. Cold Regions Science and Technology, 66(2-3), pp.53-64.

2. The Marine Geotechnical Survey Report notes the presence of mobile sediment waves particularly in the vicinity of CKP 3 – 3.5 (see Figures 5.3.6 and 5.3.7 of Appendix 2.2). This sedimentological environment would mask the recognition of ice scours. It is clear from adjacent mapping (see Figure 5.5.2) that ice scours are ubiquitous in that region. This region lies beyond the mouth of Caribou Harbour and, in light of the significant thickness of ice keels documented by DFO referred to above, represents a significant risk of damage to the proposed offshore pipeline.
3. The recognition of a region of ice grounding in the vicinity of CKP 1 (see Figures 5.5.5 and 5.5.8 of Appendix 2.2) also illustrates a significant risk to the pipeline beyond the possibility of simple linear ice scouring. The load acting on the pipeline as a result of the weight of grounded ice is a real risk in this region. The evidence of ice grounding shows that this can occur over a significant area (a rough estimate from Figure 5.5.8 would be 75 m^2). It is unlikely that the backfill overlying the pipe could absorb the load acting down on the pipe from a large volume of grounded ice. Given the shallow water depths along the proposed pipeline routing, there are a number of locations where this remains a risk.
4. Another important consideration in assessing ice scour data is the sediment type of the seabed. As noted in the Marine Geotechnical Survey Report, finer sediments such as clay and silt can record ice scours more effectively than sandy or gravelly deposits. Also, sediment reworking can rapidly infill larger scours. A significant portion (~65%) of the surveyed area is made of sand and silty sand and this corresponds to areas where fewer scours have been mapped. This again leads to significant unknowns when trying to assess the impact of ice-related hazard to the proposed pipeline.
5. It is difficult to assess the data from an already interpreted static image but a number of v-shaped reflections, in addition to interrupted reflectors within the CHIRP data suggest a possible greater influence for ice scouring (Figure 5.4.4 of Appendix 2.2). The R1 reflector and sequences SQ2 and 3a show possible evidence of disturbance related to ice scour.

As a result of these observations, a burial depth of 3 m would not seem to represent a mitigation of the risk posed by ice floes (both scouring from the ice keel and grounding of the floe). Any number of processes could damage and rupture the pipeline and, in light of the pipe being buried 3 m, this damage would not be readily accessible or observable. A protracted leak could continue for a long period before being noticed potentially resulting in sustained damage to the marine ecosystem.

Slope Failure

The bathymetry along the proposed pipeline has been well documented in the Marine Geotechnical Survey Report. The area can be classified into two broad categories – a shallow (< 5 m) region punctuated by a channel, sediment waves and ice scours for the landward 2.3 km of the proposed pipeline length, and a rapidly deepening region where

depths go from ~2 m at the mouth of Caribou Harbour to ~20 m seaward of the mouth over a distance of ~1000 m.

The proposed pipeline runs approximately parallel to the dredge channel for the Caribou Ferry Wharf. The Channel is dredged to a depth of 5.5 m below low water.

Multibeam bathymetry reveals the scalloped edge to the dredged channel which suggests retrogressive erosion (Figure 2). The eroded sediment undergoes gravity driven transport from the edge of the dredged channel downslope. The slope map in the Marine Geotechnical Survey Report (Figure 5.1.5 of Appendix 2.2) shows gradients exceeding 10° (possibly up to 20°) which, given the sediment type (sand/gravel – Enclosure 8 of Appendix 2.2), represents an unstable mobile seabed.

The proximity (within 20 m) of the unstable dredged channel slope to the proposed pipeline is cause for concern. Were there to be a larger slope failure, the seabed upon which the pipeline lays could give way. Even absent a catastrophic failure, the retrogressive erosion of the channel edge could eventually undermine the sediment base of the pipeline.

This sediment transport is the reason for ongoing dredging activity within the channel. This dredging is described in a project description by Public Works and Government Services Canada from 2017. The location of one of the areas targeted for dredging in that document coincides with the region described above. It seems plausible that this would be required again in the years to come. As such, significant machinery (barge-mounted mechanical dredges) would operate in the vicinity of the proposed pipeline posing a significant damage hazard.

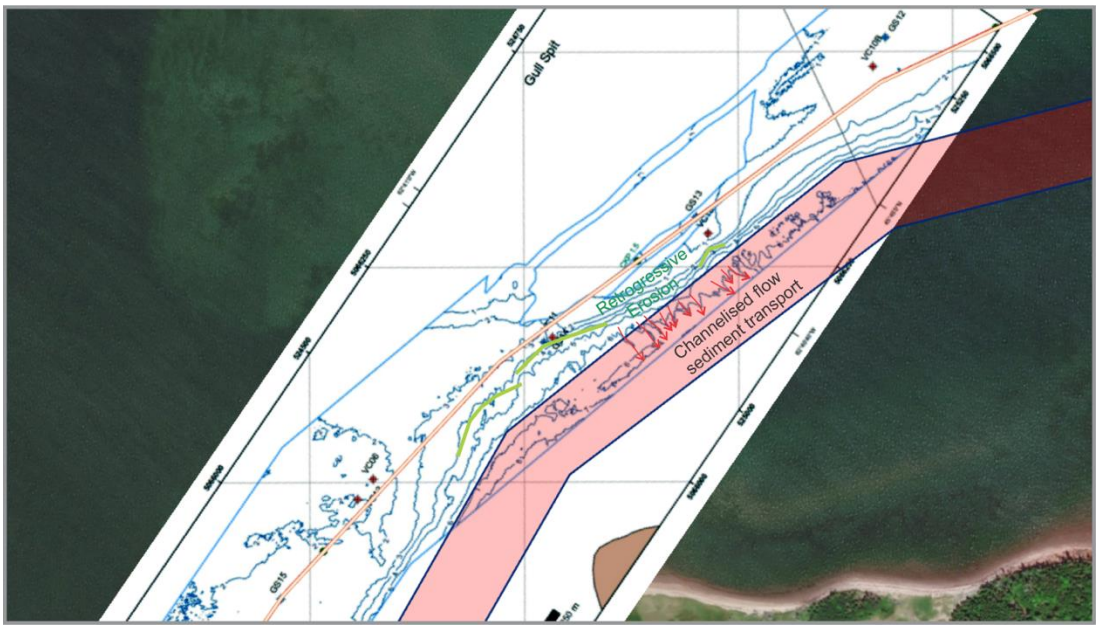


Figure 2: Map prepared for this submission showing the scalloped pattern of retrogressive erosion (in green) and the channelised gravity-driven sediment transport (red) along the edge of the dredged channel (red shading). The proposed pipeline is shown in pink.

Receiving Water Modelling

It has to be remarked that while the quality and level of detail of the modelling contained within the Focus Report is a vast improvement on the modelling contained in the EA registration documents. Nevertheless, there remains significant uncertainties, data gaps and areas of concern. It is impossible to perform an adequate examination of the model within the timeframe provided for in the public comment period. Given the consequences of inaccurate model prediction, it is recommended that a comprehensive and independent peer review of the model is conducted.

It should be noted that a numerical model of any system is a non-unique solution. Input parameters are changed to calibrate the model. The more complex a model, the greater number of parameters that are variable and consequently the greater the chance it departs from the physical reality of what it seeks to simulate. To test the validity of the numerical model, model prediction outputs are compared against measured observations over time. The short time period since the generation of the model (essentially summer 2019) to test predicted versus observed data reduces confidence in the model.

A major deficiency concerning the input parameters for the far field modelling is that the input data used to calibrate the model were acquired over the course of one season – and in many cases only over two days (May 24 and 25, 2019). This includes the determination of the temperature and salinity profiles of the water column (see Figures.12 and 13 of Appendix 4.2 for example).

This represents an inadequate dataset upon which to make model predictions in the Northumberland Strait, particularly in the Caribou Harbour region. Even over the course of a summer season, there is significant variation in the surface temperature of the water. This is more pronounced in winter when the strait freezes over and clearly a temperature and salinity profile would be very different.

The simulation periods, as outlined in Table 11 of Appendix 4.2, are the months of July and February 2019, while the model has only been calibrated for May/June 2019.

The effluent dispersion modelling also contains assumptions that raise questions as to its usefulness. There is no detailed explanation in Section 2.3.2.4 of Appendix 4.2 of what the what the “assumed arbitrary concentration” is. Assumptions of “typical mill effluent” of 900 – 1500 mg/L is given in Table 11 without any citation or relation to whether this is realistic for the Northern Pulp mill.

The model predicts “little plume intrusion into Caribou Harbour”. Local knowledge of Caribou Harbour, however, confirms that under certain (current and wind) conditions significant surface organic debris can be transported into the harbour and remain over a number of days indicative of significant flow into the mouth of the harbour. Furthermore the deposition of Gull Spit is due to inward flow into Caribou Harbour with sediments being deposited on the lee side of Caribou Point.

The simulated effluent concentration maps predicted by the model seem unrealistic when considering a continuously discharging source with seemingly isolated pockets of higher concentrations of effluent isolated in the model domain. Even if one assumes the model is accurate, there would appear to be issues with increased effluent impacting the coastline. Figure 33 of Appendix 4.1 shows high concentrations of effluent on Munroes Island. It is recalled that Munroes Island is a designated Provincial Park and Section 24 of the Provincial Parks Act (R.S., c. 367, s. 1) states:

"No person shall transport garbage, refuse or domestic, hazardous or industrial waste through, over or in any provincial park or deposit such material in or on a provincial park, except as may be authorized by permit issued by the Minister."

Figure 38 of Appendix 4.2 is most concerning. Again, if the model is accurate (something that is questionable given the assumptions and constraints), the simulated effluent concentration after only one month shows a build-up in the vicinity of the mouth of Caribou Harbour. One can only assume this increases over time.

The Winter modelling is poorly constrained by measured data. There is no examination as to whether there is any stratification of the water column which would greatly impact the way in which plume dispersal would occur. The simulated effluent concentrations in Figure 45 shows again a significant concentration build-up after a one month period albeit further southeast. It also shows a high concentration on the coast by Caribou Point.

A variety of shellfish are harvested within Caribou Harbour in the intertidal areas (e.g. oysters, mussels and quahogs) by residents (my own children have often consumed raw shellfish (oysters) right off the beach as well as cooked razor clams, mussels, and quahogs), visitors and semi-commercial fishers. These are filter feeders and would readily incorporate contamination from the discharged effluent. The risk to human health is real and potentially severe. Given the uncertainties surrounding the behaviour of the effluent plume in this location, caution is essential.

Concluding Remark

As proposed, the marine portion of the Effluent Treatment Facility proposed by Northern Pulp contains too much risk to the marine environment and human health. Uncertainties concerning the integrity of the pipeline and the behaviour of the effluent discharge under normal operating conditions remain high.

The actions needed to address and possibly mitigate these risks are time and cost intensive. It would be beneficial, therefore, to have a full federal environmental assessment under the auspices of the Impact Assessment Agency of Canada (formerly CEAA) to access the expertise of the Federal Government.

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report Comments
Date: November 8, 2019 2:52:50 PM
Attachments: Focus Report.docx

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Good afternoon,

Attached are my comments regarding Northern Pulp's Focus Report.

Regards,

November 8th, 2019

The Hon. Gordon Wilson
Minister of Environment

Minister Gordon:

I am writing in relation to the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project.

My name is I grew up in the small community of Caribou River on the Sunrise Trail along the beautiful Northumberland Strait.

I am the daughter of a third-generation Pictou Landing resident and land owner. property near Boat Harbour was expropriated by the Nova Scotia government for use by the Scott Paper Company in the 1960s.

I am currently residing in

I possess a Bachelor of a Bachelor of and a Master of

I am requesting that you reject this project put forth by Northern Pulp. There is simply not enough evidence in this Focus Report, or their Environmental Assessment document(s), to prove there will not be irreparable adverse environmental effects. Northern Pulp cannot argue that aspects of this project are mitigable, as there are still too many weaknesses in their project, and too many unknowns that cannot be predicted. Citizens of Nova Scotia cannot be assured that any adverse effects could possibly be mitigated. Currently, many Nova Scotian's do not believe that their provincial government is working with their best interests in mind with regards to the environment. Our provincial government has a proven conflict of interest in Northern Pulp's project. As a result, trust has been lost throughout Pictou County, and replaced with a deep division.

I also believe that this Focus Report, and this entire EA process, has been unfair. As noted in my previous letter from March 9th, 2019, Northern Pulp did not hold public consultations on the new Caribou Harbour effluent pipe outfall site plan, as they previously had with their initial Pictou Harbour effluent pipe outfall site plan. There also have not been public consultations on the pipeline route change as noted in the Focus Report. As stakeholders, citizens of Pictou County should have been permitted to voice their concerns over these changes, and were never permitted the opportunity to do so. It is also unfair to expect the general public be able to sift through and comprehend over 4000 pages of documents and appendices that were included in Northern Pulp's Focus Report in thirty-seven days. It is also unfair to expect your own

department to be able to digest and interpret this document in that time frame, as well as allow a further twenty-five days for review all submissions from the public. During the initial EA submission for this project in the spring, your department received well over 4000 pages of submissions. There will be thousands of pages of submissions to be reviewed for this Focus Report. You are at risk of deteriorating the quality of assessment your team can provide to you with regards to this project.

In the event that you do not reject this project, I ask that you require an Environmental Assessment Report, or defer the project to the CEAA for federal review.

I work on the frontlines of the 2.7 billion-dollar tourism industry in Nova Scotia, and it is my job to help our visitors make informed decisions about where to visit in our beautiful province. Having grown up on I always suggest it as a scenic alternative to the TransCanada Highway. Visitors can experience the sweeping seaside farmland, lush forests, small fishing communities, and the well renowned sandy beaches and warm swimming waters of the Northumberland Strait. If Northern Pulp is permitted to place their effluent pipeline in Caribou Harbour, near one of the most popular provincial park campgrounds and beaches along the Northumberland Shore, adverse effects from the effluent would be felt immediately by tourism operators all along the Northumberland Strait. Visitors already comment on the 'stink' that hangs over the Town of Pictou from Northern Pulp, and it would be difficult to confidently tell visitors that it is safe to swim in the waters of the Northumberland Strait with the lack of information that has been given about the makeup of the effluent. Northern Pulp's Environmental Assessment document states, "At this time, effluent chemistry characteristics (including the specific substances present in treated effluent and their anticipated concentration) will not be known with certainty until the project is operational."[1] This is unacceptable. With the release of Northern Pulp's Focus Report, I am still not convinced that Northern pulp knows what the makeup of their effluent currently is, or will be. Allowing this pulp mill to dump effluent in to a body of water without knowing its composition is outrageous and wholly irresponsible, on the part of the mill as well as the provincial and federal governments. Nova Scotia is striving for $4 billion in tourism revenues by 2024, one of the major goals set out in the Ivany Report (Goal 14). The province simply cannot afford to support, or approve, Northern Pulp's project, and continue to work towards such an important, and economically stimulating, Ivany report goal simultaneously.

With the Ivany Report in mind, let's turn to our fishing industries. Another major goal set out in the Ivany report (Goal 15), was to double Nova Scotia's exports of seafood on a sustainable basis by 2024. We have currently surpassed the 2024 goal of 2.4 billion in exports, thanks to the export of seafood, specifically of lobster. High prices and high demand for Nova Scotian lobsters are

[1] Dillon Consulting Ltd., *Environmental Assessment Registration Document: Replacement Effluent Treatment Facility*. Submitted January 31, 2019.

responsible for this acceleration.[2] It must also be noted that thirty-five percent of Canada's shellfish exports come from Nova Scotia.[3] Approval of this project is entirely detrimental to our continued success of sustainable seafood exports. The pipeline for Northern Pulp's new effluent treatment facility has the potential to cause mass devastation, not only to lobsters, but to other species within the environment as well. Pelagic species of fish and bivalves (such as mussels, scallops and oysters) would be contaminated or killed off by the effluent, or from the extreme temperature of the effluent, as noted in Table 5.2-1 found on page 46 of Northern Pulp's Environmental Assessment Registration Document.[4] The study, "Detecting p53 family proteins in haemocytic leukemia cells of Mytilus edulis from Pictou Harbour, Nova Scotia, Canada," by S. St-Jean et al. from 2005, provides a detailed study on the impact of the environment on blue mussels in fourteen various sampling sites chosen in the Pictou Harbour and harbour mouth. The researchers found that each set of healthy mussels placed in all fourteen sites developed leukemia cells in their tissue, and contained various other carcinogens.[5] Furthermore, as noted in Northern Pulp's Focus Report, Appendix 9.1, pages 1-2 (which is simply a memo followed by tissue results), only three marine fish species were examined in Caribou Harbour, at the proposed effluent pipeline discharge location. I do not see how this satisfies the Terms of Reference requirements set forth by the Nova Scotia Environment, section 9.1, listed under Human Health. It is noted on page 2, Appendix 9.1, of the Focus Report, that two additional tissue collection surveys are planned for 2019, targeting scallop, blue mussel, oyster, and fin-fish species. However, this information should have been collected prior to the EA project registration, and is still not complete and/or available. This is unacceptable.

I would also like to inquire as to the whereabouts of the MEKS (Mi'kmaq Ecological Knowledge Study). The Terms of Reference set out by NSE for this Focus Report, TOR 11.1 listed under Indigenous People's Use of Land Resources, stated that Northern Pulp's Focus Report required a MEKS. This implies that a MEKS was not completed for the original EA submission. This is unacceptable. Northern Pulp has included a letter from Membertou Geomatics Solutions, to Dillon Consulting Limited, submitted as Appendix 11.1 of the Focus Report, dated Sept. 25th, 2019. This letter states that it should be accompanied by the latest signed copy of the MEKS for the "Northern Pulp Pipeline Re-Alignment Route." First, why would a MEKS that has been requested by NSE for Northern Pulp's Replacement Effluent Treatment Facility Project be limited to the new pipeline route? And second, where is this document? Should it not also be included as an appendix? It is to be noted as well that the letter states this MEKS is to compliment an earlier study from July 2018, titled "Northern Pulp Effluent Treatment Facility MEKS." Where is this study from 2018? Why was it not included in the original EA submission?

---

[2] One Nova Scotia, "One Nova Scotia, Goal 15: Fisheries and Agriculture Exports." Accessed November 6, 2019. https://onens.ca/goals/goal-15-fisheries-and-agriculture-exports/deep-dive/

[3] Nova Scotia Seafood. Accessed November 6, 2019. https://nsseafood.com/

[4] Dillion Consulting Ltd., *Environmental Assessment Registration Document …,* 2019.

[5] St-Jean, S., Stephens, R., Courtenay, S. and C. Reinisch, *Detecting p53 family proteins in haemocytic leukemia cells of Mytilus edulis from Pictou Harbour, Nova Scotia, Canada.* Canadian Journal of Fisheries and Aquatic Sciences, 62, (2005): 2055- 2066.

There are too many unanswered questions to this one simple request from NSE. Not submitting a complete MEKS on the entire project is unacceptable, and disturbing. Mi'kmaq knowledge should have been at the forefront of this EA, and yet it had to be requested by NSE. This demonstrates the extreme level of disrespect Northern Pulp and Paper Excellence has for Pictou Landing First Nation, and indigenous knowledge.

There are many other items I take issue with in the Focus Report, but do not have the time to properly research. For example, there are many issues within Appendix 4.3, Sediment Transport Modeling. I understand that modeling can be a helpful tool, but I find it troubling that Northern Pulp used sediment particle size analysis (PSA) from two Paper Excellence mills in British Columbia. This reinforces a major question: what is Northern Pulp's current effluent makeup, and what will it be? This is something Northern Pulp cannot answer, and incurs too many risks to our marine environment.

I implore you to deeply consider every detail that was shared in all the letters and submissions made during this thirty-seven day public review period. Many have worked very hard to convey their concerns and expect their government to take all forms of knowledge shared in to consideration. We must all take responsibility for the legacy we are leaving behind. I believe that there would be devastating adverse effects if Northern Pulp's new effluent treatment facility is approved. An effluent pipe cannot be permitted to enter the Northumberland Strait, an already stressed and fragile ecosystem. One tainted lobster is all it takes to destroy the seafood industry of all three Maritime provinces. Adverse effects from this project are not limited to Nova Scotia; your decision affects the entire Maritime region.

We must put an end to the environmental racism that has plagued Pictou Landing First Nation for over five decades. An extension to the use of Boat Harbour is not an option. You cannot ask this community to sacrifice their health, culture, and livelihoods, any further. We must stand with PLFN as they work towards remediating and reclaiming A'se'k. January 31st, 2020 is more than a date set in the Boat Harbour Act – it is the beginning of a new chapter in Nova Scotian environmental history. It is your opportunity to set a precedent. It is a time of healing for PLFN and the county of Pictou.

"Beyond its economic functions, a healthy marine ecosystem is an integral support for local culture and identity and for the quality of life in adjacent communities."[6]

Pictou County is much more than the Northern Pulp mill.

We deserve better.

Regards,

[6] Department of Fisheries and Oceans, *Working Group Report: Northumberland Strait Ecosystem Initiative, Habitat and Resource Protection*. Ottawa: Department of Fisheries and Oceans, 2007, 10.

From: @nb.aibn.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 2:55:04 PM

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Project: replacement_effluent_treatment_facility_project Comments: The Lahey Report and good forestry depends on a market for the low-grade wood fibre in our forest and the major consumer of this product is Northern Pulp. If Northern Pulp passes the Environmental Assessment, there is no reason not to complete the project. Name: @nb.aibn.com Address: Municipality: Miramichi Postal-Code: Fax: email_message: Privacy-Statement: agree x: 69 y: 28

From:
To: Environment Assessment Web Account
Subject: Replacement Effluent Treat Facility Project for Northern Pulp
Date: November 8, 2019 2:55:18 PM

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November 8, 2019

Replacement Effluent Treatment Facility Project
To:
Mr. Gordon Wilson and The Nova Scotia Department of Environment

My name is and I am a lifelong citizen (65years) of the Town of Pictou. Today I am writing to you in regards to the application for permission to build an effluent treatment plant (it is NOT waste water) at the Northern Pulp site in Granton which also includes a pipe that will carry same said treated effluent out into the Northumberland Strait via an overland route to Caribou Harbour. This plan is due to the planned shutdown of Boat Harbour, as per the Boat Harbour Act which was passed in 2015.
I am totally against this happening and I shall go into further details as to why.

I am not a scientist, by trade or education, but have a Millwrights Certificate and have practiced that trade for some 35 years. In all honesty I feel with everything I have managed to get a hold of and read and what I have seen with my own eyes, one does not need much education to come to the same conclusions that I have. I find the report is lacking in many ways with much needed information that has yet to be studied and produced. But really pretty much all you need is one simple thing, which seems to be a bit of a rarity these days and that is just some good old common sense.

So let's get to it and I will try to explain to you what I mean.

First off, have you ever visited Boat Harbour? If not you should above all do so, before you do anything else. If you did, it makes me wonder why you would even entertain the thought of moving what is in Boat Harbour out into the middle of Prime Fishing grounds in the Northumberland Strait. Because from all that I have read, and what I have witnessed as to what is now going on in Boat Harbour and to think that basically it will be much the same thing going into the Strait.

My reasoning for this is :

First this comment taken from the Halifax Examiner:

"Chapman's on-air boasts about effluent from the new system being better than it is now contradicts the views Northern Pulp's technical manager expressed in private communication. In an email of November 29, 2017 to Dillon consultants, she writes:

Some say effluent quality [from the replacement treatment facility] will be worse than today because of all the polishing that is happening across the Boat Harbour basin — and they are correct to some extent"…

Then this taken from the EA 9.0 Human health Evaluation pg 489

At this time, effluent chemistry characteristics (including the specific substances present in treated effluent and their anticipated concentrations) will not be known with certainty until the project is operational.

Finally this taken from same section of EA page 491

In the EA they also used as their example a report from Tasmania of the proposed Bell Bay Pulp Mill as to what the effluent would be like.

So here they are planning to put a by product into the Strait, where Northern Pulp say they do not know what it contains now,(why do they do not know that, have they not ever had it tested?)
Then they use a report that is in fact imaginary and just pure speculation; on top of that have a technical manager from Northern Pulp saying the new treated effluent will not be as good as to what flows into Boat Barbour at present day.

Does that sound good to you? Well it certainly does not feel very comforting to me at all.

Now not only will this Treated Effluent have all kinds of different pollutants in it like Furins, Dioxins even Mercury and Cadmium plus some other heavy metals, there is also the fact that it will also be hot and will contain nutrients that will be a type of BOD, Biochemical Oxygen Demand and Suspended Solids SS.
All of these things are known to be acutely lethal to fish. The pipe will of course create a dead zone in the Strait. How big that dead zone will be is yet to be determined, as we are lead to believe that the effluent coming out of the pipe will be apparent all be gone within five meters of dispersal. Northern Pulp states it will meet Marine Guidelines according to one ad that they have been posting on the internet. A statement that is actually false advertising ,as there are no Marine Guidelines, where ever they got that idea from?
So if you will imagine please, if you can, using the Town of Pictou's Freshwater Containment Standpipe at the top of our Town. Then picture a total 19 of these full of effluent spilling out in the Strait in one specific place, every single day. Now tell me you believe that it will all just vanish? There is that Common Sense thing again jumping out at you!

Then let's not forget the possibility of Pipe Leaks like the three known ones. Two major ones that have happened between Boat harbour and Northern Pulp one in 2014 of 47 million lts and a more recent one in 2018, that DOE is still sitting on to tell us the results even after 13 months of investigation.
So where does Northern Pulp want to run their Pipe? The route would take it right over the Town of Pictou's watershed. This is the good and friendly neighbour that they say they are. So they want to put at risk a whole town's water supply? Hello Common Sense !

Then of course we have the Pipe route into the Strait. Well as we all know the Strait freezes in the winter and during the breakup in the Spring we get ice moving all over the place from winds and tides. This can cause many problems, it moves underwater Buoy Bases, it gouges the seabed and it destroys wharfs and pretty much anything that gets in its way. Do a little research and find out the issue of buried sea cables and wharfs like one at Cape Pele in NB have suffered at the expense of moving ice in the Strait.
The sea bed at Caribou Harbour according to Navigation Charts is made up of sand and mud which are two types of underwater terrain that are never in a stable state but continually in some kind of movement. You only need to view a sandbar at the beach and see how it changes from Tide to Tide.
The pipe diffusers cannot be buried so could sustain possible damage along with the pipe itself under these types of conditions. Considering the changes in the weather these last few years and the increases in wind storms, how much does that increase the odds of damage occurring?
I have seen nothing in the EA or the FR that address the problem of the pipe being damaged in the Strait and what they will do or how they will fix it. If damage happens what are the plans to repair it during the time ice is prevalent in the Strait?
Will they 1.) Just keep running and pumping effluent into the Strait, until such time as the ice is gone and work can

be done. Or 2.) Will they shutdown and cease production for perhaps two to three months till conditions are right ?

OK so suppose you are happy with the Pipe and the treatment facility. Let's turn now to what they want to do with the dried effluent by product from the facility. My understanding is they want to take that product, which they still do not know what it contains, or perhaps refuse to tell us what it contains and burn it in their power boilers. Considering Northern Pulp's track record when it comes to air emissions I find that to be a very troubling way to deal with the destroying of the Effluent by product. Has any testing at all been done to evaluate at what temperatures the contents of the Effluent will be destroyed, if at all or if the Particular matter will be less than the 2.5m? From April 2011 to October 10, 2018, they had 14 Failed air emission tests. With it exceeding air contaminant emissions limits by nearly 50 per cent in June of 2017.

They are on one hand saying they are preventing some of the by product from getting to the water, but then they are basically just putting it back into the air. So not only are we looking at dealing with water pollution we are also looking at a very disturbing possibility of our air quality being even worse than it is now. With the number of **respiratory cases in Pictou County over the years, can considering this kind of waste disposal actually make any sense? There it is again, that dam Common Sense.**

I might as well add this extra bit as it also has to do with DOE and Northern Pulp. We are hearing from Forestry that if Northern Pulp fails to operate, that the Forest Industry in Nova Scotia will be decimated.
I think that the word decimated is used in the sentence in a very wrong way. Due to the operations and work methods of Northern Pulp it is not the Forestry Industry that is being decimated it is actually the forests themselves. I used to be an avid fisher and you would find me in the woods, on a lake or a river enjoying my favorite sport of Angling all the time. One of my favorite places to do that was in the Liscombe Game Sanctuary. In the end I had to finally give it all up, as I could no longer enjoy a day out when I would have to view the devastation from both my truck on the way or from the waters of my favorite lakes. A Game Sanctuary Clear Cut, not just a little but hundreds of acres, quite simply destroyed. Oh, they say no worries, it is a renewable resource. Yes it may be a renewable resource to some but I am afraid I do not have 80 years of life left to see it back in its previous state again. Some claim 30 years for harvestable trees. I call BS, been there after 20 years and it is still hardly taller than me and what is growing up in its place? Softwood, lots and lots of softwood and why? Because Northern Pulp sprayed it with Gylsophates. So looks like not only are they killing things with the use of their Pulp Emission Stacks, they are also killing with their spray programs and clear cutting practices. To think they say it only kills the hardwood? Guess the birds and small animals read spay warning signs and stay away when the spray is in progress. Is common sense ringing that bell again?

So in closing in my non scientific way, I ask you Mr. Gordon Wilson and the Liberal Government's Nova Scotia Department of Environment and all its staff. What will your legacy be? Now please think very carefully about this before you answer?

Are you going to have a legacy of being the ones who:

Saved the Northumberland Strait from becoming Polluted
Saved our wonderful fresh Ocean Air and Forest air from being contaminated.
Saved our Forests and all the creatures in it from devastation.

Or will your legacy be you saved a Multi Billion Dollar International Company and some 2700 jobs that all feel it would be a positive thing just for them lone?

Let's just hope you use all your common sense?

I am certain your families, friends and the majority of the people in Nova Scotia, Prince Edward Island and New Brunswick who are all negatively affected by it will want you to use your common sense and do the right thing.

I thank you for your time in regards to reading my response.

Most Sincerely,

Sent from Mail for Windows 10

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report Response
Date: November 8, 2019 2:56:49 PM

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To the Hon. Minister of Environment,

We are writing this letter as a response to Northern Pulp's Focus Report for a proposed Replacement Effluent Facility. We have many concerns about the proposed effluent pipe and hope that common sense will prevail.

We live in Caribou, very close to the 106 Trans Canada Highway, and the proposed effluent pipe route. We are a fishing family, like generations of our family before us. We are parents to a young son and as a family work, live and play on the Northumberland Strait and its shores. This proposed pipe puts all of those in jeopardy and it is sickening to think of the catastrophic effects this pipe will have on the environment, our lively hood, and future generations of our family.

Like so many other families in Caribou, growing up fishing on the back of your father's boat was common. This is our family's legacy and we would like to be able to pass the fishing tradition to our son someday, if he so chooses, like our father did and his father before him. We fear that the proposed pipe spewing its effluent into the straight will have serious damage on all species of marine life, including the construction phase of the proposed pipe. The Marine Environmental Impact Assessment, 3-15 states "The proposed pipeline route and diffuser location will have a direct interaction with the Lobster fishery resource." making us very fearful of its impact on the delicate lobster larvae, lobster breeding grounds and the overall future of our food source, livelihood, and a billion dollar industry.

Living close to the water and spending ample recreational time on our beach in Caribou (in Caribou Harbour, adjacent to the ferry wharf) and our beach front property in Pictou Island, we can't help but wonder what effect the effluent will have on our beautiful shores. We worry about the quality of the water and the health risks it will pose to ourselves and our child. We spend many days, enjoying the warm waters of the Northumberland Strait and it would be a serious loss to our family not to be able to safely enjoy it. Also located in our community is the Caribou Provincial Park and Munroe's Island. They are also located close to the outfall of the proposed pipe. This area sees many locals and tourists alike in the warmer months enjoying the sand and sea. Many people's health could be negatively affected and these beautiful areas could become vacant do to the fear alone of one's heath becoming impacted due to the treated effluent in the water. This is a huge human health risk that has not been sufficiently addressed. Too many uncertainties.

Another concern we would like to share is the effect on our drinking water. As we have previously mentioned, we live very close to the proposed pipe route. We are extremely worried that when a pipe leak or break occurs, it will have adverse effects on our water table and drinking water. This poses serious health risks to our family. Clean, safe drinking water is a necessity and this should not be overlooked as it has potential to cause harm to our health

and overall wellbeing. Again, the human health risk has not been adequately addressed. Too many uncertainties.

We love where we live. It is home and we have a vibrant community around us. We are a point of entry into Nova Scotia through the NFL ferries operating between Caribou and Wood Islands, PEI. Hundreds of thousands of people enter Nova Scotia through our community each year. Imagine a tourist entering Nova Scotia being greeted by a discharging effluent pipe. Welcoming thought, isn't it? Our local and provincial tourism industry wouldn't withstand it.

And finally, we think of the world we want to leave We, as all parents, want our children to thrive in their environment. To have the chance to experience all that our surroundings have to offer. We are worried the impact that the pipe will have on our waters and shores, will leave nothing but destruction and waste. We are teaching our children to take care of our earth and do their share no matter how small as everything has an impact. Approval of the proposed effluent pipe is contradictory to everything that we are teaching our children. We need to lead by example and take care of our waters and land for this is truly what we are leaving our children.

Respectfully submitted,

From:
To: Environment Assessment Web Account
Subject: Northern Pulp ETF
Date: November 8, 2019 2:59:38 PM

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Northern Pulp's plan to have an onsite ETF and effluent discharged into the Northumberland is a sound and solid plan backed scientific data. The discharge of pulp effluent must meet federal Ocean and Fisheries guildlines therefore the ETF must be built and operator as such.
This project much be approved on scientific data rather than fear mongering.

NS

Sent from my iPhone

From:
To: Environment Assessment Web Account
Cc: info@friendsofthenorthumberlandstrait.ca;
Subject: Replacement Effluent Treatment Facility Project
Date: November 8, 2019 3:00:36 PM

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Comments on the Focus Report for the Replacement Effluent Treatment Facility for Northern Pulp

I am a homeowner on Caribou Island. I regard myself as extremely privileged to have the good fortune to look out at the Strait. This is where the proposed Northern Pulp pipeline is to be installed. It saddens me to my soul, about the idea of effluent from the pulp mill flowing into these waters. The bizarre idea that moving the effluent from one body of water to another to solve a problem, is ridiculous. I strongly oppose this pipeline

I have watched through the seasons, the varied wildlife that frequent these waters and shorelines. Wildlife and fishers depend on these waters and shorelines to be effluent free. This area has shallow water and warms up considerably in the summer months. Many enjoy recreation in this area of Caribou Island, wading through the warm summer waters and enjoying the beaches. Pouring hot effluent water, treated or not into this area is not a good plan and unacceptable. The area receives wild storms and with them, changing shorelines and sea beds. Dredging for the ferries is required. Will this pipeline be damaged by dredging, and the storms?

The reports on the birds in this area is lacking. I have taken photos from my yard on Caribou Island of gannets, terns, sandpipers, bufflehead ducks, red tailed hawks,and others. What about the winter birds? The snow bunting, the snowy owl? I'm not a bird expert, but a 10 minute look around is not much of a study of the situation. I can forward photos if requested.
Shellfish (oysters, mussels, razor clams, crabs, clams and quahogs are abundant in our bay. What happens to these creatures with changes in the waters?

This proposed pipe would be delivering fresh water into salt water. Millions of litres per day. How could this not effect the saltwater species that live in this shallow harbour and strait?

Furthermore; the plans to build the effluent treatment plant on grounds where previous owners buried volumes of mercury is incredibly irresponsible. The journalist, Joan Baxter explains about this extensively in her book "The Mill: Fifty Years of Pulp and Protest" Think long and hard on what could go wrong here.

Northern Pulp does not have a good track record with spills and air quality. Why would someone going for a walk be the one to notice a spill. It appears their monitoring systems are quite rubbish. How can we trust them? Who in their right mind would consider this proposed pipeline to cross over their watershed area.

Take a walk on the shore near the exhaust from Boat Harbour. Check out the dark tea coloured treated water effluent ending up in the Strait. Check out the brown bubbles on the shoreline. Take a nice deep breath. Smell good? No. This is the harmless effluent that was promised to the Pictou Landing residents. This is unacceptable. These people have been treated like second class citizens. This mess is unacceptable, and should not move from one body of water, Boat Harbour, to another in Northumberland Strait.

If the effluent water is so safe, why is it too corrosive to use in a closed loop system.
If the water is so corrosive, why is this water okay to pour into the strait near Caribou Island?

Regarding Caribou Harbour, A quote from Harbour Authority of Caribou states “Northern Pulp’s current proposal (section 8.11.2.4) confirms that there has been no testing completed with respect to the water composition of Caribou Harbour. Instead Pictou Harbour was used as a proxy for Caribou Harbour with respect to water quality. There is no explanation as to why water quality data for Caribou Harbour was “unavailable “. The Authority views such an assumption on water composition as entirely inadequate. There are major distinctions between the two harbours which makes such an assumption tenuous at best” This quote cements my non confidence with Northern Pulp’s attention to extremely important information that should have been included in their report. This verifies the sloppiness of their reports, and lack of important details. I do not trust any recommendations they make.

The conclusions of Northern Pulps assessments of the wastewater are based on disbursements into pristine waters. The Strait is not pristine, and has areas which the waters have dead zones. Why would the government think pulp effluent added to this already fragile eco environment be okay. Is it because so much government money has been poured into this facility, they feel obligated to continue on, rather than proceed forward responsibly, with respect for the environment. It is time, it is past time to act responsibly for this planet.

I have not heard of a guarantee of good will from North Pulp, that this treated effluent will be harmless. They have never put their money on the line. They should be paying for it, and they should paying for any damages, not the taxpayers of Nova Scotia or the Canadian government. No more handouts. No more extensions.

Reality is that this project should have had a federal assessment. The provincial

government has too much invested in this pulp mill to be unbiased. Since this is not happening, we have to hope the province is not just in this for the money, and will instead protect and preserve the people, the landscape, the wildlife and the waterways of this province.

Respectfully,

Caribou Island

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:05:11 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I feel that it is very important to support Northern Pulpâ?Ts proposal to install a new waste water treatment facility. It will result in an improved effluent treatment plant to replace the Boat Harbour plant. It is significant that the effluent will be well dispersed and would not be distinguishable from sea water at five meters away from the discharge point. Detractors to this proposal see this as a new volume of treated effluent to the Northumberland Straight but it would only replace the flow from the Boat Harbour plant that has been discharging for many years and very slowly dispersing into the Strait. I am a boater and feel that this will result in water quality improvements to sea water around Pictou County. This project to replace the Boat Harbour plant is necessary to keep the Northern Pulp business in operation. I believe that much of the forestry in NS is integrated with this pulp mill and can only survive with the mill running. It is also very important to the economy of rural Nova Scotia that we keep the direct and indirect jobs that result from the forestry industry. Please approve this Environmental Assessment. Name: @gmail.com Address: Municipality: NEW GLASGOW Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 58 y: 25

From:
To: Environment Assessment Web Account; minister.evnironment@novascotia.ca; pictouwestmla@bellaliant.com; Premier
Subject: Northern Pulp Focus Report
Date: November 8, 2019 3:05:30 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is I have lived in Nova Scotia for almost 20 years, over half that time spent living in Pictou County. I am a small woodlot owner who is very concerned about the future of forestry in this province. I believe that Northern Pulp is detrimentally affecting the sustainability of our forestry industry. But today I'm here to give you some reasons why I'm concerned about Northern Pulps Effluent Treatment Facility Proposal.

I believe that Northern Pulp's plan to pump up to 85 million litres (31 Billion Litres per year) of effluent into the Northumberland Strait is a bad idea. The Northumberland Strait and it's marine life is already under an incredible amount of stress. The climate is changing more rapidly than we can keep up with, the marine life in the Strait cannot withstand this incredible influx of effluent.

In addition to what it would do to the marine environment, I worry about the potential risk that this poses to our fisheries. The livelihood of our fishers is being threatened by both the make up of the effluent as well as the temperature. I do not believe the province would have even considered a proposal from Northern Pulp if that proposal was one that would put the Michelin plant next door at risk. I don't see how this is different.

The air emissions from Northern Pulp are a great concern to me. They have failed to meet the limits set out in their Industrial Approval many times. **In June, their stack tests failed one of their three tests** and only passed thanks to the average of those three tests being under the limits set in their Industrial Approval. Testing on the power boiler, the stack from where these results came, are only done four times a year. Seeing that they are given a pass even though they failed one of the tests makes me wonder how many failures are going undetected.

Northern Pulp's plan for their new effluent treatment facility includes burning 'sludge' in that power boiler. **This company has had a history of failing to meet their limits, their mill is over 50 years old and was only designed to last 25,** they are not monitored enough to make me feel they are under the targets laid out in their Industrial Approval consistently and if this project is approved, they plan to add to those air emissions. The air that we breathe in Pictou County is bad enough, I don't see a plan to add more pollution to a mill that already seems taxed in its capabilities is a smart move and I don't approve this project.

Northern Pulp's pipe route raised a lot of concerns for me with their EA submission and seeing that they are sticking with the same basic pipe route as outlined in their focus report does nothing to alleviate those concerns.

I do not trust Northern Pulp's ability to monitor a pipe line and I don't trust their leak

monitoring detection system that was mentioned in the focus report does enough to protect the Town of Pictou's water. A new route should have been chosen. The focus report talks about 'compensation' should problems be unavoidable. 'Compensation' does little for people who can't drink the water. Northern Pulp were supposed to have a leak monitoring system on their current pipe but the massive raw effluent leak from October 2018 was not discovered by Northern Pulp, **it was discovered by someone walking in the woods.**

Northern Pulp's findings in their earlier EA submission found that their were no concerns.

Dude!!! The reason they had to do the report in the first place was because they weren't doing the right work on species at risk, migratory birds marine surveys, land surveys or watercourse surveys. I do not trust any of the new conclusions that they've come to because they demonstrated that they were just going to say that everything was fine anyway. The focus report also pointed out that present conditions are putting a strain on migratory birds. Adding more stress does not help that.

The marine portion of the pipe won't have any leak detection system. If there were a leak during that stretch we would not know it. Munroe's Island is supposed to be a protected area. I don't see how this project can be approved if there isn't a system to prevent a catastrophic event in that area.

Thank you for considering my views on this issue. I am putting my trust in you, my government representatives to do the right think for the long term success of this province.

Thanks,

cc: Karla MacFarlane MLA, Pictou West
--

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:05:38 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Comments on the Focus Report for the Replacement Effluent Treatment Facility for Northern Pulp I am a homeowner on Caribou Island. I regard myself as extremely privileged to have the good fortune to look out at the Strait. This is where the proposed Northern Pulp pipeline is to be installed. It saddens me to my soul, about the idea of effluent from the pulp mill flowing into these waters. The bizarre idea that moving the effluent from one body of water to another to solve a problem, is ridiculous. I strongly oppose this pipeline I have watched through the seasons, the varied wildlife that frequent these waters and shorelines. Wildlife and fishers depend on these waters and shorelines to be effluent free. This area has shallow water and warms up considerably in the summer months. Many enjoy recreation in this area of Caribou Island, wading through the warm summer waters and enjoying the beaches. Pouring hot effluent water, treated or not into this area is not a good plan and unacceptable. The area receives wild storms and with them, changing shorelines and sea beds. Dredging for the ferries is required. Will this pipeline be damaged by dredging, and the storms? The reports on the birds in this area is lacking. I have taken photos from my yard on Caribou Island of gannets, terns, sandpipers, bufflehead ducks, red tailed hawks,and others. What about the winter birds? The snow bunting, the snowy owl? Iâ?Tm not a bird expert, but a 10 minute look around is not much of a study of the situation. I can forward photos if requested. Shellfish oysters, mussels, razor clams, crabs, clams and quahogs are abundant in our bay. What happens to these creatures with changes in the waters? This proposed pipe would be delivering fresh water into salt water. Millions of litres per day. How could this not effect the saltwater species that live in this shallow harbour and strait? Furthermore the plans to build the effluent treatment plant on grounds where previous owners buried volumes of mercury is incredibly irresponsible. The journalist, Joan Baxter explains about this extensively in her book â?oThe Mill: Fifty Years of Pulp and Protestâ? Think long and hard on what could go wrong here. Northern Pulp does not have a good track record with spills and air quality. Why would someone going for a walk be the one to notice a spill. It appears their monitoring systems are quite rubbish. How can we trust them? Who in their right mind would consider this proposed pipeline to cross over their watershed area. Take a walk on the shore near the exhaust from Boat Harbour. Check out the dark tea coloured treated water effluent ending up in the Strait. Check out the brown bubbles on the shoreline. Take a nice deep breath. Smell good? No. This is the harmless effluent that was promised to the Pictou Landing residents. This is unacceptable. These people have been treated like second class citizens. This mess is unacceptable, and should not move from one body of water, Boat Harbour, to another in Northumberland Strait. If the effluent water is so safe, why is it too corrosive to use in a closed loop system. If the water is so corrosive, why is this water okay to pour into the strait near Caribou Island? Regarding Caribou Harbour, A quote from Harbour Authority of Caribou states â?oNorthern Pulpâ?Ts current proposal section 8.11.2.4 confirms that there has been no testing completed with respect to the water composition of Caribou Harbour. Instead Pictou Harbour was used as a proxy for Caribou Harbour with respect to water quality. There is no explanation as to why water quality data for Caribou Harbour was â?ounavailable â?o. The Authority views such an assumption on water

composition as entirely inadequate. There are major distinctions between the two harbours which makes such an assumption tenuous at bestâ? This quote cements my non confidence with Northern Pulpâ?Ts attention to extremely important information that should have been included in their report. This verifies the sloppiness of their reports, and lack of important details. I do not trust any recommendations they make. The conclusions of Northern Pulps assessments of the wastewater are based on disbursements into pristine waters. The Strait is not pristine, and has areas which the waters have dead zones. Why would the government think pulp effluent added to this already fragile eco environment be okay. Is it because so much government money has been poured into this facility, they feel obligated to continue on, rather than proceed forward responsibly, with respect for the environment. It is time, it is past time to act responsibly for this planet. I have not heard of a guarantee of good will from North Pulp, that this treated effluent will be harmless. They have never put their money on the line. They should be paying for it, and they should paying for any damages, not the taxpayers of Nova Scotia or the Canadian government. No more handouts. No more extensions. Reality is that this project should have had a federal assessment. The provincial government has too much invested in this pulp mill to be unbiased. Since this is not happening, we have to hope the province is not just in this for the money, and will instead protect and preserve the people, the landscape, the wildlife and the waterways of this province. Respectfully,

@gmail.com
Address: Caribou Island Municipality: Pictou County Postal-Code:
Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 41 y: 19

From: @outlook.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:07:30 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Please keep the mill open . I have followed the bc company and itâ?Ts safe . Please keep mill open Name: @outlook.com Address: Municipality: Trenton Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 47

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:09:53 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Scientific evidence is there. This project needs to be approved. Name: @gmail.com Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 69 y: 22

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:12:06 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Im in favour of keeping Northern Pulp open and the new treatment facility and pipe going into the Strait. Nova Scotia needs forestry and the mill needs to stay open for the industry to survive. Name: @gmail.com Address: Municipality: Hardwoodlands Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 28

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:12:39 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Dear Hon Gordon Wilson I writing to you today in regards to the EA to replace Northern Pulps Effluent treatment facility. I have been a resident of Pictou County my whole life. I have been eating lobster and seafood out of the Northumberland Strait and swimming at numerous beaches in this area for over 35 years and have never had any issues with the current system affecting any of that. The last thing I would want is for this to cause any harm to anything to do with our beautiful oceans and fisheries. That being said Northern Pulp and the fisheries have been able to live together for the last 50 years so why is the approval of a new state of the art system that is currently being used by other kraft mills across Canada even an issue. The science has proven itself in other areas. I really think the fisheries and forestry are both very important parts of the Nova Scotia economy. We cannot risk the loss of either one. I believe in this project and if the science is proven and works there should be n o issues for an approval. Northern Pulp meets all environment guidelines now in regards to their effluent so how could this system not as well. There have been numerous studies done by third party environmental experts and they have stated that there will be no significant impacts on the fisheries or fish habitat as a result of the project. I believe this issue has resulted in a divide among our community and can only hope that this is resolved to support both industries. Name: @ns.sympatico.ca Address: Municipality: Trenton Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 79 y: 29

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:15:44 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Looks like a good solution to the problems! Go for it! We need the mill for the Nova Scotian economy! Name: Email: @gmail.com Address: Municipality: Upper Musquodoboit Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 45 y: 16

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:16:06 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I fully support the effluent pipe. I believe it will be a much cleaner alternative to boat harbour. As a resident who lives near the proposed pipeline I am glad that northern pulp has taken initiative to propose to use a thicker than recommended pipe. Name: Email: @gmail.com Address: Municipality: Central caribou Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 88 y: 14

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:20:07 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: The Northern Plup mill in Pictou County is not only essential to the lively hood of many Nova Scotian but to many around the world due to their large export of Pulp to companies that create some of our basic human needs toilet paper, paper towel and even the paper you write on daily. With the Nova Scotia economy and job availability at an all time low, a closure of this mill would have a huge ripple effect of jobs lost. It is not only those who work directly within the mill but the truck drivers, the forestry company owners especially the small business owners, the persons who are in the woods themselves daily moving the wood as well as land owners who would all feel the effects of a closure. The closure has the potential to then effect other resources in our province when families are forced to move to find work. The spouse of the Forestry worker who is facing job lost, could very well be the person who cuts your meat daily in your local super market. Restaurants and other s ervice industries would suffer because people wouldnt be able to afford those luxuries. However the implementation of the treatment plant for the waste from the mill will allow for more job availability to those in the Pictou county or others in Nova Scotia who chose to move there because they have obtained work, allowing Nova Scotians to stay and work in our beautiful province! The closure of the Northern Pulp Mill would have a huge trickle affect for the better or worse for Nova Scotia. Name: @hotmail.com Address: Municipality: New Germany Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 32 y: 9

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:25:06 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am a mother and a teacher here in Nova Scotia. The health of our oceans, fisheries, and forests are of the utmost importance to me. Environmental protection is essential for the health of my children and students. The pulp mills activities leads to the clear-cutting of our forests,the pollution of our waters, and it endangers our fisheries. I do not want the pipe approved. No waste water from the pulp mill should be pumped into the Northumberland Strait. Sincerely,
Name: @hotmail.com Address: Municipality: Lower Sackville Postal-Code: Fax: ### ### - ####
email_message: Privacy-Statement: agree x: 47 y: 24

From: @icloud.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:25:50 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I believe in the science , if the indigenous people allow this, letâ?Ts do it for the economy of this region. I worked around tailing ponds, settling ponds, effluent treatment in Fort mcmurray for 25 years,saw the improvements and the success of the new technology. I have been retired for 12 years, imagine the advances since then. Yes would be my answer but I think the indigenous would have final say. Name: @icloud.com Address:
Tatamagouche Municipality: Tatamagouche Postal-Code:
Fax: ### ### - #### email_message: Privacy-Statement: agree x: 84 y: 23

From:
To: Environment Assessment Web Account
Subject: Re: Northern Pulp NS Fleet Planning Board LOS
Date: November 8, 2019 3:28:14 PM
Attachments: GCIFA LOS for Fleet Planning Board.doc

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Good afternoon,
Please accept the attached letter of support from Guysborough county Inshore Fishermen's Association. The letter address concerns the fishing industry in Chedabucto Bay area which shares the waterway through the Canso Causeway with Northern Pulp and the NS fleet Planning board. Thank you and please feel free to contact myself at any time to further discuss our concerns.

For

Canso, NS

Guysborough County Inshore
Fishermen's Association
Ph: 902-366-2266/Fax: 902-366-2679

Box 98
990 Union Street
Canso, N.S.
B0H 1H0

Nov 8th, 2019

Honourable Minister Gordon Wilson
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

Re: Letter of support : Northern Pulp Nova Scotia, Focus Report, Replacement Effluent Treatment Facility

Dear Hon. Minister Gordon Wilson,

Northern Pulp Nova Scotia has submitted a Focus Report to the province on October 2, 2019. It is proposing a new treatment facility that will discharge 70-90 million litres of contaminated effluent into the Northumberland Strait every day. A Federal government study conducted a few years ago concluded that, even when meeting federal regulations, 70% of pulp mills in Canada continue to have harmful effects on aquatic life and habitat, and 55% are having harmful effects on the larger environment. The Northumberland Strait is part of the rich and vital fishing industry of our province. The reputation of our industry, and our brand, is built on seafood harvested from clean, cold, pristine waters off our province's rugged coastline. A threat to this reputation is a threat to the industry throughout Nova Scotia, Guysborough County and Cape Breton and in neighboring provinces

The Northern Pulp Nova Scotia (NPNS) Focus Report was reviewed by the Gulf Nova Scotia Fleet Planning Board in detail. The GCIFA supports the conclusions made in the review, namely:

> *In closing, the GNSFPB would like to reiterate that NPNS has failed to adequately address the Terms of Reference outlined in section 7.0 Fish and Fish Habitat, 9.0 Human Health and 2.0 Project Description… Northern Pulp relies on major assumptions and blanketed statements to suggest that there will be no harm to the marine environment, including fish and fish habitat. There are gaps in the evidence presented, including but not limited to: impact on lobster development and population health, incomplete or non-existent commitment to follow up monitoring, lack of evidence to protect vulnerable populations or habitat such as fall spawning herring, other SARA (Cod, White Hake), Scallop Buffer Zone 24, eel*

grass beds, limited understanding of the seasonal impacts of ice cover and ice scouring. The importance of the global optics of the Canadian seafood brand can not be undervalued or excluded from this Environmental Assessment approach.

Unfortunately, Northern Pulp has failed to assure our fishing industry that our brand and our livelihoods are not at risk. In fact, all evidence points to the proposed pipe and its discharging effluent having harmful effects on marine species. Mill officials and their consultants provided no hard science on the impact on fisheries and fish habitat, yet insist that discharge into the Northumberland Strait is their only option. Northern Pulp appears satisfied to have the fishing industry assume 100% of the risk of their proposed new treatment facility. This is not acceptable to the fishing industry of Atlantic Canada. We hope that your department will take these comments seriously and consider our vital fishing industry in making your final decision.

Thank you for your attention to this very serious matter,

GCIFA

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 3:28:30 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is and and I am a surfer and business owner who lives in Stellarton for the last years and I'm concerned about Northern Pulp's Effluent Treatment Facility Proposal.)

I believe that Northern Pulp's plan to pump up to 85 million litres (31 Billion Litres per year) of effluent into the Northumberland Strait is a bad idea. I do not believe the Northumberland Strait and its marine life, which is already under a lot of stress, can withstand this incredible influx of effluent.

In addition to what it would do to the marine environment, I worry about the potential risk that this poses to our fisheries. The livelihood of our fishers is being threatened by both the make up of the effluent as well as the temperature. I do not believe the province would have even considered a proposal from Northern Pulp if that proposal was one that would put the Michelin plant next door at risk. I don't see how this is different.

Thanks,

Sent from my iPhone

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:28:52 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: A clean and healthy environment, whether it be Pictou County, Nova Scotia, Canada or wherever, is paramount. A healthy economy is also important. This project is an improvement to the process at Northern Pulp, and it is the right thing to do. As someone who has interests in both the forestry and fishing industries, as well as raising my family in Pictou County, I want to see the mill build the very best treatment facility that can be built. The mistakes of previous owners, and past archaic and cruel treatment of First Nations people, should not be the framework of reference for this issue. The provincial government has committed to end the horrific legacy at Boat Harbour, and it is looking to keep in place one of the largest industries in the province. After reviewing the Focus Report, it is apparent that Northern Pulp has answered any and all questions asked of them. The sections that were of particular interest to me were the appendices on Impacts and Mitigation, Marine Geotechnical Survey, Sediment Transport Modeling, the fish habitat surveys and impact assessment marine fish, and the Receiving Water Survey. With this Focus Report, Northern Pulp has answered any questions I had with regards to this project. What is in the effluent? What is the temperature of the effluent? Dispersion how dispersed will it be? What measures will be in place to mitigate damage to the receiving water, the Pictou watershed, the wetlands that the pipe will pass, and any and all marine life in the Northumberland Strait. After reviewing this project, I feel that it will be a major improvement for Northern Pulp and will not negatively impact Northumberland Strait. My own research of kraft mills similar to Northern Pulps operation, in Pennsylvania, Sweden and several others that discharge into marine habitat with no impact to marine life, has also comforted me greatly. Thank you for this opportunity to comment on this project. Name: @gmail.com Address: Municipality: New Glasgow Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 78 y: 15

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:31:42 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I have been following the dialog regarding Boat Harbour for the last 6 months. It is my view that this project should proceed and an extension should be granted. Paper Excellence is committed to clean up the environmental issues that have been mostly created by previous companies that owned this mill. I believe they should given credit for their commitment to the environment and the people of Nova Scotia. Many companies would walk away from this problem but Paper Excellence righting a wrong that was done for many years. We as Nova Scotians should be very grateful to have a company like this in our province. They provide a big economical boost as well as utilizing our renewable natural resources. I sure hope the government can appreciate the importance of this mill. I look forward to the Government making the proper decision for all Nova Scotians. Name: @eastlink.ca Address: Municipality: Antigonish Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 45 y: 26

From:	Environment
To:	Environment Assessment Web Account
Subject:	Proposed Project Comments
Date:	November 8, 2019 3:38:43 PM

Project: replacement_effluent_treatment_facility_project Comments: I have been involved in the forest industry for many years and strong recommend the boat harbour agreement be extended. This mill is very important to Nova Scotia. The mill is required to abide by strict environmental regulation when replacing this effluent treatment facility. If they are in compliance there is absolutely no reason why this upgrade should not be done. Other provinces have done the same thing with mills. Nova Scotia needs to as well. Name:

Email: Address: Aspen, Guysborough Co. Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 47 y: 27

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:39:57 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I support my family by hauling into the mill. Name: @gmail.com Address: Municipality: Hilden Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 76 y: 26

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:43:05 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Please maintain the mandated closure of Boat Harbour to effluent from Northern Pulp Mill on January 31, 2020. I oppose oppose Northern Pulpâ?Ts plan to pump effluent into the Strait. It is time for our government to prioritize human and environmental health over industrial activity and profits. What is the state of our democracy if citizens must pressure the government to make the right decision to favour community health and well-being over economic gains and fear that this will still fail? Our current financialization of everything is sad and destructive. Life is greater than an insular, economic-growth mandate and our government should recognize this. What power does Nova Scotia Environment have to effectively, ambitiously protect the environment? What power does our Health system have to protect collective community health? Economics, particularly neoliberal economics, prevails in government prioritization of policy-decisions, or decisions in general. Our society does not need to be like this - we can have, and need to have different. The good folks at NSE, many of whom, Im assuming, likely chose a career in environment out of passion for environmental protection and justice, must be frustrated with this work. Health and environment needs to be depoliticized - both have a unique and invaluable focus on collective justice within a system that is otherwise focused on radical individualism and money. This system is broken - just look at climate change. The case of Northern Pulp is one critical example of many within a study of our broken democratic system and its negative impact on human and environmental health outcomes. Community health and well-being and environment which are inextricably linked need to be prioritized over profits at every juncture, including this one. Please close Boat Harbour to effluent from Northern Pulp Mill on January 31, 2020. Thanks for your time and consideration, Name: @gmail.com Address:
Municipality: Waverley Postal-Code: Fax: ### ### - ####
email_message: Privacy-Statement: agree x: 67 y: 22

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Support Letters
Date: November 8, 2019 3:44:45 PM
Attachments: 20191108153055195.pdf
20191108153117755.pdf
20191108153224348.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Hon. Gordon Wilson

Please find attached several Northern Pulp support letters with respect to the Focus Report.

Thank you for your time

Name: ___

Address:_ New Glasgow, NS

E-mail:_ @isaac.nlarforest.com

Signature:_

RE: Northern Pulp Environmental Assessment Focus Report

Attention: Hon. Gordon Wilson, Minister of Environment

I am in support of the approval for new Effluent Treatment Facility (ETF) for Northern Pulp. My job, my family, and rural Nova Scotia depend on it. The existing Boat Harbour ETF should remain open until such a time that the new facility is constructed. This existing provincial facility currently meets or exceeds all Provincial and Federal guidelines outlined by the corresponding Environment Departments. This was shown in the Focus Report in the benchmarking section. Once the construction of a new ETF is completed then the subsequent clean up of Boat Harbour can commence. It is my understanding through media and government reports that the cleanup of Boat Harbour can't start until a Federal EA is completed (which is project to be 24+ months to complete). This will allow for the subsequent construction of a new world class ETF which will allow our provincial forest industry to continue to thrive in the future.

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Name: _____

Address: , COM

E-mail:__ _____

Signatur _____

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Name: ___

Address:_ CLOVERVALE NS

E-mail:_ @ HOTMAIL.COM

Signature:

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E-mail:____ _____

Signature: _____

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Address:___ _____

E-mail:_____ _____

Signature: _ _____

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Name: _____

Email Address _____ .com

address E-mail:_ _____

Signatur _____

RE: **Northern Pulp Environmental Assessment Focus Report**

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A significant amount of 3rd party, independent expertise was used to compile the data and contained and analyzed in the focus report submitted by Northern Pulp for the new ETF project. The assurances provided by these experts indicate no significant adverse residual environmental impacts have been predicted for this project construction or future operation. In addition the focus report data indicated no significant impacts on the marine species surrounding the proposed new ETF discharge area. The fishery and forest industry have existed for 50+ years in the existing outfall area at Boat Harbour. Contrary to public commentary by several groups and individuals regarding the potential impact of treated effluent from the mill on lobster fishing grounds, the data provided in the focus report shows the current lobster fishing grounds can be found in closer proximity to the outfall from the existing Boat Harbour Facility than the proposed new outfall. This begs the question on why those concerned with the NEW treatment facility and outfall seem to ignore the data that shows the strong, growing lobster fishery in the area is not being impacted for the previous 50+ years. Why would a new, improved system not be an improvement on the existing situation?

Since Paper Excellence purchased Northern Pulp in 2011 numerous improvements have been made to the facility to improve air particulate, effluent and odour. As shown in benchmarking section of the Focus Report Northern pulp is currently an average to above average mill when compared to other Kraft pulp mills currently operating in all other jurisdictions in Canada. The new proposed facility will only improve on these statistics.

Name: __

Address:__ Truro NS

E-mail:_

Signature:

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Name:

Address Southampton,

E-mail:

Signature:

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Name: ___

Address: Hilden N.S.

E-mail: eastlink.ca

Signature: ___

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Name: _____

Address: Elmsdale, N.S.

E-mail: _____ mail.com

Signature: ____

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Address:____ _____

E-mail:_____ n/. not _____

Signature: __ _____

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Name: ___

Address: Enfield

E-mail:_____

Signature: ___

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Name: _____

Address: Nine Mile River

E-mail: _____

Signature: _____

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Name: _____

Address: Stewiacke N.S.

E-mail: _____ gmail.com

Signature: _____

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Signature: _____

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Name: ____

Address: Milford Station

E-mail: _____ . com

Signature: ____

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Name: ____ _____

Address: Onslow N.S _____

E-mail: _____ ail.com _____

Signature: _ _____

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Address: Windsor NS,

E-mail: _____

Signature: _____

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Name: _____

Address: Upper Stewiacke, NS

E-mail: gmail.com

Signature _____

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Address: Yoster NS _____

E-mail: MAIL.COM _____

Signatu _____

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Address: Falmouth, N.S.

E-mail: _____ mail.com

Signature: _____

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Name: _____

Address: Bible Hill NS

E-mail: @hotmail.com

Signature: _____

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Name: ___

Address: New Ross, NS

E-mail: mpatico.ca

Signature: _____

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E-mail: lca.ca

Signature _____

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Name: _____

Address: NEW ROSS, NS, _____

E-mail: .com

Signature _____

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Name: _____

Address: New Ross N.S.

E-mail: ____msn.com

Signature _____

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Address: Waterville

E-mail: @t mail. com

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Name: _

Address: Chester Grant

E-mail: eastlink.ca

Signature: _____

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Address: Wolfville NS

E-mail: s1.com

Signature: _____

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Address NEW ROSS

E-mail: @OUTLOOK.COM

Signature _____

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Since Paper Excellence purchased Northern Pulp in 2011 numerous improvements have been made to the facility to improve air particulate, effluent and odour. As shown in benchmarking section of the Focus Report Northern Pulp is currently an average to above average mill when compared to other Kraft pulp mills currently operating in all other jurisdictions in Canada. The new proposed facility will only improve on these statistics.

Name: _____ _____

Address:_____ _____

E-mail:_____ _____

Signature: _____ _____

RE: Northern Pulp Environmental Assessment Focus Report

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Name: _____

Address: Eel River Flats, NS

E-mail: @hotmail.com

Signature: _____

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Name: _____

Address: East Chester _____

E-mail:__ _____

Signature _____

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Name: _____

Address: NEW KNOX

E-mail: @GMAIL.COM

Signatur _____

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Name:

Address: MOUNT UNIACKE

E-mail: 2tmail.com

Signatur

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From: @sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:46:56 PM

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Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Minister of environment As a fourth generation commercial fisherman from Toney River I sincerely hope that you Reject the idea from Northern Pulp to dump effluent into the Northumberland Strait! The environmental effects of pulp waste can be seen at boat harbour , donâ?Tt allow this Pulp mill to destroy our water an our tourism along with a fishery in a area where lobster, crab are fished also this area is also a spawning grounds for herring an many other species ! NO PIPE @sympatico.ca Address: Scotsburn , NS Municipality: Postal-Code: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 64 y: 25

From:
To: Environment Assessment Web Account
Subject: Focus Report for Replacement Effluent Treatment Facility (ETF) Project for Northern Pulp
Date: November 8, 2019 3:48:39 PM
Attachments: Northern Pulp Focus Report.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please find attached my comments regarding the **Focus Report for Replacement Effluent Treatment Facility (ETF) Project for Northern Pulp**.

Regards,

Pictou, NS

November 8, 2019

Nova Scotia Environment
Environmental Assessment Branch
P.O. Box 442
Halifax, NS
B3J 2P8

Re: Focus Report for Replacement Effluent Treatment Facility (ETF) Project for Northern Pulp

I am writing in response to the request for public input about Northern Pulp's Focus Report for the Replacement Effluent Treatment Facility Project. Based upon the information contained in the Focus Report, I remain strongly opposed to Nova Scotia Environment granting approval for this project. The Focus Report submission provided by Northern Pulp does not adequately address the potential environmental risks associated with the project and no substantive mitigation strategies are identified to limit the risks. In my opinion, it would be reckless for Nova Scotia Environment to approve this project at this time.

I continue to have numerous concerns associated with the unknowns around this project and the Focus Report does little to alleviate those concerns. Among the many concerns that remain include the potential disruption of mercury during ETF construction that is ignored in the Focus Report. However, I will constrain my detailed response to focus on just four specific areas of concern – oxygen delignification, the impact assessment on marine fish, the pipe, and air monitoring.

Oxygen Delignification

There is confusing/misleading information presented about the inclusion of oxygen delignification technology. Oxygen delignification is identified as a new technology at the mill in Addendum 1.0 but is stated to be not part of this project. However, the 'future Oxygen Delignification system was considered in the design of the ETF and will be managed as a separate project to be undertaken after the ETF project is completed' (Addendum 1.0, p.2). Does this mean that the effluent modelling was conducted on the assumption that an Oxygen Delignification system would be in place, even though it is clearly intended to come after the ETF is operational (if at all)? If this is the case, the effluent modelling is inaccurate as the O_2 delignification system will not be a reality when the proposed ETF begins.

Impact assessment on marine fish

- There are numerous concerns about the information presented in the impact assessment on marine fish that those with experience in the fishing industry ought to be consulted about. A very cursory review of the information presented suggests several issues though:
    - Toxicity testing has not been conducted. The response to the Focus Report identifies that it *will be* done, but a timeline is not provided. This seems quite a backward approach. The onus should be on Northern Pulp to establish there will be no harm to marine fish and the robust commercial fishery in the area ***before*** environmental approval is granted. It appears the expectation by Northern Pulp is that environmental approval will be granted and then testing will be done. Under this approach, if the project proves harmful to the fishery, it will be too late.
    - There are discrepancies reported about where the effluent will reach background conditions. At one point, the Focus Report states that CCME guidelines will be reached within 100 m of the diffuser, yet background conditions are claimed to be able to be met within 20 m elsewhere in the document, and the astonishing claim that effluent concentration will be within 1% within 2m of the discharge point on p. 200.
    - Not only are there concerns about the clarity of where the effluent will reach background conditions, these claims appear highly questionable given data from previoust Environment Canada Environmental Effects Monitoring (EEM) results that identified pulp mill effluent hundreds of kilometers from its source.
    - Reaching background conditions does not mean that the effluent will not have an effect on a vibrant commercial fishery and the Focus Report makes no real effort to address these effects. Meeting Pulp and Paper Effluent Regulations (PPER) has repeatedly demonstrated through six cycles of EEM that over sixty percent of fish experience sublethal toxic effects from pulp mill effluent. The potential health and economic impacts these effects may have on the fishing industry within the Northumberland Strait must not be ignored in the decision to approve this project.
    - Despite suggestions identified in Cycle 6 EEM about how to minimize the harmful effects from pulp mill effluent including incorporating oxygen delignification (https://www.ec.gc.ca/esee-eem/default.asp?lang=En&n=F8764910-1&wbdisable=false#_Toc374692276), it is unclear which of these strategies Northern Pulp aims to include. A proponent genuinely interested in minimizing the impact on the environment and its neighbours would take the advice generated from decades of research to minimize its impact.
    - No information about Northern Pulp's past EEM studies have been included. It would have been helpful to compare the known sublethal toxicity from Northern Pulp with the type of treatment utilized today with projected sublethal toxicity from other mills using the newly proposed type of treatment. Instead Northern Pulp chose to withhold information and suggest that sublethal toxicity tests would occur in the future. This is an unacceptable risk for our fishers along the Northumberland Strait.
    - As mentioned above, it appears that effluent modelling and the promise of reaching background conditions may have been conducted on the assumption an Oxygen Delignification system will be in place despite the Focus Group clearly identifying that system is not part of this project and no implementation schedule for the O_2

delignification project has been defined. This raises concerns about the accuracy of all of the effluent modelling information and its predicted effects presented in the document.

Air monitoring

The focus report acknowledges that several air likely contaminant exceedances (using Ontario regulations) have been identified from modelling studies. As a result, the focus report identifies several contaminants that *should* be monitored, but this is insufficient. The information provided about air monitoring is problematic because:

- There are questions about the sufficiency of data used to develop the model.
    - The model used data from only one comparable mill and there is no accounting for the known variability of sludge characteristics across mills.
    - The model employed data from biomass incineration at Northern Pulp, but that sludge was derived from a completely different style of effluent treatment and, therefore, is inappropriate to generalize that current sludge characteristics will remain.
- Despite identifying expected contaminant exceedances, there is no substantial additional abatement strategy identified to prevent the exceedances such as additional filtration within the power boiler stack. The filtration on the power boiler stack has repeatedly failed to keep Northern Pulp's emissions in compliance with Nova Scotia Environment regulations. Combustion of sludge will produce additional contaminants of concern and the report identifies expected exceedances, and yet no solution is offered to control the exceedances with the exception of maintaining equipment and limiting idling. This is unthinkable. How could environmental approval possibly be granted when the proponent acknowledges they predict to exceed contaminant parameters and do nothing proactive about it?
- There is no additional source testing proposed, nor is continuous monitoring of the power boiler stack included as part of the proposal. Given the number of unknowns associated with the sludge, more active and continuous monitoring ought to be part of the plan in order to better understand the contaminants and allow both Northern Pulp and NSE to respond to problems quickly.
- The only reporting to NSE that is suggested is monthly and annual reporting. This timeframe is far too long for timely intervention should problems be reported. By the time NSE receives the data, the public will have been exposed to potential air problems for some time. Given the true characterization of the sludge to be incinerated in unknown and that modelling suggests exceedances of several contaminants, a reporting plan that prevents an immediate response is irresponsible.
- There is no plan suggesting what would be changed should problems be identified. In particular, it was troubling to read that the only action plan appears to be to correct the data, "A final data screening of all measurement data will be performed at the end of the monitoring program to examine overall trends and to identify and correct any suspect data." (Appendix 6.2, p. 24). The focus report makes no mention about what could and would be done to limit emissions.
- Ambient air receptors were sited at nearby residential properties, but only one site within the Town of Pictou was used. The Town of Pictou is one of the more populous areas in the vicinity of the mill and ought to have had more than one receptor, especially in light of the findings that

VOCs often exceed criteria when wind direction carried mill emissions toward ambient air monitors (Hoffman et al 2017, https://www.ncbi.nlm.nih.gov/pubmed/28712086).

The pipe

- In my initial response to the Environmental Assessment application I indicated my concern with Northern Pulp's ability to properly monitor the pipe. In my March 8, 2019 submission I wrote, "Northern Pulp has exhibited a poor track record with their current pipe, experiencing a number of breaks and leaks in recent years. Northern Pulp's inability to effectively maintain the integrity of their equipment over time would suggest that the ability of the company to prevent environment damage from effluent pipe breaks in the future is **uncertain** at best, not in keeping with the precautionary principle, and, therefore, too risky a prospect." This concern was not alleviated by the information provided in the Focus Report.
- The information presented about how pipeline leaks will be prevented is too vague to trust and there are no assurances that the company will choose the best available technology.
    - Though the Focus Report identifies common types of leak detection systems, it does not provide information about which is the best option and does not specify which type will be used. Instead, it indicates the decision will come later during the detailed design phase (p.62), but the basis of the decision is not identified. (e.g. Will the decision be based upon the best available technology? The best choice for detecting minor leaks? Or the cheapest option?) Once again, this is an example of a backwards approach that assumes a decision can be made in the absence of evidence.
    - The only certainty offered in the information presented about leak detection is that there are some technologies that can detect some leaks. However, Northern Pulp does not commit to use any of those technologies. No plan is presented about what will happen in the event a leak is detected. No projections of potential harm are identified. No response times are predicted. No interventions are identified. No commitments are made.
    - Additionally concerning is that no automated leak detection system will be installed outside of the land-based portion of the pipe (p. 62). One has to wonder how underwater leaks will be monitored.
- It is further troubling that the Focus Report identifies an ideal scenario of pipe depth, but also admits that the ideal will not be achieved due to cost constraints, "Ideally, the tunnel would breakout as deep as is possible – as close to the required intake and discharge depths as possible – but within cost constraints." (Appendix 2.5, p.47)

In conclusion, I remain strongly opposed to Nova Scotia Environment granting approval for this project. The Focus Report submission provided by Northern Pulp does not adequately address the potential environmental risks associated with the project and no substantive mitigation strategies are identified to limit the risks. In the absence of important information about the true environmental effects of the proposed effluent treatment facility, this project should not be approved.

Sincerely,

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:51:48 PM

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Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I believe this project is extremely important not only to the economy of Nova Scotia but also the environment, the present way the effluent is treated is no longer efficient and the Facility needs the time to replace this in a responsible manner. Giving an extension to Paper Excellence Northern Pulp will not only help the environment it will keep vital jobs and spin off growth long into the future. Nova Scotia is quickly running out of Industry and sources to keep the tax paying citizens employed. #Yespipe Name: @gmail.com Address: Municipality: Tatamagouche Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 71 y: 26

From: @tncweb.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 3:53:44 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: We are in favour of the mill continuing to run in Pictou county. The jobs are so important to us. All the men and women involved in. Losing their jobs matter also Name: Email: @tncweb.ca Address: Three Brooks Pictou,NS Municipality: Pictou Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 64 y: 31

From:	
To:	Environment Assessment Web Account
Cc:	
Subject:	Oceans North's comments on the Focus Report for the Northern Pulp's Replacement Effluent Treatments Facility Project
Date:	November 8, 2019 3:57:33 PM
Attachments:	Oceans North submission Replacement Effluent Treatment.pdf

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Please see attached Oceans North's comments on the Focus Report for the Northern Pulp's Replacement Effluent Treatments Facility Project for environmental assessment, in accordance with Part IV of the Environment Act.

OCEANS NORTH | oceansnorth.org

1533 Barrington Street, Suite 200
Halifax, NS
B3J 1E6

Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, NS, B3J 2P8
Fax: (902) 424-6925
EA@novascotia.ca

November 8, 2019

On behalf of Oceans North, we are writing to submit comments on the Focus Report for the Northern Pulp's Replacement Effluent Treatments Facility Project for environmental assessment, in accordance with Part IV of the *Environment Act.*

Oceans North is a non-profit organization that fosters science and community-based conservation in the Arctic and Atlantic regions of Canada. We support sustainable fisheries, management measures that aim to rebuild fish populations and place-based measures to protect marine diversity and traditional access. Our goal is to promote policies and programs that address the unprecedented environmental changes taking place in the North and Atlantic regions and ensure that their waters are protected within the framework of sustainable management and indigenous knowledge, rights and consultation.

We urge the province to remain committed to the *Boat Harbour Act* and to the January 31, 2020 deadline as a first step in making up for years of environmental racism faced by Pictou Landing First Nations. With respect for the Focus Report regarding the Replacement Effluent Treatment Facility Project, we strongly conclude that this Minister should **reject** this undertaking due to its strong potential for environmental, economic and social damage.

The Focus Report does not meet the required Terms of Reference because it lacks sufficient information on many of the items required. The concordance table does not adequately address many of the public concerns it is supposed to, particularly with respect to "Total Suspended Solids" (TSS). The Mi'kmaq Ecological Knowledge Study also was not submitted as part of the Focus Report.

The Federal Pulp and Paper Effluent Regulations (PPER) is a very low bar for environmental regulation, shown to be inadequate and does not protect the marine environment over the long term to any great extent. Indeed, the PPER is currently being consulted on for modernization[1]. Some the main shortcomings of the existing regulations as described by Environment and Climate Change Canada include:

[1] https://www.canada.ca/content/dam/eccc/documents/pdf/PPER%20Modernization%20-%20Detailed%20Proposal.pdf

- "Environmental effects monitoring (EEM) studies required by the PPER have shown that the effluents from 70% of pulp and paper mills are impacting fish and/or fish habitat, and that the impacts at 55% of these mills pose a high risk to the environment."
- "What is achievable through process control and wastewater treatment has improved since 1992 when the PPER were put in place, and best technologies and techniques are well documented."

The Northumberland Strait is a very different marine environment than most marine discharge pulp mills in Canada that sit in fjords and as a result requires unique consideration which is not taken into account from the PPER or Northern Pulp's Replacement Project. We are most concerned with total suspended solids (TSS), the effluent of pulp mills made up mainly of short cellulose fibres too small for pulp / paper production. These fibres are extremely refractive in aquatic environments (especially in saltwater where effluent will go) and can take a very long time to degrade. In short, the TSS load from the planned discharge may spread and settle many kilometers away and build in size over years. The deposits can be several meters thick, and smother anything on the bottom in a black anoxic envelope. Northern Pulp is still planning to discharge thousands of kg of TSS per day. Releasing this volume of TSS will be a chronic issue with the potential for large geographic scale damage in Northumberland Strait. With the plan to discharge into open waters the problem faced in Boat Harbour is simply exported into a larger marine area where impacts will be more difficult to discern and track.

I. Overall Concern for the Marine Environment

The Northumberland straight is a unique and biodiverse marine ecosystem that provides livelihoods for thousands of Maritimers. But alarmingly this ecosystem is under compounding stressors due to climate change, weakening the ability of system to respond and adapt to new threats.[2] We are concerned about the pipeline construction and effluent impacts on a number of commercially important fish species, many of which are already depleted, including: American lobster, Atlantic herring (critical zone), rock crab, winter flounder, American Plaice (threatened), White Hake (endangered), Winter Skate (endangered), Atlantic bluefin, Atlantic mackerel (critical zone).

The Focus Report mentions that no studies were conducted on the impact of lobster larvae or herring eggs. The pipeline project threatens juvenile lobster in the Northumberland Straight and thus the health of lobster and the lucrative and important fishery in the region for both commercial and indigenous fisheries. The lobster fishery is valued at approximately $750 million dollars in Nova Scotia alone. Fishermen previously made sacrifices to their valuable scallop fishing areas by protecting important habitat zones from scallop dragging to protect juvenile lobster. The pipeline construction and effluent threaten not only to undue this sacrifice and good will but jeopardize the livelihood of thousands of fishermen.

An important herring spawning area in the Northumberland Straight is also jeopardized by the pipeline. Herring support important fisheries and processing facilities in Atlantic Canada and are used as bait for the lobster industry. Within the ecosystem, their role is paramount. As a forage fish, herring support energy transfer through the food chain, as food for larger organisms like whales and tuna and by eating smaller organisms like zooplankton. These herring are currently at critically low levels[3] and the threat that that is posed by the pipeline effluent could jeopardize this important fish from ever recovering. This threatens the fishery jobs as well as the ecosystem role that herring play.

2 https://report.ipcc.ch/srocc/pdf/SROCC_FinalDraft_FullReport.pdf
3 https://waves-vagues.dfo-mpo.gc.ca/Library/4071309x.pdf

We are also concerned about the project's impact on important eelgrass beds. The recent IPCC Special Report on the Ocean and Cryosphere in a Changing Climate[4] stressed the critical role that coastal habitats such as eelgrass can play in buffering against some of the impacts of climate change. The damage to the important function of eelgrass beds through direct removal and disturbance will only weaken the ecosystem's ability to respond to climate change.

II. Detailed comments on the Focus Report

OVERVIEW SECTION

The Focus Report reiterates that the new effluent treatment facility will be designed to meet the federal pulp and paper effluent regulations (PPER). This is a very low environmental bar as explained above.

page XXXVI – We note that the proposed effluent treatment facility will have a daily annual average flow of 62,000 m^3 / day; peak flow 85,000 m^3/ day.

page XXXVIII - "The receiving water study at the existing Boat Harbour dam discharge into the Northumberland Strait undertaken to assess environmental impacts has concluded that existing dilution factors are low and insufficient for effluent mixing with the ambient water. A diffused outfall outside of Caribou Harbour in the Northumberland Strait is considered to have much less potential effluent impact on the receiving environment and represents an improvement." - This is the entire crux of the problem where effluent mixing in the near shore is insufficient, and this becomes the excuse for dumping material offshore rather than considering the real impacts of dumping offshore.

CONCORDANCE TABLE (responses to original replacement ETF project proposal) - page 1 of Focus Report

There are a number of instances where the listed concern is not responded to correctly in the table (e.g. a concern about wastewater being responded to as an air quality issue).

It is very clear that air pollution problems faced by the public are long-standing, yet the industry response is 'we are meeting regulations'. It is time for a proper Federal Environmental Assessment on Northern Pulp that takes into account the fact that existing environmental regulations are not working, and local conditions need to be taken into account to correct those regulations and permits.

Page 27 of Appendix 1.1 cites the concern of DFO that the proposed effluent pipe will discharge directly into an existing Marine Refuge Scallop Buffer Zone, which "forms part of DFO's Other Effective Area Based Conservation Measures that contribute toward Canada's 2020 Marine Conservation Targets". Also "If a new activity such as the effluent discharge is permitted in or around this area and later deemed incompatible with the stated conservation objectives, loss of Marine Refuge status may occur, in whole or in part." and finally "It should be noted that, it is probable that the marine portion of the effluent pipe construction will travel through, and discharge inside the Marine Refuge." The response comment to this concern was simply to see section 7.3 of the focus report. ** That section of the report mentions the scallop buffer zone but actually says nothing about its importance as a conservation measure or how the planned discharge may cause loss of marine refuge status. Northern Pulp is essentially saying, we are planning to discharge into a conservation area and are not going to do anything about it.

Many of the comments regarding impacts on marine fish and fish habitat were not answered directly in the focus report, but rather set aside to be answered by a future environmental effects monitoring

4 https://www.ipcc.ch/srocc/home/

program. In other words, the new waste treatment facility will be up and running before serious concerns regarding impacts can be answered – and the only source of answers will be a future EEM program which may or may not be up to the task. This line of reasoning will only be effective if EEM results can be used to alter permit conditions for the mill, including complete revamping of the effluent treatment system if necessary.

Appendix 1.1 page 22 (of 125, the appendix page numbering restarts, oddly unnecessary) - an individual concern about the amount of solids per day that will enter the Marine environment with the new system of effluent treatment. The response comment to this concern was to refer to section 4.3 of the focus report.

Other concerns regarding the total suspended solids issue are also listed. The response comment is almost always to refer to section 4.3.

Appendix 1.1 page 36 (of 125) - The Ecology Action Centre also mentioned the solids issue "Total Suspended Solids (TSS) largely consists of cellulose fibers. Although the document states that 85 to 95% of the lignin, cellulose, sodium sulphide and sodium hydroxide will be removed from the sludge via biological activity in treatment, there is no information provided about the 5-15% which survives treatment - the cellulose. Cellulose fibers are refractory, meaning that they don't degrade quickly or decompose well in water, especially seawater. The registration document provides, in section 5.2.2.9 on Effluent Quality, that the effluent annual average flow will have an anticipated TSS concentration of 48 mg/l of effluent which equates to a total 3053 kg of TSS per day, i.e., a full dump truck load each day in equivalent tonnage. These fibers have the potential to settle into a deep hole or depression, smothering the bottom and causing anoxia in the underlying sediment." The focus report response comment is to refer to section 4.3.

NOTE: When you actually read section 4.3 of the Focus Report, the above concerns on TSS are not addressed, and the section actually concludes with a false and very misleading statement (see below).

Ice scour and subsequent limited chances for the proposed pipeline's survival are mentioned numerous times in the Appendix 1.1 listing. The response comment was usually to refer to section 2.2 of this focus report.

PROJECT DESCRIPTION

2.2 Marine geotechnical survey - page 18 (And appendix 2.2)

"Conduct geotechnical surveys and provide the survey results to confirm viability of the marine portion of the pipeline route. The surveys must determine the potential impacts of ice scour on the pipeline."

The planned trench depth is up to 3 m (Page 21). However, the report notes here that the bedrock depth is not known and could be quite shallow.

Estimated ice scour depth in the sediments is a key issue in this portion of the focus report. Numerous ice scours were observed by surveys and they occurred to depths of 9 m. The ice scours were observed to penetrate into the sediment 0.3 to 0.4 m at most. (page 23). This is presented as justification for a trench depth of 3 m.

Appendix 2.2 has numerous figures indicating survey track lines for surveying underwater sediments and evidence of ice scours. It should be noted that the proposed pipeline route near the Pictou causeway

was not surveyed for approximately 200 m beyond the Northern Pulp property. This is a shallow water area right near shore which could be impacted strongly by ice scours. The proposed pipeline route next to the causeway is quite shallow overall, only about 2 m deep or less (Figure 5.1.1 in appendix 2.2).

About half of the proposed pipeline route in the Caribou Harbour channel is also quite shallow (figure 5.1.4 in appendix 2.2).

2.3 Characterization of effluent – page 23 (and appendix 2.3)

"Submit data regarding the complete physical and chemical characterization of NPNS' raw wastewater...."

Page 25 of the Focus Report reminds us that most of the suspended solids in the effluent is 'mainly fibres and lime'. We are also told that the federal pulp and paper effluent regulations only protect against acute toxicity (Page 26). Once again, this is a very low bar of environmental protection.

Table 2.3 -3 in the Focus Report shows total suspended solids concentration in treated effluent is presently 29 mg/l. The proposed new biological treatment system will not control total suspended solids to any great degree, the same table indicating the concentration will remain above 20 mg/L. This simply highlights the fact that cellulose fibres are quite refractory and effluent treatment is not likely to remove them unless very specialized methods are employed such as centrifugal hydrocyclones. Suspiciously, the numbers regarding total suspended solids presented in the Focus Report are much lower than the value that was submitted in the original Northern Pulp EA paper, which was expected to be 48 mg/L with the proposed new effluent treatment system. How did this happen?

Appendix 2.3 page 6 - "Numerous studies have firmly established that concentrations of PCDDs, PDCFs and polychlorophenols in effluents from ECF bleaching are close to or below the level of detection ..." this is a completely spurious argument frequently used by industry when talking about harmful toxins in their effluent. A toxic compound 'below the level of detection' is still toxic. A laboratory using inexpensive methods to detect toxins will not find them, the results will be below the level of detection. If that same laboratory uses more expensive (more refined) methods of detection, the detection limit will be lowered and the toxic compound will be more likely to be found even at very low concentrations. The detection limit employed must be linked back to the concentration of the toxic substance which causes harm. There is no point in having a laboratory detection limit in milligrams per litre if the substance is toxic in micrograms per litre.

We are left to hunt through individual lab report sheets at the end of the appendix to get some idea of what is going on. One sheet (Dioxins and Furans by HRMS) lists a reportable detection limit of 9.48 pg/l for most dioxins and furans; and most samples turned out ND. An IJC water quality objective for one of the dioxins is 10 parts per quadrillion, or 10 per 10^{15}. 9.48 pg/l = 0.00948 pg/g = 9.48 per 10^{15}. In other words, the detection limit chosen by the laboratory analyzing the pulp mill effluent is actually very close to a guideline above which harm is possible.

Appendix 2.3 page 9, table 1 - 2, total suspended solids is again provided as 29 mg/L at the present outflow while we see that at the Caribou Harbour overflow it is only 2.5. This reinforces the hypothesis the Caribou Harbour is presently holding back many thousands of tons of total suspended solids in the form of cellulose fibers. The harbour is presently acting as a huge settling basin, and there will be no such ability to settle out solids in a controlled manner once the new proposed effluent pipe discharge is active.

The same table illustrates the detection limit issue mentioned above. Total phosphorus concentrations are provided in mg/l and we see the effluent presently is around 1.5 mg/l at discharge, while in Caribou Harbour the value is listed as ND. Even a very eutrophic lake will have a typical TP concentration of about 0.1 mg/l or less, only going to around 0.5 during peak bloom conditions. The TP values presented in Table 1-2 are extraordinarily high, so what was the detection limit they used for the Caribou Harbour samples? Once again, digging deep into the laboratory analysis sheets we find reported detection limits of 0.02, 0.1 to 1.0 mg/l for total phosphorus. The latter two detection limits are not useful from an environmental impact perspective in Canadian freshwaters, so why were they used?

Similar detection limit issues can be found in almost every single table in this appendix. One last example - Table 1-3 lists metal concentrations. A value of 0.022 ug/l is provided for Total Mercury at discharge point C. That value is very close to the CCME guideline of 0.026 ug/l for freshwater. Yet all other values for total mercury at other sample collection points are listed as ND. What detection limit was used by the laboratory? Hunting deep in the report pages, we find an RDL of 0.013 ug/l for the mercury analysis - only half the value of the actual guideline. From an impact assessment perspective this is unacceptable, we need values that are lower than this RDL.

2.4 Treated effluent characterization – page 32 (and appendix 2.4)

"Submit a complete physical and chemical characterization of NPNS's expected effluent following treatment by the proposed technology..."

Page 34 of Focus Report, Chemical Oxygen Demand discussion. "Many organic compounds, including colour compounds and fibres, which are not easily biodegradable, along with any inorganic chemicals will show up as pCOD." (bolded emphasis mine). pCOD = particulate chemical oxygen demand. Also: "Total COD is the typical industry measurement in Canada, referred to as tCOD in the lab report, which is a combination of the biodegradable sCOD fraction and the not easily biodegradable pCOD. The focus of the laboratory trial was the removal of sCOD at different flow rates and loadings." Here we finally have an admission that the fibres in the effluent are not readily biodegradable, they are refractory. Moreover, the proposed effluent treatment system will not even attempt to work on these fibres and reduce their load in the effluent.

Page 39, Table 2.4-3. Note t hat TSS loadings are still expected to be thousands of kg per day. The bulk of this material will be cellulose fibres which do not degrade readily, they will simply accumulate on the marine bottom and smother sediments. (The associated appendix to this section of the Focus Report has nothing else to add).

2.5 Changes to pipeline – page 39 (and appendix 2.5)

"Provide any proposed changes to the pipeline construction methodology and other associated pipeline construction work, related to the potential changes to the marine portion of the pipeline route...."

This section does not provide much in the way of any analysis that would be particularly helpful. Appendix 2.5 does mention pipeline armour - again this just assumes that ice scours will not become any deeper as time goes by.

FACILITY DESIGN, CONSTRUCTION AND OPERATION AND MAINTENANCE

3.1 Treatment Technology Specifications - page 44 (And appendix 3.1)

“Submit treatment technology specifications (e.g., optimal performance range of the technology) and an assessment of the efficacy of the proposed treatment technology...”

We see on page 44 that the Pulp and Paper Effluent Regulations allow over 10,000 kg per day of total suspended solids which is outrageous. We are shown a calculated value of 1875 kg per day of total suspended solids discharged with the proposed effluent treatment system - and since this is far lower than the PPER allows, “the new ETF will be able to provide adequate treatment”. Once again, since the PPER is completely inadequate to the task of protecting the marine environment over the long term - the pulp mill gets away with it discharge plans. Appendix 3.1 does not add to this argument.

3.3 Effluent discharge parameters - page 50 (And appendix 3.3 - which is blank)

“Effluent discharge parameters must be updated (where necessary) based upon the results of the effluent characterization...”

The estimated total nitrogen loading of around 400 to 500 kg per day is very high. This could represent a significant nearshore marine eutrophication risk.

“TSS at 48 mg/L at the design flow of 85,000 m^3/day equates to 4,080 kg/day, while the Veolia guarantee for TSS is ≤ 1,875 kg/day and the 2018 BHETF annual average discharge was 1,717 kg/day.” - once again, discharging thousands of kilograms per day of total suspended solids comprised mostly of refractory cellulose fibres is not a good idea.

3.4 Spill Basin - page 56 (And appendix 3.4)

“A spill basin is not a regulatory requirement...” but “ NPNS has made the decision to include one because it is considered a best practice in the design of an ETF.”

The appendix describes plans for a standard earthen basin with a plastic liner. This type of spill basin is at the low end of reliability.

3.5 Effluent pipeline leak detection - page 60 (And appendix 3.5, which is blank)

“Provide viable options including the selected option for leak detection technologies and inspection methodologies...”

Page 62 in this section notes “...selected systems have demonstrated success in detecting leaks as small as 60 L/hr.” This means that chronic small leaks in the pipeline, especially in the near shore, could go on for months without being detected. This could lead to localized impacts which would not be detected by routine monitoring programs.

MARINE WATER AND MARINE SEDIMENT

4.1 baseline marine studies- page 69 (And appendix 4.1)

“Conduct baseline studies for the marine environment (such as marine water quality and marine sediment) in the vicinity of proposed marine outfall location.”

Page 72 - now suddenly the contracted laboratories are able to detect lower concentrations of total Dioxins and Furans (see discussion above) and we see a background water quality of 3.213 picograms

per litre in Table 4.1-2. It would have been nice to have that low detection limit when discussing the actual mill operations and effluent.

Page 78-the Northumberland Strait samples indicate sediment with a high proportion of sand. Depending on the grain size composition of the sand the sediments might be quite mobile. There is imagery in other sections of the report and in the appendices indicating this potential movement of sand. This may or may not cause problems for the pipeline.

The baseline marine studies recorded here appear to be only about water quality and sediment. There's nothing on organisms.

Appendix 4.1 has a long listing of chemical analysis of sediment and soil samples in the area. There's quite a bit of evidence here to indicate existing contamination of sediment and soils from past industrial practice. These results may be helpful for suggesting future contamination of marine sediments if the proposed outfall is put in place.

4.2 receiving water study- page 82 (And appendix 4.2)

“Update the receiving water study to model for all potential contaminants of concern in the receiving environment....”

Fig. 4.2-1 shows a series of deeper (>20m) ‘holes’ near the proposed outfall location which may become depositional sites for TSS.

Fig. 4.2-3 - note how the modelled particles seem to accumulate in the same general area as the deep holes. This figure should have had an overlay of depth contours to aid in interpretation. The same comment applies to figure 4.2-4.

Figure 4.2-6 - dilution factor rather than particle concentration this time but note how heterogenous the results are. This simply highlights the fact that particles will settle out in clumped distributions in the marine environment. Impacts from the proposed outfall will be localized. However, it is the extent and number of these localized impacted areas that will lead to chronic harm to the marine environment.

4.3 sediment transport modelling - page 97 (And appendix 4.3)

“Provide results of sediment transport modelling work to understand the impacts of potential accumulation of sediment within near-field and far-field model areas...”

Page 100 - “a significant percentage of the particles are very fine colloidal-type material, with greater than 90% of the particles smaller than 75 µm (0.003 inches) in diameter (for comparison, human hair is between 50-70 µm). Both their low density and their small size prevented these particles from settling out in the secondary clarifiers after more than 11 hours in that calm environment.”

The above quote refers to the fact that the total suspended solids released by the planned diffuser will be primarily composed a very fine plant fibres. The secondary clarifiers cannot handle this material, which is why I'm suggesting that they use centrifugal hydrocyclones. The mill must do more to prevent these fine plant fibres from being released.

Page 102 - “As indicated above, effluent particles are not readily settleable and are likely to travel significant distances far from the diffuser.” - yes, and this is exactly the problem! And just after the

above quote we find: “Total suspended solid particles are largely organic and biodegradable. They are a food source for other marine organisms and as such are not expected to build up and deposit in areas away from the diffuser.” **this is a patently false and misleading statement** - the report itself has stated that the particles mentioned here will be refractory material that does not readily degrade!

FISH AND FISH HABITAT

7.2 Fish habitat baseline survey - page 119 (And appendix 7.2)

“Conduct fish habitat baseline surveys for the marine environment, to the satisfaction of Fisheries and Oceans Canada.”

The video methods employed here were reasonable. The video quality was reasonable but not particularly good. However, video methods alone do a very poor job of capturing the full diversity of our nearshore benthos. SCUBA and grab sample methods should have been employed as well.

Unfortunately, the taxonomic analysis performed here resemble something that a poorly trained undergraduate student would put together. Taxonomic authorities should've been present for each ID. I particularly question the algal identifications, as there are numerous filamentous forms which add to diversity but are almost impossible to ID via video. *Laminaria longicuris* is no longer a valid taxon - the entity is now called *Saccharina latissima*. *Fucus spiralis* is mentioned several times, this is an unlikely ID unless the vessel went into very shallow water at a peak high tide.

Overall, the results of this fish habitat baseline survey are completely inadequate for actually describing the true taxonomic diversity of the area. The report just lists a handful of species that are readily seen by an untrained observer. A more thorough analysis (especially grab samples in sediment, and trap nets for fish) could have provided far more detail. There may be far more diversity in these areas than suggested by this very limed overview survey.

7.3 impact assessment for marine fish - page 122 (And appendix 7.3)

“Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information....”

Page 123- “Based on testing, modelling and the incorporation of mitigation activities, no significant residual impacts to marine water quality are expected to arise on any fisheries or fish habitat as a result of this project.”

This statement far overextends the truth from the evidence presented. Northern Pulp is just meeting the PPER, that’s it. There are going to be plenty of ‘residual impacts’ against that preposterously low bar of environmental protection.

Quote immediately following the one listed above “To confirm these predictions, NPNS will continue with a federally-regulated Environmental Effects Monitoring (EEM) program and additional EA Follow-up monitoring.”

This procedure is very concerning. Any potential impacts are only going to be discerned by a preplanned monitoring program. EEM is a fairly rigorous regulatory process between the mill and the Federal government. EEM may or may not allow the inclusion of third-party observations of harm outside of the

planned EEM a monitoring area or program. Furthermore, those third-party observations may or may not lead to changes in Mill operations. We need some assurance that third-party observations can influence how this Mill produces paper and what its effluent standards become.

Page 123 - “Marine Regional Assessment Area (RAA) – The area inclusive of Pictou Harbour, Caribou Harbour, and the south-eastern portion of the Northumberland Strait adjacent to the Marine Local Assessment Area.” This proposed large scale assessment area is very poorly defined by this statement. We need a much tighter definition which includes an area at least within 20 km of the plant outflow. Any observations of harm by any third-party must be addressed if they occur within the planned RAA.

Appendix 7.3, section 3.6.3- the entire indigenous fisheries section here is blank, this is very worrying.

7.4 updated environmental effects monitoring program - page 148 (And appendix 7.4)

“Submit an updated Environmental Effects Monitoring (EEM) program..”

The EEM process is a regulatory one. The Focus Report emphasizes this by including the PPER EEM regulations as appendix 7.4.

- effects on benthic invertebrate community or fish population is only measured against ‘exposure area’ and ‘reference area’ - the difference being exposed to effluent or not. We are not given any guidance on exposure other than 1% concentrations of effluent. Any measurements of distance are given in a few hundred meters - nothing about having impacts km away.
- most effects measurements are quite coarse, tissue residue, tumours, etc.

So from the beginning EEM is not designed to detect subtle effects, especially at long distances. It's mainly about detecting harm close to the pipe.

The Focus Report in this section of course highlights the regulatory obligation. Page 150 - “If the mill demonstrates that the effluent concentration is <1% at a distance of 250 m, then the EEM does not require a fish community study component. Likewise, if the mill demonstrates that the effluent concentration is <1% at 100 m from the discharge, then a benthic invertebrate community study is not required. At present, the three-dimensional (3D) modelling of the area in the local study area as part of the updated RWS indicates that dilution to less <1% effluent will occur at approximately 20 m from the discharge location (Stantec, 2019).”

“The predictions in the most recent RWS indicate there will be no requirement for NPNS to conduct either a fish community or benthic community study near the discharge.” Once again, the PPER and its associated EEM regulations are completely inadequate to detect the major issue of cellulose fibres being released into the marine environment.

Interestingly - “Although not regulated as part of the PPER, some the fish and benthic component studies are still warranted as part of the EA Follow-up and monitoring program that is described original EARD (EcoMetrix, 2018b) and it is intended that they will be completed by a third party consultant for the current project.” We are not certain whether the public will have any input into those studies.

HUMAN HEALTH

9.1 baseline study marine survey - page 165 (And appendix 9.1)

“Complete baseline studies for fish and shellfish tissue (via chemical analysis) of representative key marine species important for commercial, recreational and Aboriginal fisheries in the vicinity of the proposed effluent pipeline and diffuser location.”

Interesting tissue residue analysis which may or may not become important in the future. Toxic effects from the mill will have to be extreme to detect a change here which is concerning.

9.2 human health risk assessment - page 166 (And appendix 9.2)

“Commence a Human Health Risk Assessment (HHRA) to assess potential project-related impacts on human health...”

The entire section and associated appendix screens potential toxins against a series of risk assessments and then just mentions regulations and guidelines that may or may not be present.

INDIGENOUS PEOPLE’S USE OF LAND AND RESOURCES

11.1 Mi’kmaq Ecological Knowledge Study - page 188 (And appendix 11.1)

The study is not included as part of the Report. The description that is provided does not adequately explain how the concerns raised through the study would be addressed.

III. Compliance with Bill C-68

On June 21, 2019, Bill C-68[5] the modernized Fisheries Act, reached royal assent and became law in Canada. There are several provisions of this law which need to be considered by Fisheries and Oceans Canada (DFO) with the Replacement Effluent Treatment project that are not currently addressed.

1. The definition fish habitat:

   > “fish habitat means water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas”
   >
   > The above definition allows DFO to follow a broad ecosystem approach when dealing with industrial impacts on fish habitat. DFO has a mandate under Bill C-68 to investigate and assess industrial impacts on fish habitat in an unconstrained manner based upon science.

2. The purposes of the Fisheries Act in Bill C-68 now include “the conservation and protection of fish and fish habitat, including by preventing pollution.” This is a clear statement that DFO has a role in the Northern Pulp issue and industrial impacts on fish habitat in general.
3. “When making a decision under this Act, the Minister may consider, among other things” (a selected list is provided here):
   a. the application of a precautionary approach and an ecosystem approach;
   b. scientific information;

5 https://www.parl.ca/DocumentViewer/en/42-1/bill/C-68/royal-assent

c. Indigenous knowledge of the Indigenous peoples of Canada that has been provided to the Minister;

d. community knowledge

4. "The Minister may establish standards and codes of practice for":

    a. the avoidance of death to fish and harmful alteration, disruption or destruction of fish habitat;

    b. the conservation and protection of fish or fish habitat; and

    c. the prevention of pollution.

5. Bill C-68 adds Ecologically Significant Areas to the Fisheries Act regulatory toolbox.

DFO needs to carefully assess the potential impacts of the project on the scallop buffer zone as an ecological significant area as it currently protects juvenile lobster.

6. The Act refers to the deposit of a "deleterious substance" in water frequented by fish. This will need to be examined in the context of the TSS that Northern Pulp will be releasing. A high proportion of that discharge will be refractory cellulose fibers – and no-one knows where that material will end up in the Strait. We do know that cellulose fibers degrade slowly in marine waters, and they can accumulate on the bottom and adversely affect sediment biota. The term 'deleterious substance' is applicable.

IV. Conclusion

We conclude that this project poses unprecedented risk to the marine environment and surrounding communities and that the Minister should reject the undertaking.

Sincerely**,**

Oceans North

Oceans North

From:
To: Environment Assessment Web Account
Cc: pictouwestmla; Sean.Fraser@parl.gc.ca;
Subject: Northern Pulp"s Focus Report for a Proposed Replacement Effluent Treatment Facility
Date: November 8, 2019 3:58:44 PM
Attachments: Central Caribou Cemetary Concern.odt
FOCUSREPORTATTACHMENT.odt
MyFinalDraft.odt

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Honourable Minister Wilson
Thank you for the opportunity to give feedback about this important matter.
I'm requesting the Northern Pulp Project be rejected because of the significant adverse and environmental effects. The Focus Report is incomplete and leaves important questions unanswered. A key concern for me is that the effluent quality isn't improved from today and there would be more stack air emissions from the sludge treatment. In what I'm learning about environmental impacts, the mill plan keeps us further behind at a time when there is technology that could make a significant difference.We do not have years to come from behind.
Respectfully submitted,

To: Honourable Minister Wilson,
From:
Date: 2019-11-08
Re: Northern Pulp EA Focus Report

Your department has new environmental protection and sustainability laws to address the urgent need for a cleaner environment. I was disappointed to read the content of the Northern Pulp Focus Report. It is incomplete as to the assigned tasks. It doesn't address my March 2019 EA submission concerns which are still valid. The process can be a barrier to any public who have reading and writing challenges and the short window a barrier for some to submit valuable feedback. I request rejection of this project because there is a likelihood that the undertaking will cause significant adverse and environmental effects which are unacceptable.

A recently retired I am privileged to live on beautiful Caribou Island the last 22 years experiencing Nature up close and personal. Recently, I observed for an hour the absence of birds at Boat Harbour Point D and later at a vantage point in Caribou Harbour, the unscientific but sobering sight and sound of fall migratory flocks layered over the usual resident birds. I support the Boat Harbour Act closure date.

Northern Pulp claims to be typical of 88 mills in Canada and then claims to be state of the art without improving the characteristics of its effluent. The looseness of its words creates conflict, distress, and distrust. Northern Pulp is not "typical". How many mills are sending effluent into lobster, and scallop grounds? What alternate oyster farm sites are available in Pictou County if Caribou Harbour's oyster farm potential is lost to effluent changing the background water of today? How many mills are building settling ponds adjacent to a known mercury contamination site without addressing how that construction will impact the contaminated site or future access to remediation? Isn't that significant to an environmental assessment and providing full disclosure to the Dept. Of Environment? Is it typical in modernizing to add to stack emissions adding health concerns to populations downwind? If truly a "state of the art wastewater management facility", a delignification unit would have been included in the project as was first indicated in November 2015 in the Pictou option creating:.Reduced chlorine dioxide bleaching chemicals by 30 – 40%, with a corresponding reduction in effluent organic loading and chlorinated compounds; Reduced effluent color; Reduced wood losses; Increased recovery of lignin to the liquor cycle, with a resulting reduction in the mill's carbon footprint; Reduced energy consumption by reducing aeration requirements in the new ETF, with a resulting reduction in the mill's carbon footprint; and Reduced nutrient addition in the new ETF." Even with that system design in place, the numbers may not have been enough for the project to address the

concerns of other entities. Any reference to the delig. system can not be used by the Minister in decision making because there is no firm commitment to a timeline other than a weak if / then connection. It is up to Northern Pulp / Paper Excellence to fund this, not the taxpayer.
If a higher quality pipe was available on the market since 2005, why was it not selected until the focus report was required (NP: “chosen for its reliability”)? The reader may not notice that improved monitoring of the pipeline refers only to the land-based pipeline, **not** the marine based. How will Northern Pulp be alerted and remedy an ice strike, a malfunction, an end cap displacement, materials failure, a leak etc. What lies beneath the water will remain a mystery if not monitored. Dilution is not an effluent treatment. Neither was it right 50 years ago. The estimated effluent in receiving water is not Caribou’s water characteristics. **TCU** (Total Colour Units) at Boat Harbour Point A is reported as 750 and Caribou Harbour is 4! Northern Pulp on colour: ” aesthetic parameter, and generally not regulated or guaranteed. ... In the future, with the proposed AST process and expected reductions in COD, treated effluent will have less colour than today at Point A.” The Minister must recognize that colour is of high significance to other entities such as tourism, real estate, and local enjoyment.
After issues with a Pictou Landing First Nations Cemetary, I expected to see specific mention of the **Central Caribou Cemetary** off TCH 106 and the Central Caribou Road overpass. The Focus Report map shows a connection. Perhaps it has been surveyed and not an issue. To confirm that without being asked would be transparent and trust-building for special places.
I previously easily identified double the shipwrecks referenced by Northern Pulp in their EA submission. In the Focus Report, the investigators were not able to do testing in the area of Gull Spit being transected by the pipeline. There is no indication what testing will be done in advance of laying the pipeline as it is located in the vicinity of the lighthouse and area lore notes shipwrecks and the bounty of French warships from Louisbourg. There is a potential for articles of archeological interest. It is not difficult to picture ships going aground and the folks in the day deciding a lighthouse would be preventive. The Culture letter indicated agreement as to what was presented but the area around **Gull Spit wasn’t presented and therefore couldn’t be approved.** Incomplete task.
Across the harbour from Gull Spit is Munroes Island Caribou Provincial Park. Munroe’s Island was acquired by the **Nature Conservancy** using locally raised dollars. In 1992, it was divested to the provincial government for protection and annexation to what was then Caribou Provincial Park.
It has interest for M’ikmaq history and culture, archaeological interest. Also known as Little Carriboo Island, Doctor Island and Tedookesit (Place of the Running to the Bushes). Margaret MacMaster wrote in The Stories of Caribou about the peaceful M’ikmaq escaping a Mohawk raid in 1760. Believing they could swim the 200 yard wide deep channel at night, the Mohawk were swept

out to sea on an ebb tide and bodies returned on the next tide in the morning. A M'ikmaq celebration followed for being spared. Ms. MacMaster makes reference to accounts of a burying ground there. There is to be no development on the island and it was "rescued" from the prospect of commercial development to protect the flora, fauna, wildlife, birds and accessible for people to enjoy the natural setting – hiking, kayaking, swimming. It is unclear from the Focus Report what impact the discharged effluent will have, given drift of **Total Suspended Solids of over 4000 kg./day**. Estimates of TSS settling ranges from 1 – 4.8 km from the diffusers – Caribou Harbour, Munroes Island and fishing grounds are within that range. Northern Pulp's lack of concern for effluent colour and the chemistry of the effluent discharged at the outfall and influenced by tides, currents, winds and generally the coastal flow is Southeast not Northwest. There is no appeal for frequenting a polluted beach to which Pictou Landing First Nations can confirm about their special Lighthouse Beach. In addition, there is no early warning indicator for pipeline failure. The Provincial Park can not be relocated and is an important resource to Pictou County. Historic Pictou Lodge is a short walk down the beach from the park – a unique pairing.

How would the department reconcile allowing an unmonitored pipeline to be laid alongside a sedimenting navigation channel and where greener practices are undertaken? Northumberland Ferries have already joined Green Marine. To demonstrate local awareness of impacted neighbours, I was surprised that this was not mentioned in the Focus Report, nor was the approval of the replacement (greener) ferry for the Holiday Island ferry. The Focus Report indicates that the channel will be transected by the pipeline at one point. The pipeline will be weighted by concrete but Northern Pulp fails to confirm that the concrete is of a marine type that doesn't change chemically. I assume it is but it was not confirmed – a communication deficit that doesn't add credibility. There may be bedrock encountered in laying the pipeline but there is no mention of protecting Caribou Island aquafers. It would be a concern of residents. We are on drilled wells so attention to aquafers on our low lying island needs to be considered. The greater amount of seabed material to be removed to trench the pipe at the depth and width required will have an impact on sediment. The Focus Report is to describe management of the excavated materials and what measures will be taken to manage the silting given the marine life concerns ie lobster, scallops, crab, oysters. The navigation channel is regularly dredged to a cost of over $1 million. There is no indication in the report that Northern Pulp / Paper Excellence is willing to post a bond to cover the cost of a premature dredging of the channel and the associated federal assessment ahead of schedule? Northern Pulp has not addressed the TSS impact to the navigation channel and potential for shorter intervals between dredgings moving forward.

In the documentary "**Climate Change and the Human Prospect**" created from an Environmental Thinkers Conference in Pugwash , NS the summer of 2018,

there is optimism about how communities can find pathways to improving Carbon Drawdown. Northern Pulp has written that if the mill had been built today, things would have been different. It is largely forgotten that the Middle River is extracted for the mill process but is **not** restored after use on site but flushed in its altered state off site. If an in-ground swimming pool can significantly divert groundwater, what is the impact on the mercury contamination site when the treatment facility is built diverting large amounts of groundwater and what steps is Northern Pulp / Paper Excellence doing to mitigate any present or future risks such as accelerating the spread / rate of contamination? The proposed treatment facility does **not** improve the effluent **nor** air emissions characteristics. Polluting effluent is not something to be grandfathered. In fact, by the Focus Report, these are worse.

This plan is out of step with today's understanding of the environment and how we must interconnect. 20 years ago a mussel farm application for Caribou Harbour was declined because there was insufficient flushing of Caribou Harbour to clear the by-products / debris of the mussels. Over 4000 Kg / day effluent TSS at the harbour entry that the studies indicate a prediction of between 1-4.8 km settling away from the diffusers includes our 10 km. Caribou Harbour and the Munroes Island Caribou Provincial Park, spawning and nursey grounds. As I expressed in my previous submission, Northern Pulp hasn't provided assurance that there is sufficient flushing of Caribou Harbour to repel the TSS. Will settling occur at the Provincial Park or further drift Southeast to Pictou Harbour? Running out of time for a plan that is environmentally responsible and doesn't negatively impact other entities is no reason to accept this plan with it's many deficits. The plan lacks an overall wholistic perspective. Northern Pulp's seeming resistance to considering the abundance of offered local knowledge is folly for us all. I don't believe Appendix 1.2 Engagement Plan is sustainable for Northern Pulp without adding resources. Federal election environment platform and debates, youth activism for drawing immediate attention to Climate Change, 11,000 scientists just this week 2019-11-06 declaring a climate emergency. The project doesn't advance this cause.

I apologize in advance for any errors. I've done my best to be factual and to interpret from the context of living on Caribou Island. I'm attaching some references.

Finally, I reiterate that the Minister must reject the Northern Pulp EA Plan and Focus Report because the Project has significant adverse and environmental effects that can't be mitigated.

Thank you for the opportunity to comment from the public sector.

Central Caribou Cemetary



Photo October 2019



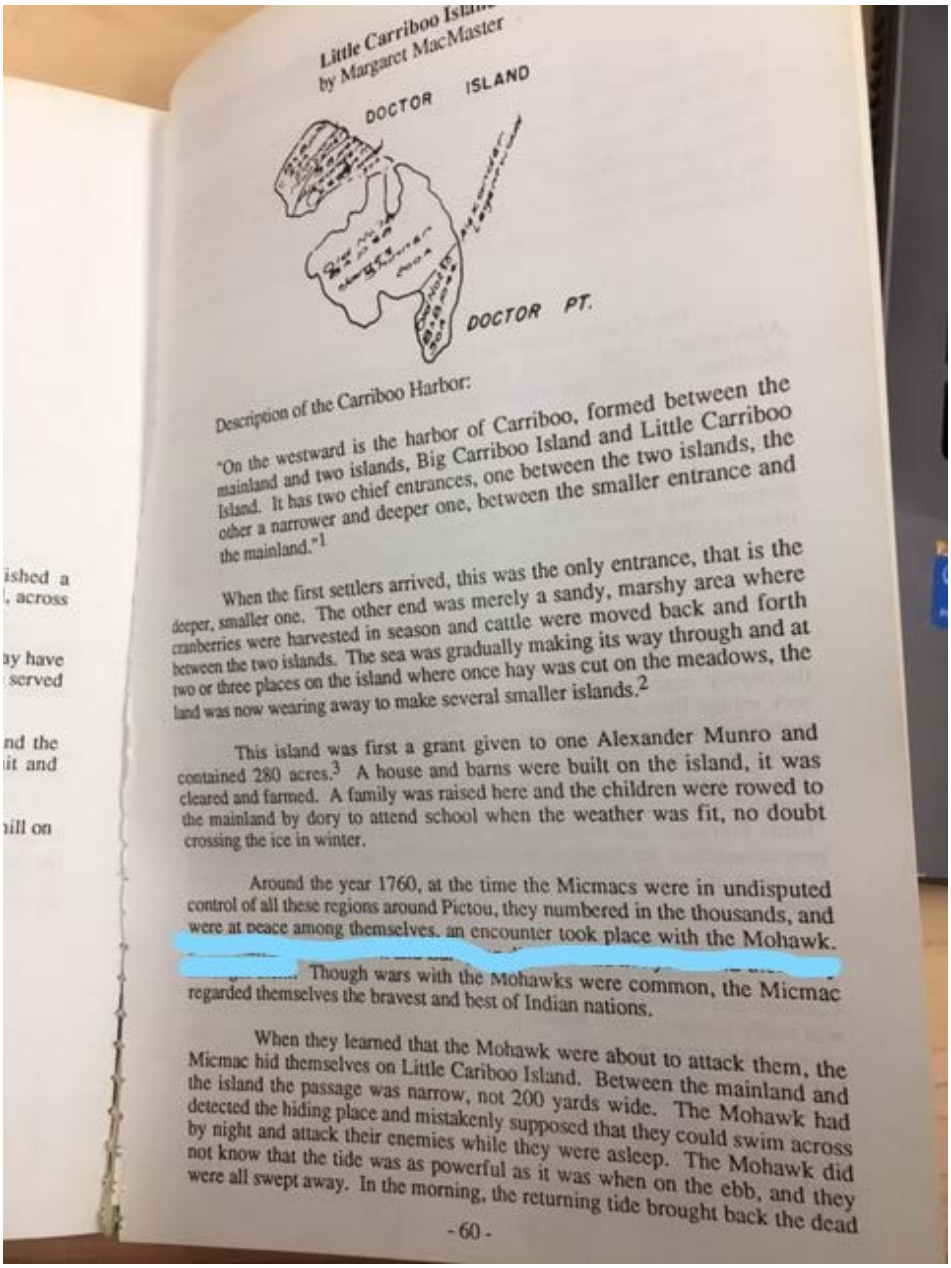
Central Caribou Road, indicated by the magenta arrow, crosses the TCH 106 by overpass. The guard-railed descent of the overpass for Central Caribou Road runs along the side of the Central Caribou Cemetary established 1886.
The cemetary entrance is on the Priest Road which is indicated by the green arrow.
A lane not owned by the cemetary runs along the back of the cemetary by TCH 106 and along the side of the cemetary closest to the Central Caribou Road and exits on Priest Road. This lane allows a through one way access for vehicles using the cemetary. It appears to be intersected by the pipeline route.
A Google map used in the Northern Pulp Focus Report is no clearer in showing whether the proposed pipeline route intersects at any point with the cemetary lane. In addition there is no confirmation that the buffer required for the specialized pipeline construction through the overpass does not intersect with the lane. The lane access is required for the safety of vehicles exiting the cemetary. In this older section of the cemetary, vehicle use is one way and limited turning options.

Respectfully submitted,

2019-11-04

Munroe's Island and other references in no particular order.

Currently Munroe's Island and Caribou Provincial Park.
Known as Munroe's Island, Little Carriboo Island, Doctor Island and Tedookesit (Place of the Running to the Bushes)



Little Carriboo Isla
by Margaret MacMaster

Description of the Carriboo Harbor:

"On the westward is the harbor of Carriboo, formed between the mainland and two islands, Big Carriboo Island and Little Carriboo Island. It has two chief entrances, one between the two islands, the other a narrower and deeper one, between the smaller entrance and the mainland."[1]

When the first settlers arrived, this was the only entrance, that is the deeper, smaller one. The other end was merely a sandy, marshy area where cranberries were harvested in season and cattle were moved back and forth between the two islands. The sea was gradually making its way through and at two or three places on the island where once hay was cut on the meadows, the land was now wearing away to make several smaller islands.[2]

This island was first a grant given to one Alexander Munro and contained 280 acres.[3] A house and barns were built on the island, it was cleared and farmed. A family was raised here and the children were rowed to the mainland by dory to attend school when the weather was fit, no doubt crossing the ice in winter.

Around the year 1760, at the time the Micmacs were in undisputed control of all these regions around Pictou, they numbered in the thousands, and were at peace among themselves, an encounter took place with the Mohawk.

Though wars with the Mohawks were common, the Micmac regarded themselves the bravest and best of Indian nations.

When they learned that the Mohawk were about to attack them, the Micmac hid themselves on Little Cariboo Island. Between the mainland and the island the passage was narrow, not 200 yards wide. The Mohawk had detected the hiding place and mistakenly supposed that they could swim across by night and attack their enemies while they were asleep. The Mohawk did not know that the tide was as powerful as it was when on the ebb, and they were all swept away. In the morning, the returning tide brought back the dead

bodies, each with a tomahawk tied to its head. Needless to say, great joy filled the Micmac when they sighted the dead foes and they held a great celebration.[4]

At the time of the arrival of the English settlers, the incident was still fresh in the memory of the Indians. James Harris mentioned that he had found two or three Tomahawks buried in the sand on the shores of Little Carriboo Island. The Micmac called the island "Tedookesit", meaning "Place of the Running to the Bushes". It came from the refuge that the Micmac took when the Mohawk were near.[5] There are those who say that there is a spot on the island where a burying ground exists.

Early Owners

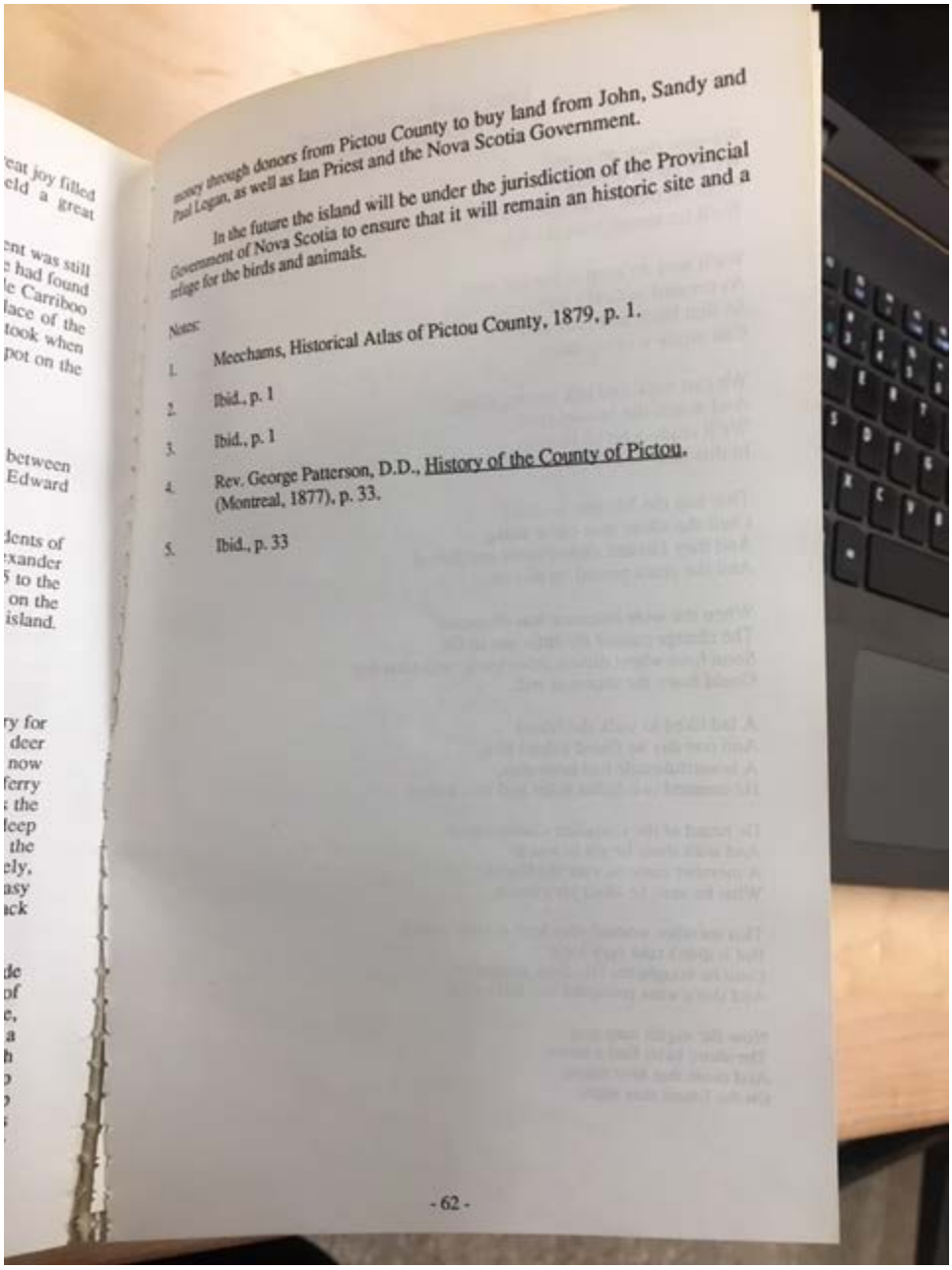
The Crown Grants for Little Carriboo Island were divided between Alexander Logan, James Skinner, Alexander Legertwood and Edward Mortimer. By 1879 the whole island belonged to Alexander Munro.

The late Harry and Ray Johnson, and Jo (Johnson) Priest, residents of Bay View were born on the island. They were the family of Alexander Munro's daughter. The family moved to Bay View about 1894 or 1895 to the property now owned by Dr. E. Skinner. There was also another house on the island and it is reported that John Langille was the last to be born on the island.

The Island Today

Little Carriboo Island is now nearly all wooded, but is a sanctuary for the osprey, eagles, and other sea birds. Foxes are born in dens here and deer seek refuge from the hunters. Clams are plentiful on the shore, but are now prohibited from being eaten because of pollution. Since the start of the ferry service to Prince Edward Island in the late 1930's, what is now known as the "Big Entrance" has been continuously dredged to keep the channel deep enough for the ferries to pass through. Very little attention was paid to the "Little Entrance" and now time and tide have caused it to fill in completely, now connecting the island to the mainland. The large sand bar allows easy access to all-terrain vehicles and trucks which rip and tear along the back shore.

A few years ago, a consortium wanted to buy the island and made plans to turn it into a huge vacation resort. This alarmed the residents of Carriboo and one man, Burton Langille, who was feeding the birds over there, was really worried. Anne Boone, a local lady, watched a story on TV about a conservation group in Toronto, The Nature Conservationists of Canada which buys islands and lands for preservation purposes. She called Mr. Langille who got in touch with this group. Mr. William Schwartz, a member of the group was sent from Halifax to review the situation. Following this review plans were made and an option was taken out with the island owners. The money for this project was privately donated and Mr. Schwartz had a difficult time gathering the funds. However, he did not give up and was able to raise the



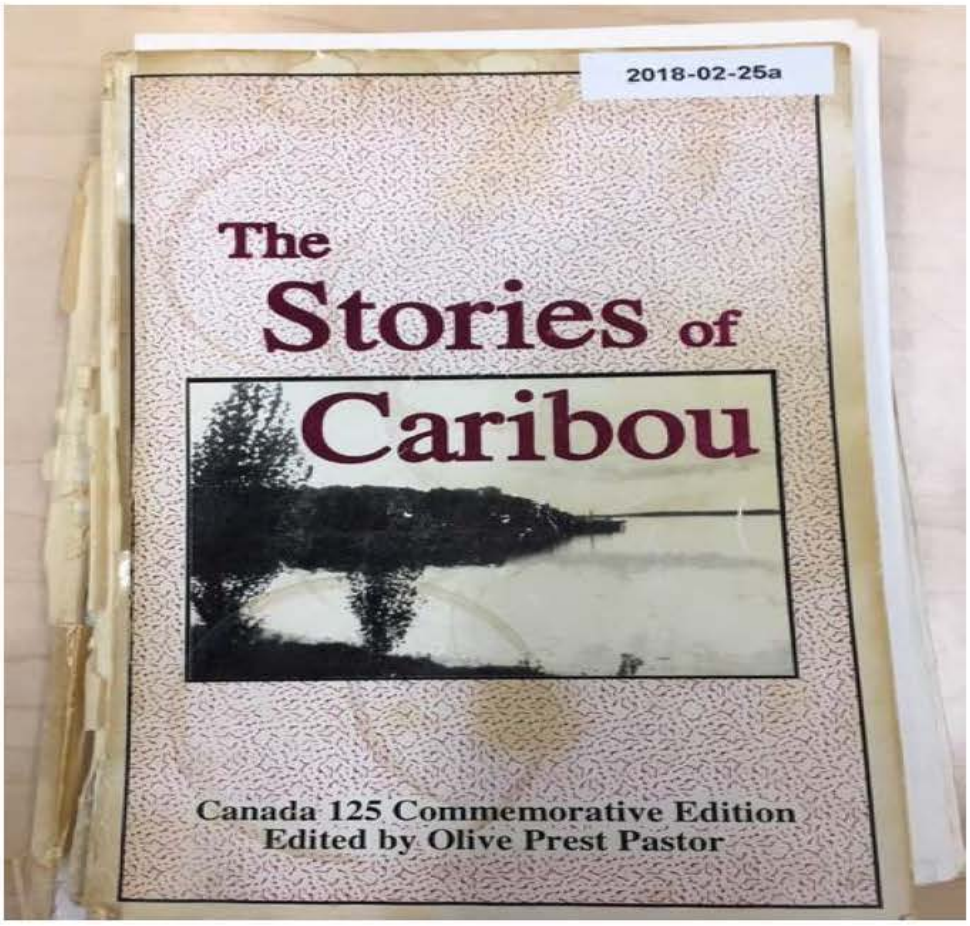
money through donors from Pictou County to buy land from John, Sandy and Paul Logan, as well as Ian Priest and the Nova Scotia Government.

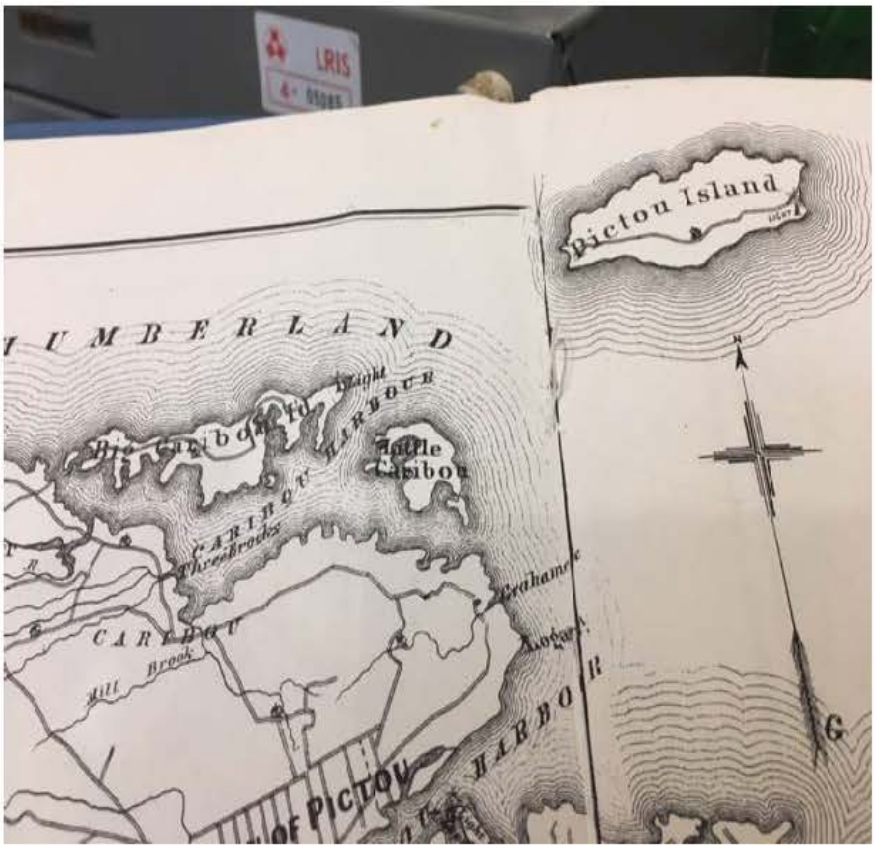
In the future the island will be under the jurisdiction of the Provincial Government of Nova Scotia to ensure that it will remain an historic site and a refuge for the birds and animals.

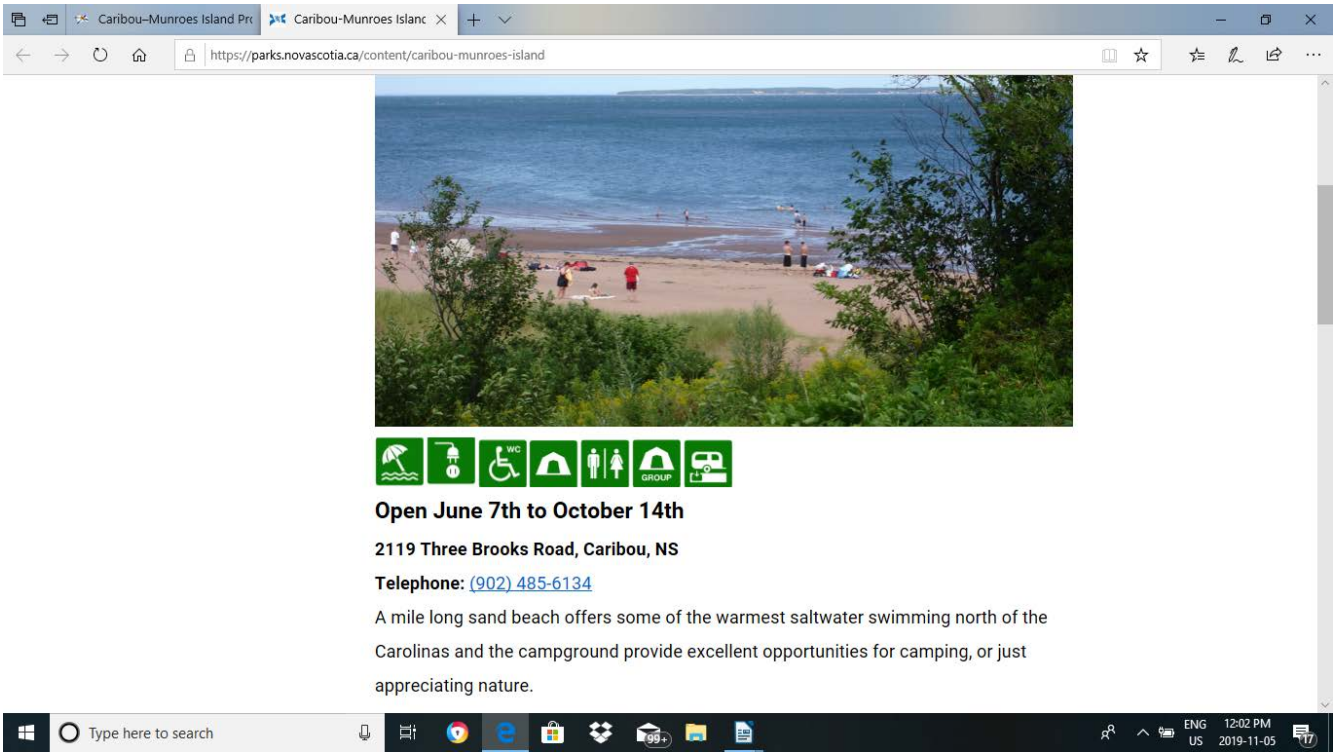
Notes:

1. Meechams, Historical Atlas of Pictou County, 1879, p. 1.
2. Ibid., p. 1
3. Ibid., p. 1
4. Rev. George Patterson, D.D., History of the County of Pictou, (Montreal, 1877), p. 33.
5. Ibid., p. 33

The Nature Conservancy divested Munroe's Island to the protection of the NS Government in 1992 to allow annexing to what was then Caribou Provincial Park.


2018-02-25a
The
Stories of
Caribou
Canada 125 Commemorative Edition
Edited by Olive Prest Pastor


LRIS
Pictou Island
CARIBOU
Mill Brook
HARBOUR
OF PICTOU



Description

Caribou-Munroes Island Provincial Park is 11 km (7 mi) north of Pictou and close to the PEI ferry terminal. A mile-long sand beach offers some of the warmest saltwater swimming north of the Carolinas and the campground provides excellent opportunities for camping, or just appreciating nature. Hiking trails can be enjoyed along the shore to Munroes Island. Other activities include bird watching, canoeing and kayaking.

Nearby:
Northumberland Fisheries Museum, Hector National Exhibit Centre (both in Pictou) and Museum of Industry, Westray Memorial (both in Stellarton).

Campground accommodations include:
90 open and wooded overnight sites (24 with electrical service, 66 unserviced). Walk-in sites and group sites are available. Open sites are situated on a hill overlooking the ocean.

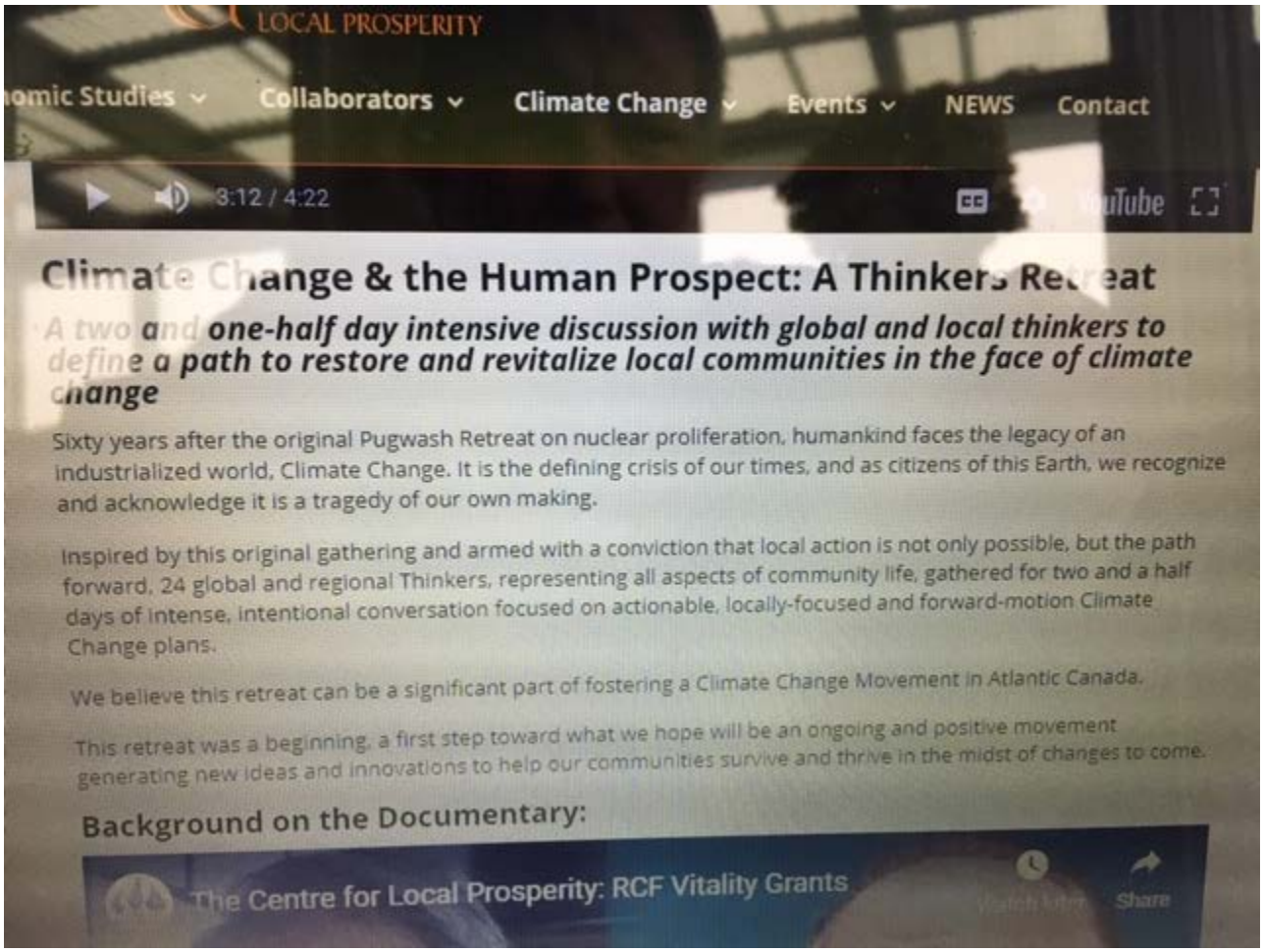
Park amenities include:
flush toilets, showers, disposal station, fire grills, cooking shelters, dishwashing station, change houses, wood and ice. Wi-Fi is available at the park office and surrounding area. This is a Campground Host park. Leashed pets permitted.

Detailed Information

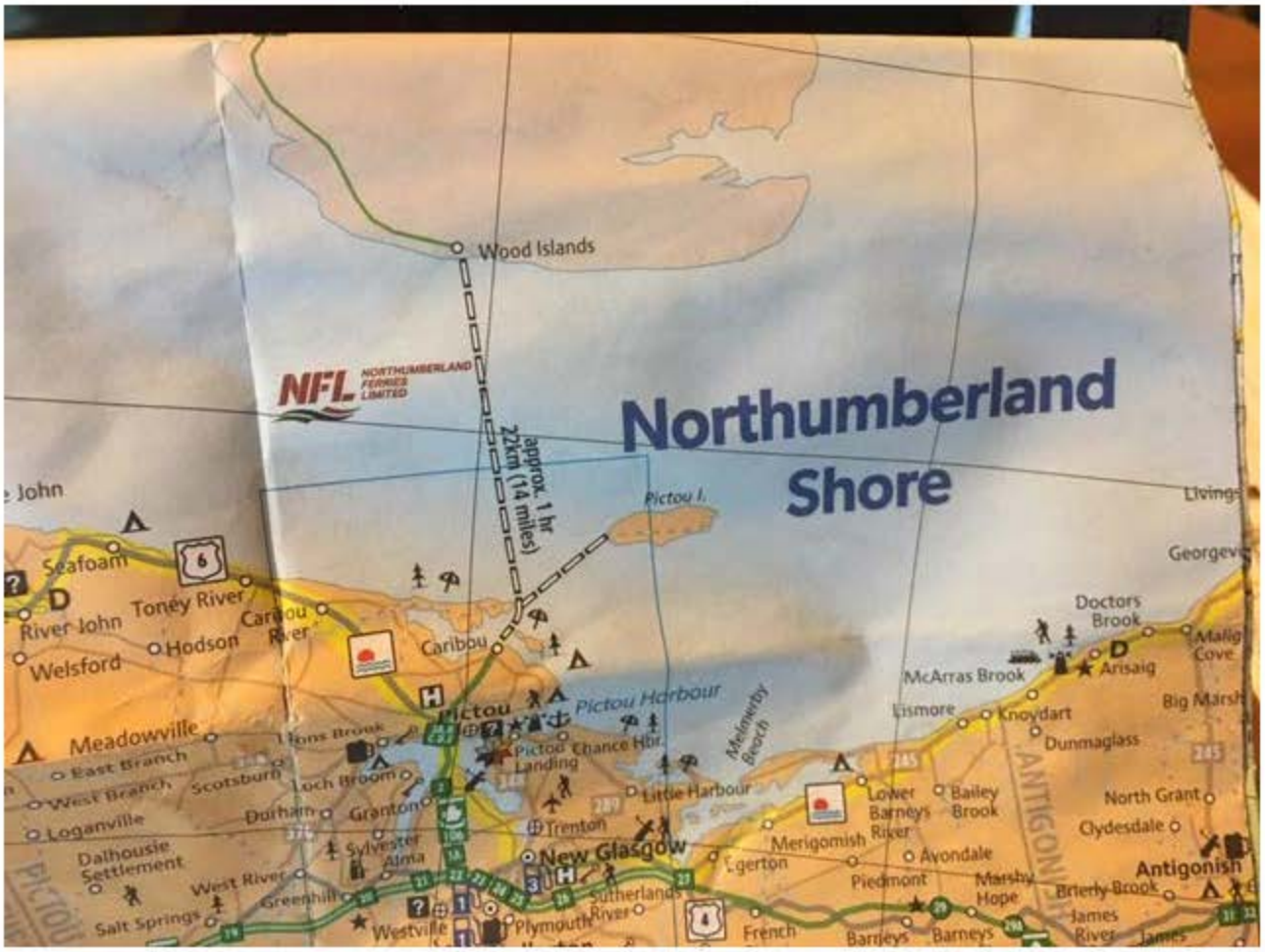
Outdoor activities: Hiking, Swimming

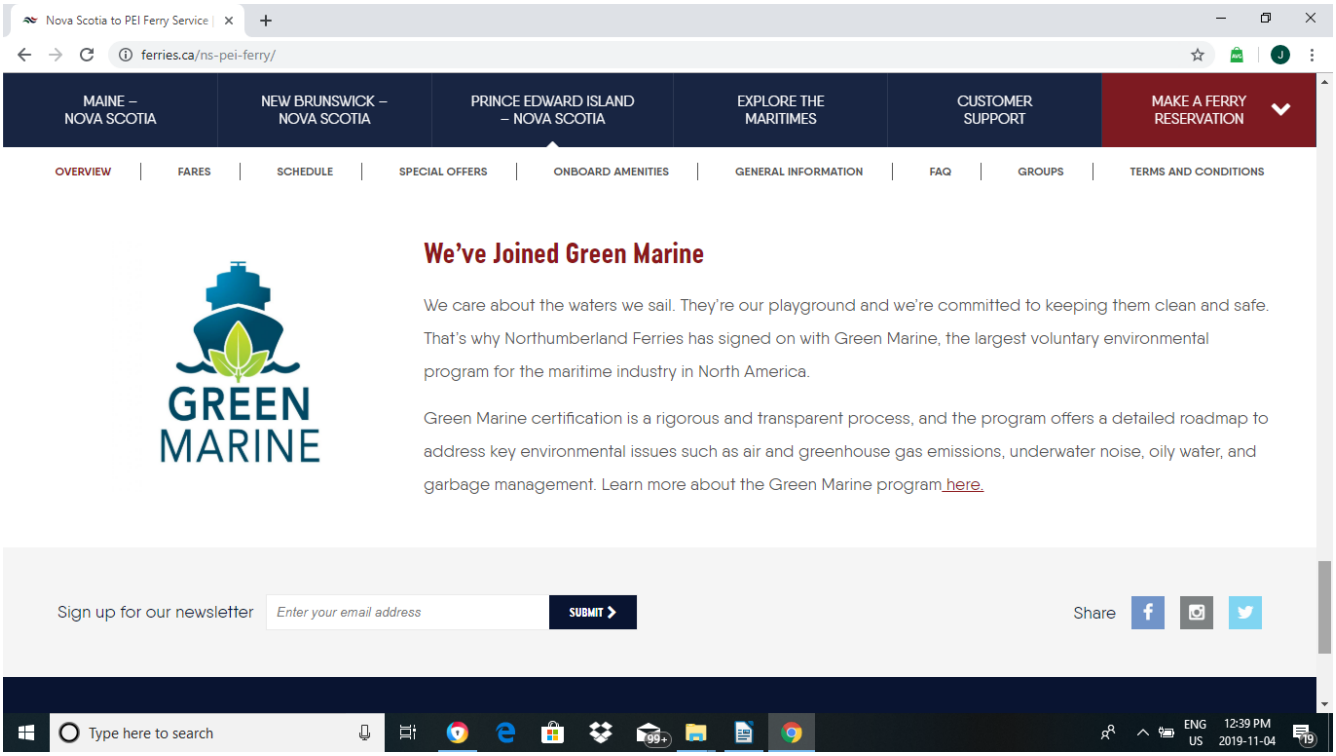
Directions: Hwy 104, Exit 22 to Hwy 106 to Caribou; 6 km (4 mi) north of Pictou.

Thinker's Conference Pugwash



2019-11-06 The statement is published in the journal BioScience on the 40th anniversary of the first world climate conference, which was held in Geneva in 1979. The statement was a collaboration of dozens of scientists and endorsed by further 11,000 from 153 nations. The scientists say the urgent changes needed include ending population growth, leaving fossil fuels in the ground, halting forest destruction and slashing meat eating.


Wood Islands
NFL
NORTHUMBERLAND FERRIES LIMITED
approx. 1 hr 22km (14 miles)
Northumberland Shore
Pictou I.
Seafoam
River John
Toney River
Hodson
Welsford
Caribou
Caribou River
Pictou
Pictou Harbour
Pictou Landing
Chance Hbr.
Meadowville
East Branch
West Branch
Loganville
Scotsburn
Lons Brook
Loch Broom
Durham
Granton
Dalhousie Settlement
West River
Greenhill
Salt Springs
Sylvester Alma
Trenton
New Glasgow
Little Harbour
Melmerby Beach
Westville
Plymouth
Sutherlands River
Egerton
Merigomish
Lower Barneys River
Bailey Brook
Avondale
Piedmont
Marshy Hope
French
Barneys
Doctors Brook
Malig Cove
Arisaig
McArras Brook
Lismore
Knoydart
Dunmaglass
Big Marsh
North Grant
Clydesdale
Antigonish
Briery Brook
James River
ANTIGONISH



2.0
"The need for blasting is considered very unlikely. It is anticipated that spoils from the excavation will be repurposed as fill to cover over the trenched pipeline once placed " I note a lack of detail about containing the spoils and sedimentation impact to spawning beds.

Appendix 2.1 On-land pipeline info - TIR confirms pipeline routing is not yet determined as of September, 27, 2019. Therefore can not be considered as accurate and is incomplete contrary to Minister's instructions. Pictou watershed, wetlands, flora and fauna are vulnerable to construction and risk of pipeline effluent leaks. See also Central Caribou Cemetary adjacent to TCH 106 and Central Caribou Road and its overpass.

Appendix 2.2 Marine Geotechnical Survey – Executive Summary Paragraph 5 "The proposed pipeline route transects a channel within Caribou Harbour between CKP 0.400 and CKP 0.675 with a maximun depth of 6.8 m. North of the channel, water depths remain very shallow as the proposed route approaches and crosses Gull Spit." Has Northern Pulp received federal permission to run the pipeline parallel to the existing navigation channel. If construction of a pipeline creates a premature need for dredging the channel, will Northern Pulp / Paper Excellence post a bond to cover the cost which at last dredging was

approximately $1 million. Has Northern Pulp confirmed the details of the Vacation Island replacement ferry requirements? Those would have priority over a pipeline route.

Appendix 2.3 Characterization of Effluent The parameters of the estimated effluent exceed those of Caribou Harbour. The statement that effluent is comparable to other mills is not a scientific conclusion nor can it be used as a reason to accept the effluent. Northern Pulp jumps back and forth between typical and state of the art facility. Compares Middle River and Caribou Harbour to Points A and C in Boat Harbour. Why would Caribou Harbour accept lesser water quality? Example colour currently TCU 4. Effluent treat would be over TCU 750.

3.0 "The leak detection system installed at NPNS between Pictou and Caribou will fall into one of these three categories. Final selection will be made during the detailed design phase. Automated leak detection will not be installed in the rest of the fused HDPE pipeline outside of this land-based section. " unacceptable risk.

3.3 Effluent Discharge Parameters

No Point D info Point A less accurate – State of maintenance – not being met currently ?
Colour is an aesthetic parameter, and generally not regulated or guaranteed.

In the future, with the proposed AST process and expected reductions in COD, treated effluent will have less colour than today at Point A.

TSS at 48 mg/L at the design flow of 85,000 m3 /day equates to 4,080 kg/day, (can that really be 8976 lbs/day?)

3.5 Effluent Pipeline Leak Detection
"Automated leak detection will not be installed in the rest of the fused HDPE pipeline outside of this land-based section." I noted that a higher quality pipe available since 2005 was an upgrade not made until the Focus Report. There is no indication how the diffusers will be monitored for malfunction / damage or the marine portions for leaks. This is inadequate management of this risk.

4.0 Marine Water and Marine Sediment
"Particles discharged one metre from the seabed at slack tide are likely to travel 1 km before settling." Yet 4.2-5 indicates suspended solids will be background in

2 meters from diffusers? TCU will be 750. What happens in different tides and conditions where “the bottom” is stirred up and the strait is brown and could take 2 days to settle? How does the agitation of the Strait impact sedimentation containing effluent “debris”?

“For the worst case condition, 90% of the TSS particles dropping from the diffuser port are expected to transport and deposit 4.8 km away from the outfall location and not settle near the diffuser. “

“As indicated above, effluent particles are not readily settleable and are likely to travel significant distances far from the diffuser. Total suspended solid particles are largely organic and biodegradable. They are a food source for other marine organisms and as such are not expected to build up and deposit in areas away from the diffuser. “ Not expected is an expression of uncertainty.

4.2-3 Google map can’t be zoomed. Showing effluent concentration in July 2019
4.2-4 as above in this map for February – map needs to be extended to show model for Boat Harbour (A’sek)

7.0 Fish and Fish Habitat - The proposed outfall lies within the intersection of the marine ferry lines to Prince Edward Island (PEI) and Pictou Island. See also colour unit of 4 vs. 765

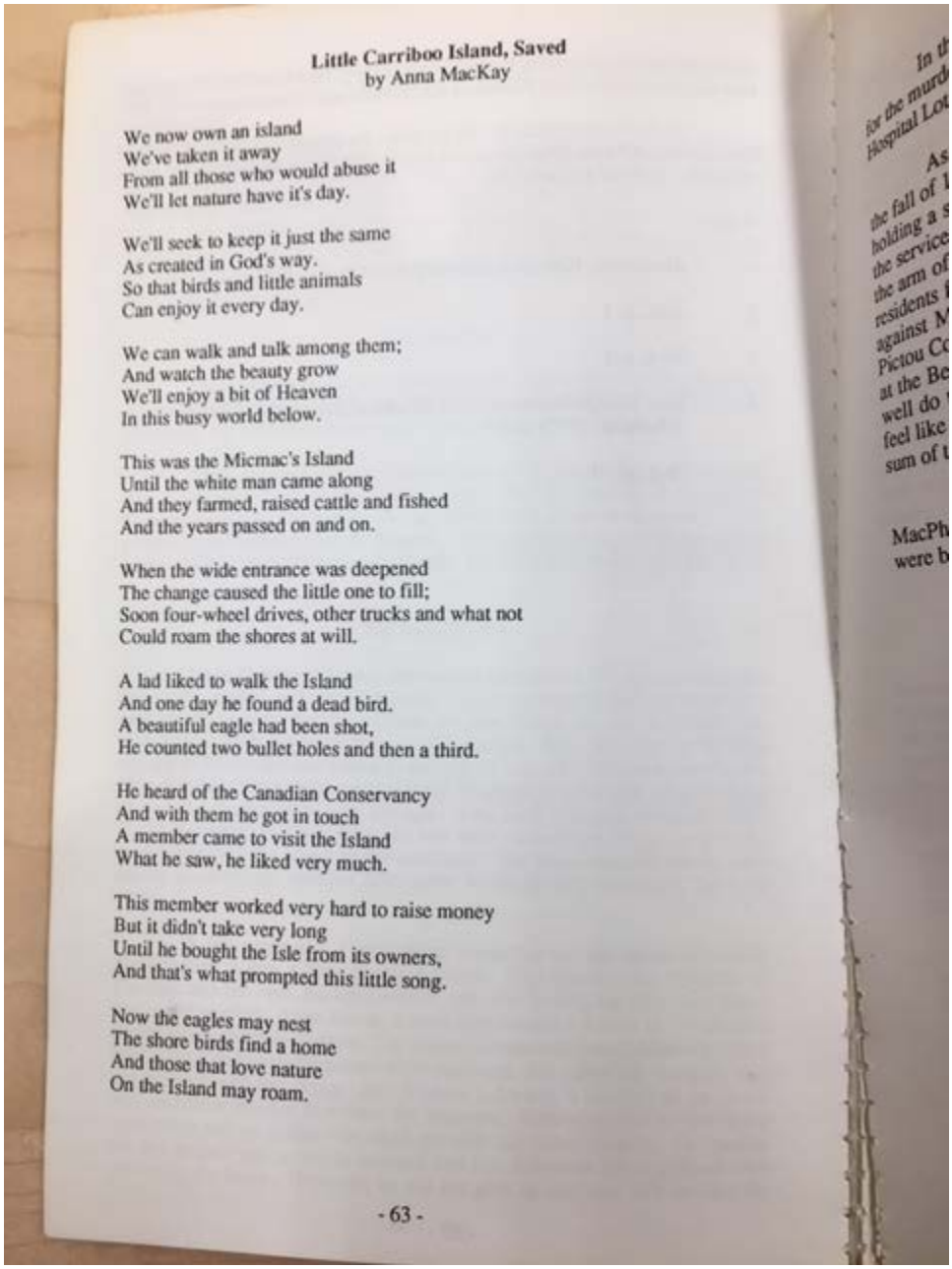
Appendix 9.2 Human Health Risk assessment
Must include Dr Dan Reid study and consultation with Dalhousie University Community Epidemiology – independent and arms length.

10.0 Archeological Assessment - Due to the fact that cultural resources were found in the archaeological survey, it was suggested by Special Places that the detailed survey results not be provided herein. (Pers. Comm. C. Cottreau-Robbins, September 2019).

Appendix 10.1 Archeological Resource Impact Assessment
Was the additional shipwreck information added?

11.0 Indigenous People’s Use of Land and Resources – Monroe’s Island was a place of escape for
M’ikmaq from Mohawk raid. “The Stories From Caribou”

Addendum 1.0 – New technology at mill Delig. Unit in future but no timeline or commitment



Little Carriboo Island, Saved
by Anna MacKay

We now own an island
We've taken it away
From all those who would abuse it
We'll let nature have it's day.

We'll seek to keep it just the same
As created in God's way.
So that birds and little animals
Can enjoy it every day.

We can walk and talk among them;
And watch the beauty grow
We'll enjoy a bit of Heaven
In this busy world below.

This was the Micmac's Island
Until the white man came along
And they farmed, raised cattle and fished
And the years passed on and on.

When the wide entrance was deepened
The change caused the little one to fill;
Soon four-wheel drives, other trucks and what not
Could roam the shores at will.

A lad liked to walk the Island
And one day he found a dead bird.
A beautiful eagle had been shot,
He counted two bullet holes and then a third.

He heard of the Canadian Conservancy
And with them he got in touch
A member came to visit the Island
What he saw, he liked very much.

This member worked very hard to raise money
But it didn't take very long
Until he bought the Isle from its owners,
And that's what prompted this little song.

Now the eagles may nest
The shore birds find a home
And those that love nature
On the Island may roam.

It was not until 1921 that Pictou Island received its first telephone. Until that time communications took place by the use of straw torches. Leslie Simpson took care of the torch communication on the mainland and Duncan MacDonald on the Island. If there was grave illness on the mainland and an islander was required to come across, one torch was lit. Two torches meant that a death had taken place and to come to the mainland at once. The same code was used if an islander had to send the message.

Boxing Day Shooting Matches

On Boxing Day, Bernard Prest held target shooting with geese, turkeys or ducks as the prizes. The local men would pay a fee and shoot at the targets and the man who had the most points accumulated at the end of the day won the prizes. The targets were put up in the field close to the Charles Prest property. They were bulls eyes painted on cardboard. Henry MacMaster, Roy Prest, Thomas Anderson, Alfred MacMaster and Alexander Logan were regular attendees. Sometimes the location of the shoot was moved to another site. The Porters also played host to the event.

The Caribou Provincial Park

On July 2, 1959, the Caribou Provincial Park was officially opened. The Park was part of a five year plan designed to provide attractive campsites all over the Province of Nova Scotia. Judge Harvey A. Veniot, who was the local MLA at the time, was instrumental in having the park in the Caribou area. The Honourable R.C. Levy was on hand for the opening of the park and did the honors of cutting the ribbon.[1]

The Park at Caribou was one of the larger ones to be built in the province and originally, plans included having a wildlife park within the recreational area. However, the wildlife aspect was not developed, instead the picnic grounds and the beach area became the focal point in the park.

In 1992, the park has been in operation for thirty-three years. In the summer, local people and tourists use the beach area and campers fill the park. During the winter local residents cross country ski and walk in the park.

Notes:
1. "Pictou Advocate", July 2, 1959, p. 1.

French Warship in Cariboo River

by Olive Pastor

After the siege of Louisbourg many of the French warships made a run for Quebec. Many of the first English settlers who came to Cariboo Island knew the story of the French Man-O-War that disappeared into Cariboo Harbor to escape the English. The crew took the ship up the harbor into Cariboo River past the fork in the river. Supposedly, they left the ship with the intention of returning for it at a future date.

As the story goes, Dr. Harris and his brother Matthew decided to search for the vessel. At the river they split up and each went up a different branch from the fork. One of them found the abandoned ship in a cove near the old George Morrison property. The cannons had been removed, possibly dumped in the harbor on the way up. However, the rigging was still intact.

The Harris brothers returned to their home to get equipment to haul the ship into open water. But in their absence, the Indians burned the ship to the water line. They later told the Harrises that the French had instructed them to burn the ship if the English found it.

People in the Cariboo area believe that this ship like many of the other French ships had gold on board. In fact, some time later, the land near the ship was disturbed, like something was dug out of the ground. A French ship was seen in the harbor; probably returning to get the ship or its cargo. Some early settlers are said to have found French coins. There also have been rumors for years of cannons laying at the bottom of Cariboo Harbor.

Notes:
See History of the County of Pictou, by Rev. George Patterson, p. 43 for documentation about this French ship.

From:
To: Environment Assessment Web Account
Subject: Respond to Northern Pulp Focus Report on Replacement ETF
Date: November 8, 2019 3:59:37 PM
Attachments: EA letter_Nov8.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

November 7, 2019

The Hon. Gordon Wilson

Minister of the Environment

Nova Scotia

Via email: ea.novascotia.ca

Dear Mr. Minister:

I am writing in reference to the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project.

After consideration of the information provided by Northern Pulp in its Focus Report I urge you to **reject** this proposal for a replacement Effluent Treatment Facility for the following reasons:

- Despite the measures outlined in the Focus Report there remains a high degree of risk to the land and marine environment of Caribou Harbour and the Northumberland Strait. The science within provides no guarantee that the proposed ETF poses no risk of irreparable damage and degradation to this uniquely sensitive estuarial environment;

- The Focus Report does not take into consideration either the additional threat to the ocean environment due to global climate change as described in the report released by the Intergovernmental Panel on Climate Change in September or the introduction of new Pulp and Paper Effluent Regulations (PPER) to be introduced by the Government of Canada in 2021;

- The proposed ETF would disproportionately affect the history, culture and economy of Pictou County by disrupting the fishing and tourism industries in the impact area and imposing an industrial effluent disposal site on a highly sensitive physical and cultural environment.

I am not a scientist. My area of expertise is in the area of and research. I have lived in Caribou since and my property touches the shore of the eastern extent of Caribou Harbour,

believe I have a good understanding of the history and impact of the Northern Pulp mill not only on Pictou County but the entire province of Nova Scotia.

It is my conclusion that the decision to be made by the Government of Nova Scotia in relation to the future of Northern Pulp NS Corp. is the most significant and consequential one to date in this new century. To allow this extremely high risk proposal for a replacement ETF would be a costly mistake that would negatively affect the health, well being and economy of Pictou County and the province as a whole.

I am not an engineer or scientist but I have sufficient education and experience to think analytically. I also have been observing the environment of Caribou Harbour closely for twenty years. I have walked numerous times around Munroe's Island, kayaked to the proposed site of the discharge pipe in the waters outside of Caribou Harbour and have observed the wildlife of this special place. I have reviewed the data in Northern Pulp's Focus Report submitted in support of this proposal. I have also researched numerous articles about the impact pulp mills have on the environment. Science agrees that pulp mills without doubt have a deleterious impact the environment but there is no consensus in science about the degree of these environmental or health impacts. The debate is really about what impact is acceptable. The Northern Pulp Focus Report provides a great deal of data, more than could possibly be reasonable for a layperson to evaluate within thirty days. Add to this the fact that there have been no public consultations initiated by Northern Pulp about this report that could address questions from the public. Most of the data involves the engineering decisions Northern Pulp will undertake in planning and executing its replacement ETF. The science in the report is not definitive but approximate based on modeling and upon data sufficient to make certain assumptions about the conditions and environment that a new ETF will encounter. In other words it is an educated guess.

On the other hand there is a mounting scientific consensus that societies collectively will be affected by climate change, including significant changes to the ocean environment that will present new challenges to coastal communities. As reported in Canada's Oceans Now: Atlantic Ecosystems 2018 released by Fisheries and Oceans Canada, all of the species fished commercially in the Atlantic region have declined or are under stress. Northern Pulp's Focus Report makes no mention of these factors. In fact there is little mention of the local fishery in Caribou or that area of the Northumberland Strait. There is no acknowledgement that the proposed site for the effluent dispersal array is directly within Fishing Area 26A, the heart of the local commercial fishery. Outside of the environmental threat to fishing in the region, there is no acknowledgement of the incompatibility between a dispersal zone for treated industrial effluent and a perception of a clean fishery in this area.

Another aspect of determining an objective evaluation of this proposed ETF is the record of this pulp mill's existing ETF. This record indicates that there have been leaks in the effluent pipe from the outset up to the present (check out the history of the mill in this timeline: http://themillfilm.ca/the-history/) The Focus Report assumes that using regulated and certified materials and employing reliable construction techniques in the building the pipeline will mitigate risk to an acceptable level. History indicates that this is not a safe assumption instead it indicates that leaks should be expected. NS Environment has yet to release a report on the impact of the mill's most recent leak in October 2018. The location of the proposed new effluent pipe is so hazardous that such a delay would be unacceptable.

This proposed ETF is an extreme high-risk enterprise with little acknowledgement of the downside effects or costs to the public in the case of failure. Construction of the pipeline assumes the right to: 1) exploit public infrastructure 2) contravene prohibitions intended to protect the watershed for the Town of Pictou and 3) expropriate a major section of an environmentally protected coastline (and a major location for fishing and tourism) for use as an industrial site. It is willing to take this risk because of BATEA, Best Available Technology Economically Achievable principles. While effective in maintaining the mills operations to the benefit of the mill's owners these principles are detrimental to the public purse as ultimately Nova Scotia is on the hook financially for any system failure. The long-term pubic interest must be the highest consideration in making this assessment. This proposal does not satisfy numerous tests of social accountability or responsibility, not the least of which is the unwillingness to make an adequate investment into a new plant that would not impose such a risk to the public. The disproportionate domain over this area granted to Northern Pulp should this project go ahead would unacceptably dominate the right of others, public and private, to the peaceful use and enjoyment of this area.

The willingness to engineer such a desperate and risky solution to the problem of losing the Boat Harbour ETF indicates Northern Pulp's short-term investment strategy. Building a new mill is not economically achievable because the natural resources available are not to scale with the cost of a new, environmentally efficient, plant. Northern Pulp's business model is to exploit its aging facility and its access to Nova Scotia's resource until it is no longer viable. It also expects the public to pay the cost of building a new ETF. When Northern Pulp leaves, as it inevitably will, the public is on the hook for any environmental clean up

The terms of reference for the Focus Report does not include the wide extent of the forest industry in its purview. None the less, forests overall are a necessary consideration for your Ministry to include in its analysis; after all, this entire proposal is focused on the dispersal of forest residue into the ocean environment. What goes out must first come in.

A prominent theme in the warnings contained in the scientific discussion of climate change is the rapid loss of forest environments around the globe. The Leahy Report of 2018 was partially in response to this acknowledged threat. As much as there is local concern over the proposed replacement ETF in Caribou there is growing public concern that the NS Government's management of Crown land in concert with the pulp industry is detrimental to health of Nova Scotia's forests and wildlife habitat.

Nova Scotia cannot afford to approve this proposed replacement ETF. It would require significant public investment in pursuit of a policy of resource exploitation that has short-term benefit to Northern Pulp NS Corp. but significant long-term costs for the public. It also discounts the present and increasing value of natural forest environments and reduces the

value of forests down to the artificially low price of pulpwood. This is no longer acceptable. Public policy must change from exploitation to preservation. Nova Scotia's industrial forest sector must adapt to a changing economy increasingly based on acknowledging the limits on consumption. Nova Scotia cannot compromise the economy of the future by clinging to the economy of the past.

Preservation and protection of the environment is the key to the future economy of Nova Scotia. This is the scientific approach that must take precedence in consideration of a proposal that is inherently detrimental to the environment, lacking in accountability and reckless in regard to public safety and the long term public good.

Reject this proposal.

Sincerely,

Braeshore, Pictou Co.

Nova Scotia

November 7, 2019

The Hon. Gordon Wilson
Minister of the Environment
Nova Scotia

Via email: ea.novascotia.ca

Dear Mr. Minister:

I am writing in reference to the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project.

After consideration of the information provided by Northern Pulp in its Focus Report I urge you to **reject** this proposal for a replacement Effluent Treatment Facility for the following reasons:

- Despite the measures outlined in the Focus Report there remains a high degree of risk to the land and marine environment of Caribou Harbour and the Northumberland Strait. The science within provides no guarantee that the proposed ETF poses no risk of irreparable damage and degradation to this uniquely sensitive estuarial environment;
- The Focus Report does not take into consideration either the additional threat to the ocean environment due to global climate change as described in the report released by the Intergovernmental Panel on Climate Change in September or the introduction of new Pulp and Paper Effluent Regulations (PPER) to be introduced by the Government of Canada in 2021;
- The proposed ETF would disproportionately affect the history, culture and economy of Pictou County by disrupting the fishing and tourism industries in the impact area and imposing an industrial effluent disposal site on a highly sensitive physical and cultural environment.

I am not a scientist.

I believe I have a good understanding of the history and impact of the Northern Pulp mill not only on Pictou County but the entire province of Nova Scotia.

It is my conclusion that the decision to be made by the Government of Nova Scotia in relation to the future of Northern Pulp NS Corp. is the most significant and consequential one to date in this new century. To allow this extremely high risk proposal for a replacement ETF would be a costly mistake that would negatively affect the health, well being and economy of Pictou County and the province as a whole.

I am not an engineer or scientist but I have sufficient education and experience to think analytically. I also have been observing the environment of Caribou Harbour closely for twenty years. I have walked numerous times around Munroe's Island, kayaked to the proposed site of the discharge pipe in the waters outside of Caribou Harbour and have observed the wildlife of this special place. I have reviewed the data in Northern Pulp's Focus Report submitted in support of this proposal. I have also researched numerous articles about the impact pulp mills have on the environment. Science agrees that pulp mills without doubt have a deleterious impact the environment but there is no consensus in science about the degree of these environmental or health impacts. The debate is really about what impact is acceptable. The Northern Pulp Focus Report provides a great deal of data, more than could possibly be reasonable for a layperson to evaluate within thirty days. Add to this the fact that there have been no public consultations initiated by Northern Pulp about this report that could address questions from the public. Most of the data involves the engineering decisions Northern Pulp will undertake in planning and executing its replacement ETF. The science in the report is not definitive but approximate based on modeling and upon data sufficient to make certain assumptions about the conditions and environment that a new ETF will encounter. In other words it is an educated guess.

On the other hand there is a mounting scientific consensus that societies collectively will be affected by climate change, including significant changes to the ocean environment that will present new challenges to coastal communities. As reported in Canada's Oceans Now: Atlantic Ecosystems 2018 released by Fisheries and Oceans Canada, all of the species fished commercially in the Atlantic region have declined or are under stress. Northern Pulp's Focus Report makes no mention of these factors. In fact there is little mention of the local fishery in Caribou or that area of the Northumberland Strait. There is no acknowledgement that the proposed site for the effluent dispersal array is directly within Fishing Area 26A, the heart of the local commercial fishery. Outside of the environmental threat to fishing in the region, there is no acknowledgement of the incompatibility between a dispersal zone for treated industrial effluent and a perception of a clean fishery in this area.

Another aspect of determining an objective evaluation of this proposed ETF is the record of this pulp mill's existing ETF. This record indicates that there have been

leaks in the effluent pipe from the outset up to the present (check out the history of the mill in this timeline: http://themillfilm.ca/the-history/) The Focus Report assumes that using regulated and certified materials and employing reliable construction techniques in the building the pipeline will mitigate risk to an acceptable level. History indicates that this is not a safe assumption instead it indicates that leaks should be expected. NS Environment has yet to release a report on the impact of the mill's most recent leak in October 2018. The location of the proposed new effluent pipe is so hazardous that such a delay would be unacceptable.

This proposed ETF is an extreme high-risk enterprise with little acknowledgement of the downside effects or costs to the public in the case of failure. Construction of the pipeline assumes the right to: 1) exploit public infrastructure 2) contravene prohibitions intended to protect the watershed for the Town of Pictou and 3) expropriate a major section of an environmentally protected coastline (and a major location for fishing and tourism) for use as an industrial site. It is willing to take this risk because of BATEA, Best Available Technology Economically Achievable principles. While effective in maintaining the mills operations to the benefit of the mill's owners these principles are detrimental to the public purse as ultimately Nova Scotia is on the hook financially for any system failure. The long-term pubic interest must be the highest consideration in making this assessment. This proposal does not satisfy numerous tests of social accountability or responsibility, not the least of which is the unwillingness to make an adequate investment into a new plant that would not impose such a risk to the public. The disproportionate domain over this area granted to Northern Pulp should this project go ahead would unacceptably dominate the right of others, public and private, to the peaceful use and enjoyment of this area.

The willingness to engineer such a desperate and risky solution to the problem of losing the Boat Harbour ETF indicates Northern Pulp's short-term investment strategy. Building a new mill is not economically achievable because the natural resources available are not to scale with the cost of a new, environmentally efficient, plant. Northern Pulp's business model is to exploit its aging facility and its access to Nova Scotia's resource until it is no longer viable. It also expects the public to pay the cost of building a new ETF. When Northern Pulp leaves, as it inevitably will, the public is on the hook for any environmental clean up.

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local concern over the proposed replacement ETF in Caribou there is growing public concern that the NS Government's management of Crown land in concert with the pulp industry is detrimental to health of Nova Scotia's forests and wildlife habitat.

Nova Scotia cannot afford to approve this proposed replacement ETF. It would require significant public investment in pursuit of a policy of resource exploitation that has short-term benefit to Northern Pulp NS Corp. but significant long-term costs for the public. It also discounts the present and increasing value of natural forest environments and reduces the value of forests down to the artificially low price of pulpwood. This is no longer acceptable. Public policy must change from exploitation to preservation. Nova Scotia's industrial forest sector must adapt to a changing economy increasingly based on acknowledging the limits on consumption. Nova Scotia cannot compromise the economy of the future by clinging to the economy of the past.

Preservation and protection of the environment is the key to the future economy of Nova Scotia. This is the scientific approach that must take precedence in consideration of a proposal that is inherently detrimental to the environment, lacking in accountability and reckless in regard to public safety and the long term public good.

Reject this proposal.

Braeshore, Pictou Co.
Nova Scotia

From: @live.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:03:29 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: As someone who works in the forestry sector I believe Northern Pulp should be given the opportunity to build a first class wastewater treatment facility. I encourage the Environment Minister to consider the economic spinoffs from Norther Pulp and related jobs and approve the Environmental Assessment. Name: @live.ca Address:
Municipality: Tatamagouche Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 52 y: 29

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:05:13 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: My Husband and Myself are 100 behind the replacement Name: @ns.sympatico.ca Address: MacLellans Mountain Municipality: Pictou County Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 93 y: 23

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:05:28 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Nova Scotia needs forestry !!! Name: @gmail.com Address: Municipality: Caledonia Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 43 y: 28

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:05:57 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I work in the Pulp and Paper industry and after reviewing the focus report, I believe the engineers and the scientists have put together a solid world class effluent treatment facility, that will enable the forestry sector and the fishing community to co-exist in the same region with out any undo harm to the environment. I am looking forward to a long career in the forestry Industry. I hope the Premier releases the importance of his decision that will impact the whole forestry sector. I feel that Northern Pulp will be a responsible community member by monitoring air, water, and wild life in future studies. Please make a factual and scientific decision and thank you for giving me a chance to have my say. Name: @hotmail.com Address: Municipality: New Glasgow, NS Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 80 y: 21

From:
To: Environment Assessment Web Account
Subject: Re: Focus Report, Northern Pulp
Date: November 8, 2019 4:12:42 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Halifax, Nova Scotia,

November 8, 2019

Gordon Wilson
Minister of the Environment
Government of Nova Scotia

Dear Minister Wilson;

I am writing to express my vehement opposition to the proposed plan by Northern Pulp to dump up to 85 million litres of warm toxic effluent into the Northumberland Strait. There is nothing in the Northern Pulp's Focus Report to satisfy my concerns.

My mother grew up in the town of Pictou, and our large Acadian family continue to call it home. My family own property in Caribou River and spend part of the year there. We swim and fish in beaches and waters along that coast and harvest shellfish in beautiful Caribou Harbour. This coastline is precious to us.

Caribou Harbour is a sensitive ecosystem and it is teeming with life. Its muddy bottom holds nutrients which nourish the shellfish and small baitfish. The seabirds, such as the Blue Heron, feed on the small fish at low tide and the Eagles and other birds of prey scoop up larger fish, all parts of the amazing, natural circle of life. Should Northern Pulp plan come to fruition, it is evident that the high tides will bring chemical toxins into Caribou Harbour and deposit them in the muddy bottom when the tide retreats poisoning the ecosystem that I have known and loved. The foamy toxic sludge which we now see as a slick in Pictou Harbour or washed up along the beaches inside Pictou Harbour will now be deposited along the beaches in Caribou, Caribou Island and Caribou River. The toxins will be spread over a lucrative lobster fishing grounds, and even if the lobster survive, their tissue will be unsafe for human consumption. This cannot be allowed to happen.

The pulp mill in Pictou has been poisoning our water, air and soil since my mother was a little girl. Organisms that live in Pictou Harbour are deformed and/or toxic. The VOCs emitted in his smokestacks from the pulp mill are hazardous to human health (see Linda Pannozzo, Halifax Examiner, March 7, 2019 *).(I know a woman whose lung condition deteriorated while living in Pictou and since leaving, has not had a single flare-up*.) People who live in parts of Pictou County affected by the pulp mill have woken up and will not stand for this kind of poisoning any longer. The proposed treatment facility will not significantly detoxify the effluent. And, as a member of Pictou Landing First Nations stated in the film, *There Is Something in the Water,* directed by Ellen Page, we cannot simply take the problem from their backyard, Boat Harbour, and put it in their/our front yard, the Northumberland Strait.

It it time to usher in a new era of relationship between the Pictou First Nation, the Mi'kmaq and the Nova Scotia Government. Remember, this is Mi'kma'ki and the

Mi'kmaq retain title to this territory we call Nova Scotia. We are all Treaty People - which means we must respect our obligations to steward these lands and waters through partnership with the Mikmaq - and to ensure the Mi'kmaq have continuous access to land and waters that form the basis of their modern day livelihood, their traditional economy and land-based cultural and healing practices. Pictou Landing First Nation has made it clear that this pulp mill and consecutive governments have violated their obligations and have acted without honour. I stand in solidarity with Pictou Landing First Nation and call on you to honour the Boat Harbour Act (2015) and close the Boat Harbour Treatment Facility by January 21, 2020.

Minister, frankly it is time for the pulp to close and for your government to invest in sustainable and environmentally sound industries that respect Mi'kmaq title, aboriginal and treaty rights and UNDRIP. What are you doing to support the development of the green economy and community economic development in Nova Scotia? The status quo isn't working. In a time of climate crisis, ecological overshoot, rising global economic inequality we need to be bold and innovative. I hope that your attachment to the forestry industry stemming from your former occupation as a forestry technician will not cloud your decision making process.

Sincerely,

From: @outlook.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:13:27 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: After hearing the economic report that was presented by Unifor,there is no other conclusion. The mill needs to remain open and running.Without it, Nova Scotias economy could take decades to recover. The loudest voices should not be able to tear apart our economy. I ask that the mill be granted an extension. Name: @outlook.com Address: Municipality: frasers mountain Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 43 y: 27

From:
To: Environment Assessment Web Account
Subject: NP replacement effluent treatment facility project
Date: November 8, 2019 4:13:54 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Honourable Minister Wilson:

I am writing in response to Northern Pulp's focus report for their replacement effluent treatment facility project that would discharge up to 85 million litres of treated pulp effluent daily into the Northumberland Strait.

In my March 9 response to Northern Pulp's original EARD (attached), I outlined my concerns with Northern Pulp's parent company and their global reputation for deforestation, air pollution, fraud, bribery and greenwashing. As a retired police officer with 30 years experience, it concerns me greatly that Nova Scotia's government feels this foreign owned corporate bully is the best we can do.

Like many citizens, I was pleased to see Nova Scotia environment do the right thing on March 29 by rejecting Northern Pulp's EARD and requiring the company to submit a focus report based on a lengthy terms of reference provided by NSE.

To no surprise, Northern Pulp has failed to meet those terms of reference.

They have not provided data to prove that the project can be done safely. On almost every key point Northern Pulp has not provided concrete plans on what will be done. Examples include:

- No plan for a definite pipe route
- No plan for leak detection on the marine portion of pipe
- No specified leak detection for on-land pipe
- No clear description of composition of effluent

The focus report also contains many factual errors on the most basic information such as:

- Where fish are located and where fishermen fish
- Risks of treated pulp effluent to marine environments

Minister Wilson, I am asking that you reject Northern Pulp's proposed project. Their focus report does not prove that their project will not cause adverse effects to the environment. In fact, this focus report proves that Northern Pulp has no intention of changing its environmental legacy, as it has stated repeatedly in the media. If this project is approved, Northern Pulp will continue to operate in the same vain of its parent company at the expense of Pictou County and all\ Nova Scotians.

I also ask that the Nova Scotia Legislature honour the Boat Harbour Act and the scheduled closure date of January 31, 2020. As a cottage owner on Pictou Landing, I am very familiar with the polluted air and water that Pictou Landing First Nation must live with every day. Over the last two years, I have come to learn of the significant impacts that 53 years of pollution has had on the Pictou Landing First Nation community. This community can wait no longer to begin to heal.

Sincerely,

Upper Rawdown, NS

Moodie Cove, Pictou Landing)

From:
To: Environment Assessment Web Account
Subject: Northern Pulp
Date: November 8, 2019 4:17:24 PM

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Hey I'm a young person living in Pictou and Northern Pulp would provide someone like me with a great career and there arent many other good jobs in my area...please consider an extension for a treatment facility!

From:
To: Environment Assessment Web Account
Subject: Response to Northern Pulp"s focus report for proposed ETF
Date: November 8, 2019 4:17:45 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Gordon Wilson,

I am writing in response to Northern Pulp's focus report for their replacement effluent treatment facility project.

Like many citizens of Nova Scotia, Prince Edward Island and New Brunswick, I was relieved by Margaret Miller, the previous Environment Minister making the right decision by not approving Northern Pulp's EARD last March but requiring the company to complete a focus report.

However, and to no surprise, Northern Pulp failed to meet the requirements of the terms of reference; by a long shot. Some examples are as follows:

- No plan for leak detection on marine portion of pipe
- No clear plan for leak detection on land-based pipe
- No clear description of composition of effluent
- No studies conducted on lobster larvae or herring
- Did not re-route the pipe beside highway

The focus report also contains many factual errors on the most basic information such as:

- Where fisherman fish
- Section 7 Figure 7.3-3 is truly misleading
- risks of treated pulp effluent to marine environments

Northern Pulp has failed to engage with the public regarding this project. Northern Pulp failed to listen to the concerns of thousand of citizens. The risks associated with this project are astounding and warrant a rejection. There is too much as risk in regards to human health, the marine environment, the fishery, the tourism industry, property value in and around the county of Pictou. This company has held every citizen in this Province hostage for way too long.

Minister Wilson, I am asking that you reject Northern Pulp's proposed project. Their focus report does not prove their project will not cause adverse effects to the environment. In fact, what it does prove is that Northern Pulp has no intentions on changing their environmental

footprint and proves sheer and utter disrespect for every citizen in this Province, for the environment and for the Indigenous community of Pictou Landing First Nation. A company attempting to brand themselves and good corporate citizens, yet being so arrogant and ignorant to ask for the extended use of Boat Harbour. Let's put an end to this company playing the government like a fiddle and beating the public like a drum. Time to move on to more sustainable forest practices without relying on a 50 year old polluting factory.

Yours Truly,

From:
To: Environment Assessment Web Account; Minister, Env
Subject: Northern Pulp Focus Report
Date: November 8, 2019 4:18:53 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

I have read the EARD documents previously submitted by Northern Pulp Nova (NPNS) concerning their proposed replacement Effluent Treatment Facility (ETF) and submitted a letter of concern to the Department of Environment regarding this project. Upon review of the Focus Report recently submitted by NPNS in response to the terms of reference outlined by the Department of Environment for this project, I am still unsurprisingly left with questions and concerns about this proposed new ETF project. It is a significantly large document and if we were given an appropriate amount of time, I would have liked to thoroughly dissect this report before writing a response. Given the lack thereof, I will focus on a few key points in this report which concern me greatly.

- The terms of reference required that NPNS to: *"Provide viable options including the **selected** option for leak detection technologies and inspection methodologies, with specific consideration to any portion of the pipeline located in the Town of Pictou's water supply protection area".*

NPNS's attempted to address this requirement in section 3.5 is as follows*: "A leak detection system as described below will be installed with the effluent pipeline to monitor for potential leaks in the overland portion of the route between Pictou and Caribou, in the unlikely event that one occurs. Leak Detection Programs (LDP) for liquid pipeline systems generally fall into two categories, internal or external.*

Examples of external leak detection systems include:

-Visual checks including aerial inspections and video surveillance;

- Sound monitoring; or

- Fibre optic cable systems sensing temperature, pipe strain or other operational signs.

Internal systems for leak detection include:

- Operational systems checks;

- Metering for volume flow, pressure loss, and flow/mass balancing; and

- Automated Computational Methods such as statistical models and/or real time transient modelling (RTTM).

….

LDP's utilizing fibre optic systems, line balance metering, or, RTTM methods generally provide the highest level of sensitivity

….

The leak detection system installed at NPNS between Pictou and Caribou will fall into one of these three categories. Final selection will be made during the detailed design phase. Automated leak detection will not be installed in the rest of the fused HDPE pipeline outside of this land-based section."

This is nothing more than brief musings about a few options that exist for pipeline leak detection systems without any actual analysis towards selecting the appropriate solution. There is a wealth of information on this topic that is readily available which has been applied to countless industrial projects worldwide. I expected to see a rather large appendix outlining an in depth review of all applicable pipeline leak detection technologies available. Such a study would have led NPNS to selecting the best technology for their proposed application. There is nothing of this nature in their focus report and given that the selection of the appropriate technology was a clear requirement of the terms of reference;

NPNS has clearly not met this requirement.

It is not secret that NPNS does not have a spotless track record concerning effluent leaks and one particular leak has been a catalyst leading to the premature closure of the current Boat Harbour Effluent Treatment Facility. It is my opinion that if NPNS had a serious commitment to satisfying this requirement, there would have been significantly more content on this matter given it has been 4+ years since the conception of this project.

In addition to the existing terms, it would be prudent to require NPNS to outline the exact procedures for dealing with alarms from this hypothetical leak detection system. This is an incredibly long pipeline (>15km) and we need assurances that there is a sound procedure in place in the event that a leak is detected. Given the critical exposure risks along this route, a redundant detection system is warranted and should be a requirement.

It is also very disappointing to see that a leak detection system is only being considered for the over land portion of the route between Pictou and Caribou Harbour. The excluded marine portions are the only sections including the seemingly precarious “spool pipe segments” (section 3.5.1) of the entire route. Without a leak detection system on these sections of the pipe, we are putting Pictou and Caribou Harbour at risk without any justifications whatsoever cited in this report.

Furthermore, it appears that the overlaying of survey data from the Province of Nova Scotia on the map of the Town of Pictou’s source water protection area has the appearance of being nothing more than a "back of the napkin" sort of analysis. I would strongly urge that a more detailed analysis be provided, including a wide variety of worst case scenarios including high flow leaks coupled with extreme environmental conditions such as floods, snow melt, surface icing, snow damming, transient construction projects, temporary berms, etc.

Like all structures, this equipment has a life expectancy and we cannot afford to push the boundaries of this, as was done before. The project should require a detailed plan for maintenance of the equipment and ultimately, a binding agreement to replace the pipe prior to the end of its expected life expectancy.

- Most, if not all, baseline studies are insufficient within this report. Likely due to the simple fact that the time-frame in which they have been completed is entirely insufficient. For example in section 2.2 of the Focus Report, ice scour data was only collected in the spring of 2019. A single year is insufficient data to statistically determine the maximum ice scouring that may occurs in this area. At a minimum, the Federal Canadian Ice Service data should have been consulted in order to ensure the reference year is not a statistical anomaly. Even with the currently measured maximum ice scour of 0.4m in some of the 133 observed ice scour locations along the proposed pipe route; it is reasonable to question if the cumulative annual excavation of seabed materials will result in the eventual exposure of the pipe. How will the ongoing monitoring of this marine pipe route be surveyed, to ensure that the risk of damage by ice scour or marine activities is mitigated properly?

I have frequented Caribou Harbour for 30+ years and can attest to the fact that this location does experience environment extremes that do not provide a stable location for a marine outfall. The seabed changes frequently, storms and surges have gotten more extreme, ice densities vary greatly from year to year, and currents can be extremely high or slack. One year of data is simply not enough to determine the viability of this location.

- The effluent quality is undeniably worse than the current system for all but one of the documented pollutants in Table 2.4-3. To be clear, I am by no means advocating the continuation of the current treatment facility. However, it appears NPNS is proposing to put a worse quality effluent in a different place, with a blinded hope that dilution will improve the situation. This is not a forward thinking solution! It should also be noted that the Human Health Risk Assessment (HHRA), uses the current BHETF effluent characteristics for this assessment and stated that “*The future effluent from the new ETF is expected to equal to or better than the existing BHETF. Therefore, the assumed performance is conservative.”* The aforementioned table in the report contradicts this statement making the HHRA model not just incomplete, but not so conservative after all.

- It is strongly doubtful that air emissions qualities can be improved by the additional burning bio-sludge in the power boiler. In fact, within the HHRA, it was stated that “*Stantec found little information related to the combustion of pulp and paper sludge but used a sewage sludge incineration guidance to assist with predicting emissions for volatile organic compounds and NSE criteria air contaminants. As such, there is uncertainty in the predicted emission rates”*. In contradiction, section 6.2 states that “*references to other pulp and paper operations have confirmed that there are no specific emission issues that are created when bio-sludge is mixed with biomass.”* The Focus Report also states that *“the diversion of*

sludge for combustion in the power boiler may, in fact, displace the use of fossil fuels, thereby reducing the overall greenhouse gas (GHG) emissions and reducing the potential for odours from the pulp mill." (1.1.1). It is absurd to suggest a benefit in air quality without providing an incremental comparison of airborne emissions resulting by burning this sludge simply because the results are largely unknown. The best assurance that was offered was to simply state that both the current and modeled future emissions are within the ambient air quality standards identified in the Nova Scotia Air Quality Regulations. If the emissions are to be worse or better, we deserve clarity on the matter regardless of meeting guidelines.

- There are successful and healthy commercial shell-fisheries thriving in the Caribou area, whereas all other surrounding areas are typically closed due to contamination. This project will undoubtedly put these and many other nearby fisheries at risk. It is worth mentioning that I personally harvest or purchase a significant quantity of seafood in the Caribou area. I also frequently use these waters for recreational activities and am a part time resident of the area for roughly half of the year, which makes these risks somewhat more personal.

Upon review of the current HHRA, I must say that it is very incomplete and ripe with assumptions thus far. In particular, I take issue with the data collection method for the food survey in this HHRA. "Cold calling" residents of the province and only collecting data from Pictou county residents is not the correct approach. Given that only 300 phone respondents have completed the survey (<1% of Pictou County) it is very unlikely that they have proper representation of the scale of seafood consumption sourced from this area. Under the current method it is likely that that no commercial fishers were contacted, most consumers are unaware of the exact source of the food, and this affected area being largely seasonal properties has possibly been omitted. Without including all local commercial fisheries registered in this area, proactively reaching out to local and seasonal property owners and gathering a larger sample set of random citizens, the data collection method cannot be considered sufficient for a proper HHRA

I also disagree with the chosen local zone radius of 5km. The residency and migratory habits of all consumed seafoods, coupled with various other environmental parameters within a larger area needs to be understood in order to conclude what the appropriate local radius should be for this HHRA. Until this has been completed along with a more through and inclusive food survey, I would consider the HHRA term to be grossly incomplete.

In closing, this report does indicate that NPNS has spent some effort making improvements to their original submission. Yet a great deal of the document appears to be an attempt to provide spin on their economic importance and boast mediocre improvements to their facilities and environmental impacts. The report has no doubt been derived in haste given the glaring contradictions, mistakes, and admissions of broad assumptions made in place of scientific data; most of which could have been obtained with proper due diligence on this matter. Any negative net benefits of the project are shrouded in ambiguity and some data is seemingly deceitfully omitted. This report provides me with little faith or comfort that approving this project is in the best interest of the governed citizens and I compel you to outright reject this proposal.

Sincerely,

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:19:58 PM

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Project: replacement_effluent_treatment_facility_project Comments: I am expressing my concerns regarding the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal that is being considered under the provincial environment assessment. I reject this proposal in its entirety due to the serious negative environment effects this project will have on the land, sea, and air. This project will create human health risks, will damage Nova Scotias tourism and fishery sectors and it will damage the ecosystems in this region - which includes vibrant wetlands, coastal, and marine ecosystems and a diversity of wildlife. Pleas make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage in this project would do to our environment and our citizens. Name: @ns.sympatico.ca Address: Municipality: Digby Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 66 y: 27

From:
To: Environment Assessment Web Account
Cc: info@friendsofthenorthumberlandstrait.ca;
Subject: Northern Pulp"s Focus Report for their Replacement Effluent Treatment Facility project
Date: November 8, 2019 4:20:15 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

RE: Northern Pulp's Focus Report for the Replacement Effluent Treatment Facility project.

My name is , I live in are still living in Pictou Landing having moved there in . The current effluent system

I have a PhD in earth sciences from with concentrations in structural geology and geochemistry. I studied groundwater dispersion in ancient systems. I have worked in mining and established exploration work camps with well thought out environmental reports and contingencies all of which were well received by each of the communities I worked in from Northern Ontario and Nunavut to Sweden, Norway, Morocco and many other places. I have worked with first nations communities here in Canada and around the world with a strong relationship of engagement and have always addressed and mitigated concerns.

I have followed the various dealings of the pulp mill and the government and been particularly disturbed by things related to Northern Pulp and their parent company Paper Excellence as they seem much more removed from the community than previous owners. They have no corporate communications person who is based **in the community** and the current "community liaison committee" is made up of unknown individuals and therefore unable to be contacted with concerns directly. They are therefore completely ineffective as a "liaison" committee.

My main concern revolves around the fail safes and timely mitigation in place for breaches and ruptures in the effluent containment and transfer systems.

The mill personnel response time for spills usually begins AFTER have noticed and called in the problem or leak. This has happened at least 6 times over the period in which have monitored the relatively short length of pipe crossing . This is

concerning because the new pipeline will no longer be monitored by who to date have been the quickest and most effective way to alert the company of breaches.

The new system of monitoring the pipeline consists of very little in the way of fail safes for leaks or ruptures and I have seen no plan to immediately stop the effluent when a rupture occurs.

The mill facility is designed and laid out so that in the event of a rupture or failure of any large dangerous goods vessel or dangerous goods storage tank, the lost material will be contained in a containment area (if the tank is equipped with one)-

There should not be an if --- this needs to be standardized – no area should be at risk and all parts of the containment and delivery system need fail safes in case of a breach.

Breaches have happened too many times in the past over areas that are not in a watershed to take chances now! The future is about to become much more uncertain in terms of flooding and climate upheaval. Within the focus report, the current system is not good enough and I have not seen anything that indicates the degree of improvement required.

I would also point out that there is not topographic profile on fig 3.5-1 and without this data to the contrary it is quite obvious that any breach in the pipeline will contaminate well water. There is no way that the pipeline should cross this area without a system in place to divert effluent.

In summary I believe there needs to be

1. a clearly identified and present committee in place to deal with community concerns which will include environmental breaches.

2. a state of the art monitoring system which detects even minor changes in the flow and pressure exerted on the pipe with a fail safe that immediately stops the flow of effluent after a breach,

3. better data on the watershed areas and topographic areas defined where future floods due to climate change are likely and how this will affect the proposed system

The fail safes required for the inevitable breaches which have happened and will take place in the future are one of the most overlooked and critical aspects of the current focus report.

Regards,

_____

@gmail.com

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:21:22 PM

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Project: replacement_effluent_treatment_facility_project Comments: Dear Hon. Gordon Wilson, We need you to approve the Environmental Assessment for Northern Pulp. This treatment facility is a world class treatment facility that is not only used in other parts of Canada but also around the world. This treatment facility is an improvement over the effluent that is currently entering the Northumberland Strait. Pictou County and all of Nova Scotia needs Northern Pulp to remain in operation. There are so many jobs dependent on this company, not just the people who are directly employed at Northern Pulp, but all the spin off jobs as well. I hope you will look at the science behind this proposal and realize this is not going to have a negative impact on our environment. Thank you for your time and consideration. Name: @gmail.com Address: Municipality: New Glasgow Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 12

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:25:38 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Have lived and worked in this county for 50 years..life long Westville resident..and never seen the likes of the disrespect for those who work their hardest to make something of this county..we NEED the mill,we NEED forestry..its all we really have..the mill of today is so much more efficient than the mill of 30 years ago...people need to stop and think about how depleted this province will be without this industry..can say Im bias.. has more than 30 years at the mill..so I have seen and heard all the changes..know the effort put into improvements..know many who work not just at the mill but for the mill..woodsmen,truckers,etc. They work everyday..not 3 months a year and draw government checks the other 9.That we as tax payers are supplying for them. This project has to proceed to keep not just mill families eating but anyone who works at local businesses, car dealerships,retail stores,etc. You take the work out of a community so a few have better land values ,you are catering to the wrong people... Name: Email: @gmail.com Address: Municipality: Westville Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 54 y: 27

From: @northernpulp.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:27:53 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Hello regulators, I am writing today to support the construction of Northern Pulps new effluent treatment facility. I believe that the company and its consultants have more than answered all questions with the recently submitted focus report letter. The forestry and fishing industries have co-existed for over 50 years without harm to any fish or sea habitat so why would this new process which has been proven to work across the world be any worse than what we have now? This new facility will be state of the art and meet and exceed all government regulations so I implore you all to make this decision based on the facts submitted and not negative public opinions. In closing, I am firm in the belief that this province needs Northern Pulp and the questions that the province have asked of the company have been answered and Northern Pulp should be given the green light to start construction of their new facility Name:
Email: @northernpulp.com Address: Municipality: trenton Postal-Code: ns Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 77 y: 32

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:28:21 PM

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Project: replacement_effluent_treatment_facility_project Comments: hello I worked for freemans for years I worked in the woods before that so I have worked on both ends I have also worked in the fishing industry so I know what both industrys mean to the economy . I read the northern pulp praposol to help both industrys .I think they are on the right track . we definitely need the forest industry to keep the economy running . seems to me they have a good plan and put a lot of thought into the project Name: Email: @hotmail.com Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 65 y: 28

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:29:27 PM

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Project: replacement_effluent_treatment_facility_project Comments: Need to keep place running Name: @hotmail.com Address: Municipality: First South Postal-Code: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 84 y: 37

From: @live.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:29:52 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: It would be absolutely criminal to pump so called effluent into the Northumberland Straight. Effluence of any kind does not belong in our waters let alone so called treated effluence. NO PIPE Name: @live.com Address: Municipality: Pictou Postal-Code: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 58 y: 33

From:
To: Environment Assessment Web Account
Subject: Response to Northern Pulp Focus Report
Date: November 8, 2019 4:36:13 PM
Attachments: Environmental Assessment Branch November 2019 response.docx
Env. Assessment March 2019.pdf

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Please find attached my responses to Northern Pulp Focus Report, and my earlier response to Northern Pulp Replacement Effluent Treatment Project.

Thank you for the opportunity to respond and for your consideration to this important matter.

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ea@novascotia.ca

RE: Northern Pulp Focus Report

08 November 2019

The Honorable Stephen McNeil, Premier of Nova Scotia; and the Honourable, Gordon Wilson, Minister of Environment for Nova Scotia:

My name is I have lived almost my whole life in Pictou County. I come from a family which has fished the Northumberland Strait for 6 generations. The Northumberland Strait is such a beautiful, intricate part of our way of life here; supporting industry, travel, recreation and relaxation for all who seek these sacred opportunities and adventures in life.

Eight months ago, I wrote to Minister Margaret Miller outlining my concerns in regards to protecting the Northumberland Strait and ending environmental racism towards Pictou Landing First Nations; by the dumping of effluent in Boat Harbour. I am attaching that letter to this one in response to Northern Pulp Focus Report.

Before I go any further, I wish to thank the Honourable Stephen MacNeil, and his courageous Cabinet and Colleagues, for standing firm on The Boat Harbour Act. In the past 50 plus years every government in Nova Scotia has permitted, encouraged, or simply turned a blind eye to this horrendous injustice towards the people of Pictou Landing First Nations, as well as the rest of the population of Pictou County. Thank you, cannot be said enough for standing by the Boat Harbour Act.

I realize there will be economic impact, but historically people rally when they are faced with change. Nova Scotia can no longer continue to have our forests raped, and our fisheries and tourism harmed for this outdated, global, polluting industry. Yes, we need forestry, in the sense for re-forestation, we need trees for the animals that are now in our backyards; and on our highways; because we have destroyed their homes. We need forestry; to build new homes and businesses for our increasing population here in Nova Scotia, but there are better ways! Many forestry people have come forward and stated this publically, in regards to Northern Pulp's Replacement Effluent Treatment Facility Project and now the Focus Report. Nova Scotia needs sustainable forestry practices.

I stand by my comments and questions I presented in my first letter of 08 March 2019 and at this point I wish only to add that I have run the Property Identification Numbers which Northern Pulp set out in their Focus Report as properties being affected by the construction/creation/ placement of the pipe which will pump effluent from Northern Pulp into the Northumberland Strait. These numbers are as follows:

65097099; 65094914; 65094808; 65094906; 65094930; **65094971**; 65097065; 65094948; 65095010; 65091336; 65091328; 65095036; 65103798; 65106288 and 65131252.

I have entered the forgoing numbers on Property online; and nothing comes up corresponding with them. The only exception is the number; bolded, highlighted in yellow, and underlined **65094971** is the only actual PID # in the area, showing the property situated east of the Pictou Rotary near the Jitney Trail.

How this pipe is going to run along the 106 Hwy to the Northumberland Ferries and the Caribou Fishers Wharf and not affect land owners on either side of the highway? Has our Department of Transportation and Infrastructure Renewal already agreed to/or permitted this pipe to be placed on/or under their right of way? Also, in the recent past there was a leak, what has come of that investigation? It has been over a year, and nothing has been released regarding that incident? What will happen if the "new pipe" leaks at the rate of millions of litres per day? What then, for the residents of Pictou County, its marine life, wildlife, flora and fauna? Who answers to those environment catastrophes? Who pays to clean it up? The same management that didn't know they had a leak in October 2017, until property owners reported it? The same management that have Property Identifying numbers that show nothing corresponding with them in a Focus Report to our Government Officials?

Please apply the Precautionary Principal in your reviews of the history, and the supplied documentation by Northern Pulp or Paper Excellence as they have continually demonstrated over the past 50 plus years, "there is a chance of damage resulting", one needs only to visit Boat Harbour, or take a deep breath (smell and taste the effluent) in Pictou County, to know whole heartily that damage has resulted and continues here. Haven't we paid Northern Pulp enough for their abuse, destruction, and disregard for the PLFN and residents of Pictou County? Do we now have to sacrifice our multi-million dollar fishing industry? What is left of our tourism industry? The health and safety of our future generations to this global polluter?

Please, Honourable Gentlemen, do not destroy the incredible beauty and resources of the Northumberland Strait or any other part of Nova Scotia please bring this corporate nightmare to its rightful end. Be the first government of Nova Scotia, in over half a century, to put The People and Environmental Protection FIRST. Nova Scotia will rally, we are fundamentally survivors and innovators, removing a poison environment is a step in the right direction for everyone on the planet, stay brave, and place us on a path to a brighter, cleaner future.

Respectfully submitted

@munpict.ca

att.

Environmental Assessment Branch

Nova Scotia Environment

PO Box 442

Halifax, NS, B3J 2P8

Submitted via email: ea@novascotia.ca

08 March 2019

Dear Minister Miller

I write to you as a lifetime resident of Pictou County, to protect the Northumberland Strait and to end the half century of environmental racism that continues to this day in Boat Harbour.

Please reject the proposed Northern Pulp Replacement Effluent Treatment Facility Project due to the following:

Northern Pulp's Environmental documents use as an example a pulp mill in Tasmania, Australia which does not exist! How can this document be considered, in any way credible, on this fallacy alone? There is no mention of the amount of mercury that will be present in the effluent they propose to dump into the Northumberland Strait. The Northumberland Strait has economically provided for Nova Scotia, Prince Edward Island and New Brunswick, fisheries industries, tourism industry, transportation (Northumberland Ferries Ltd.) along with numerous small business along this beautiful coast. Our license plates states we are: "Canada's Ocean Playground".

Northern Pulp claims that damage will be minimal, how can they make such a claim when the Northumberland Strait is home to a very delicate ecosystem, it is Governments and citizens' responsibility to protect this ecosystem and the sustainable industries that it provides to the Maritime Provinces.

I have lived in Pictou County my entire life, leaving for education and work opportunities for years and then returning to stay. My family summered on Caribou Island, and when I was between 4 and 6 years old my Mother, Aunts, cousins and myself would pick wild heather along the rocky shores of Caribou Island. By the age of 7 there was no more heather to be found along Caribou Island. I realize this may be a coincidence, but as I was born in and Scott Paper opened in 1967, I have often wondered if the air/water emissions from this industry contributed to the demise of the wild shrub, possibly making the air or the soil to acidic for the plant to continue to thrive. How will the effluent from Northern Pulp effect marshlands, and rivers and brooks? Once these are destroyed can they be remedied? What adverse effects will this have on all wildlife that have already lost their habitat to the clear-cutting, forestry industry here in Nova Scotia?

I respectfully request that this project be subject to a Federal Assessment as the Northumberland Strait is under the jurisdiction of the Federal Government and the *Fisheries Act* is Federal Legislation, not provincial. This proposed project by Northern Pulp, is not worth the risk and the precautionary principle means it is incumbent on the Nova Scotia government to err on the side of caution.

The Northumberland Strait has a delicate ecosystem which must be protected.

There has been no consideration given to the Town of Pictou Watershed, where the pipe will be put through.

The Pictou Landing First Nations, the Northumberland Fisheries Association and the public have raised many concerns which are not being properly addressed by Northern Pulp regarding this project. There has been no public consultations on this newly proposed site.

The potential effects on species at risk has been ignored, the proposed site of the pipe goes through a rock crab nursery which feeds the lobsters; there is a herring spawning bed in close proximity to the site of the pipe; not to mention other protected species such as piping plover, hawks and eagles How will these protected species be affected by not just the effluent, but the construction of this pipe?

I work in by-law enforcement for the County of Pictou, one of the aspects of my position is to remove, seal, whale, shark, porpoise carcasses from the coastline of the county. Has any thought been given to the protection of these incredible sea creatures? How many more species will die from exposure to these chemicals that will spill from this pipe?

As the tax payers have paid for this company for the past 52 years how much more are we going to pay for the pollution we have been subjected to, along with the rape our forestry, and now are we to pay for Northern Pulp to destroy "Canada's Ocean Playground" and the century old industries it has provided? How in 2019 can this be condoned in a leading country of the world?

Please right the wrongs of the past half century, please hold this company to a higher standard and protect our province, our children, and their future by calling for a full Environmental Assessment Report on this proposal; and close the effluent treatment facility in Boat Harbour on January 31, 2020 as scheduled.

Respectfully submitted

From:
To: Environment Assessment Web Account
Subject: Northern Pulp"s Effluent Treatment Facility Proposal
Date: November 8, 2019 4:42:17 PM

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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is and I am writing to you about my concern with Northern Pulp's Effluent Treatment Facility Proposal. I am a resident of Pictou County, I have grown up walking the beaches, swimming in the waters and fishing on the waters of the Northumberland Strait. The idea that Northern Pulp wants to use, what I think of as my backyard, as a dumping ground for their waste is unfathomable.

I believe that Northern Pulp's plan to pump up to 85 million litres (31 Billion Litres per year) of effluent into the Northumberland Strait is a terrible idea. We all know that when you discard of pollutants in the ocean they do not just go away. They may appear to disappear or meet background concentrations, but the fact remains, the pollutants are still there. The solution to pollution is not dilution!

There are many people who eat shellfish off the shores of Caribou Island and surrounding beaches, many people who swim and boat in the Northumberland Strait, there are also many recreational and commercial fisherman on the water as well. To put all that at risk is not fair to ask. Using the Northumberland Strait as an effluent dumping ground is putting the ocean, marine life and people in unnecessary danger.

The mill has proposed an effluent pipe running into the Northumberland Strait on more then one occasion in the past. It was not approved. At that time the danger could be foreseen. We claim to be more educated now, claim to be making decisions based on science. If this is true then the pipe proposal should be denied this time as well. There should never be an effluent pipe from Northern Pulp flowing into the Northumberland Strait ever.

Thanks,

From:
To: Environment Assessment Web Account
Subject: Comments on Northern Pulp
Date: November 8, 2019 4:45:10 PM
Attachments: Northern Pulp CBFHA to NSE Nov 7 2019.pdf

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Please find attached our comments Northern Pulp review.

Thank you!

Cape Breton Fish Harvesters Association (formerly LFA27 Management Board)
262 Commercial St. Suite #4
North Sydney, NS, B2A 1B8

www.capebretonfish.com
facebook: Cape Breton Lobster
twitter: cblobsters

Cape Breton Fish Harvesters Association
262 Commercial St., Suite #4
North Sydney, NS, B2A 1B8
Phone/Fax: (902) 794-2227
Email: CapeBretonLobster@gmail.com
Website: www.capebretonfish.com

November 7, 2019

Honourable Minister Gordon Wilson
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

Re: Northern Pulp Nova Scotia, Focus Report, Replacement Effluent Treatment Facility

Dear Hon. Minister Gordon Wilson,

Northern Pulp Nova Scotia has submitted a Focus Report to the province on October 2, 2019. It is proposing a new treatment facility that will discharge 70-90 million litres of contaminated effluent into the Northumberland Strait every day. A Federal government study conducted a few years ago concluded that, even when meeting federal regulations, 70% of pulp mills in Canada continue to have harmful effects on aquatic life and habitat, and 55% are having harmful effects on the larger environment. The Northumberland Strait is part of the rich and vital fishing industry of our province. The reputation of our industry, and our brand, is built on seafood harvested from clean, cold, pristine waters off our province's rugged coastline. A threat to this reputation is a threat to the industry throughout Nova Scotia, Cape Breton and in neighbouring provinces.

The Northern Pulp Nova Scotia (NPNS) Focus Report was reviewed by the Gulf Nova Scotia Fleet Planning Board in detail. The CBFHA supports the conclusions made in the review, namely:

> *In closing, the GNSFPB would like to reiterate that NPNS has failed to adequately address the Terms of Reference outlined in section 7.0 Fish and Fish Habitat, 9.0 Human Health and 2.0 Project Description… Northern Pulp relies on major assumptions and blanketed statements to suggest that there will be no harm to the marine environment, including fish and fish habitat. There are gaps in the evidence presented, including but not limited to: impact on lobster development and population health, incomplete or non-existent commitment to follow up monitoring, lack of evidence to protect vulnerable populations or habitat such as fall spawning herring, other SARA (Cod, White Hake), Scallop Buffer Zone 24, eel grass beds, limited understanding of the seasonal impacts of ice cover and ice scouring. The importance of the global optics of the Canadian seafood brand can not be undervalued or excluded from this Environmental Assessment approach.*

Unfortunately, Northern Pulp has failed to assure our fishing industry that our brand and our livelihoods are not at risk. In fact, all evidence points to the proposed pipe and its discharging effluent having

harmful effects on marine species. Mill officials and their consultants provided no hard science on the impact on fisheries and fish habitat, yet insist that discharge into the Northumberland Strait is their only option. Northern Pulp appears satisfied to have the fishing industry assume 100% of the risk of their proposed new treatment facility. This is not acceptable to the fishing industry of Atlantic Canada.

We hope that your department will take these comments seriously and consider our vital fishing industry in making your final decision.

Thank you for your attention to this very serious matter,

Cape Breton Fish Harvesters Association

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Replacement Effluent Treatment Facility Project
Date: November 8, 2019 4:45:53 PM
Attachments: NP Focus Report Comments.pdf
NPEA Response_Mar2019.pdf

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Please find attached my comments concerning the Northern Pulp Replacement Effluent Treatment Facility Project.

November 7, 2019

Nova Scotia Environment
Via email: EA@novascotia.ca

Dear Honourable Minister Wilson:

Re: Northern Pulp Replacement Effluent Treatment Facility Project

I am writing in response to Northern Pulp's focus report for their replacement effluent treatment facility project that would discharge upwards of 85 million litres of treated pulp effluent daily and into the Northumberland Strait.

The below comments are a follow up to my March 9, 2019 response to Northern Pulp's original EARD where I outlined my concerns with Northern Pulp's public engagement process (attached).

NSE's terms of reference for Northern's Pulp's focus report outlines the following two requirements for public engagement.

1.1 Provide a response (via a concordance table) to questions and comments raised by the public, Mi'kmaq and government departments, and incorporate these comments in the Focus Report where applicable.

I am unable to find any reference to my comments and concerns in the concordance table in Appendix 1.1 of Northern Pulp's Focus Report. There is no section of the concordance table focused on public, stakeholder or Mi'kmaq engagement.

1.2 Provide a plan to share future reports and/or studies relevant to this Project with the public and the Mi'kmaq such as the Pictou Landing First Nation, including but not limited to the future Environmental Effects Monitoring results for the new effluent treatment facility.

Page 11 of Northern Pulp's focus report includes a chart outlining levels of engagement for stakeholders, right holders, and the public for various phases of the project. Northern Pulp has deemed an email notification as a light level of engagement and posting a report on-line as a medium level of engagement.

Table 1.2-2: Engagement Plan after the Focus Report

Recipient	Project Phases					Engagement Level / Frequency
	Project Milestones	Results of Regulatory Approvals	Additional Studies	Construction Complete	Environmental Effects Monitoring Results	
NPNS Employees/ Retirees	Email Notification	Email Notification	Email Notification	Email Notification	Email Notification Post report online	High
Provincial Government	Email Notification	Email Notification	Email Notification	Email Notification	Post report online	High
Local NSE Officials	Email Notification	Email Notification	Email Notification	Email Notification	Post report online	High
Local MLA/ MPs	Email Notification	Email Notification	Email Notification	Email Notification	Post Report online	High
PLFN	Email Notification	Email Notification	Email Notification	Email Notification	Post report online	High
Local Municipalities	Email Notification	Email Notification	Email Notification	Email Notification	Post report online	High
Suppliers/ Vendors	Post report online	Post report online	Post report online	Post report online	Post report online	Medium
Civic Community	Post report online	Post report online	Post report online	Post report online	Post report online	Medium
Key Business Leaders	Post report online	Post report online	Post report online	Post report online	Post report online	Medium
Other	Post report online	Post report online	Post report online	Post report online	Post report online	Low

Public engagement is defined as a two-way process, involving interaction and listening, with the goal of generating mutual benefit. Sending an email notification and posting information on a website provides little to no opportunity for interaction and listening on the part of Northern Pulp, the public or stakeholders.

On two occasions (January 22, 2018 and July 9, 2018) Northern Pulp consultants, Dillon Consulting, responded to inquiries from Friends of the Northumberland Strait . asked Dillon Consulting on both occasions if there would be a second set of public open house meetings. Dillon Consulting responded that yes, *"there would be another open house session where the public's questions from the initial phase of engagement would be answered and recommended environmental plans would be presented."*

Despite having a new receiving water location, new route, changes to the original technical proposal and several dozen new studies, Northern Pulp failed to honour that commitment. Instead, they chose to keep the public and stakeholders in the dark until filing their environmental assessment on January 31, 2019, leaving the public and stakeholders only 30 days to review massive amounts of technical information.

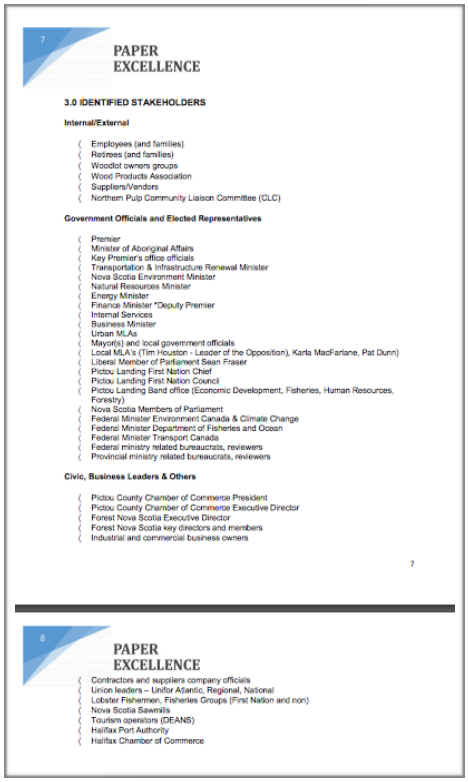
In a January 16, 2019 New Glasgow News story, (https://www.ngnews.ca/news/local/lack-of-public-consultation-ahead-of-northern-pulps-submission-of-environmental-assessment-sparks-backlash-276338/?fbclid=IwAR3bzXql2TfRqKiTOMpABZb-umqpcekfBmKsFgya8JSFoKJOLFJP_DMsVAk) Northern Pulp blamed a survey boat blockade and an increased number of required studies for the delay in filing their project and subsequent lack of further public open houses. Northern Pulp's director of communication stated "*We're at a point now where we want the project to move forward.*" Northern Pulp had since May 2015 to start moving forward on their project but instead opted to wait another two years and four months before commencing work.

In more recent month's, Northern Pulp has done little to indicate they will improve their public or stakeholder engagement practices.

In late August of this year, The Fishermen's Working Group representing over 3000 fishers in the Northumberland Strait, sent a letter to Northern Pulp requesting copies of any completed studies or reports for their ETF project. Northern Pulp failed to respond to the fishermen's request despite the following:

- That the NSE terms of reference states that *"during the preparation of the Focus Report, it is strongly recommended that NPNS continues to engage with* ***relevant stakeholders*** *and the Mi'kmaq including Pictou Landing First Nation, and to share relevant studies and reports";*
- That the fishermen are identified as **stakeholders** in Northern Pulp's Stakeholder Engagement Plan (Appendix 1.2) ;
- That Northern Pulp indicated on their website that 90% of the studies were completed at the time.

Page 9 of Northern Pulp's focus report indicates the Stakeholder Engagement Plan (SEP) was developed to *"outline how information will be provided to multiple stakeholders and rights holders in a timely manner so that these groups can voice their opinions and concerns"* (appendix 1.2). The SEP identifies Lobster Fishermen, Fisheries Groups and tours operators (DEANS) as stakeholders. The SEP, however, fails to outline how these particular stakeholders will be engaged (fig 2.3).



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3.0 IDENTIFIED STAKEHOLDERS

Internal/External

- Employees (and families)
- Retirees (and families)
- Woodlot owners groups
- Wood Products Association
- Suppliers/Vendors
- Northern Pulp Community Liaison Committee (CLC)

Government Officials and Elected Representatives

- Premier
- Minister of Aboriginal Affairs
- Key Premier's office officials
- Transportation & Infrastructure Renewal Minister
- Nova Scotia Environment Minister
- Natural Resources Minister
- Energy Minister
- Finance Minister *Deputy Premier
- Internal Services
- Business Minister
- Urban MLAs
- Mayor(s) and local government officials
- Local MLA's (Tim Houston - Leader of the Opposition), Karla MacFarlane, Pat Dunn)
- Liberal Member of Parliament Sean Fraser
- Pictou Landing First Nation Chief
- Pictou Landing First Nation Council
- Pictou Landing Band office (Economic Development, Fisheries, Human Resources, Forestry)
- Nova Scotia Members of Parliament
- Federal Minister Environment Canada & Climate Change
- Federal Minister Department of Fisheries and Ocean
- Federal Minister Transport Canada
- Federal ministry related bureaucrats, reviewers
- Provincial ministry related bureaucrats, reviewers

Civic, Business Leaders & Others

- Pictou County Chamber of Commerce President
- Pictou County Chamber of Commerce Executive Director
- Forest Nova Scotia Executive Director
- Forest Nova Scotia key directors and members
- Industrial and commercial business owners

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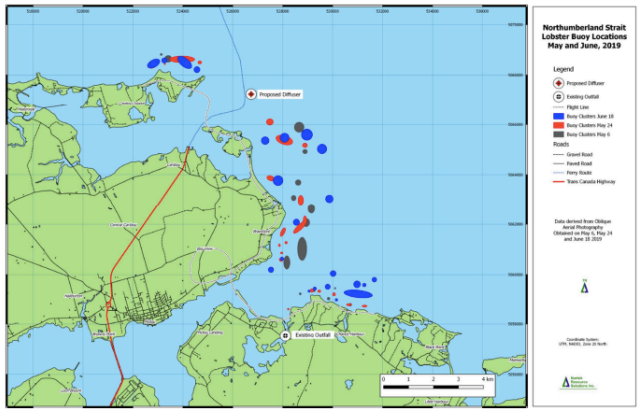
- Contractors and suppliers company officials
- Union leaders – Unifor Atlantic, Regional, National
- Lobster Fishermen, Fisheries Groups (First Nation and non)
- Nova Scotia Sawmills
- Tourism operators (DEANS)
- Halifax Port Authority
- Halifax Chamber of Commerce

2.3 Consultation Methods

STAKEHOLDER GROUP	CONSULTATION MEDIUMS
Government officials	⟨ Phone / email / text messaging ⟨ One-on-one discussions ⟨ Formal meetings
Neighbouring communities	⟨ Print media, and radio/TV announcements ⟨ Public meetings ⟨ Focus group meetings ⟨ Surveys ⟨ Polling ⟨ Project website
Employees and retirees	⟨ Phone /email /memos/MailChimp (email distribution tool) ⟨ Print media and radio/TV announcements ⟨ Employee information sessions
First Nations (PLFN)	⟨ Phone / email / text messaging ⟨ One-on-one discussions ⟨ Formal meetings ⟨ Project website
NGO's	⟨ Print media, radio/TV announcements ⟨ Public meetings ⟨ Focus group meetings ⟨ Surveys ⟨ Polling ⟨ Project website
Industry partners	⟨ Phone / email / text messaging ⟨ One-on-one discussions ⟨ Print media, and radio/TV announcements ⟨ Public meetings ⟨ Focus group meetings ⟨ Surveys ⟨ Polling ⟨ Project website

Northern Pulp's lack of public and stakeholder consultation is clearly reflected in the inaccuracies of their focus report. For example, Page130 of Northern Pulp's focus report includes a marine chart illustrating locations of "lobster buoy clusters" (fig 7.3-3). The figure shows no lobster fishing within or near the pipe diffuser location. Fishermen have attempted to tell Northern Pulp repeatedly that lobster fishing occurs along the pipe route and within the diffuser area. This is just one example of Northern Pulp not accepting information for what is true and instead manipulating it to meet their own needs.

Figure 7.3-3: Northumberland Strait Lobster Buoy Locations



Critical information gaps in Northern Pulp's focus report also illustrate a lack of response to public and stakeholder concerns. One of the most notable information gaps is no clear description of the effluent composition. This information has been requested repeatedly by the fishermen, by members of the public, and by NSE.

As the Minister of Environment, you are obligated to *'consider steps taken by the proponent to address environmental concerns expressed by the public'* when making your decision. Many issues raised in the original EARD by the public and by stakeholders showed a strong likelihood the project will harm the environment. These same issues were not addressed satisfactorily in the focus report. For this reason, I urge you to reject this project. Northern Pulp has been given multiple opportunities to show the community that their project would not cause harm, but they have failed.

In addition to rejecting Northern Pulp's ETF proposal, I expect our government to uphold its promise to Pictou Landing First Nation and close Boat Harbour to the flow of pulp effluent on January 31, 2020. The community of Pictou Landing First Nation should not have to live one more day breathing in the toxic haze from Boat Harbour that sweeps over Pictou Landing. As a cottage owner and a neighbour to Pictou Landing First Nation, we have experienced the air pollution first hand that this community must endure every day. We have the luxury of returning to our home in Hants County when the air pollution becomes overwhelming. The community members of Pictou Landing First Nation do not have that same luxury, nor should they have to leave their home to reap the benefits of the clean air and water that all Nova Scotians are entitled to.

Sincerely,

Upper Rawdon NS

(summer residence - Pictou Landing)

March 9, 2019

Dear Honourable Minister Miller:

I am writing in response to Northern Pulp's environmental assessment for their new effluent treatment facility that would discharge upwards of 85 million litres of treated pulp effluent daily into the delicate ecosystem of the Northumberland Strait.

have a cottage on Moodie Cove, Pictou Landing. As recreational water enthusiasts, we have spent our summers exploring the Strait and observing its diverse marine life. The Caribou Harbour area is one of our favourite areas to explore. We travel from the Pictou Landing Marina, make our way around the PEI Ferry markers and anchor off Munroe's Island. Here we will walk the beaches, swim and snorkel. While snorkelling, we have noticed the Caribou area is rich in marine life and is home to large populations of juvenile fish and crustaceans.

Concern: Northern Pulp's Community Liaison Committee - Lack of Transparency

While there are countless data gaps and inaccuracies in Northern Pulp's Environmental Assessment related to potential harmful environmental effects of the Project, I would like to focus on one concern with respect to public consultation, specifically Northern Pulp's Community Liaison Committee.

Northern Pulp provides the following description of their Community Liaison Committee (CLC) in their EA.

"NPNS has an existing Community Liaison Committee (CLC). The CLC serves as a formal consultation process with certain local stakeholders in compliance with NPNS' Industrial Approval to operate. The CLC serves a very important role in providing advice and facilitating two-way communication. The CLC members represent themselves as members of their community and provide their own personal perspective to the committee. They also provide constructive input on how the company may better address and respond to the community needs and concerns. The CLC meets at a minimum twice annually, in Spring and Fall, as well as convening on an as-needed basis. The CLC includes representatives from Pictou Landing First Nation, the communities of Abercrombie, Pictou Landing Moodie Cove and Pictou, NPNS staff, and NPNS executives."

In the Socio-Economic Impact section of the NPEA, under *8.14.6 Follow-up and Monitoring [operation and maintenance phase],* Northern Pulp states: *The existing Community Liaison Committee will continue to serve the very important role in providing advice and facilitating two-way communication between the local community and NPNS.*

And also under the Socio-Economic section, under 8.15.3.3 Characterization of Residual Environmental Effects, the NPEA states: *The existing CLC will continue to provide two-way communication between NPNS and the surrounding communities.*

Northern Pulp's CLC meeting minutes (sample: http://northernpulp.ca/assets/Uploads/NPNS-CLC-June-2018-summary-notes-FW.pdf)) indicate there is a representative from Moodie Cove on the CLC, however no name is provided for that committee member nor any of the other committee members.

As mentioned above, our cottage is on Moodie Cove, along with 20 other cottages that are accessed by three private roads. There are no permanent residents on Moodie Cove. Twelve of the cottages, including ours, is accessed via Rustico Lane. I contacted an executive member of the association for our road, to ask if knew who the representative was for Moodie Cove on Northern Pulp's CLC. was unaware there was a representative and called Northern Pulp on behalf of our association to find an answer.

received a call back from Terry Fraser, Northern Pulp's Technical Manager. Ms. Fraser indicated that the CLC members are anonymous and that if we wanted to present any of our views or questions to the committee, it would have to be through her.

In Nova Scotia Environment's *Guide for the Formation and Operation of a Community Liaison Committee (*https://novascotia.ca/nse/issues/docs/Community_Liaison_Committee_Guideline.pdf*),* it states the purpose of a CLC is: *To represent community interest by providing an avenue for the mutual exchange of information between the proponent and the community with respect to any existing or potential environmental effects of the project plan and activities.*

The Guide also details the following mandate and responsibilities by the proponent and CLC members:

Section	Description	Issue/Concern
The mandate	*A forum whereby the residents can bring any issues of public concern related to proponent's activities to the attention of the facility operators.*	The only residents who can bring their issues forward, are the ones sitting on the CLC, therefore Northern Pulp's CLC fails to represent the concerns of their communities.
Proponents Responsibility	*Notice of the CLC formation and members must be made known to the residents of the affected area by the proponent."*	Northern Pulp's members have remained confidential making it impossible for residents to bring their concerns forward to the CLC.
Proponents Responsibility	*The proponent should ensure that the views of the CLC are made available to the public in an appropriate manner.*	Minutes from CLC meetings made available to the public are vague and provide no detail on input from CLC members (sample: http://northernpulp.ca/assets/Uploads/NPNS-CLC-June-2018-summary-notes-FW.pdf)
CLC Members' Responsibility	*Discussing community views, issues and concerns with respect to the project plan and activities.*	It is impossible for CLC members to adequately express the views of the community when the community is unaware of who to express their views to.

In summary, Northern Pulp's Community Liaison Committee fails to facilitate any genuine or meaningful two-way communication between the local community and Northern Pulp. The CLC also fails to effectively represent the concerns and opinions of the surrounding community. It is my understanding that Northern Pulp's CLC structure has been brought to the attention of Nova Scotia Environment in the past, and that NSE has accepted this poor level of functioning.

Not only did Northern Pulp fail to hold a second set of public consultation sessions to inform the community on changes to their proposed ETF and the new Caribou outfall location, but they are now suggesting their CLC committee will be a primary tool in mitigating environmental effects from the construction and operation of this new facility to the socio-economic environment. (section 8.14 - Socio-economics Environment, 8.14.4.2 - Mitigation).

As the Minister of Environment, you are obligated to *'consider steps taken by the proponent to address environmental concerns expressed by the public'* when making your decision. Northern Pulp has not done an adequate job informing the public and collecting concerns, and therefore cannot properly address them. As well, Northern Pulp does not have the proper infrastructure in place to address any public concerns during the construction and operation phases of the project.

Based on the above outlined concerns, combined with the extensive data gaps in the NPEA, I am requesting that you reject Northern Pulp's proposal. Northern Pulp has failed to demonstrate that their project will not cause adverse effects to the environment that can be mitigated.

Sincerely,

Upper Rawdon NS
(summer resident - Moodie Cove, Pictou Landing)

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 4:47:37 PM

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Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: - Choose - Comments: This level of pollution is not sustainable, I have seen effects on lobsters on Eastern side of Pictou Harbour over 15 years ago, not to mention reBoat Harbour... which should not be repeated even at a fraction of previous practices Name: @hotmail.com Address: Municipality: Pictou Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 67 y: 17

From:
To: Environment Assessment Web Account
Subject: Re: NP replacement effluent treatment facility project
Date: November 8, 2019 4:49:34 PM
Attachments: .pdf

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Dear Honourable Minister Wilson:

I am writing in response to Northern Pulp's focus report for their replacement effluent treatment facility project that would discharge up to 85 million litres of treated pulp effluent daily into the Northumberland Strait.

In my March 9 response to Northern Pulp's original EARD (attached), I outlined my concerns with Northern Pulp's parent company and their global reputation for deforestation, air pollution, fraud, bribery and greenwashing. As a with 30 years experience, it concerns me greatly that Nova Scotia's government feels this foreign owned corporate bully is the best we can do.

Like many citizens, I was pleased to see Nova Scotia environment do the right thing on March 29 by rejecting Northern Pulp's EARD and requiring the company to submit a focus report based on a lengthy terms of reference provided by NSE.

To no surprise, Northern Pulp has failed to meet those terms of reference.

They have not provided data to prove that the project can be done safely. On almost every key point Northern Pulp has not provided concrete plans on what will be done. Examples include:

- No plan for a definite pipe route
- No plan for leak detection on the marine portion of pipe
- No specified leak detection for on-land pipe
- No clear description of composition of effluent

The focus report also contains many factual errors on the most basic information such as:

- Where fish are located and where fishermen fish
- Risks of treated pulp effluent to marine environments

Minister Wilson, I am asking that you reject Northern Pulp's proposed project. Their focus report does not prove that their project will not cause adverse effects to the environment. In fact, this focus report proves that Northern Pulp has no intention of changing its environmental legacy, as it has stated repeatedly in the media. If this project is approved, Northern Pulp will continue to operate in the same vain of its parent company at the expense of Pictou County and all\ Nova Scotians.

I also ask that the Nova Scotia Legislature honour the Boat Harbour Act and the scheduled closure date of January 31, 2020. As a cottage owner on Pictou Landing, I am very familiar with the polluted air and water that Pictou Landing First Nation must live with every day. Over the last two years, I have come to learn of the significant impacts that 53 years of pollution has had on the Pictou Landing First Nation community. This community can wait no longer to begin to heal.

Sincerely,

Upper Rawdown, NS

(summer resident - Moodie Cove, Pictou Landing)

On Friday, November 8, 2019, 04:43:36 p.m. NST, @yahoo.ca> wrote:

Dear Honourable Minister Wilson:

I am writing in response to Northern Pulp's focus report for their replacement effluent treatment facility project that would discharge up to 85 million litres of treated pulp effluent daily into the Northumberland Strait.

In my March 9 response to Northern Pulp's original EARD (attached), I outlined my concerns with Northern Pulp's parent company and their global reputation for deforestation, air pollution, fraud, bribery and greenwashing. As a with 30 years experience, it concerns me greatly that Nova Scotia's government feels this foreign owned corporate bully is the best we can do.

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Sincerely,

Upper Rawdown, NS

(summer resident - Moodie Cove, Pictou Landing)

March 9, 2019

Dear Honourable Minister Miller:

I am writing in response to Northern Pulp's environmental assessment for their new effluent treatment facility that would discharge up to 85 million litres daily of treated pulp effluent daily and into the Northumberland Strait.

Our family has had cottages on Moodie Cove since the early 1900's, long before the mill compromised air quality and before its effluent hugged the shoreline along Lighthouse Beach. My deep appreciation for the Northumberland Strait's beauty and clear water is what keeps our family coming back.

As with 30 years of experience, the history of Northern Pulp's parent companies is of particular concern to me. Northern Pulp is owned by Paper Excellence a subsidiary of Indonesian conglomerate, Sinar Mas. Sinar Mas is owned by the Widjaya family, one of the wealthiest families in Indonesia. Their businesses are responsible for deforestation of the Indonesian rainforest; contributing to hazardous level of smog in Singapore and Malaysia; defaulting on a $14 billion loan; greenwashing their companies; and bribing government officials.

As Northern Pulp wraps up 50 years of deceit and environmental racism with Pictou Landing First Nation, they say they are ready to start a new and improved environmental legacy in Nova Scotia. Sinar Mas does not have their own country's best interests at heart. How are we to believe that their environmental practices in Nova Scotia will ever be any better. Below are a number of examples of questionable practices and concerns by Sinar Mas, parent company of Northern Pulp.

1. Asia Pulp and Paper makes Corporate Criminal List top 10
https://globalexchange.org/2018/11/23/ten-top-corporate-criminals-of-2018
In 2018 Asia Pulp and Paper was listed in the top ten of corporate offenders on the Global Exchange list. Global exchange is an international human rights organization dedicated to promoting social, economic and environmental justice around the world. Each year it releases its top corporate criminal list too highlight some of the world's corporate worst-of-the-worst on issues like violations of human rights and workers' rights, environmental destruction, war profiteering, and tax evasion and other white-collar corporate crime, just to name a few.

Asia Pulp and Paper made Global Exchange's 2018 "10 Top Corporate Criminal" list for continued destruction of the Indonesian rainforest and peatlands and attempting to "greenwash" its image for the global market

2. Executives with Sinar Mas arrested in Bribery scandal in Indonesia

An October 2018 article in Mongabay (detahttps://news.mongabay.com/2018/10/palm-oil-executives-arrested-in-bribery-scandal-in-indonesia/ils the arrest) details the arrest of three Sinar Mas executives *after an employee was caught bribing politicians to kill an inquiry into water pollution and plantation licenses in Borneo*. Two of the executives were employed with a palm oil company which falls under Sinar Mas and according to the Mongabay article was located *near Lake Sembuluh in Seruyan district, in the Bornean province of Central Kalimantan. The lake is ringed by oil palm plantations and mills and has become severely polluted, with residents complaining of itchy skin after swimming in its waters and the collapse of fish stocks.*

PT Binasawit Abadi Pratama, was a smaller company the executives worked for operating near the lake. A tip was received by investigators about *a planned meeting in Jakarta between Binasawit representatives and provincial legislators, during which the bribery was supposed to take place.* Further

investigation revealed that there were problems with Binasawit permits and that *Sinar Mas wanted to pay off the legislators not only to kill the inquiry into water pollution but also to tell the media that Binasawit's permits were in order.* At the conclusion of the investigation two executives from Sinar Mas were charged.

3. Greenpeace Slams AP&P over links to Deforestation
https://www.greenpeace.org/usa/news/greenpeace-slams-app-sinar-mas-links-deforestation-ends-engagement-company/

An article by Greenpeace International in May of 2018 calls out Asia Pulp and Paper (AP&P) over its deforestation practices in Asia and indicated that Greenpeace has ended all engagement with the company. Through *mapping analysis by Greenpeace International* it has been revealed that *almost 8,000 ha of forest and peatland has been cleared since 2013 in two concessions which are, through ownership, linked to APP and its parent company the Sinar Mas Group.* Greenpeace has put *these allegations to APP/Sinar Mas. The group failed to provide a credible response or to take meaningful action. As a result, Greenpeace has ended all further engagement with APP/Sinar Mas.*

In 2013 APP had adopted a Forestry Conservation Policy (FCP) and had *committed to end forest clearance within its own and suppliers' concessions, protect remaining forests in these areas, improve management of peatland and work with communities to resolve social conflicts.* Greenpeace had been advising and inputting into the FCP, however when it was able to show the deforestation of nearly 8000 hectares through satellite imagery and company deeds, it ended its relationship with APP stating that *this new evidence tells us that APP/Sinar Mas is not genuinely serious about stopping deforestation in Indonesia.* Greenpeace further called upon customers of APP to demand they end their deforestation practices and that if *APP and the Sinar Mas Group do not immediately comply, then all customers should cancel contracts and walk away.*

4. Behind-the-scenes ties and significant influence over wood suppliers linked to fires and deforestation in Indonesia.
https://www.seattletimes.com/business/ap-exclusive-pulp-giants-makeover-obscures-supplier-ties/

According to an AP exclusive published in the Seattle Times, December 19, 2017, Sinar Mas, known by its international trade name, Asia Pulp and Paper, one of the world's largest paper producers was attempting to "Greenwash" its image for the global market. In the article it states that Asia Pulp and Paper (APP) *has insisted in company publications, public events and to the media that most of the companies that supply it with wood are "independent," not owned by it or in other ways affiliated with it.* The AP reviewed over 1000 pages of company records and determined that 10 individuals owned these "independent' wood suppliers, and *that six are employees of the Sinar Mas group and two are former employees, one with links to the Widjaja family, which owns Sinar Mas. Several work in the finance department of Sinar Mas Forestry.* According to the article, Sinar Mas had pledged in 2013 to stop deforestation however the investigation found that *a company owned by two employees of Sinar Mas Forestry has been cutting down tropical forest on the island of Borneo since 2014.*

The AP was able to find that 27 so called independent wood suppliers had links to Sinar Mas even though the company had told the outside world that they were independent. They were able to identify some by *matching biographical details in the documents, including birth dates, to information in social media profiles, news reports, forestry industry documents and other sources.*

The article goes on to describe that on top of its pledge to stop deforestation in 2013, that Siiar Mas made another *pledge to gain prior and informed consent of local communities for new plantations,* but in spite of this, *Sinar Mas is pressing ahead with plans to turn 66,000 hectares (163,000 acres) of state land in the Bangka Belitung island chain off Sumatra into industrial forestry plantations despite substantial*

opposition from locals. The move puts the company on a collision course with villages that farm on the land and which some 100,000 people call home.

5. Defaulted on $14 billion worth of bonds and loans in 2001

In the mid-1990s Asia Pulp and Paper (APP) embarked on an aggressive expansion strategy to turn their pulp and paper operations into a global player. Billions of dollars were required to fund the intended expansion. According to the Bulls and Bears Blog, t*he company commenced a global drive for funds and managed to issue* billions *of dollars' worth of bonds starting 1994, with the help of the eager Wall Street investment banks, and a story that sold with investors: an emerging market blue-chip, with competitive advantage in fast-growing Indonesian hardwood, and operating in low-cost Indonesia while collecting revenue in dependable US currency.* (http://stocktaleslot.blogspot.com/2005/11/asia-pulp-paper-debt-default.html.

Several years later, after a down turn in global paper prices , APP were unable to meet their debt payments on bonds , loans and trade payables and according to Wikipedia, *in 2001, Asia Pulp & Paper (APP), the subsidiary of Sinar Mas Group, called a standstill on $14 billion worth of bonds and loans and stopped repaying its debt, including interest payments, in what is still the largest default to foreign investors in Asian market history.* This included *about US$6.7 billion of dollar notes, the biggest missed bond obligation by an Asian company to date,* (The Strait Times, Published Apr 28, 2015, https://www.straitstimes.com/business/worst-asian-default-forgiven-as-indonesia-billionaire-sells-debt).

The consequences for the Widjaya family were limited and as the ultimate owners of APP*, there was no forced pledging of their personal assets, nor any injection of assets to prop up the company for debt restructuring. The family and their associates were still left as the operational managers after the whole debacle. (Bulls and Bears Blog)*. The Widjaya family was also the owner of Bank Internasional Indonesia, *before it was taken over and bailed out by the government in 2001 because it was unable to force Sinar Mas and other borrowers to repay their debts,* and that, *more than half of the bank's loans were made to Sinar Mas companies, violating rules on inter-group lending.* (Bloomburg Billionaire Index, Overview Eka Widjaya)

The Widjaya family business went on to recover from this debt default and expanded their properties in Indonesia, Singapore and China and according to the Bloomburg Billionaires Idex , Eka Widjaya , the founder of the family business was listed in 2017 with a net worth of $ 8.1 Billion.

Minister Miller, our natural resources deserve better than Sinar Mas. Nova Scotia deserves better. Pictou County deserves better. I am asking you to reject Northern Pulp's EA proposal. Their EA does not prove that their project will not cause adverse effects to the environment, and given their parent company's history of deceit and environmental destruction, there is no evidence to show that Northern Pulp has any intention of starting an improved environmental legacy here in Nova Scotia.

Sincerely,

Upper Rawdown NS
(summer resident - Moodie Cove, Pictou Landing)

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:00:46 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I support the replacement effluent treatment project. The new pipeline and facility will meet environmental standards and regulations. There are other mills in Canada that successfully use this treatment system. The project will help to sustain the economically important forest industry throughout the province while reducing and mitigating environmental impacts in the Strait. Name: @gmail.com Address: Municipality: New Glasgow Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 50 y: 24

From:
To: Environment Assessment Web Account
Subject: Forwarded Response to Northern Pulp's Focus Report From
Date: November 8, 2019 5:01:26 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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To the Honourable Gordon Wilson
Minister of Environment
Province of Nova Scotia
Halifax, NS

Via email to: ea@novascotia.ca

Re: Northern Pulp's Focus Report

Dear Minister Wilson,

Further to my previous letter to Minister Miller, thank you for inviting public response on the Northern Pulp Focus Report.

The more I learn about this mill the more concerned I become.

The Abercrombie Point mill has been a bad deal for the taxpayers of Nova Scotia during the 50+ years of its existence.

I see the pros and cons of the Northern Pulp mill as follows:

PROS:

- employment of local residents at the mill site and spin-off jobs to supply chain workers and wood lot owners

Cons:

- significant degradation of the Acadian Forest on both Crown and privately held lands

- negative effects on natural species that live in the forest, both plant and animal

- the financial liability of the Indemnity Clause funded by the taxpayers of Nova Scotia.

- the cavalier attitude of mill management recently shown toward a local book store and the Pictou Lodge when the mill's management publicly threatened to boycott both local businesses

As for the Indemnity Agreement , this may have been a good idea at the time when the Province negotiated with Scott Paper to build the mill but this has become an increasingly bad deal for NS taxpayers due to the fact it is handed down to successive owners of the mill. A small province like ours cannot afford to guarantee the profitability of foreign owners who have shown no interest in avoiding severe pollution of the local land, water and air.

The mill was designed for a 30 year useful life. We are now 22 years past that expiry date. Even with a new and relocated Effluent Treatment System (which still represents an environmental risk for potential leak of toxic waste) we are still left with a 52 year old mill that will continue to deteriorate and need more money to run. As in the past that will likely result in contributions from taxpayers.

The ongoing financial burden to NS taxpayers while this mill continues to operate is proof that the negotiations to bring it here in the first place we're not done in good faith for the citizens of Nova Scotia. Our best interests were not considered as far as the long term existence of this mill was/is concerned.

I believe the Cons outweigh the Pros and the time has now come for us to do the math and determine the costs to shut this mill down and shift our focus on the following:

- rehabilitating our degraded forests,
- developing other more profitable markets for our private wood lot owners
- keeping our current Northumberland Strait fisheries and the Pictou Water Supply safe from the potential disaster of a toxic chemical spill
- improving the future of Pictou County's tourism industry.

Sincerely,

Dartmouth, NS

Sent from my iPad

From:
To: Environment Assessment Web Account
Subject: Environment Minister re Pulp Mill
Date: November 8, 2019 5:12:31 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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I truly value our beautiful Pictou County beaches, Provincial Park and prime fishery . All of these valuable resources need to be protected.

Thank you

Sent from my Galaxy Tab® A

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:14:27 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Please consider long term environmental impacts over short term economic gains. We need leaders that make decisions for the future. We need to prioritize our two most important resources, air and water. Do not make the mistakes of the people before you. Name: Email: @hotmail.com Address: Municipality: Pictou Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 59 y: 27

From: @northernpulp.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:15:12 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: If the science behind this system is sound then put the pipe in and hold them accountable if the fishery is damaged. Get them to improve the air quality as well. That will generate even more jobs. Name: @northernpulp.com Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 73 y: 16

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:23:00 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I cannot believe the thought process of seone wanting to dump industrial effuent into our Northumberland strait. When the world is trying to clean up the mess from 50 years ago the NS gov might be considering this! Do you not realize this pipe to the strait goes through Pictous water shed? Do you realize the fishing industry is a multi billion asset not including our tourism industry? What will be our new NS slogan Canadas ocean dumping ground? Name: Email: @gmail.com Address: Pictou Nova Scotia Municipality: Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 58 y: 15

From: @icloud.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:23:17 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I am a professional forester, woodlot owner and was for several years a non- profit woodlot owner organization advocating for private woodlot owners. It is important to note that many of our 30,000 family forest owners rely on periodic income from forestry activities to support their families. Over the last 23 years I have worked across the province with the sawmills, pulp mills, and harvesting, trucking, and silviculture contractors. In the fall of 2016 I travelled to Finland with a group of Nova Scotia woodlot owners to study the Finnish forest industry and what was behind their tremendous success of their family forest owners. One of our important findings was that the Finnâ?Ts success in forest sustainability was in part due to the high degree of integration between the sawmilling and pulpwood sectors. More specifically, sawmills need pulp mills buy their by-products wood chips and woodlot owners need pulp mills and low grade markets to do proper forest management and silviculture required for forest improvement. At least 4 of the 5 major sawmills in N.S. depend exclusively on Northern to buy their sawmill chips and at least 2 of these major sawmills have publically stated they would have to cease operations should Northern close. In my opinion should Northern Pulp cease to operate this will be a very significant blow to our forest industry from which I doubt we could recover for many decades. Closure will also result in the loss of thousands of rural jobs and incomes of forest owners. I do believe that the fishery and the pulp mill can co-exist. It is a fact that similar effluent treatment systems have been proven in other parts of the world and I see no reason that we canâ?Tt maintain our forest industry and fishery here in Nova Scotia providing we have the proper environmental safeguards in place. I support the Effluent Treatment plan in principal and hope that the eventual closing of Boat Harbour and subsequent cleanup can be delayed allowing for this projects completion. Most importantly of all we should make sure we protect the environment and respect each others livelihoods and cultures while doing so. Name: Email: @icloud.com Address: Municipality: Waverley Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 59 y: 19

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:24:11 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: It is very important to install the treatment facility at northern pulp! The studies have shown there will be minimal impact on ocean life! My family and 1000s of others depend on this mill from forestry to the shops that keep us running daily! Name: @hotmail.com Address: Municipality: Londonderry Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 27 y: 23

From: @bellaliant.net
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:26:48 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: It is time that we face the reality that NP is not a good corporate citizen and that using up the valuable resources contained within our forests for such a small return while at the same time polluting our environment makes no sense. There is no SAFE level of the chemicals contained in the effluent to dump into the straight. We cannot jeopardize both our fishing and our tourism for the benefit of a foreign company that cares nothing for our environment. It is time we allowed them to go away and to look at more ecologically sustainable and value added ways of using the resource that belongs to all Nova Scotians, not to NP. No pipe into the straight and no extension of time. Name: @bellaliant.net Address: Municipality: Halifax Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 23

From:
To: Environment Assessment Web Account
Subject: Response to Focus Report on Northern Pulps Proposed Replacement Effluent Treatment Facility Project
Date: November 8, 2019 5:27:08 PM
Attachments: Response to Focus Report on Northern Pulps Proposed Replacement Effluent Treatment Facility Project .msg

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Dartmouth, NS

Response to : Focus Report on Northern Pulp Proposed Replacement Effluent Treatment Facility Project

Respectfully submitted to The Minister of the Environment :

"Nova Scotia Environment works to protect and promote a healthy environment. ……protecting the provinces land, water and air. "

Having spent my years summering at our family cottage in Pictou landing, I have spent a lifetime being exposed to the pollution of the land, water and air created by the paper mill at Abercrombie Point and the Boat Harbour effluent treatment facility ☹ My children and now my grandchildren have lived with the pollution and we often have had to vacate our cottage due to the nausea and chest pain that can ensue from breathing the plume of emissions that descend like a fog from the Boat Harbour treatment facility and Northern pulp mill.

I have many concerns, but would like to focus on the air quality/ emissions that will be created by the proposed new activated sludge treatment (AST) effluent treatment facility (ETF) and the plan to burn BIOSLUDGE , along with the current biomass, in the biomass (power) boiler. My focus is on AIR QUALITY in the terms of reference (section6) requested by the Nova Scotia Dept. of Environment April 23,2019 and Northern Pulps response in the focus report.

I reference Northern Pulps focus report Appendix 6.2 -updated air dispersion model (which also addresses 6.1 - revised air contaminants). I noted while preparing this that there was a revision to 6.1 just last week (October 28/19) – summary of maximum predicted GLC's (ground level concentrations) from the operation of the project.

Appendix 6.2 opens to Stantec Expanded Air Dispersion Modelling Study for the replacement ETF. There are many shocking statistics upon reading the study.
The first (section 2.0 Facility description & process overview) is that there are 6 primary sources of air contaminants, with only 4 stated as being equipped with some form of pollution control technology .
There are 11 other secondary emission sources stated in the pulping process.
3..0 Air contaminants of interest – there are 86 (Appendix A, Table A1) air contaminants determined to be potentially emitted from 'the Project' (ie. replacement ETF & co-combustion of biomass and biosludge in the biomass boiler)
4.0 Emission inventory lists 86 emission contaminants associated with the project.
4.1 Biomass boiler (biomass + biosludge) – expected to potentially release metals, CACs, PAHs, dioxons and furans and VOC's. Emmision rates for all these contaminants from the biomass boiler were estimated.

Page 25/68 stated “as ETF is not yet operational , site specific sludge composition could not be obtained and sludge composition noted was used as a surrogate.”
Page 26/68 stated “… there is limited information publicly available pertaining to combustion of biosludge from pulp and paper mills.”
Guidelines published by US environmental protection agency (US EPA AP-42, Chap.2.2) for sewage sludge incineration was used to estimate contribution from biosludge for emission rates of CAC’s and VOC’s.
4.2 Activated sludge treatment ETF is expected to potentially release TRS, VOS’s ammonia and some species of PAH’s .
4.3 Emission rates for other existing sources of air contaminants were also estimated (the definition of estimate Merriam Webster is to determine roughly)
5.0 Next sections referred to Air Dispersion Modeling Methodology
6.0 Air Dispersion Modeling Results
7.0 Discussion - air contaminants with modeled exceedances are ammonia , chloroform, total reduced sulphur , hexavalent chromium.

8.0 Summary and conclusion stated “As the biomass boiler is not yet operating with the co-combustion of biosludge and biomass, Facility- specific stack testing results are not available. As such, emissions were estimated using emission factors, stack testing results from similar operations at other Kraft pulp mills (Howe Sound and Crofton), and/or sludge composition from another Kraft mill with similar operations (Howe Sound). The data quality is lower when non-site-specific data is used, as there is a level of UNCERTAINTY on representativeness of actual operations.
Once the replacement ETF is operational, pending approval by the province, Northern Pulp will conduct stack testing of the co-combustion of biomass and biosludge in the biomass boiler. Upon receipt of the stack testing results, the emission rate of hexavalent chromium will be revised, and the air dispersion modelling will be updated to determine if the maximum predicted GLC is below the corresponding ambient air quality standards. In addition, the contaminants that were predicted to exceed ambient air quality criteria with the main contribution being from the AST ETF (ammonia, chloroform, and TRS) will be monitored at ambient monitoring station(s) surrounding the Facility to assess whether air criteria are being met. It is recommended that the monitoring data be used to refine the emission rates and the air dispersion modelling be updated at that time. If the revised air dispersion modelling results and/or the monitoring results indicate the need for mitigation (i.e. an air criteria exceedance is measured or predicted), an air emission reduction plan will be developed and submitted to NSE for review and approval, prior to implementing mitigation actions.”
In regards to the above statement , since there are so many unknowns in regard to burning of the biosludge and associated air quality/ emissions , Northern Pulp is responsible for follow up stack testing. How are we to trust them with their history of poor compliance (ie. failing stack emission guidelines repeatedly, failing to detect ruptured effluent pipes) and disregard for the environment.

9.0 Closing stated, “ This report has been prepared by Stantec Consulting Ltd. wth the input and assistance of Northern Pulp for the sole benefit of Northern Pulp.”

Appendix 9.2 Human Health Risk Assessment by Ecomatrix Inc., states in 2.7 Uncertainties , “ Throughtout the HHRA process, assumptions must be made due to a lack of absolute scientific knowledge. ….. every assumption introduces some degree of uncertainty into the risk assessment process. “
“The predicted air emissions presented in this HHRA are from the updated air dispersion modeling study (Stantec,2019a). The emission rates were estimated by using the existing emissions from the ’19 stack test, anticipated biomass fuel feed rates & adjusting to include anticipated ETF biosludge in the biomass boiler. Stantec found little information related to the combustion of pulp and paper sludge, but uses a sewage sludge incineration guidance to assist with predicting emissions for VOC’s and NSE criteria air contaminants.
AS SUCH, THERE IS UNCERTAINTY IN THE PREDICTED EMISSION RATES.”

What is missing ?
Concrete data on air quality/ emissions associated with burning of the biosludge in the biomass boiler and data on whether the existing biomass boiler, with its antiquated wet scrubber as the only environmental protection technology, can do the job.
Will Northern pulp adhere to the 14 parts biomass to 1 part biosludge burn ratio in the boiler ?
What is the BTU value of the biosludge to confirm its categorization for fuel vs incineration (re. US environmental protection agency guidelines)?

Sections 12 of the Environmental Assessment Regulations (specifically 12.c, 12.d,12.da) have not been satisfied with the Northern Pulp Focus Report.

Respectfully, I ask the Environment Minister to reject the proposed project. Northern Pulp has not provided enough information to prove that the project will not harm the environment, or more importantly, harm or have adverse effects on human health ! Northern Pulp has been allowed to pollute our land, sea and air for far too long with a pulp and paper facility that was never meant to operate past 25 years !!!
We cannot trust Northern Pulp to monitor air quality / emissions created by the burning of biosludge in the biomass boiler associated with the new AST ETF nor take action to mitigate the risk to human health and the environment based on their history.

A solution for Northern Pulp would be to construct an up to date closed loop system. This would mitigate all environmental and human health risk and concerns. The technology does exist and the owners have the resources.

It is time to stop this antiquated facility from continuing to pollute our environment and adversely effect our human health.

Again, Nova Scotia Environment works to protect and promote a healthy environment.
We are depending on you to protect us and the next generation !

Respectfully ,

From: @yahoo.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:30:56 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: We need the jobs that the mill creates. If they shut down it will be a big blow to our economy. Name: @yahoo.com Address: Municipality: Antigonish Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 66 y: 33

From: @icloud.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:30:59 PM

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Project: replacement_effluent_treatment_facility_project Comments: I am in full support of this project. I believe whatâ?Ts in the focus report true and believe that this is the best way for northern pulp to continue to operate in a most environmentally friendly way as feasible. With little to no impact on fisheries and or agriculture. Name: Email: @icloud.com Address: Municipality: Hilden Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 86 y: 27

From: @senb.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:32:36 PM

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Project: replacement_effluent_treatment_facility_project Comments: My name is of the SENB Forest Products Marketing Board. Our organization represents approximately 8200 private woodlot owners in the South East New Brunswick region. I have been following the events unfolding in N.S regarding the efforts of Northern Pulp to establish a new effluent treatment plant in order to comply with legislation requiring the existing effluent treatment plant to be shutdown in early 2020. I have been very impressed with the level of detail and study Northern Pulp has put into making sure the new plant follows all environmental standards and will have as minimal impact as possible on the environment once it is built. As a person who has been looking out for the health of our forests for the past 22 years, I believe it is vitally important that Northern Pulp ensure there will be no significant environmental impacts as a result of the new effluent treatment plant being established. To this end, I feel conf ident that they have done the necessary groundwork and commissioned the necessary studies to accomplish this goal. From a financial impact perspectiveâ?¦ The only way I can reference a relatable experience should the Boat Harbor Act not be amended to allow an extension of its use, and Northern Pulp not be granted their permit to build the new plant is to say that we, as woodlot owners, would see a repeat of what happened to us as a result of the 2008 U.S. housing crisis. Back then we went from marketing 200,000 cord of wood per year to 50,000. Numerous forestry workers were forced into bankruptcy or lost their jobs. Our province went from 54 mills purchasing forestry products to 27. It has only been in the past 12 months since Northern Pulp began purchasing softwood pulp out of our area that we have began to see a rebound from the 2008 housing crisis. A market for our pulp is critical for those that work in our forests to build confidence, encourage growth, and embrace forestry as a viable career choice. As rewarding a career as forestry can be, I canâ?Tt recall the last time I spoke with anyone who has said to their sons or daughters that a career in forestry is worth considering. Moving forwardâ?¦ We cannot ignore the concerns of our neighbors who draw their living from the sea, and we cannot disregard the concerns of the first nations whose land this was long before the arrival of my ancestors. I believe we all must work together, for our collective benefit, to see Northern Pulp be able to continue to provide all the economic and social benefits it does. There is a solution, that may not be perfect for any one party, but will provide a way for all of us to move forward together. In the meantime, I would like to put the support of our private woodlot owners behind Northern Pulps proposal for a new effluent treatment plant and implore the N.S government to do all within its authority to ensure that they provide a path forward for Northern Pulp and all the other parties involved. Name: SENB Marketing Board Email: @senb.ca Address: Shediac, N.B. Municipality: Scoudouc Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 52 y: 20

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:38:19 PM

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Project: replacement_effluent_treatment_facility_project Comments: No Pipe!! Name: @gmail.com Address: Municipality: Wolfville Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 58 y: 21

From: @gmail
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:40:18 PM

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Project: replacement_effluent_treatment_facility_project Comments: My family has Depended on northern pulp for 30 years..and there are thousands more like me.we need this mill to continue for years to come. The forest industry in nova Scotia depends on this mill shutting it down can not be an option. Name: @gmail Address: Municipality: Collingwood Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 54 y: 38

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:41:19 PM

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Project: replacement_effluent_treatment_facility_project Comments: I support the mill . I work directly in the forestry business and the Mill creates multiple jobs. It would be an incredible loss to have the Mill closed . Name: Email: @hotmail.com Address: Municipality: Antigonish Postal-Code: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 76 y: 18

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:42:00 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Dear Premier McNeil, I believe that Northern Pulps plan to pump up to 85 million litres 31 Billion Litres per year of effluent into the Northumberland Strait is a bad idea. I do not believe the Northumberland Strait and its marine life, which is already under a lot of stress, can withstand this incredible influx of effluent. In addition to what it would do to the marine environment, I worry about the potential risk that this poses to our fisheries. The livelihood of our fishers is being threatened by both the make up of the effluent as well as the temperature. I do not believe the province would have even considered a proposal from Northern Pulp if that proposal was one that would put the Michelin plant next door at risk. I dont see how this is different. Do the right thing. Support the community in transitioning to green jobs and a circular economy - make this a shining example of what can be done in a climate crises instead of a murky slimy example of how to pollute. There is no pipe long enough to hide this disgrace and there is no place in our ocean that should accept the tailing and effluent of our human greed, thank you . Name: @gmail.com Address: Municipality: Halifax Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 73 y: 11

From: @yahoo.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:42:20 PM

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Project: replacement_effluent_treatment_facility_project Comments: I am in favor of Northern Pulp moving forward with the proposed wastewater treatment facility. The proposed system has proven effective in other provinces such as British Columbia. Across Canada there are 88 pulp and paper mills that coexist in their local communities with other industry...with this proposed system NS should be able to as well. After reviewing the focus report I feel the scientific research will allow for the construction of a facility that will create jobs and support the economy while protecting the environment at the same time. Name:
Email: @yahoo.ca Address: Municipality: Antigonish
Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 55 y: 18

From:
To: Environment Assessment Web Account
Subject: Fisheries Industry Submission on NPNS Focus Report
Date: November 8, 2019 5:46:09 PM
Attachments: Fisheries Industry Submission, NPNS EA, Nov 8, 2019.pdf

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To Whom it May Concern:

Please find attached a submission on NPNS's Focus Report from the Gulf Nova Scotia Fleet Planning Board, the Fishermen's Association of PEI, and the Maritime Fishermen's Union.

Please send confirmation of receipt at your earliest convenience.

Best regards,

--

Juniper Law
ph:

Juniper Law

Fergusons Cove, NS
@juniperlaw.ca

The Honourable Minister Gordon Wilson
Nova Scotia Environment
Barrington Tower, 1894 Barrington St., Suite 1800
P.O. Box 442
Halifax, NS B3J 2P8

November 8th, 2019

Dear Minister Wilson:

I am counsel for three fishing industry organizations representing the fishing industry in the Northumberland Strait: Gulf Nova Scotia Fleet Planning Board, PEI Fishermen's Association, and Maritime Fishermen's Union. These organizations represent some 3,000 fishers working in this region, and have been active participants in the environmental assessment process for Northern Pulp Nova Scotia's (NPNS) proposed effluent treatment system since the project was proposed.

Please find herein the submissions on behalf of these fishing industry associations, including concerns expressed by these three industry associations and four independent expert technical reports regarding the environmental, social and economic impacts of NPNS's proposed effluent treatment system.

We note that the 30-day public comment period is hardly adequate to enable a robust assessment by the public, including the fishing industry, given the volume of materials submitted by NPNS.

Furthermore, we are deeply concerned that there is an appearance of bias on part of the Province in this matter given, as the Nova Scotia Court of Appeal noted in Pictou Landing First Nation v Nova Scotia (Minister of Aboriginal Affairs), that the Province is attempting to be both investor in and regulator of the Effluent Treatment System. Given the Province's contractual approval of and payment for the ETS design, how can we have any confidence that the Province will provide an impartial assessment of the environmental impacts of the ETS?

In summary, based on the review conducted by these associations and the independent technical reviews, it is clear that NPNS has failed to provide a complete response to the terms of reference for the required Focus Report, and furthermore, that information provided by NPNS, incomplete as it is, raises concern for significant and unacceptable adverse impact risks for the Northumberland Strait marine ecosystem, local communities and the fishing industry sector. The health of the marine environment and the region's seafood export market hangs in the balance.

We urge you to exercise your authority under Nova Scotia's *Environment Act* and associated *Environmental Assessment Regulations* to (a) reject this project due to the significant adverse effects and/or environmental effects that cannot be mitigated that this project will likely cause, or in the alternative, (b) require an environmental-assessment report given the incomplete nature of NPNS's Focus Report and Environmental Assessment Registration Documents. If you permit NPNS's project to proceed, you are putting the Atlantic Canada seafood products, and the fishing industry that provides these products, at risk, as well as the health of the Northumberland Strait marine environment.

on behalf of
Gulf Nova Scotia Fleet Planning Board
PEI Fishermen's Association
Maritime Fishermen's Union

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EXECUTIVE SUMMARY

We urge the Minister to review in detail the technical review provided by the fishing industry association and the expert reviews provided by Dr. Laura Braden, Dr. Arnault Le Bris, Dr. Andrea Battison, and NEXUS Coastal Resource Management Ltd. Each of these reports provide unique, detailed, and nuanced critiques of Northern Pulp Nova Scotia's proposed effluent treatment system, in terms of both the inadequate information provided to determine the full potential impact of the project on the Northumberland Strait, and the likely adverse effects and environmental effects that cannot be mitigated. Following is a summary of key findings of these reports.

1. **Bleached Kraft Pull Mill Effluent (BKPME) negatively impacts reproduction ability, immune system function, and liver function of marine life, and toxic elements of the effluent accumulate over time**

As detailed in Dr. Braden's expert report, BKPME is a complex mix of chemicals, many of which are known to be toxic to a variety of aquatic life, and some of which are known to persist and accumulate in the receiving environment for decades. NPNS has not addressed the substantial volume of scientific literature documenting the detrimental impacts of BKPME on fish health, and nor has NPNS conducted tests to determine the potential sub-lethal impacts of their effluent on fish health.

Furthermore, NPNS has based its assessment of potential negative impacts on the marine environment on a modelling study covering a mere one-month time period. Northern Pulp's one-month modeling exercise shows that parameters of its effluent are predicted to increase, but what are the impacts beyond one month? As such, Northern Pulp ignores the potential for long-term increase in concentration of toxic components of the effluent, and the resultant impact on marine life in the Strait.

NPNS must provide a long-term accumulation model for the various parameters of the effluent, before the Minister can reasonably conclude that there is no serious risk of harm to marine life in the Strait.

Furthermore, NPNS did not consider the impact of aluminum, barium, copper, iron, manganese, mercury, phosphorus, and zinc on the health of marine life in the impacted area. Metals, especially copper, are acute toxins to lobster and other marine crustaceans.

> *"The exclusion of many metals from the list of COPC [Chemicals of Public Concern] and minimal information on bioaccumulation is concerning as metals are known to be toxic to American Lobster."*
>
> Dr. Battison, Expert Report Submission

NPNS assumes that (a) there is no accumulative effect of their effluent over time on fish health, (b) there is no sublethal effect of diluted effluent on fish, (c) their modelling of effluent dilution is accurate, and (d) the characteristics of the actual effluent will be consistent with the predicted effluent. Given that NPNS has provided no assurance that these assumptions are valid, the Minister cannot reasonably rely on NPNS's assurances that their effluent will not adversely affect the marine environment in the Strait.

> *"The negative physiological effect of BKPME [Bleached Kraft Pulp Mill Effluent] has been well described on fishes, including depressed immunity, altered reproduction and decreased overall resilience…. [furthermore] there is no description or characterization of the potential for components of the predicted BKPME for bioaccumulation, despite the large body of evidence for*

bioaccumulation of several toxic components such as chlorinated organic compounds and wood extractives."

Dr. Braden, Expert Report Submission

"My major concern is that the one-month simulation period is not sufficient to evaluate the cumulative impacts of effluent waters released continuously for several years, possibly decades. … the focus report does not adequately address the risks of bioaccumulation of toxins in the marine environment."

Dr. Le Bris, Expert Report Submission

"Consensus within the scientific and technical community is that COPC [Chemicals of Public Concern] disposal, particularly those identified as endocrine disruptors and persistent … pollutants in marine environments is of mounting concern… and that conventional treatment options (including activated sludge processes as proposed in this ETF) are considered to be insufficient to address concerns regarding commercial fisheries. This is particularly in light of mounting concerns over the need for more stringent attention to cumulative effects and consideration of increasing stress indicators of ocean health. [refs. omitted]"

NEXUS Expert Report Submission

"In my professional opinion, given the information presented in the focus report and associated documents, it is impossible to conclude that the proposed work won't lead to harmful alteration, disruption, or destruction of fish habitat."

Dr. Le Bris, Expert Report Submission

2. NPNS has not provided empirical characterization of the effluent it intends to release into the Strait

As Dr. Braden states in her Expert Report, "There is limited-to-no information regarding the true chemical characteristics of the proposed effluent." The Minister cannot blindly approve the project without a full understanding of what NPNS intends to release into the Northumberland Strait.

3. NPNS's baseline study is inadequate to enable a full evaluation of the project's potential environmental effects and to enable an accurate environmental effects monitoring program

NPNS's marine water quality study was conducted over two days, which is too short a period to provide useful baseline information. Water quality in the impact area is dynamic; it has strong seasonal cycles in nitrogen, phosphorus, oxygen demand and phytoplankton bloom. Thus, a two-day sampling period is inadequate to gain an understanding of the receiving waters into which NPNS intends to release its effluent, and therefore it is impossible to know, based on the information provided by NPNS, how their project will impact marine waters in the area.

Furthermore, NPNS's fish and fish habitat survey was wholly in adequate to determine the diversity of fish that will be impacted by the effluent. NPNS considered impacts only on those species which it observed during a limited sampling exercise and an inadequate literature survey. NPNS ignores the potential impacts of their project on species at risk known to reside in the area to be impacted by their project, including American plaice, lumpfish, porbeagle and Atlantic sturgeon. It is unreasonable for the Minister to conclude that the project will have no adverse impacts when NPNS has not addressed the potential impacts of their project on species at risk in the impacted area.

Likewise, NPNS did not consider impacts on Atlantic halibut, perhaps because NPNS relied on outdated studies and did not account for recent changes in the population abundance and distribution of Atlantic halibut.

Without a proper baseline survey, it will be impossible to evaluate what impacts the effluent will have on the impacted area. In the words of Dr. Le Bris from his Expert Report submission, "the baseline surveys are insufficient to evaluate the impacts of the effluent on the marine environment in the future."

> *"The short duration [fish habitat] survey … was unable to capture seasonal variation in fish communities and fish habitat; therefore, it has limited value as a baseline survey."*
>
> Dr. Le Bris, Expert Report Submission

> *"[NPNS's Underwater Benthic Habitat Survey] was conducted using a towed camera and was designed to survey benthic substrate. This is not a proper methodology to survey highly mobile species such as fin-fish, because they can easily escape the camera field of view."*
>
> Dr. Le Bris, Expert Report Submission

> *"the focus report failed to recognize that the regional assessment area for this project is one of the regions with the historical highest diversity of fish species in the southern Gulf of St. Lawrence…"*
>
> Dr. Le Bris, Expert Report Submission

4. NPNS's Focus Report contains errors with respect to background concentrations of metals

NPNS's Focus Report contains inconsistencies with respect to background concentrations of metals in Caribou Harbour, in that it appears that actual concentrations are at least ten times lower than the concentrations listed by NPNS. The source of these inconsistencies could not be found due to missing raw data and associated quality assurance information.

The upshot of the background concentrations errors is that the distance from the diffuser by which ambient conditions are reached may have been significantly underestimated, and thereby the negative impacts of NPNS's effluent may be farther-reaching than reported by NPNS. The Minister must request NPNS to provide the missing data so that NPNS's assertions concerning the dilution zone can be independently verified.

5. NPNS has not adequately addressed the risk to the marine portion of the pipe due to ice scour

NPNS considered ice scouring from only a single year; there is no indication whether this was an average year for ice scouring, or what the range of extreme ice scouring might be. Without this information, the Minister cannot reasonably conclude that the proposed three-metre burial depth for the pipeline would be sufficient to avoid effluent spills due to ice damage.

The lack of leak detection technology in the marine portion of the proposed pipe is unacceptable.

6. NPNS has not adequately assessed the risk of sedimentation to fishing grounds within the impacted area

NPNS indicated that 90% of Total Suspending Solids (TSS) released with the effluent will be deposited somewhere between 1 and 21 kilometres from the diffuser. Given the wide range of this estimate, and given that much of the TSS are not easily biodegradable, we are concerned that the project poses an unacceptable risk of damage by sedimentation to fishing grounds in the region of the diffuser.

NPNS's only assurance that such risk is minimal comes from examples of other mills operating in other regions. This is cold comfort given that the nature of TSS settling is highly dependent on the nature of the specific receiving waters system.

> *"The potential effect of TSS is dependent on the type of raw material introduced to the natural environment and the nature of the receiving environment. Therefore, comparison of models using effluent from mills in other regions is irrelevant and can lead to inaccurate conclusions."*
>
> NEXUS Expert Report Submission

Honourable Minister Gordon Wilson
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

Re: Northern Pulp Nova Scotia, Focus Report, Replacement Effluent Treatment Facility

Dear Hon. Minister Gordon Wilson,

The Gulf Nova Scotia Fleet Planning Board (GNSFPB), the Prince Edward Island Fishermen's Association (PEIFA) and the Maritime Fishermen's Union (MFU), including its subsidiary R&D company Homarus Inc., have reviewed the Focus Report submitted by Northern Pulp Nova Scotia (NPNS) on Oct 2, 2019. The report is visually appealing and gives some new information about the potential impacts of the project on many fronts. However, it lacks many details that would have been necessary to answer several of the concerns that we have with regards to the project. Due to limitations in time and resources, the comments below only cover the portions of the Focus Report relevant to the fisheries and marine environment. These three organizations along with Pictou Landing First Nation represents the interests of over 3000 commercial fishing licenses and 215 communal commercial licenses in New Brunswick, Prince Edward Island, Gulf Nova Scotia and Pictou Landing First Nation. Value of landed lobster in 2018 for LFA 26A on PEI alone was $59,977,775.00 (personal communication with the Province of PEI).

The GNSFPB, PEIFA and MFU have been engaged since the beginning of this process and have reviewed the previously submitted registration and Environmental Assessment documents. We still have significant concerns that the Focus Report has failed to adequately respond to the Terms of References outlined by the Minister. Northern Pulp Nova Scotia (NPNS) has failed to present relevant and adequate evidence to prove that the fishery, considering the biological and economic components, will not be seriously harmed as result of the proposed effluent treatment facility. The Focus Report inadequately addresses the impacts of the construction of the pipeline and discharge of effluent on key fisheries life stages, habitat and general population level health. The Focus Report does not provide the necessary contextual background that identifies the Southern Gulf of St. Lawrence as an ecologically significant area, which is currently undergoing climactic shifts in ambient water quality, considering temperature and oxygen levels. The ongoing changes in the Southern Gulf are altering the ecosystem resilience and baseline tolerance thresholds for environmental conditions. There are major gaps and assumptions made throughout this Focus Report which do not sufficiently meet the terms of reference assigned by the Minister of Environment.

Biology

7.0 Fish and Fish habitat TOR: *Conduct additional impact assessment for treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. Assessment methodology must first be agreed upon by NSE in consultation with relevant federal departments.*

7.5 Fish and Fish Habitat TOR: *Clarify what contingency measures will be in place to mitigate potential impacts (e.g., thermal shock to fish) due to potential large and rapid fluctuations in water temperature in the winter at the diffuser location during low production or maintenance shut down periods.*

There are significant concerns regarding the potential for negative population level impacts on American lobster from the effluent discharge, specifically the presence of dioxins, furans and phenols. In addition to the presence of chemicals, there are concerns about the impacts of altering the pH, temperature, oxygen level and salinity in the receiving environment.

Considering water quality and effluent composition, we have several key concerns with the information presented by NPNS and the potential impacts on lobster health. First, NPNS predicts that effluent will have a temperature range of 25-37°C. DFO temperature probes throughout the Gulf of NS have shown annually that even during the warmest months, the average temperature does not go above 15-20°C. The effluent temperature is significantly higher than the ambient temperature in the receiving environment, and in the winter months, the thermal shock from heated effluent will be even greater. The Canadian Water Quality Guidelines for the Protection of Aquatic Life state that "Human activities should not cause changes in ambient temperature of marine and estuarine waters to exceed ±1°C at any time, location, or depth. The natural temperature cycle characteristic of the site should not be altered in amplitude or frequency by human activities. The maximum rate of any human-induced temperature change should not exceed 0.5°C per hour" (CCME 2003). NPNS only outlines the contingency methods to keep the effluent within the 25-37°C temperature range but does not describe how they will meet the guideline for rate of change, or elaborate on any biological impacts resulting from the expected temperature range.

In addition to this, the near and far-field modelling was completed for a 30-day tidal cycle to identify how and where the effluent will concentrate, given tidal condition and seasonal ice cover. The model only accounts for 30 days of effluent discharge during two seasonal conditions; and does not indicate what the entrainment and dilution rates would be over months or years of accumulation. Figure 4.2-4: Simulated Effluent Concentration by End of One-month Simulation Period in February shows that after 30 days there is accumulation in the North East corner of Caribou Island. The graph supplied is difficult to analyze, but it appears that there are concentrations at least at 2.00-2.25 mg/L after just 30 days. Dilution ratios are expected to

change over the winter months, with increased accumulation rates from annual ice cover from January to April. An accumulative model is necessary to predict the accumulation of parameters of concern; parameters such as resin acids, fatty acids, AOX, PAH, and TDF which are known to bioaccumulate in sediment, tissues of invertebrates, vertebrates (El-Shahawi 2010, Lander 1990).

Northern Pulp Nova Scotia's report states that monitoring would continue, which would supply data for required contingency plans. This concept of monitoring is useful in some projects, but in this case it is being proposed to monitor possible, unknown changes that **will be caused** by the effluent. This is a major gap in the data in the project. By the time a monitoring project picks up on changes it will be too late. The negative effects will have taken place and there is no timeline/predictions possible to show if it could be reversed or how long it would take.

It takes lobster 6-7 years to reach a size at maturity, meaning that effluent may flow for 6-7 years before we see any problems. If monitoring picks this up after 6-7 years and changes begin to be made, it's too late to reverse the 6-7 years of damage that is already done. Also, work done by Laufer et al, 2012 concludes **"that alkylphenols are endocrine disruptors to lobster larvae at metamorphosis because they possess juvenile hormone activity. They also delay molting, reduce growth, and are toxic at relatively low concentrations."** According to Appendix E of Appendix 7.2 (Underwater Benthic Habitat survey of Caribou Harbour Pipeline corridors), concentrations of all phenols measured in the effluent are greater than background concentrations at the proposed diffuser location. This is an unacceptable risk to take when dealing with the key fishery in the Southern Gulf of St. Lawrence.

Furthermore, the requirement here was to conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. A sentence stating that future studies "could include" specific testing shows this testing has not been completed and that it may not be in the future. This is not a path forward, it is a concept, but not a plan.

Within table 7.3-2 (labelled incorrectly as 7.3-1 in the body of the report) it states: *"Potential Effect - Water Quality – changes to water quality due the discharge of treated effluent to the Northumberland Strait at the diffuser outfall location Residual Effect - Meeting industry design standards for effluent treatment and design of the effluent diffuser to* ***maximize dilution*** *of effluent in the marine environment, effects will ensure that* ***any changes to water quality in the receiving environment are minimized to a small area*** *(within 5 m of the outfall) prior to water quality meeting background or CCME guidelines for the protection of aquatic life. Overall Significance -* ***Overall effects are considered to be generally minor, localized and generally reversible*** *- Not Significant"*

What are the expected minor, localized effects? If the proponent has done this work and knows there will be "expected minor, localized effects" they should be shared with in this

document. Decreased dissolved O_2, a change in temperature, salinity, etc. would effect species differently and should not be generalized. Increased temperature is more significant to scallops than lobster, but this is not portrayed in the table. In fact this data is not provided at all.

Sea Scallop - "Mortality will occur at temperatures of 23.5ºC or greater and mass mortality of scallops has occurred historically in portions of the southern Gulf" (DFO, 2011).

Lobster - "In lobsters, there is a complex relationship between temperature, growth and reproduction. Molting is inhibited below 5°C, and growth rate is proportional to temperature between approximately 8 and 25 °C" (Crossin, et al. 1998).

Both species would be affected by changes to their environment, but in different ways. NPNS has not laid out contingency plans to describe how damage to each species would be mitigated. There is also no definition of the phrase “generally reversible”. What does this mean and how is it going to be accomplished? Simply stopping the release of effluent will not reverse the damage done.

American Lobster Habitat Concerns

7.2 Fish Habitat Baseline Survey TOR: *Conduct fish habitat baseline surveys for the marine environment, to the satisfaction of Fisheries and Oceans Canada*

The proposed effluent treatment facility will cause extensive habitat displacement or destruction during the construction phase. NPNS conducted Underwater Benthic Habitat Surveys to understand the habitats and benthic communities that are present along the proposed pipeline corridor and diffuser area. The UBHS was conducted for a very limited period of only 5 days from May 3 to May 7, 2019. This limited sample window does not allow for a fulsome picture of the marine and benthic environment. The marine environment, including plant communities, benthic communities and planktonic composition fluctuate significantly on a seasonal cycle. Results from a study by Mutsamaki (2015) shows that “the patterns observed in one depth zone or season cannot be directly extrapolated to larger areas and that drawing meaningful conclusions on the small-scale distribution in the fish assemblage structure require sufficient replication of sampling in space and time”. This indicates the evidence presented in the UBHS should not be considered as a ‘meaningful’ representation of the full benthic and invertebrate communities.

The results of the limited UBHS show that there is valuable lobster habitat in all 3 areas studied (Pictou Harbour, Caribou Harbour and Diffuser Area). Lobster require different types of habitat throughout their life cycle; and DFO research indicates that availability of appropriate habitat types is a limiting factor for lobster population viability. Following the larval stage, stage IV lobsters will begin to settle on the ocean floor. Stage IV lobsters seek gravel, cobble and larger sediment to provide shelter. Younger stage IV lobsters may also use sand or silty environments

to bury themselves to provide protection. As lobsters grow and mature, they are able to use multiple habitat types to create shelter. NPNS does not present any adequate plan to mitigate habitat loss or effectively replace habitat.

The Focus Report states that there is a potential effect on marine fish habitat by "direct removal, disturbance of existing substrates utilized by multiple species and their life stages due to the staging, excavation, pipe placement and material backfilling" (Table 7.3-2 Summary of Marine Impacts, Mitigation Measures and Overall Significance). The Focus Report does not provide any description of mitigation measures, including how they will replace the existing habitat or how they will design a staged timing protocol to "incorporate fisheries timing windows to avoid sensitive life stages, periods of adverse weather or spring tides to reduce turbidity and sedimentation". NPNS repeatedly applies a vague blanket statement that they will time the in-water work to consider a multitude of factors (life stages, weather, tides, fisheries activity) while still meeting practical requirements. In order for NPNS to meet the TOR above, and for the Minister to make an informed decision on the effectiveness of proposed mitigation measures, NPNS must provide a detailed plan on these mitigation activities (ex: staged timing of work, Erosion and Sediment Control Plans). Mitigation measures must be assessed by their specific merits and ability to reduce or eliminate harm. It cannot be sufficient to state that a plan will be developed in the future.

Atlantic Herring Vulnerability

7.3 – Impact Assessment for Marine Fish TOR: *Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. Assessment methodologies must first be agreed upon by NSE in consultation with relevant federal department.*

Beyond the 8 'important fisheries' identified for commercial, recreational and Aboriginal value, NPNS has recognized three "key indicator species" that warrant further investigation due to their importance in commercial and Indigenous harvests occurring within the LAA: American lobster, rock crab and Atlantic herring. Upon review of potential impacts on the herring fishery, NPNS has ignored a fundamental component related to the vulnerability of the herring population to impacts from the construction of the pipeline and discharge of effluent. The proponent only refers to the direct interaction with harvest activities, with no regard for the potential biological impacts.

There are two spawning stocks of herring in the Southern Gulf, Spring Spawning (SS) and Fall Spawning (FS). The SS stock has been in the critical zone since 2004, and the FS stock has been in the cautious zone since 1999 (Surette 2016). The Fall Spawning stock has 5 major spawning

grounds in the Gulf of St. Lawrence; one of these few remaining spawning grounds is located near the mouth of Pictou Harbour, directly adjacent to the proposed project area (Figure 1, Surette 2016). DFO is currently developing rebuilding plans for both Spring and Fall Spawning stocks. DFO states that "Elevated fishing mortality, during the mid-1990s to 2010, declines in weights-at-age, and low recruitment rates are contributing to declines in SSB, further impeding the rebuilding of the stock." (DFO 2018). Given DFOs mandate to support the protection of habitat and fish stocks using the Precautionary Approach, NPNS must provide further evidence that the pipeline construction and discharge of effluent will not further inhibit the rebuilding of this critically important fish stock; including sublethal effects on reproduction and recruitment rates in order to meet the TOR for fish health.

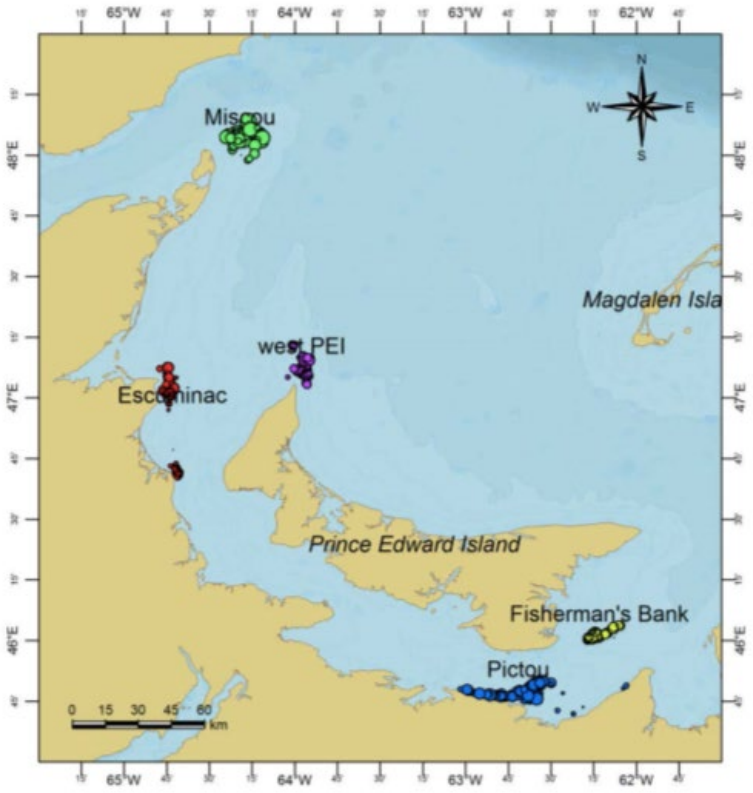


Figure 1: Herring Spawning grounds from 'Estimation of local spawning biomass of Atlantic Herring from acoustic data collected during fall commercial gillnet fishing activities in the southern Gulf of St. Lawrence' (NAFO Div. 4T). (Surette et al., 2016).

Unique and Vulnerable Habitat Concerns

7.3 – Impact Assessment for Marine Fish TOR: *Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. Assessment methodologies must first be agreed upon by NSE in consultation with relevant federal department.*

In addition to the general habitat concerns above, NPNS also proposes the pipeline to be placed directly through a federally protected marine refuge, Scallop Buffer Zone 24. The Department of Fisheries and Oceans has established SFA 24 to conserve important juvenile American lobster habitat, as it is essential to the life cycle of the species. DFO states that "no human activities that are incompatible with the conservation of the ecological components of interest may occur or be foreseeable within the area" (DFO List of Marine Refuges, 2019). The construction and operation of a marine pipeline is directly incompatible with the conservation of the identified conservation objectives of SFA 24.

The presence of eelgrass is also identified by NPNS to be valuable in the life cycle of a variety of species, especially as a nursery shelter to provide protection in sandy and silty bottom types. In Table 7.3-2 Summary of Marine Impacts, Mitigation Measures, and overall significance, NPNS states that there is potential for "direct removal, disturbance of highly important habitat type for multiple species and their life stages due to the staging, excavation, pipe placement and material backfilling". The effects are expected to be "long-term, reversible", with the only mitigation method listed to "avoid direct removal of eel grass beds where feasible". NPNS fails to define the extent of 'reversible' impacts, and does not provide an estimate of the extent to which they can feasibly avoid eel grass beds throughout Caribou Harbour. Considering the Terms of Reference, NPNS has not assessed the impact of the loss of valuable and unique habitat to the overall health of the key marine species.

Ice Scour

2.2 Marine Geotechnical Survey TOR: *Conduct geotechnical surveys and provide the survey results to confirm viability of the marine portion of the pipeline route. The surveys must determine the potential impacts of ice scour on the pipeline.*

The risk of ice scouring is also present throughout the proposed area (Focus Report Section 2.2 Marine Geotechnical Survey). The marine geotechnical survey identified 146 ice scour features within the survey area. NPNS states that burying the pipeline 3 m under the seabed is appropriate to avoid scour impacts. This conclusion is based on limited information; NPNS relies on one sample from 2019 and does not consider any additional research or evidence.

Redistribution of Contaminants

7.3 – Impact Assessment for Marine Fish: *Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. Assessment methodologies must first be agreed upon by NSE in consultation with relevant federal department.*

The working group has concerns around redistribution of metals during digging to install pipe along Pictou Causeway.

"A baseline marine environmental effects monitoring (EEM) program (including fish tissue analysis [using crab or lobster hepatopancreas tissue chemistry and mussel or oyster tissue chemistry], sediment and water quality, etc.) should be established in the Northumberland Strait marine receiving environment prior to remediation or disturbance of Boat Harbour sediments" (Romo et. al. 2019)

Considering levels of arsenic, cadmium, and other heavy metals along the causeway, there is concern that these heavy metals will be redistributed during the installation process. The report does not include mitigation measure being put in place to avoid the redistribution of dangerous metals. What is being done to mitigate this?

Contaminant Bioaccumulation and Potential Fisheries Closures

7.3 – Impact Assessment for Marine Fish: *Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. Assessment methodologies must first be agreed upon by NSE in consultation with relevant federal department.*

4.1 – Marine Water and Marine Sediment: *Conduct baseline studies for the marine environment (such as marine water quality and marine sediment) in the vicinity of proposed marine outfall location.*

4.2 - Marine Water and Marine Sediment: *Update the receiving water study to model for all potential contaminants of concern in the receiving environment (based on the results of the effluent characterization and/or other relevant studies such as Human Health Risk Assessment). Baseline water quality data for Caribou harbour must be applied to this study. Refer also to Addendum 3.0.*

As mentioned in previous communications from fishing industry and others, the cumulative effects of the proposed receiving water contaminants on locally important commercial species such as lobster, herring and scallops, to cite but a few, are a major concern. The report provides details on the composition of the proposed receiving water (p.55 - Table 3.3.1) and models the dispersion of the effluent in the receiving water study (RWS). However, a bioaccumulation model

backed by scientific references and adapted to the special ecosystem parameters of the Northumberland Strait should have been produced.

Our concerns about bio-accumulation have still not been addressed by this latest report. For example, in British Columbia the bioaccumulation effect of contaminants discharged into the marine ecosystem (dioxins, furans, etc.) by local paper mills (ex: Port Mellon) have been the cause of important area fishing closures (Howe Sound area – bioaccumulation in Dungeness Crab hepatopancreas). Thus, the potential for fishery area closures in the Northumberland Strait remains.

Environmental Effects Monitoring

7.3 – Impact Assessment for Marine Fish: *Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. Assessment methodologies must first be agreed upon by NSE in consultation with relevant federal department.*

7.4 Environmental Effects Monitoring *Submit an updated Environmental Effects Monitoring (EEM) program based on the results of various relevant baseline studies and an updated receiving water study. Refer also to Addendum item 4.0*

NPNS acknowledges that there is potential for the following impacts: changes to water quality, increase in sound and vibration, disturbance to benthic habitat, disturbance to highly important nursery habitat and spawning grounds, direct mortality (of marine shellfish, benthic invertebrate community) (Table 7.3-2). Despite these impacts, they predict that “no significant residual impacts to marine water quality are expected to arise on any fisheries or fish habitat as a result of this project” (7.0 Fish and Fish Habitat). In order to confirm this conclusion, that there will be no significant residual impacts, NPNS states that they will follow up with the federally-regulated Environmental Effects Monitoring program. Given the predicted conditions, the EEM would NOT require NPNS to conduct a fish community study component or a benthic invertebrate community study. NPNS would have zero mandated requirements to monitor impacts on the fish or benthic communities. Considering for a moment just the impacts on the lobster population, negative effects will not be fully observed until a full life cycle (6-7) has reached the commercial size. Without thoughtful, frequent and thorough monitoring, there could be catastrophic ecosystem level impacts where it is too late to intervene.

The federally-regulated EEM is insufficient in providing consistent baseline data according to Romo et al. 2019 in their review of the documents in consideration of the remediation of Boat Harbour. "**Selection of species, contaminants of concern and sampling locations were ad hoc**

and often inconsistent with environmental effects monitoring requirements under the Canadian federal Pulp and Paper Effluent Regulations"

The PEI Legislative assembly, standing committee on fisheries and agriculture invited representatives from Environment and Climate Change Canada, to discuss the proposed effluent treatment facility. Geoff Mercer, Regional Director General at ECCC stated in his opening remarks "Compliance rates with the regulations is high and based on the self-reported data, over 97% attest that mills across the country conduct are compliant with the regulations. **Despite this high level of compliance with the existing effluent standard, the environmental effect studies have shown that the effluents from 70% of the pulp and paper mills across the country are having an effect on fish and/or, depending, fish habitat."**

Both of these points show clearly how flawed the current system is and that this is not a reliable method to monitor changes. There is clearly data missing from the baseline study to consider it complete.

Fishing Activity, Human Health and Market Access

9.1 Baseline Study Marine Survey: *Complete baseline studies for fish and shellfish tissue (via chemical analysis) of representative key marine species important for commercial, recreational and Aboriginal fisheries in the vicinity of the proposed effluent pipeline and diffuser location.*

7.0 Fish and Fish habitat TOR: *Conduct additional impact assessment for treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. Assessment methodology must first be agreed upon by NSE in consultation with relevant federal departments.*

The proponent is required to conduct impact assessments on the key marine fish species important for commercial, recreational and Aboriginal fisheries. In order to verify that there will be no negative impact on fisheries, NPNS must understand and take measures to mitigate interactions with physical fishing activities. NPNS uses a visual observation of lobster buoys in 2019 as a proxy for the exact location of lobster fishing activities (Figure 7.3-3: Northumberland Strait Lobster Buoy Locations). The graphic only shows buoy “clusters” observed on 3 different dates throughout the regular lobster fishing season. This attempt to pinpoint the location of fishing effort lacks relevant information in terms of the number of harvesters/vessels that fish within the area, how many buoy/lines are represented within each ‘cluster’. Generally, this shows that there was a lack of effort from NPNS to understand the most basic facts of the lobster fishing efforts in the area. The graphic fails to show that there are 20 vessels that fish lobster within 300 meters of the proposed marine outfall.

Under the TOR for the Human Health Risk Assessment portion of the Focus Report; NPNS is required to consider the impacts of human consumption of fish, other seafood and other exposure pathways. Of equal importance to the physical and biological impacts on the marine ecosystem, harvesters are concerned with the potential for challenges in marketability and the global reputation of pristine, healthy Canadian lobster. The Canadian lobster industry has an extensive export market, supplying international markets with much of our landed seafood. Canadian seafood harvesters, and the entire lobster sector, are fulfilling food security needs while providing a healthy, pristine renowned product.

NPNS states that there is a risk for tainting of seafood due to the chemical parameters identified in the effluent characterization (9.0 Human Health). NPNS compared the concentration of the parameters to the guidelines for taste and odour in water to identify the risk for tainting. There is potential for tainting under the following pathways: Total Iron, Catechol, 2-Cholrophenol, 2,3 Dichlorophenol, 2,6 Dichlorophenol, 3,4 Dichlorophenol, 2, 3, 4, 6 Tetrachlorophenol, 2,4,5 Trichlorophenol (9.0 Human Health). In addition to the physical risks of consuming tainted product, there will be detrimental impacts to the global reputation of Canadian lobster (and other seafood) products. Market perceptions of poor product quality (by tainting) can persist even if the results show safe exposure levels for consumption. This persistent perception will prolong and deepen the impacts for harvesters and other industry stakeholders. The magnitude of this impact should not be underestimated; this a ‘Canadian lobster’ issue, not just a Pictou or Caribou Harbour issue.

Throughout several areas of the Focus Report, NPNS uses proxy data and conditions from other Paper Excellence Mills, including Howe Sound and Crofton kraft mills in British Columbia. NPNS considers factors such as operating temperature and sedimentation rates to act as a surrogate for expected effluent quality at the proposed ETF. Upon investigation, there are challenges related to seafood tainting and contamination throughout the BC coastline. First, in fishing areas 28-1, 28-3; consumption of crab hepatopancreas should not exceed 55g/week due to dioxin contamination. Secondly, there is a permanent prohibition of all species of bivalve molluscs across the entire coastline and connected water sources of British Columbia. The closure is due to the widespread presence of biotoxins. While these closures are not solely attributable to the Pulp and Paper Mills; NPNS is unable to prove that there would not be similar closures as a result of the increase in dioxins or biotoxins from their proposed effluent.

Using proxy data is an assumption and does not meet the terms of reference which states: "Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information”

The socio-economics of a loss to the fishery for both commercial harvesters and First Nation harvesters is worth an assessment with updated information that it will be consistent with current discharge as the methodology behind treating the effluent is completely different. The

fact that the discharge will meet all provincial and federal discharge quality limits does not equate to the effluent being safe for the fish, benthic communities, and human health; as stated by Geoff Mercer, Regional Director General at ECCC during his appearance at the PEI Legislative assembly, standing committee on fisheries and agriculture on February 1, 2019: “Despite this high level of compliance with the existing effluent standard, the environmental effect studies have shown that the effluents from 70% of the pulp and paper mills across the country are having an effect on fish and/or, depending, fish habitat.”

Northern Pulp sent a team to visit mills in Sweden as well. These mills run systems similar to what is being proposed at the NPNS mill and is again used as a proxy. This makes it appear that meeting future regulations is the main concern and because it is being done successfully in Sweden it can be done successfully in Canada. The Harvesters and Pictou Landing First Nation are concerned with negative effects to the fish and benthic communities and not just if the mill is meeting regulation. There was a report completed by a group in Sweden regarding the Södra Mill; Biologisk recipientkontroll vid Södra Cell Värö Årsrapport för 2013 by Peter Ljungberg and Björn Fagerholm. This document shows that the fish community in the area of the Södra mill is completely different than in the Northumberland Strait. Trawl surveys were completed to look at species in the area and 66% of the catch is a species of flatfish. It’s all sandy/silt bottom with very few crustaceans. The assumption is that both areas can be compared but in actuality the ecosystems are different. The few Norway lobsters in the area of the Södra mill are declining in the area of effluent release over the last 10 years. This has not been directly attributed to the mill but the reason for the decline is also not stated. There are some species increasing in the area of the diffuser as well, but the report states; "The fact that an individual fish species is increasing need not only be positive for a society, it can also cause problems for other species in terms of competition or predation, factors that in turn lead to changes in the entire ecosystem"

Parameters measures and monitored by the regulatory authority in Sweden are TOC, nitrogen, phosphorus and suspended material. This is insufficient information based on what we have heard from Environment and Climate Change Canada regarding the requirement for changes to the Canadian Pulp and Paper Effluent Regulations.

On the human health risk question, there is only talk about doing an eventual study on the subject. This important question should have been discussed more broadly in the report and answered with best available science and modelling. Therefore, even if areas remain open there remains the potential for negative impacts on market access for products coming from areas adjacent to the mill and the Northumberland Strait due to perceived health risks by general consumers.

Sub-lethal effects and insufficient science references

In section 4, there should have been more discussions backed by scientific literature or studies. In particular, there is no discussion of potential sub-lethal effects of the proposed effluents on economically important species such as lobster, herring and scallops even though there exists scientific work and literature on the subject. Instead, the report provides water dispersion modeling accompanied by affirmations based on opinion alone.

Ecosystem Concerns

7.2 Fish Habitat Baseline Surveys: *Conduct fish habitat baseline surveys for the marine environment, to the satisfaction of Fisheries and Oceans Canada.*

The Department of Fisheries and Oceans is currently starting to incorporate an eco-system approach to their stock assessments. To better understand the fluctuations in populations of each species the department is incorporating aspects that effect the population such as: temperature, timing of prey availability, predator abundance, etc. NPNS's proposed effluent release has the potential to affect every species in the surrounding area including but not limited to mackerel, herring, scallops, and lobster directly and indirectly. There are numerous examples of population declines in the Gulf of St. Lawrence due to the change in timing of a species' prey. Changing ocean temperatures are causing phytoplankton and zooplankton to bloom earlier in the year resulting in lower food availability for those species relying on it. This has been shown for small mackerel which rely mainly on calanus copepods as a main prey source. According to NPNS's report, the dominant open water species found is calanoid copepods. Northern Pulp is proposing to release large amount of hot fresh water year-round. This will effect the timing of the copepods reproduction resulting in a mis-matched timing of food for the young mackerel in the area. Lack of food availability results in decreased condition of the mackerel and decreased recruitment to the fishery.

Mackerel are not the only species that rely on phytoplankton and zooplankton for growth and survival, herring, bivavles and even North Atlantic Right Whales all rely on these microscopic organisms for survival.

Understanding possible shifts in phytoplankton and zooplankton blooms is essential to baseline studies for a marine ecosystem. This portion of the baseline survey is incomplete; "Further studies in the area of the proposed diffuser location have begun in the summer of 2019, with **additional studies to be scheduled prior to any construction activities**. These studies aim to provide a baseline of phytoplankton and zooplankton presence, diversity and relative abundance."

Northern Pulp states that eelgrass and eel grass beds are present in Caribou Harbour. DFO has listed eelgrass as an ecologically significant species. It is important to understand what

the loss of eelgrass will mean for the area, but this has been listed as “not significant” by Northern Pulp (page 146).

According to DFO (2009): “Loss of eelgrass and other seagrass populations is a worldwide phenomenon largely associated with anthropogenic stresses. Eelgrass populations have been lost in virtually all areas of intense human settlement. Eelgrass plays an important role in the physical structuring of the nearshore marine environments by filtering the water column, stabilizing sediment, and buffering shorelines. Eelgrass meadows have extremely high levels of primary production, ranking among the most productive ecosystems on the planet. Eelgrass adds spatial complexity above and below the substrate creating a three- dimensional habitat that contributes to higher densities and different species compositions than in unstructured habitats, particularly mud/sand flats. Numerous species across several phyla (seaweed, invertebrates, fish) utilize the support structures of eelgrass and / or benefit from lower predation rates in vegetated habitat compared to unvegetated areas. There are no substitute structuring organisms with the same function as eelgrass that can grow on the sand/mud flats of intertidal and subtidal areas within the salinity ranges occupied by eelgrass. Eelgrass (*Zostera marina*) in eastern Canada has characteristics which meet the criteria of an Ecologically Significant Species. If the species were to be perturbed severely, the ecological consequences would be substantially greater than an equal perturbation of most other species associated with this community.”

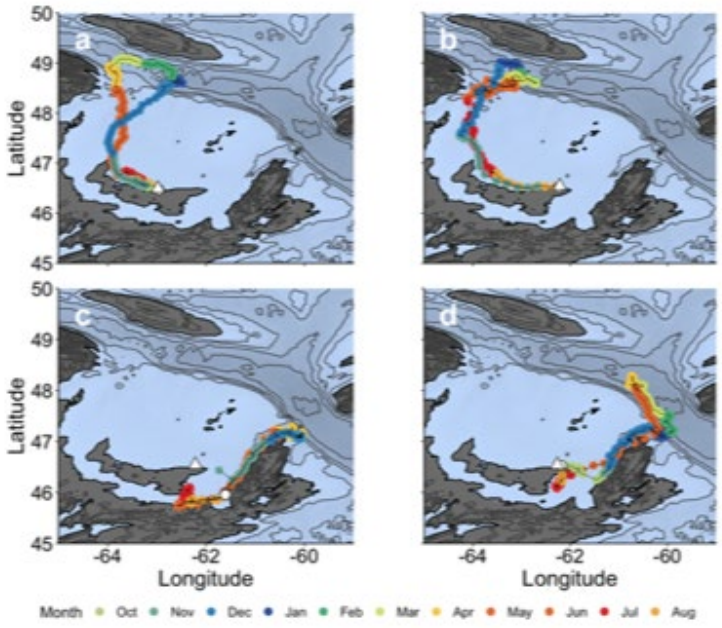
Loss of this species in any capacity should be considered significant and more data should be collected to assess the impacts to the entire eco-system. Loss of eel grass beds has the potential to disrupt and displace numerous species in the area. Sufficient data was not collected for the focus report to understand the fallouts of the loss of eel grass beds in the area.

Species Distribution

7.2 Fish Habitat Baseline Surveys: *Conduct fish habitat baseline surveys for the marine environment, to the satisfaction of Fisheries and Oceans Canada.*

Northern Pulp reported that they completed underwater video transects to determine benthic habitat from May 3-7, 2019. Although is seem obvious, the majority of marine life is capable of mobility. Looking at an area for 4 days in May is not representative of activity in an area for an entire year. Temperature changes and food availability shift which species inhabit which areas at different times of the year, but this is not accounted for while looking at only 4 days of video feed. According to Comeau and Fernand, 2002 in a review of movement studies of American lobster, *Homarus americanus* (American Lobster) move on average between 2 and 19 km depending on depths. The fact that no lobsters were seen during this survey is not representative of year-round benthic habitat but merely a snapshot of a few days in the year. This is insufficient data to be considered a baseline survey.

American lobster is not the only species present in the area but unaccounted for. The figure below shows Atlantic halibut that was satellite tagged in 2014 and the approximate path it took over the next several months. This publication has been submitted for peer review (James, et al 2019). Image C shows, an Atlantic Halibut in the area of the proposed diffuser site in June of 2015. This highlights a gap in baseline data because Northern Pulp was looking at only 4 days with a video transect which is insufficient to capture all species in the area at any given time throughout the year.



"The proposed project will interact with the Rock Crab resource along the proposed pipeline corridor (Figure 7.3-7) but not at depths greater than 10 m or near the diffuser location." This is a flaw in the report because the data is blatantly incorrect. Rock Crabs are in depths greater than 10 m: "Rock crab (Cancer irroratus) is distributed along the Atlantic coast, from South Carolina to Labrador, from the intertidal zone to a depth of 575 meters" (DFO 2008). This underestimates the effect the proposed pipeline will have on Rock Crab.

In closing, our three fishing organizations (GNSFPB, PEIFA and MFU) would like to reiterate that NPNS has failed to adequately address the Terms of Reference outlined in section 7.0 Fish and Fish Habitat, 9.0 Human Health and 2.0 Project Description. Due to limitations in time and capacity, this report only reviewed the information that was relevant to the fisheries. Northern Pulp relies on major assumptions and blanketed statements to suggest that there will be no harm to the marine environment, including fish and fish habitat. There are gaps in the evidence presented, including but not limited to: impact on lobster development and population

health, incomplete or non-existent commitment to follow up monitoring, lack of evidence to protect vulnerable populations or habitat such as fall spawning herring, other SARA (Cod, White Hake), Scallop Buffer Zone 24, eel grass beds, limited understanding of the seasonal impacts of ice cover and ice scouring. The importance of the global optics of the Canadian seafood brand can not be undervalued or excluded from this Environmental Assessment approach.

Our conclusion following the review of the report remains that some of the major concerns brought forth by commercial harvesters have still not been appropriately answered. Therefore, until these concerns have been met, Nova Scotia, Prince Edward Island and New Brunswick harvesters find unacceptable the pursued development of Northern Pulp's currently proposed effluent treatment facility.

All of the above is respectfully submitted to the Nova Scotia Minister of Environment, the Honourable Gordon Wilson, within the 30-day public comment period for consideration of the Northern Pulp Effluent Treatment Facility Focus Report.

The report is the collaborative effort of science staff from all three organizations. These are professionals with years of experience working and researching directly on the waters of the Northumberland Strait.

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PRINCE EDWARD ISLAND FISHERMEN'S ASSOCIATION

Sincerely,

Gulf Nova Scotia Fleet Planning Board

Maritime Fishermen's Union

Prince Edward Island Fishermen's Association

CC:

MP Sean Fraser
MP Mike Kelloway
MP Lenore Zann
Hon. Keith Colwell
MLA Karla MacFarlane

Finfish Health in Relation to the Proposed Northern Pulp Nova Scotia Effluent Treatment Facility

A Scientific Report

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1.0 Definitions

BKPME – Bleached kraft pulp mill effluent
NPNS – Northern Pulp Nova Scotia
ETF – Effluent treatment facility
AOX – Adsorbed organohalides
TN – Total nitrogen
TP – Total phosphorous
DO – Dissolved oxygen
BOD – Biological oxygen demand
COD – Chemical oxygen demand
ASC – Antibody secreting cells
ROS – Reactive oxygen species
RWS – Receiving water system
MFO – Hepatic mixed-function oxygenase
EROD – Ethoxyresorufin-*o*-deethyase
VTG – Vitellogenin

2.0 Foreword – Statement of Qualifications

Laura Marie Braden, PhD, holds a doctorate in Molecular Immunology, with a focus on Aquatic Animal Health. With over a decade in experience in her field, Dr. Braden has over 10 publications in peer-reviewed journals, has presented her research at over 40 national and international conferences, 15 of which where she was an invited speaker. She sits on the editorial board as an external reviewer for many journals, including *Journal of Fish Diseases*, *Parasites & Vectors*, *Aquaculture*, *Fish & Shellfish Immunology*, and *Developmental & Comparative Immunology*. She currently leads the Molecular Genetics and Biotechnology Program at AquaBounty Canada and is an Adjunct Professor in the Department of Veterinary Medicine at the Atlantic Veterinary College. A *curriculum vitae* for Dr. Braden can be found in Appendix I.

3.0 Executive Summary

The following report includes a scientific review of the available information pertaining to the negative effects of bleached kraft pulp mill effluent (BKPME) on health of finfish. Specifically, this report attempts to summarize the scientific consensus on the physiological effects of BKPME on freshwater and marine finfish, and how those data pertain to the potential risks associated with the proposed effluent treatment facility (ETF) of Northern Pulp Nova Scotia ("the Proponent"; NPNS), which aims to discharge 85 million litres of BKFME per day into the Northumberland Strait.

Although improvements in treatment of BKPME have certainly decreased acute lethality to finfish, effluent from pulp and paper mills continues to release chemicals that affect physiological systems. Potential effects on fishes from exposure to BKPME can be generalized into two main categories; 1.) Direct effects, such as those impacting physiological processes including reproduction, immunity and hepatic function, and 2.) Indirect effects, including ecosystem alteration in habitat and food availability. The identity of the compounds associated with these effects remain to be elucidated; however, the scientific consensus is that these effects are mill-specific and must be considered in the context of environmental and ecological effects (1–5).

This report will first attempt to summarize the available scientific literature on the direct effects of BKPME exposure on finfish, and by doing so, will demonstrate significant deficiencies in the conclusions drawn by the Focus Report (FR), specifically related to the findings of no significant impact by the proposed effluent treatment facility on physiological parameters and fitness of fish populations in the receiving water system (RWS).

These deficiencies are summarized in the following document and include, a.) an assessment of the major findings and conclusions expressed by NPNS, b.) an assessment of the reliability of the underlying research relied upon to create these findings and conclusions, c.) identification of information gaps in the materials of the Focus Report, d.) impacts of these gaps on the reliability of the conclusions made in the Focus Report, and e.) a description of assumptions that are relied on in the Focus Report that drove the main conclusions filed by the Proponent.

Taken altogether, this assessment of the available data pertaining to the proposed ETF with respect to potential negative effects on finfish in the RWS concludes that there is insufficient evidence to support the overall claim by NPNS that there are no potential negative impacts on finfish health. For example, there is no empirical data characterizing the effluent that is predicted to enter the RWS, nor is there any empirical data demonstrating the physiological effects of this effluent on finfish that reside in the RWS, specifically, the Northumberland Strait.

Despite the lack of information or evidence presented by the Proponent in the EARD and the subsequent FR, where only predictions and modeling were used to assess impact to fish populations in the RWS, the Proponent reaches a firm conclusion that there is no expected impact to fish populations. This conclusion is not appropriate for the following reasons:

1.) *The Proponent does not provide adequate evidence to support a conclusion that there is no potential significant impact on finfish*
2.) *The Proponent does not supply critical information concerning effects of their predicted effluent on finfish reproduction, immunity, or liver function – three systems known to be affected by BKPME*
3.) *The Proponent claims that any damage will be "minimal" but not substantiated by data present in the report, nor is it substantiated by the pertinent scientific literature*
4.) *There is no evidence that the receiving water system (i.e., the Northumberland Strait) will be able to absorb and disperse the volume of effluent proposed by the ETF*

Given these described deficiencies, further studies (acute, sublethal, and generational) on the effects of the proposed BKPME on finfish residing in the RWS are required.

4.0 Scope of Review

This current critical review focuses on all areas of both the Environmental Assessment Registration Document (EARD) and subsequent Focus Report (FR) that pertains to the potential negative physiological consequences of exposure to the predicted effluent on finfish health (freshwater and marine).

Within the 245-pg FR, this review focuses specifically on Sections 3-4 and 7, with associated data found in Appendices 3, 4 and 7, and associated documents.

The FR attempts to address Terms of Reference delivered to NPNS after consultation with public stakeholder groups. The conclusions and recommendations are based primarily on the information provided in the FR and how it relates to published data on pulp and paper mills and BKPME, and how BKPME effects finfish, rather than a global review of the potential effects to marine species. Furthermore, this current report addresses the main points within the Terms of Reference pertaining to finfish health and whether these terms were addressed by the FR.

4.0 Background Review

4.1 Pulp and Paper Mills

The pulp and paper industry convert natural wood resources or recycled fibre into a wide variety of paper products. Canada is the world's largest exporter of pulp and newsprint, and the pulp and paper industry is a fundamental pillar of the economy and natural resource sector exporting over $13 billion CDN in 2013 (6). In order to manufacture paper products, wood chips or other plant fibres must be converted to pulp to create thick fiberboard that is later processed in a paper mill. The pulp and paper industry is the sixth largest polluting industry, discharging a variety of gaseous, liquid and solid wastes into the environment. The processes used to produce pulp are water intensive (50-60 m3 of water to produce a ton of paper; (1)) and generate large quantities of effluent which is comprised of > 240-250 different chemicals with varying degrees of toxicity to aquatic ecosystems (1,7). Due to the large-scale environmental degradation associated with this industry, it is imperative that a strict science-based approach be utilized to mitigate negative effects to both ecosystems and human health.

Resultant pulp only constitutes about 40% of the original weight of the wood, which results in a considerable proportion of organic matter as waste in effluents. These have potential for considerable damage to the receiving water system (RWS) if discharged as untreated due to high concentrations of biological oxygen demand (BOD), chemical oxygen demand (COD), adsorbed organohalides (AOX), suspended solids, fatty acids, tannins, resin acids, lignin and derivatives, sulfur and sulfur compounds (1). Both naturally occurring and xenobiotic compounds are present in effluent, with variable levels of persistence (8), and with acute and chronic toxic effects of varying

severity (9). Further to this complexity is the assertion that no two paper mills will discharge identical effluents due to operational differences. Thus, every pulp and paper mill is a large, complex, highly interactive operation with mill-specific effluent that should be characterized fully to understand the degree of toxicity (1).

4.1.2 Pulp Mills in Canada

As of 2019, there were 89 pulp mills across Canada, primarily located in British Columbia, Ontario, and Quebec (6,10), of which a majority operated on chemical pulping processes. Chemical pulp mills use two processes: either sulfate (kraft) or sulphite processes, both of which rely on high temperatures to break down lignin. Pulp produced from these processes are used for fine paper products. The kraft process involves treating wood chips with white liquor (sodium hydroxide and sodium sulfide) to break down and remove hemicelluloses and lignin, resulting in strong cellulose fibres. In contrast, the sulphite process results in weaker cellulose fibres, but creates pulp that is easier to bleach (i.e., bleached kraft pulp mill; BKPM). Alternative methods include thermomechanical and chemi-thermomechanical pulp mills, which apply steam to refine or pre-treat input wood chips with weak chemical solutions. All the above processes are known to produce considerable pollutant loadings to land, air, and water (11). For example, Canadian pulp, paper and paperboard mills released 302 tonnes of pollution onto land, 166,613 tonnes of air emissions, and 5,955 tonnes of wastewater in 2013 (6).

In 1992, regulations pertaining to the discharge of pulp and paper mill effluents (*Pulp and Paper Effluent Regulations*; *PPER*) were revised in Canada and included stricter control for discharge of BOD, TSS and acute lethality. Moreover, the revised regulations were paired with the establishment of the EEM program, which examines the effects of effluent on wild fishes. Data from the first several cycles of the EEM program showed that BKPME was causing general eutrophication in the receiving environments in addition to a national pattern of metabolic and physiological disruption in fish (4,12).

4.1.3 Northern Pulp Bleached Kraft Pulp Mill

The Northern Pulp Nova Scotia Corporation (NPNS) Bleached Softwood Kraft pulp mill is located at Abercrombie Point adjacent to Pictou Harbour in Pictou County, Nova Scotia. NPNS is a typical bleached kraft pulp and paper mill that has been operating in Pictou County, Nova Scotia, since 1967 and manufactures ca. 275,000 t of bleached kraft pulp annually (10). Effluent wastewater from NP has been treated by retention in settling and aerated ponds in a tidal lagoon known as Boat Harbour, in the Pictou Landing First Nation (PLFN), under a provincial agreement that expired in 2015. Since that time, the mill has been tasked with finding or developing an alternate facility to treat and dispose of wastewaters.

The Replacement Effluent Treatment Facility Project proposed by NPNS was registered February 7, 2019 for environmental assessment (EA). The EA Registration Document (EARD) was deemed insufficient by the Minister of Environment and a Focus Report was required to address a Terms of

Reference (TOR) document. The TOR included requests for more details on many deficiencies of the project, including:

1.) Public, Mi'kmaq and government engagement
2.) Project description
3.) Facility design, construction and operation and maintenance
4.) Marine water and marine sediment
5.) Fresh water resources
6.) Air quality
7.) Fish and fish habitat
8.) Flora and fauna
9.) Human health
10.) Archaeology
11.) Indigenous people's use of land and resources

With respect to the overall subject of this current review, there were many questions raised by reviewers of the EARD pertaining to potential impacts on fish and fish habitat. The TOR specifically requested documentation of these potential impacts. However, the Focus Report is extremely deficient in providing those details. In fact, there is no data showing effects of proposed effluent on fish, nor does the report acknowledge pre-existing data of the effects of BKPME on fish health. The following section attempts to summarize these effects.

4.2 Effects of Bleached Kraft Pulp Mill Effluent on Aquatic Animal Health

Bleached kraft pulp mill effluent (BKPME), like the effluent produced by NPNS, is a complex mixture of chemicals that possess environmentally active properties and are known to be toxic and mutagenic to a wide variety of aquatic organisms (2,9,13). The process of pulping and bleaching generates dissolved lignin, cellulose degradation products, and other wood extractives such as terpenoids, resin acids (RAs), phytosterols, and chlorophenolic compounds, some of which that are known to persist in the receiving environment for > 30 years (e.g., RAs; (8,14)). Wastewater discharge can include solids and dissolved organic matter which increases the biological oxygen demand (BOD) in receiving waters; ammonia, nitrates, phosphorus, and sulfur compounds, which cause nutrification of receiving waters; and heavy metals such as arsenic, cadmium, hexavalent chromium, lead, manganese, selenium and zinc; and finally, chelating agents, chlorates, and organochlorine compounds, known toxicants (6,9). The use of elemental chlorine for bleaching in kraft mills has historically results in elevated levels of organochlorine compounds such as polychlorinated dibenzo-*p*-dioxins (PCDD) and dibenzofurans (PCDF) in receiving environments. In Canada, *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* issued under the *Canadian Environmental Protection Act* (CEPA), require mills using a chlorine bleaching process to

discharge effluent with dioxin and furans below measurable levels due to the closing of several fisheries.

However, despite the move away from elemental chlorine, organochlorines have not been eliminated from discharges (9), and detectable levels of toxicologically chlorinated dioxins and dibenzofurans have been detected in effluents from mills that use ECF technology, including that of NPNS (10). This is attributable to the co-generation of molecular chlorine from chlorine dioxide generators, as well as the liberation of chlorine from chemical reactions during pulp bleaching (1,15). Thus, there remains a certain level of AOX-associated toxicity in BKPME regardless of the elimination of elemental chlorine in bleaching processes. This has been demonstrated for both aquatic invertebrates (16), and vertebrates (17).

Despite several decades of research, pulp mill effluents are poorly described, and there is limited progress in identifying agents responsible for disrupting fish physiology due to complexity and variability of effluents (18). Notwithstanding, there are several parameters of BKPME that have consistently correlated with negative outcomes, including AOX, BOD, COD, RA, phytosterols and TSS loading. These toxic effects have been exhaustively explored over the last 20 years on both receiving aquatic ecosystems and organisms that reside within. With respect to wild fish populations residing in areas receiving pulp mill effluent, there are a variety of negative physiological impacts, including compromised immunity (19–22), altered endocrinology and reproductive parameters (4,5,15,17,23–30), organocellular damage (31,32), genotoxicity (13,33–35), altered hepatic retinoid storage (14), hepatic sex steroid ligand availability (36), and altered hepatic enzymatic activity (37,38). The following sections attempt to summarize some of the scientific data associated with these negative impacts on immunocompetence, reproduction and hepatic enzyme activity.

4.2.1 Effects on Immunocompetence

Negative impacts on fish immunity is strongly associated with exposure to BKPME, such as decreased numbers and activity of lymphocytes in fishes exposed to effluent including perch (39), roach (21), and mummichog (40). Changes in hematology may reflect a more profound effect on lymphocyte maturation and migration, which may indicate general immunosuppression. An immunosuppressive effect was reported for roach exposed to BKPME and this was correlated with lower numbers of circulating lymphocytes and circulating antibodies (20), and numbers of antibody secreting cells (ASCs) are reduced in laboratory exposure studies (21). Moreover, macrophage function was shown to be reduced in effluent-exposed mummichog (40). With respect to disease susceptibility, macrophages play a key role in detection and clearance of pathogens and are critical in orchestrating immune responses of fish (41). Thus, reduction in macrophage activity in BKPME-exposed fish suggests these animals are more susceptible to disease. Indeed, another study observed significantly higher burdens of a ciliate protozoan, *Ichthyophthirius multifiliis*, in fish residing in a BKPME-contaminated lake (20). In the freshwater fish, *Channa punctatus*, immunotoxicity due to BKPME exposure was elevated compared to controls and was exacerbated as a function of

temperature (19). Interestingly, there was a biphasic effect which was dependent on the time of exposure. For example, there was a stimulatory effect on ASCs after a short-term effluent exposure, while after long-term exposure there was an inhibitory effect. Santos *et al.* (42) observed significant oxidative damage due to activation of circulating phagocytes in European eel (*Anguilla anguilla*) gill, a tissue known to be susceptible to oxidative damage in response to BKPME exposure (43). Oxidative stress associated with activation of macrophages in fish exposed to BKPME has been reported, with incongruent results related to exposure times and distance from the discharge source (42). Thus, it is clear that chemicals present in BKPME significantly alters normal immune function, and furthermore, that these effects must not be considered in the absence of environmental (e.g., temperature, pathogen load) effects.

4.2.2 Effects on Reproduction

Decades of studies demonstrating a range of effects have shown that a major concern with respect to effects on fish physiology is the potential for BKPME to alter fish reproduction and fertility as observed by delayed sexual maturation, reduced circulating gonadotropins, smaller gonads and reduced secondary sexual characteristics (reviewed in (5,18,44–46)). These effects have been reported in North American, Scandinavian, New Zealand, and Chilean studies, where effluents from all types of mill processes, wood furnishes, and treatments are capable of impairing fish reproduction from the molecular to the individual or population level (17,18,47). Despite intense research efforts, the precise mechanisms underlying these adverse reproductive outcomes are not clear and the identification of bioactive substances have proven challenging. Research has concentrated on biologically active sex steroids in response to effluent exposures. Most of these studies have focused on estrogenic (48,49) and androgenic (29) pathways. While there is certainly strong evidence that these pathways are affected, they are not the only pathways that could be involved in the reproductive effects caused by pulp and paper mill effluents. In fact, many effluents have strong anti-reproductive activities but are neither strictly estrogenic nor androgenic in standard assays (18). Of the constituents of wood (''wood extractives''), the plant sterol β-sitosterol is one of the most common one present in effluents (50), and is known to cause several endocrine effects in fish, including vitellogenin (VTG) induction altered plasma sex hormone levels and gonadal steroidogenesis (51). Table 1 attempts to summarize the known reproductive effects on finfish due to BKPME exposure.

Table 1. Examples of reproductive effects due to BKPME exposure in teleost fishes (reviewed in (18)). As can be observed, deleterious reproductive effects are still observed despite the substitution for chlorine dioxide in ECF bleaching. NPNS has described its processes as "typical" in this category (10).

Test fish	Country	Treatment[1]	Toxic effect	References
White sucker (*Catostomus commersoni*)	Canada	ECF	Reduced gonad size, circulating sex hormones, and fecundity; delayed	(25)

Test fish	Country	Treatment[1]	Toxic effect	References
			sexual maturity; changes in secondary sex characteristics	
Goldfish (*Carassius auratus*)	Canada	ECF, TMP	Depressed sex steroids; Neuroendocrine pathways affected	(24,52)
Fathead minnow (*Pimephales promelas*) Zebrafish (*Danio rerio*)	Canada	ECF	Suppression of egg production; Induction of reproductive pathways	(53,54)
Mummichog (*Fundulus heteroclitus*)	Canada	ECF	Depression of testosterone production	(55)
Rainbow trout (*Oncorhynchus mykiss*)	Canada, Brazil, New Zealand, Chile	EC/ECF	Estrogenic effects; Increased gonad size and early maturation	(5,56,57)
Redbreast sunfish (*Lepomis auritus*)	USA	EC/ECF	Reduced estradiol, increased incidence of atretic vitellogenic oocytes	(58)
Largemouth bass (*Micropterus salmoides*)	USA	EC/ECF	Reduced gonad size lower plasma sex hormones, reduced vitellogenesis	(59)
Mosquitofish (*Gambusia holbrooki*)	USA	-	Masculinization of females	(28,60,61)
European perech (*Perca fluviatilis*) Roach (*Rutilus rutilus*)	Finland	ECF	Decreased size of gonad, reduction in plasma sex steroids	(39)
Eelpout (*Zoarces viviparous*)	Sweden	ECF	Significantly higher males in population	(59,62)
Shortfin eel (*Anguilla australis*)	New Zealand	ECF	Increased plasma estradiol and testosterone	(63)

[1]Treatment process refers to either elemental chlorine (EC), elemental chlorine free (ECF) bleaching, or thermomechanical pulping (TMP)

As previously stated, the exact chemical compounds involved in the effects on reproduction are ambiguous; however, they are known to occur in the absence of elemental chlorine bleaching such as the ECF processes utilizing chloride dioxide (15), similar to the processes performed at NPNS. Given the wide variety of reproductive effects observed, it is unlikely that there is a single chemical involved in anti-reproductive effects. The observation that neuroendocrine pathways are affected by BKPME exposure (24,64), in addition to the contribution of endocrine signalling in both androgenic and estrogenic pathways, implies that many different chemical compounds interact with neuroendocrine systems. However, many effluents have strong anti-reproductive activities but are

neither strictly estrogenic nor androgenic in standard assays (18). Thus, there is clearly a multitude of mechanisms contributing to these effects that are a product of the mill-specific processes.

4.2.4 Effects on hepatic enzymatic activity

BKPME is known to induce mixed-function oxygenase (MFO) in finfish. Induction of MFO enzymes in fish is a consistent indicator of the presence and bioavailability of polyaromatic compounds such as polynuclear aromatic hydrocarbons (38), some plant hormones (65), and chlorinated dioxins and furans (66). For BKPME, MFO induction can be used as a proxy for potency of the chemical constituents within, but the identity, concentration and ecological hazards of the individual compounds requires further analysis.

The elimination of elemental chlorine in the pulp bleaching process through new regulations led to a major reduction of toxic AOX-associated compounds in BKPME, and subsequently resulted in substantive decrease in the presence of these compounds in the receiving environment and associated organisms (11). However, negative impacts on fish are still observed despite improvements, including MFO induction (38) and increased liver size (67). It is thought that wood extractives are a major cause of this effect (66,68), and key molecules involved have been identified as chlorinated lignin-derivatives (37). Resin acids (RAs) and phytosterols are consistently found in pulp mill effluent and are capable of inducing liver damage via MFO enzymes. A well-established method for determined the activity of these enzymes is via the standard bioassay using rainbow trout where the activity of ethoxyresorufin-*o*-deethylase (EROD) is measured (66). Using this method, many researchers have demonstrated substantial induction of MFO in fishes exposed to BKPME, both in chlorine-based processes, and ECF-based processes similar to the one employed by NPNS (10,38,65).

5.0 Proposed Replacement Effluent Treatment Facility Project

The proposed project will consist of the development of a new effluent (wastewater) treatment facility (ETF) constructed on Northern Pulp property, and a transmission pipeline that will carry treated effluent overland and in the marine environment and discharge via an engineered diffuser (marine outfall) (10).

The proposed new ETF will employ the AnoxKaldnes BAS™ Biological Activated Sludge process purchased from Veolia Water Technologies, which combines Moving Bed Biofilm Reactor (MBBR) technology with conventional activated sludge. Once treated onsite at Northern Pulp's facility, effluent will be sent through an approximately 15 km long pipeline. The pipeline will enter the south side of Pictou Harbour and make landfall on the north side of the harbour roughly following Highway 106 right-of-way to Caribou, and then re-enters the marine environment adjacent to the Northumberland Ferries marine terminal and continues for approximately 4.0 km through Caribou Harbour to the Northumberland Strait, terminating at an engineered marine outfall.

As stated in the EARD, "*the effluent is anticipated to meet compliance with federal PPER*" (pg 84), and furthermore, that effluent "*will meet ambient water quality at the edge of a standard mixing zone*" (pg 84).

The quality of this effluent entering the RWS will be described in the following section.

5.1 Predicted Effluent Quality

Expected daily maximum water quality characteristics of the treated effluent were used to conduct modelling for simulated concentrations over a one-month period (10). Table 1 compares those data with the background water characteristics of the RWS. What can be observed is the significant increase in concentration of all metrics. However, this data does not consider any long-term accumulation of various parameters of the effluent. For example, AOX and RA are known to be recalcitrant to degradation and persist in the environment (3,8,69), and as such, an accumulative model is necessary to predict environmental concentrations over extended periods of time. Additionally, these values are predicted and do not represent the actual chemical characterization of the ETF BKPME, therefore, it is unclear what the actual increase or decrease of these metrics will be upon discharge of the effluent.

Table 2. Comparison of background quality with proposed ETF effluent water quality in receiving water system (Caribou Harbour). Parameters with empirical evidence for negative physiological effects on aquatic organisms are denoted with an asterisk (*).

		Average Value		
PARAMETER	**Unit**	**Background[1]**	**Average Velocity (2018)[2]**	**Fold change[3]**
AOX*	mg/L	n/a	7.8	7.8x
TN*	mg/L	0.17	6.0	35x
TP*	mg/L	0.5	1.5	3x
Colour	TCU	4.5	750	167x
COD*	mg/L	n/a	725	725x
BOD_5*	mg/L	ND	48	48x
TSS*	mg/L	2.5	48	19x
DO*	mg/L	9.7	>1.5	-6.5x
pH*	-	7.8	7.0-8.5	-1.1x – 1.1x
Temperature (summer)*	°C	16.8	37	2.2x
Temperature (winter)*	°C	1	25	25x
TDS	g/L	30	2	-15x
Cadmium	µg/L	0.084	1.03	12.2x
TDF*	pg/L	3.213	3.675	1.14x
PAH*	µg/L	0.01	0.044	4.4x
TRA*	mg/L	0.06	0.57	9.5x
TFA*	mg/L	0.07	0.335	4.8x
TPh*	µg/L	ND	6.13	6.13x

[1]Daily background water quality of the receiving water system (Caribou Harbour), obtained from Table 4.2-3 in the Focus Report (10)
[2]Daily effluent water quality during average velocity operations, obtained from Table 4.2-4 in the Focus Report (10)
[3]Calculated fold-change increase or decrease (-) of components taken as the ratio of effluent/background measurements

As can be observed in **Table 2**, all of the measured analytes will be altered in the RWS to varying degrees; however, the analytes that are of highest concern with respect to impact on fish health and fitness include concentrations of AOX, COD, BOD_5, TSS, pH, DO, TDF, PAH and TRA. Most studies evaluating negative physiological effects of BKPME exposure looks at the effluent as a complex mixture. Some of the available scientific evidence addressing components on an individual in reference to observable effects on fishes is summarized in **Table 3**.

Table 3. Summary of effects of the major harmful BKPME components on finfish health, including the predicted discharge from NPNS, effects that have been documented, the species and accompanying references.

Analyte	Expected daily discharge[1] (kg/day)	Effect(s)	Species	Reference(s)
Adsorbed organic halides (chlorinated compounds)	663	MFO induction; MFO induction, genotoxicity	Rainbow trout; Chinook salmon	(35,37)
Chemical Oxygen Demand	61,625	-	-	-
Biological Oxygen Demand	4,080	Reproductive anomalies, infertility	Fathead minnow	(4)
Suspended Solids	4,080	-	-	-
Dioxins and Furans	NP	Masculinization; Genotoxicity; Immunotoxicity; Anti-estrogenic	Mosquitofish; Smallmouth bass; Spotted snakehead	(19,28,34,70)
Resin Acids	NP	Altered vitellogenin, sex steroids in females; Depleted hepatic retinoic acid levels; Testosterone depression	Zebrafish; White sucker, Rainbow trout; Mummichog	(14,55,71)
Fatty Acids	NP	-	-	-
Phenols	NP	Testosterone depression	Mummichog	(55)
Polyaromatic hydrocarbons	NP	MFO induction; Altered testosterone; VTG induction	Rainbow trout; Mummichog; Rainbow trout	(23,37,51,65,68)

[1]Based on data provided in the FR

5.2 Findings of EARD/FR pertaining to Impacts of ETF and BKPME on Finfish (Freshwater and Marine)

In short, both the EARD and FR conclude that there are no potential significant impacts on either freshwater or marine fish or fish habitat.

These are described in detail below.

5.2.1 Freshwater

In the EARD, the Proponent summarizes the residual adverse effects and environmental effects (Section 8.6 and pg. 535). In this, during all three Construction, Operation and Maintenance Phases of the project, the conclusion was:

> *"No significant residual environmental effects identified with planned and standard mitigation implementation, authorization, and environmental protection measures".*

Similar to the EARD, the FR prepared by NPNS reported a summary of no significant impact due to operations (included effluent discharge):

> *"Once the project is operational, no impacts are anticipated to freshwater fish and fish habitat during the operation and maintenance phase"* (pg. 220)

5.2.2 Marine

In the EARD, the Proponent summarizes the residual adverse effects and environmental effects (Section 8.12 and pg 588). In this, during all three Construction, Operation and Maintenance Phases of the project, the conclusion was that there would be no significant impact:

> *"Overall, based on the results of this EA Registration, it is concluded that, with planned mitigation and the implementation of best practices to avoid or minimize adverse environmental effects, the residual environmental effects of the project, including the effects of accidents, malfunctions and unplanned events as well as cumulative environmental effects, during all phases are rated not significant"*

Similar to the EARD, the FR prepared by NPNS provided the following summary of the assessments conducted on marine fish and fish habitat (pg. v – Executive Summary):

> *"Potential impacts to these marine VECs were evaluated in light of minor adjustments to the marine pipeline route and the updated receiving water assessment and comparison to the current outfall. Based on the receiving water study results and with identified mitigation… no significant residual adverse environmental effects were identified… A diffused outfall near outside of Caribou Harbour in the Northumberland Strait is considered to have much less potential effluent impact on the receiving environment and represents an improvement."*

With respect to water quality of the RWS, the EARD and FR concludes that there is unlikely to be significant residual effects as a result of BKPME discharge. However, this conclusion was drawn after a **one-month modelling** of effluent discharge and **fails to take cumulative effects** of recalcitrant chemicals present in BKPME. Furthermore, the chemical characteristics of the BKPME are projected and do not represent the actual effluent. In the absence of empirical data, it seems unlikely that NPNS can make any conclusions about the potential negative impacts.

5.2.3 Assessment of Major Findings

The Proponent concludes that **there are no significant impacts anticipated** by either construction or the operational phases of the ETF, on either freshwater or marine fish or fish habitat. This assertion is based on the notion that the predicted BKPME will be at background levels within 2 m of the diffuser port and will therefore not pose a risk to finfish in the RWS. There are several key assumptions that play a critical role in the validity of these conclusions:

1.) The dilution of effluent is as predicted, and major harmful components of the effluent will be diluted to ambient by 2 m past the diffusers.
2.) The characteristics of the actual effluent is consistent with the predicted effluent
3.) The 85,000,000 L/day of effluent that will be discharged by the diffuser will act in a way that is accurate to models
4.) There is no accumulative effect of the effluent over time on health or habitat of finfish
5.) There is no sublethal effect of the diluted effluent on finfish in the RWS

Identified issues with Major Findings:

1.) As per **Table 1**, there is a substantive change in the concentration of many components of concern in the predicted BKPME. The buffering capacity of the RWS to reduce any negative effects of this volume of BKPME is a dangerous, and unsubstantiated, presumption. For example, COD in the immediate effluent is predicted to be 725x higher than ambient. That represents an extremely high gradient that is proposed to be reduced to 0 within 2 m (~ 7 ft) from the diffuser. This assertion does not seem credible and cannot be properly assessed using a modeling approach. Empirical evidence to support this predicted discharge and assumed dilution of discharge (over time) must be included.
2.) It is well documented in the literature that there are recalcitrant chemicals present in BKPME. These chemicals – namely, resin acids, fatty acids, AOX, PAH, and TDF – are extremely slow to degrade in the environment and **have a propensity to bioaccumulate in sediment** (72) or in tissues of invertebrates (73) and vertebrates (74). All the modeling data in the EARD and FR looks at the discharge and flow of effluent over a one-month period. Even with very small initial concentrations of these chemicals into the RWS, **it is inconceivable to assume there will be no accumulation over time or space**. Furthermore, this potential accumulation will be under influences of seasonal variation in tidal and current flow. It is unclear how the Proponent reaches the conclusion that there will be no effect when these parameters have not been addressed in the models.
3.) **Without sublethal testing of their proposed effluent**, it is unclear how the Proponent can conclude there will be no effects to finfish health. Due to the substantial variation both in terms of chemical characterization and effects on fish reproduction (reviewed in 7), it is necessary to test individual mills and their effluents for the potential to negatively affect aquatic organisms (46,75). As part of the effort to better understand these effects, several laboratory exposure and bioassay models have been developed. For example, a short-term

laboratory test assessing egg production by the fathead minnow (*Pimephales promelas*) is a consistent and sensitive indicator of overall reproductive status of how fish respond when exposed to mill effluent (25,76).

4.) Overall, both the EARD and the FR appear to have **omitted a science-based review on the available literature pertaining to the effects of BKPME on finfish health**. There is an exhaustive body of literature available, and only 1 reference (11) was mentioned in the references. To conclude the EA with a finding of no significant impact on fish health after all the primary data associated with the subject is not acknowledged lacks scientific credibility and is, frankly, unacceptable.

5.2.3 Addressing the Terms of Reference in the FR

The purpose of the FR was to address issues brought up during public consultation and review of the EARD by relative stakeholders. With respect to the focus of the current review, i.e., finfish health, the following sections of the TOR were assessed: 2.3, 2.4, 4.1, 4.2, 7.3, 7.4, and 7.5.

These terms of reference, including the data submitted in the FR and resultant conclusions drawn by the review herein are described below:

Project Description (2.3-2.4) – Regarding Effluent

The Proponent was asked to submit data regarding the complete physical and chemical characterization of the raw wastewater (pp 23-32 of FR; Appendix 2.3). The Proponent was also asked to submit a complete physical and chemical characterization of the expected effluent entering the RWS (pp 32-39; Appendix 2.4)

Assessment after review:

The Proponent refers to the 2018 Effluent Characterization (Table 2.3-3) to represent the predicted effluent. However, it is unclear how this conclusion is valid, as the 2018 Effluent is based off the old system, which differs on several different levels, including the "polishing" phase. In contrast, the predicted effluent will not undergo this "polishing" phase.

The Proponent consistently refers to the PPER as a guidance for justification of toxin levels in their effluent. At no point does the Proponent indicate they are moving towards a progressive and science-based approach. The PPER have been criticized for not setting higher standards for effluent treatment (4). For the Proponent to rely on these regulations only considering "*acute lethality to fish*" as an important indicator of toxicity is careless and demonstrates no consideration for the finfish communities residing in the RWS, many of whom are listed as threatened or endangered by COSEWIC (77–82).

Importantly, the data provided in 2.3-2.4 are based on predicting effluent characteristics and subsequent modelling. As stated on pp 33, "*Based on Veolia's **anticipated** performance of the proposed ETF, it is **expected** that the proposed replacement ETF will provide performance that is comparable to other mills*".

Considering the significant potential for negative impacts on several species of fish (see Section 6.0), a speculative and predictive approach is not justified. Empirical evidence is required to validate these claims.

Marine Water and Marine Sediment (4.1-4.2)

The Proponent was asked to perform baseline studies on marine water quality and sediment quality in the vicinity of the proposed marine outfall location (pp 82; Appendix 4.1). Furthermore, the Proponent was asked to update the receiving water study to model for all potential contaminants of concerns in the RWS (pp 82-96; Appendix 4.2).

Assessment after review:

The Proponent only demonstrates data for effluent modelling for a period of 30 days. As this project is projected to last for longer than 30 days and in months other than July and February, it is unclear why modelling results over a period of 365 days were not obtained. This data essentially ignores any potential for accumulation over time and space, which is extremely likely to occur given the volume and masses of effluent proposed to be discharged by the ETF. This fact is particularly concerning for refractory chemicals that are known to exist in BKPME (8).

This modeling data is extremely deficient and lacks reasonable credibility for the above reasons. Furthermore, there is a clear inconsideration for potential effects over time.

Fish and Fish Habitat (7.3-7.5)

The Proponent was asked to conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational, and Aboriginal fisheries. This must be based on updated information, additional studies and/or an understanding of expected movement of contaminants (pp 122-; Appendix 7.3). The Proponent was also asked to submit an updated EEM program based on results of various relevant baseline studies and an updated receiving water study (pp). Finally, the Proponent was asked to clarify what contingency measures will be in place to mitigate potential impacts due to potential large and rapid fluctuations in water temperature in the winter at the diffuser location during low production or maintenance shut down periods.

Assessment after review:

The Proponent did not conduct any additional studies to help provide evidence that might support their initial claims of "no impact" in the EARD. What would have been expected would have included sublethal toxicity testing of the predicted effluent as is a common practice for understanding effects on fish health.

In contrast, the Proponent simply conducted review of their own studies (while ignoring the body of scientific data) and concluded "*no significant residual impact to marine water are expected to arise on any fisheries or fish habitat as a result of this project*". They go on to describe all of the studies that could be

performed after approval, *"Future studies could include toxicity testing, specifically on larval lobster and herring eggs to evaluate sublethal effects on these species".*

In contrast to the findings of the FR, the current review of the literature identified 6 species of finfish listed as "endangered", with 4 listed as "threatened" and 2 of "special concern". The Proponent fails to identify American plaice (endangered), lumpfish (threatened), porbeagle (endangered), and Atlantic sturgeon (threatened). They only consider a fish as potentially impacted by the project if they were observed during the sampling. This is extremely concerning, particularly with so many species in fragile population status. Atlantic sturgeon is known to inhabit the waters of Pictou and is particularly vulnerable to anthropogenic disturbances due to its longevity and age to reproduction (83). It is unacceptable for the Proponent to assume this species will not be affected by the project just because they did not observe it during their limited marine fish survey.

6.0 Impacts of Proposed ETF on Finfish considering Empirical Evidence

In contrast to the Proponent's conclusion that there are no significant impacts expected on freshwater or marine fish or fish habitat, **there is a substantial body of literature that documents the negative physiological effects of pulp and paper mill effluent at various concentrations on aquatic organisms, and in particular, finfish**. This body of literature is largely absent from the EARD and FR, so it is plausible that the Proponent was simply unaware of the scientific consensus. Notwithstanding, the data is quite clear and demonstrates that components of effluent, whether they be derived from chlorine- or chlorine-free treatment processes (such as NPNS), fundamentally alter fish reproductive and immune systems, and by doing so, significantly impact overall fitness of these organisms. It is worthwhile to mention that much of the research concedes that the chemical(s) ultimately involved in these effects are not well characterized (11). Differential treatment processes in pulp and paper mills across Canada, and from different locations around the world, discharge complex and variable effluent, and these effluents are in a dynamic state of flux with respect to their characterization (2,4,11,17). Thus, it is not a clear-cut mechanism of effect that can be generalized to any one mill. Because of this confounding factor, it becomes even more prudent to critically examine BKPME on an individual mill basis to fully understand potential impact, which would include using laboratory models such as the fathead minnow reproductive test or comparators (53).

With respect to the specific fish populations of the Northumberland Strait, there is an extreme paucity of data pertaining to the physiological impact of BKPME. Moreover, there is limited-to-no information regarding the true chemical characteristics of the proposed effluent. Thus, identification of true effects and potential impacts are limited to using a comparative approach (**Table 4**).

Table 4. Species of fishes known to inhabit the freshwater tributaries or marine waters of Northumberland Strait, their known habitat and COSEWIC status, the proposed impact by the EARD, and the potential impact of BKPME exposure as determined by scientific studies.

Species[1]	**Proposed Impact[2]**	**COSEWIC Status**	**Comparator Species[3]**	**Effect[4]**
Atlantic mackerel (*Scomber scombus*)	None	Secure	-	Unknown
American plaice (*Hippogloissoides platessoides*)	None	Threatened	Winter flounder (*Pleuronectes americanus*)	Skin lesions, increased parasite abundance, hepatic lesions, increased EROD (67)
Atlantic salmon (*Salmo salar*) Brook trout (*Salvelinus fontinalis*)	None	Special Concern – Endangered; Sensitive	Rainbow trout (*Oncorhynchus mykiss*) Chinook salmon (*Oncorhynchus tshawytscha*)	Altered retinoic acid receptors (14); Increased gonad size, early maturation (84); Intersex characteristics (57); Genotoxicity (35); Induction of EROD (38)
Rainbow smelt (*Osmerus mordax*)	None	Secure	-	Unknown
Blueback Herring (*Alosa aestivalis*)	None	Sensitive	-	Unknown
Gaspereau (*Alosa pseudblueoharengus*)	None	Sensitive	-	Unknown
Atlantic halibut (*Hippoglossus hippoglossus*)	None	Secure	Winter flounder (*Pleuronectes americanus*)	Skin lesions, increased parasite abundance, hepatic lesions, increased EROD (67)
Atlantic herring (*Clupea harengus*)	None	Special concern	-	Unknown
Atlantic sturgeon (*Acipenser oxyrinchus*)	None	Threatened	-	Unknown
Atlantic striped bass (*Morone saxatilis*)	None	Threatened	Largemouth bass (*Micropterus salmoides*)	Reduction in fry survival, endocrine disruption (27); Decreased lymphocytes, neutrophilia (85)
Atlantic bluefin tuna (*Thunnus thynnus*)	None	Endangered		

American eel (*Anguilla rostrata*)	None	Threatened	European eel (*Anguilla anguilla*)	Gill damage due to oxidative stress (42); Reduced immunity (42)
Atlantic cod (*Gadus morhua*)	None	Endangered	-	Unknown
Winter Skate (*Leucoraja ocellate*)	None	Endangered	Winter flounder (*Pleuronectes americanus*)	Skin lesions, increased parasite abundance, hepatic lesions, increased EROD (67)
Winter Flounder (*Pleuronectes americanus*)	None	Secure	Winter flounder (*Pleuronectes americanus*)	Skin lesions, increased parasite abundance, hepatic lesions, increased EROD (67)
Lumpfish (*Cyclopterus lumpus*)	None	Threatened	-	Unknown
Porbeagle (*Lamna nasus*)	None	Endangered	-	Unknown
Spiny dogfish (*Squalus acanthias*)	None	Special concern	-	Unknown
White hake (*Urophycis tenuis*)	None	Endangered	-	Unknown

[1]Species as listed by the EARD and FR
[2]Proposed impact by EARD and FR
[3]Comparator species; there has been no evidence pertaining to the effects of BKPME on the species of the RWS, thus, scientific studies that investigated these effects in closely related species are list. If there was no appropriate comparator, then (-) was recorded
[4]Physiological impacts as determined by the associated reference

Marine fish, and their habitat, are closely linked to the surrounding physical environment, including water and sediment quality – all of which could be impacted by the proposed ETF. The main commercial fisheries of importance include lobster, sea scallop, herring, mackerel and rock crab, however, the Northumberland Strait is an important migration corridor for many other species including Atlantic salmon, Atlantic bluefin tuna, American eel, winter skate, and Atlantic cod (86). Furthermore, nearshore habitats populated with eel grass are known nurseries for juvenile fishes (e.g., Atlantic salmon), or habitat for benthic species including that of the American eel (*Anguilla rostrata*). The American eel plays an important role in Canada's aquatic biodiversity. It has the greatest range of any fish species in North America and has supported major commercial, recreational, and Aboriginal fisheries (citation). Enlisted as threatened, it is thought that declines in abundance are due to habitat degradation, especially in light of pollution (77). Furthermore, introduction of an exotic parasite, *Anguillicoloides crassus*, that infects the swim bladder of American eels, is thought to be imposing an additional pressure on the species (87). Others have linked the collapse of the European eel to *A. crassus*, as heavy infections can lead to hemorrhagic lesions, swim

bladder fibrosis or collapse, skin ulceration, decreased appetite, and reduced swimming performance (88). It is well documented that exposure to BKPME reduces immune competence in fishes, and this has been associated with higher parasite burdens in some populations (20,22). Therefore, the additive effects of *A. crassus* infection with exposure to BKMPE may present a serious concern for populations of American eel and needs to be studied further. In addition to American eel, several other species of fish known to inhabit the RWS are listed as endangered by COSEWIC, including Winter Skate (89), Atlantic Salmon (82), Atlantic Sturgeon (83), Atlantic Cod (81), Atlantic Bluefin Tuna (79), Porbeagle (90), and White Hake (78).

The Northumberland Strait is home to 15 salmon-bearing rivers, and the populations of Atlantic salmon in that area are in decline. As ecological keystone species, the health of salmon populations can be viewed as an indicator of overall ecosystem health. The potential impacts of BKPME discharged by the proposed ETF are simply not understood, however, in other systems the negative impacts on reproduction and immunity are well documented in salmonids (e.g., (26)). The Proponent failed to produce any scientific evidence on the effects of their effluent on salmon.

The Proponent consistently states that their proposed ETF and associated effluent is treated to "*a level that is non-toxic and meeting regulated (PPER) effluent discharge parameters*" (example, page 66, (10)). However, there is no empirical evidence characterizing the true chemical properties of the effluent. It is unclear how the Proponent can make any informed or accurate predictions on the potential environmental impacts on the RWS or the organisms that reside there. Furthermore, it is important to note that these regulations are antiquated and are currently undergoing a major revision as recent EEM studies indicate that 70% of pulp and paper mills in Canada are impacting fish (91). Thus, although they may be true in stating they are within PPER *per se*, this will certainly not be the case in the future. Furthermore, the PPER are designed to prevent effluents that cause "*acute lethality*", and do not consider effects of long-term chronic exposure. Given the extremely high level of concern regarding the potential impacts on fish populations in the RWS, there should be an avoidance of harm, disruption or destruction, not simply "*acute lethality*". For example, there are known effects in fish that are not observed for years subsequent to initial BKPME exposure that would seriously impact the health of fish populations in the RWS (e.g., 53).

Irrespective of that fact, applying a science-based approach, as was claimed by the Proponent, would imply the most current available information would be used to inform decisions on effluent treatment and discharge. However, this is not the case. For example, a recent publication by Martel *et al.* (2017) discussed recommendations by experts in the field regarding the limits of BOD in BKPME that should be followed to prevent deleterious effects on fish populations (4). Therein, the authors prescribe a maximum BOD_5 of > 20 mg/L as having the greatest probability of no effect on finfish reproduction. The study was intended to provide insights for best management practices that could be incorporated into mill-specific strategies for achieving minimal or no impact on fish reproduction (4). These best practices recommendations should be included in the design or

development of any new pulp and paper mill. It is inappropriate for the Proponent to ignore recommendations made by scientific consensus.

The true impacts of the projected effluent should be evaluated using independent laboratory exposure studies for all major important species. Furthermore, upon close examination of the body of literature cited by both the EARD and FR, it is apparent that the Proponent did not consider the large and comprehensive available datasets produced across time and space, where a general consensus has been reached on the toxic effects of BKPME to finfish health.

7.0 Summary

The installation of secondary effluent treatment processes across Canada has substantially improved effluent quality through reductions of compounds producing acute toxicity, including organochlorine discharges and AOX compounds. However, BKPME released in aquatic receiving environments still contains bioactive compounds that affect fish metabolism, reproduction, and health. Investigations into the substances involved in these negative effects has indicated that wood constituents are partly to blame, but that many unidentified and uncharacterized substances in the effluent are involved. Thus, despite the improvement in effluents, pulp and paper mills continue to exact negative physiological effects on aquatic organisms, and furthermore, a more comprehensive understanding of the complete chemical profile of BKPME and associated bioactive properties needs to be completed.

With respect to the project in question, **there is simply not enough supporting documentation to support the conclusion that there will be no negative effects on aquatic animals and the associated ecosystem of Caribou Harbour and the Northumberland Strait**. The negative physiological effect of BKME has been well described on fishes, included depressed immunity, altered reproduction and decreased overall resilience. While effluent plume modelling may have some success in predicting the concentration of effluent in receiving waterways, they do not provide accurate accounts of the organisms in those waterways, as many are migratory. Furthermore, the relative importance of habitat is dynamic over time and space. For example, sensitive habitats of near-shore environments represent critical nursery areas for many larval fishes during certain times of the year (e.g., post-emergence of salmonid smolts), while for other organisms that are sedentary (e.g., mussels), avoidance of deleterious environmental stimulants is not possible. **Additionally, the predictive modeling fails to account for accumulation of BKPME components over a period longer than a month which severely limits any predictive power.** And finally, there **is no description or characterization of the potential for components of the predicted BKPME for bioaccumulation, despite the large body of evidence for bioaccumulation of several toxic components such as chlorinated organic compounds** (69)**, and wood extractives** (8)**.**

8.0 Conclusion

There are numerous issues and concerns that are raised in the above document pertaining to the effluent characterization and associated impacts to marine fish and fish habitat. For example, there is a lack of baseline environmental data, effluent composition data, or data on toxicity of proposed effluent to fishes that reside in the RWS. The Proponent appears to ignore the massive body of literature on the deleterious physiological impacts of BKPME on finfish, as well as the very real potential for bioaccumulation of toxic compounds in the RWS. Furthermore, the FR does not acknowledge the most up-to-date scientific recommendations on limits of effluent components (i.e.,

BOD limits), that are necessary to reduce potential harm to fishes. With respect to the fish species potentially at risk, there are 4 species residing within this RWS that are listed as “threatened”, and 6 species residing within this RWS that are listed as “endangered” by COSEWIC. Additive effects involving already stressed populations due to climactic variability and habitat loss, combined with the known impacts (e.g., compromised reproductive and immunological systems) of exposure to BKPMEs pose a real and significant concern for these species of fish.

In conclusion, it is of my professional opinion that this Focus Report is deficient in the necessary supporting documentation and empirical data regarding the potential impacts of the proposed ETF by NPNS on finfish in the Northumberland Strait.

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Appendix I – *Curriculum vitae,*

Expert witness report on the Focus Report for the Northern Pulp Nova Scotia Replacement Effluent Treatment Facility

November 7, 2019

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Introduction

Context of this report.

On October 2, 2019, Northern Pulp Nova Scotia Corporation (NPNS) submitted a focus report for the replacement effluent treatment facility project for environmental assessment. This focus report was requested by Nova Scotia Environment as additional information to support a final decision regarding the approval of the environmental assessment for the construction and subsequent operation of a new effluent treatment facility including a pipeline to transport treated effluent for discharge into the Northumberland Strait.

Public comments on the focus report can be made until November 8, 2019. In this context, the Gulf Nova Scotia Fleet Planning Board, Prince Edward Island Fishermen's Association, and Maritime Fishermen's Union solicited my expert opinion via Barrister and Solicitor, Jamie Simpson of Juniper Law. This report presents my objective, unbiased opinion on the potential impact of the new effluent treatment Facility project proposed by NPNS.

Content of this report.

The report provides first a short summary of my analysis of the focus report. Given my expertise in biological Oceanography and Fish Ecology, I conducted an in depth reviewed of parts 4. Marine Water and Marine Sediment and 7. Fish and Fish Habitat of the focus report. This second part of my report documents the series of issues that I identified with parts 4 and 7 of the focus report and relevant appendices (Appendices 4.1, 4.2, 4.3, 7.2, 7.3, and 7.4).

Finally, a general discussion addressing two main questions is provided:

- Does NPNS's submitted materials adequately address the potential risks of bioaccumulation of toxins in the marine environment, and if not, what these risks may be?
- Is NPNS's assertion that the effluent released into the Strait through the proposed treatment system will be less harmful than the effluent currently entering the Strait via the current Boat Harbour treatment system (particularly with respect to the release of metals) valid?

The response to these questions rely on my analysis of the entire focus report, with particular attention to parts 2.3 and 2.4 (because of their relevance to the second question listed above) and with an in-depth review of parts 4 and 7.

Summary

The results of the focus report in terms of impact of the replacement effluent treatment facility to the marine environment are highly dependent on the results from the receiving water study. The receiving water study is based on two modelling exercises. The credibility of the results from any modelling exercises depends mainly on 1) the robustness of the models, 2) the implementation of the models. Reviewing the robustness of these two models is outside my expertise; therefore, I did not review the structure of these two models. However, given my modelling skills and general knowledge of physical oceanography, I was able to review the implementation of these two models. I found a potentially significant issue with the implementation of the far-field model: **it assumes that the one-month simulation period is enough to represent dilution processes that will occur over the several decades of effluent discharge from the proposed outfall location**. This is an issue, because effluent concentrations are likely to increase over time, which will affect future dilution. More details on this issue and other potential issues with the receiving water study are provided in the part 4 of this report.

The terms of reference for the focus report included baseline surveys of the marine fish and fish habitat as well as an impact assessment of treated effluent for key marine species important for commercial, recreational and Aboriginal fisheries. These surveys and impact assessments are especially important given the great concern expressed by the public and the government for the potential impact of the proposed work on the value environmental component (VEC) "Marine Fish and Fish Habitat". Indeed, according to the concordance tables showed in the focus report (pages 2 and 3, Dillon 2019), 195 public comments (2nd highest number) and 34 government comments (4th highest number) were related to the VEC "Marine Fish and Fish Habitat".

On June 21, 2019, Bill C-68, an act to amend the Fisheries Act and other Acts in consequence has received Royal Assent and is now law. This enactment amends the fisheries act to "provide measures for the protection of fish and fish habitat with respect to works, undertakings or activities that may result in the death of fish or the harmful alteration, disruption or destruction of fish habitat". An important question related to item 7.2. of the terms of reference is thus: Can the proposed work lead to the harmful alteration, disruption, or destruction of marine fish habitat?

In my professional opinion, given the information presented in the focus report and associated documents, **it is impossible to conclude that the proposed work won't lead to harmful alteration, disruption, or destruction of fish habitat.** Indeed, I found that baseline fish and fish habitat surveys for the marine environment were incomplete and had numerous gaps. No surveys of the intertidal zone and of the extent and structure of eelgrass meadows were conducted. Furthermore, as described in the focus report and appendix 7.2, the methodology used for marine fish habitat surveys is not reproducible, which will prevent future comparison if environmental monitoring programs are conducted.

Review of part 4. Marine Water and Marine Sediment

4.1 Baseline Marine Studies

Conduct baseline studies for the marine environment (such as marine water quality and marine sediment) in the vicinity of proposed marine outfall location.

Marine water quality

A baseline water quality study was completed to enable future monitoring of the impact of the effluents on water quality and also to be used in the water quality receiving study. Water samples were taken on May 24 and 25, 2019 at varying depth and tide cycles. The analysis of the water samples that were collected are robust and the concentrations are reliable. However, despite proper chemical analysis of collected water samples, the current baseline study of water quality is of limited use for future comparison because of its short temporal extent.

Issue 4.1.1. The marine water quality study was conducted over a period of time too short to provide a useful baseline.

The biochemical properties of marine waters in the southern Gulf of St. Lawrence, including the area of study, are highly dynamic in time and show strong seasonal cycles (Strain et al. 1998, Blais et al. 2018). For instance, concentrations in nitrogen and phosphorus, and oxygen demand show strong variation in response to seasonal plankton blooms (Blais et al. 2018). These seasonal cycles vary in their timing from year to year and any comparison of chemical properties of marine water through time needs to capture these seasonal cycles. The marine water quality baseline study conducted as part of the focus report does not provide sufficient temporal information to enable future monitoring of change in water quality.

Suggestion. Conduct a new study of the chemical properties of marine water in the proposed work area with sample collection extended throughout the year

Sediment quality

A baseline study of the sediment chemical composition was conducted to characterize the materials that may be excavated and potentially permanently sidecast or disposed of during the construction phase. Sediment samples were collected along the length of the proposed pipeline corridor and in the vicinity of the preferred outfall location.

Issue 4.1.2. The sediment in Pictou Harbour showed concerning levels of harmful chemical concentrations.

Results indicated that many chemical concentrations exceed levels of Canadian Environmental Protection Act Disposal at Sea for Pictou Harbour. This included Total PAH, 2-Methylnaphthalene, acenaphthene, fluorine, naphthalene, arsenic, and cooper. This raises concerns for the future excavation of the sediment in Pictou Harbour.

Because of the lack of baseline data (Romo et al. 2019), it is difficult to affirm that these elevated concentrations **of Total PAH, 2-Methylnaphthalene, acenaphthene, fluorine, naphthalene, arsenic, cooper and lead are related to the past and ongoing effluents discharged from Boat Harbour.** However, given the results from the far field modelling study, which indicates that effluent from the existing dam discharge at Boat Harbour can accumulate in Pictou Harbour (Figure 4.2-6 of Focus Report, Dillon 2019), there is a high likelihood that these elevated concentrations of harmful chemicals are related to current effluent discharge in Boat Harbour. This is a significant concern for any future effluent discharge in the Northumberland Strait, and supports the adoption of the precautionary approach.

4.2 Receiving Water Study

Update the receiving water study to model for all potential contaminants of concern in the receiving environment (based on the results of the effluent characterization and/or other relevant studies such as Human Health Risk Assessment). Baseline water quality data for Caribou Harbour must be applied to this study. Refer also to Addendum 3.0.

The receiving water study is a key component of the focus report and the results from this study are used in section 7.3. to evaluate the potential impacts of the proposed work on marine fish and fish habitat. If the results are inaccurate then conclusion in section 7.3 of the focus report needs to be revised.

The receiving water study was conducted using a far-field hydrodynamic model (Mike 21) and a near-field hydrodynamics model (Cormix). Results from the far-field hydrodynamic model were then used into the near-field model. Evaluating the robustness of these models is outside my area of expertise and would require a professional physical oceanographer familiar with these two models. Even if a model is robust, the accuracy of the results depends heavily on the proper implementation of the models. Given with my expertise in biological modelling and my general knowledge of physical oceanography, I was able to review the implementation of the far-field model and of its results.

I identified three issues that require clarifications. Issue 4.2.1 and potentially 4.2.2 could have serious implications for the credibility of the results of the receiving water study.

Issue 4.2.1. Concern that a one-month simulation is not sufficient to capture cumulative impacts of effluent waters over many years.

One specific objective of the receiving water study was to model the dispersion of effluent characteristics in order to evaluate potential for cumulative effects. This was done using a far-field hydrodynamic modelling using the MIKE 21 model. Model simulations were conducted for a period of one month (simulation time) and the reported results show effluent concentrations at the end of this one-month simulation period (Figures 4.2-3 and 4.2-4 of focus report). **My major concern is that the one-month simulation period is not sufficient to evaluate the cumulative impacts of effluent waters released continuously for several years, possibly decades.** On figure 41 of Appendix 4.2 of the focus report, we can notice positive trends in simulated effluent concentrations at the 8 locations located at 100 m from the outfall (Figure 1 of this report). These trends suggest an accumulation. As stated by the focus report, the concentration remains low at the end of the simulation period. However, one can ask given trends observed in Figure 41, what would the final concentrations after a simulation period of several months or several years? **This question needs to be addressed given its implication for future monitoring of potential impacts on marine life.**



Figure 1. Simulated effluent concentrations at three locations at a 100 m radius of the Outfall Discharge in July. Figure 41 from Stantec (2019). The time series of simulated concentrations show positive trends through time, which indicates accumulation. Only 3 of the 8 model locations are shown here, but increasing trends in concentration are visible at the 8 locations in Figure 41 in Stantec (2019).

Issue 4.2.2. It is not clear how the discharge is incorporated into the model.

The flow parameter is clearly specific (85,000 m^3 / day), but it is unclear how the discharge is released. One would expect that a discharge of ~3,542 m^3 is released at every time step (60 minutes) of the model. However, this is not mentioned in the description of the model implementation. This issue aligns with a previous comment from the reviewer from ECCC that the "explanatory details provided on far-field simulations are very brief and do not permit a full appreciation of the model's robustness or the credibility of its results" (page 4 of Addendum 3.0). The figures provided in the report and in appendix 4.2 do not capture the continuous nature of the discharge of effluent water. This casts some doubts on the model implantation and credibility of results. This is especially concerning in the light of comment on page 8 of focus report on which it is written that the model assumes that "no background concentrations are present". Does that mean that background concentration from a previous time step or resulting from accumulation over months or years is not considered?

Issue 4.2.3. Conditions during the months of February and July are unlikely to reflect year-round conditions.

The focus report included a simulation for the month of February in response to comments from Environment and Climate Change Canada (ECCC) and Nova Scotia Environment (NSE) – Addendum 3.0. The concern was that the presence of ice in the winter modifies stratification of water column and thus could affect dispersion rates. The appendix 4.2 of focus report now states on page 2.28 that the two scenarios (July and February) "will be able to envelope the year-round physical oceanographic and hydrodynamic environments for modeling effluent dispersion". However, given that wind is a main driver of ocean circulation and that winds vary drastically in both their direction and amplitude across seasons in the study area, we can expect that simulations for the months of July and February are unlikely to reflect spring and fall conditions. This is especially true for the fall season, during which winds are generally stronger.

4.3 Sediment transport modeling

Provide results of sediment transport modelling work to understand the impacts of potential accumulation of sediment within near-field and far-field model areas. This should include chemical and physical characterization of the solids proposed to be discharged by NPNS as well as a discussion of how these solids will interact with the marine sediments and what the potential impact will be on the marine environment as a result.

The focus report was tasked with discussing how the solids discharged by NPNS can impact the marine environment. Based on the modeling results and observed currents in the area, the focus report concluded that "effluent sedimentation is not likely to occur in the proposed diffuser

area". Therefore, effluent sediment will not have a significant impact on the marine benthic environment" (page 102, Dillon 2019). The focus report only looked at the risks of sedimentation of total suspended solids (TSS) and potential subsequent impacts on the benthic environment. They omitted to evaluate other impacts that TSS can have such as light attenuation in the water column.

Issue 4.3.1. The report does not discuss potential impacts that release of total suspended solids may have on light attenuation and subsequently on the growth of eelgrass and seaweed in the local and regional assessment area.

Light and temperature are the two main parameters controlling the growth of marine flora such as eelgrass and seaweed. Eelgrass beds have been shown to be very sensitive to change in light intensity as a result of human disturbance (Larkum et al. 2006). Given that the dredging of marine sediments will result in an increase in the TSS in the water column, this will reduce light intensity, which has the potential to impact eelgrass meadows adjacent to the proposed work area. However, the NPNS environmental impact assessment and focus report did not consider the potential impacts that added TSS in the water column can have on eelgrass and seaweed beds.

Review of part 7. Fish and Fish Habitat

7.1 Conduct fish and fish habitat baseline surveys for the freshwater environment, to the satisfaction of Fisheries and Oceans Canada.

Conduct fish and fish habitat baseline surveys for the freshwater environment, to the satisfaction of Fisheries and Oceans Canada.

I reviewed the freshwater Fish and Fish habitat surveys and did not find any significant issue.

7.2 Fish Habitat Baseline Survey

Conduct fish habitat baseline surveys for the marine environment, to the satisfaction of Fisheries and Oceans Canada.

Environmental impacts of a development project are best evaluated using before-after-control-impact (BACI) design studies. Baseline surveys conducted before project construction are thus necessary to enable future evaluation of the environmental impacts by the company or by any other groups who wish to do so. To be useful, data from baseline surveys need to be collected in a thorough and reproducible manner.

An underwater benthic habitat survey (UBHS) was conducted from May 3 to 7, 2019 in Caribou Harbour and Pictou Harbour. The objectives of the survey were: i) to identify what habitat types are present; ii) to identify what benthic (bottom) communities are present; iii) to determine if eelgrass is present; and iv) to describe what vegetation species are present (Dillon 2019). As well as this, a side-scan survey was conducted to characterize substrate in the proposed project area. ***I found numerous issues with the Fish Habitat Baseline Survey.*** These issues are described below.

Issue 7.2.1. The baseline survey is too short to capture seasonality in species distribution, growth and life-history.

The fish habitat baseline survey was conducted over a very short period of four days from May 3 to 7. In regions with strong seasonal fluctuations in climate such as the proposed work area, seasonality is a prominent feature governing many aspects of marine species life, including distribution, growth, survival, and recruitment. For instance, lobster larvae are released in the water column during the summer and settled to the bottom late summer / fall (Annis 2005). Similarly, juvenile Atlantic cod and other groundfish adopt a bottom life style in September – October and thus density of juvenile cod and other groundfish is higher in nearshore water in the fall (Methven and Bajdik 1994). Growth of eelgrass is maximal during warmer summer months and thus the extent of eelgrass meadows is maximal in early fall before winter die-offs (Larkum et al. 2006). Some migratory benthic fish species such as halibut migrate from winter deep spawning areas to summer shallow feeding areas (Le Bris et al. 2019). Those are a few examples of how seasonality governs life-history of fish and fish habitat Atlantic Canada. To be useful, baseline surveys need to capture this seasonality. **Because of its very short duration, the fish and fish habitat baseline survey conducted as part of the focus report did not capture the seasonal variation in fish communities and fish habitat; therefore, it has limited value as a baseline survey.**

Suggestion. Conduct a fish habitat baseline survey at multiple times of the year to capture seasonal variations.

Issue 7.2.2. The extent (surface area) of eelgrass meadows in the vicinity of proposed work was not measured. As well as this, the methodology used in the marine baseline habitat surveys does not provide the necessary information to enable future comparison as part of an environmental monitoring program.

The underwater benthic habitat survey indicated that eelgrass was present in Caribou Harbour in the vicinity of the proposed work (Dillon 2019). Eelgrass (*Zostera marina*) is the only seagrass

species (*i.e.* marine flowering plants) found in Canada. Seagrass meadows are among the most productive ecosystems on the planet (Cullen-Unsworth and Unsworth 2018). For instance, seagrass meadows sustain global fisheries production (Unsworth et al. 2019) and are responsible for more than 10% of global carbon sequestration annually (Fourqurean et al. 2012). Consequently, the global decline in seagrass extent has been a great concern for ocean health (Cullen-Unsworth and Unsworth 2018, Orth et al. 2006, Waycott et al. 2009). In Canada, eelgrass is considered an ecologically significant species because a disturbance to eelgrass meadows has substantially greater ecological consequences than a disturbance of equal magnitude on most other species in the community (DFO 2009). Eelgrass has been shown to be particularly important for juvenile fish, including juvenile Atlantic cod, because it offers shelter from predators, thus reducing predation risks (Gorman et al. 2009). A complete survey of eelgrass meadows adjacent to any coastal development or new human activities should be included in marine fish habitat baseline surveys.

It has long been demonstrated that excessive nutrient inputs can reduce growth, density, and biomass of eelgrass meadows (Short et al. 1995). Furthermore, eelgrass has minimum light requirements to grow and it is thus highly sensitive to change in turbidity (Larkum et al. 2006). Therefore, in order to evaluate in the future if the effluent is impacting eelgrass meadows in the area, it is necessary to properly measure:

- The extent of the eelgrass meadows (i.e. surface area).
- The percentage cover of the meadows in a given area.
- The density of the eelgrass meadows (density of shoot).
- The canopy height (average leaf length).

Measuring the above characteristics can be relatively easily done through snorkelling / SCUBA Diving survey and analyses of satellite imagery (Wilson et al. 2019) or of aerial photography taken by planes or by drones (Duffy et al. 2018). The work conducted as part of the fish habitat baseline surveys for the marine environment only recorded the presence / absence of eelgrass along video transect lines. This is insufficient to enable future monitoring of the potential impacts on eelgrass meadows of the proposed project.

Suggestion. A complete survey of eelgrass meadows adjacent to the proposed work area should be completed. This should include eelgrass meadows that can be impacted by either the transport of effluent materials or by the physical work that will be conducted to install the pipeline and which could result in re-suspension of sediment and thus reduction in light intensity. Eelgrass meadows potentially located along Caribou Island, Munroes Island and along the coast outside Pictou Harbour should be surveyed. Such survey should follow the methodology developed by the Global Seagrass Monitoring Network (www.seagrass.net) in addition to measuring the full extent (surface areas) of each meadow encountered.

Issue 7.2.3. The methodology used to analyze images from the underwater benthic habitat video survey is not well detailed and sometimes subjective, which will impede comparison of results with potential future monitoring studies.

The detailed video analysis presented in Appendix 7.2. quantified the percent cover of each substrate categories at each transect. The methodology used to estimate percent cover is not explained. An approach that can be used to limit observer bias when quantifying percent cover from images or videos is to divide the image frame in numerous grid cells using and count the presence / absence in each grid cell. Because of the lack of mythological explanation in focus report and Appendix 7.2, it is unclear if the percent cover analysis was done using a grid on the images or not. As well as this, to quantify percent cover from videos require to stop the video at specific time interval (e.g. every minute). Unfortunately, no details are provided on how video images were analyzed. Finally, distribution of macro faunal species was estimated using a semi-quantitative approach (page 6 of Appendix 7.2.). A quantitative approach could have been easily employed by, again, dividing the images in numerous grid cells and counting the presence / absence in each grid cell. Such approach would have provided more reproducible results.

Suggestion. More details on the video analysis methodology should be provided to enable an evaluation of the performance of the marine fish habitat survey and, most importantly, to evaluate if the survey is reproducible in the future. A more quantitative approach should be used for the estimation of substrate percent cover and for distribution of macro faunal species.

Issue 7.2.4. Only a survey of the benthic habitat was conducted. No survey of the pelagic (in the water column) and intertidal zones (zone between low and high tide mark) was conducted.

Fish habitat is defined in subsection 2(1) of the Fisheries Act to include “all waters frequented by fish and any other areas upon which fish depend directly or indirectly to carry out their life processes”. Based on this definition, not only the bottom but the entire water column should have been surveyed, including the intertidal zone. Water quality analyses were conducted in section 4 of the focus report but no survey of the biological communities (phytoplankton, zooplankton and ichtyoplankton) was provided. These are important species communities at the base of the food web that drives future recruitment of marine fish species important for commercial, recreational and Aboriginal fisheries. As well as this, no survey of the intertidal zone was conducted. The intertidal zone is home to communities of species specifically adapted to this environment and that constitute important food source for many coastal fish species. Without proper surveys of the intertidal and pelagic zones, the future impact of the proposed work will be impossible to monitor because of the lack of baseline information.

Other minor issues:

- The justification for the choice of the classification scheme for substrate type was not provided (Appendix 7.2, page 6). There is also one size class missing between "Boulder (>25 cm)" and "Cobble (3-13 cm)".
- The term "high-level video analysis" is used on numerous occasions in the report on the marine fish habitat baseline survey (Appendix 7.2) without being defined. The superlative "high" is subjective.

7.3 Impact Assessment for Marine Fish

Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. Assessment methodology must first be agreed upon by NSE in consultation with relevant federal departments.

The focus report conducted an additional impact assessment of treated effluents on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. Despite the presence of numerous fish species in the area, including species important for commercial, recreational and Aboriginal fisheries, the focus report concluded that "*no significant residual impacts to marine water quality are expected to arise on any fisheries or fish habitat as a result of this project*" (page 123, Dillon 2019). **This conclusion is driven uniquely by the results of the receiving water modelling study, which indicated that beyond a zone < 5 m from the diffuser, water parameters will match marine baseline data in the Northumberland Strait.** If the predictions from the receiving water study are inaccurate, then the conclusion of the focus report regarding potential impacts on marine life is not valid. As noted above, there is some doubt regarding the credibility of the results of the modelling studies. Regardless of the type of model, any results from modelling studies should be taken with caution given that modelling exercises always require assumptions – and the precautionary approach principle must be applied.

On top of the potential issues with the receiving water study, **I noticed several issues in the study of distribution of marine fish species in the proposed work area**. These issues are presented below.

Issue 7.3.1 The "Distribution of Marine Fish and Fish Habitat in Study area" part of the section 7.3. is insufficient.

The focus report only uses the results from the Underwater Benthic Habitat Survey (UBHS) to describe the distribution of marine finfish in the study area and stated that "marine invertebrates and marine fin-fish species sightings were rare and were not found in any abundance" (page 127, Dillon 2019). This survey was conducted using a towed camera and was design to survey benthic substrate. This is not a proper methodology to survey highly mobile species such as fin-fish, because they can easily escape the camera field of view.

As well as this, the focus report failed to recognize that the regional assessment area for this project is one of the regions with the historical highest diversity of fish species in the southern Gulf of St. Lawrence and that the region is considered as an Ecologically and Biologically Significant Area (Rondeau et al. 2016).

Issue 7.3.2. The mitigation measures proposed in table 7.3-2 are often vague and not specific to each indicator and / or potential effect.

For instance, one mitigation measure for the physical disturbance of plankton diversity and abundance is to stage the work according to fisheries timing windows. This does not make sense because there is no fishery for planktonic species. Similarly, the same mitigation measure is proposed to reduce impact on lobster and avoid sensitive stages. Sensitive stages are not defined. They could include larvae stages, young of the year, or egg-bearing females. Clarification on how mitigation measures will address each species indicator and potential effects are required.

Issue 7.3.3. Atlantic halibut (*Hippoglossus hippoglossus*) is not evaluated in the potential impacts to important fisheries of commercial, recreational, and Aboriginal value within the project area and the likelihood of occurrence of Atlantic halibut in the LAA should be revised from low to medium-high.

Atlantic halibut is a species of growing commercial value in Atlantic Canada. Its value has increased from 6.6 million dollars in 1995 to 59.8 million dollars in 2017 and it is now the third most valuable fin-fish fishery in the country (https://www.dfo-mpo.gc.ca/stats/commercial/sea-maritimes-eng.htm). Accompanying the growth in population abundance, the population has expanded its distribution (Boudreau…) and halibut is now commonly present in the eastern part of the Northumberland Strait. Indeed, figures from the most recent halibut stock assessment report (DFO 2019) show that halibut is commonly caught in scientific surveys (Figure 2) and in commercial catches (Figure 3) in the eastern Northumberland Strait in the vicinity of the Marine Regional Local Assessment Areas. Finally, recent tracking of halibut using pop-up satellite archival tags has revealed that a halibut tagged in on the northeast side of Prince Edward Island (46.543°N; 62.218°W) on November 11, 2014, for which the tagged popped-up near Port Hood Nova Scotia (46.956°N; 62.608°W) on August 20, 2015 spent several days from June 18, 2015 to June 30, 2015 inside the regional assessment area and the local assessment area (Figure 4). This indicates that the area of interest is a summer feeding area for Atlantic halibut. Tracking of other Atlantic halibut using pop-up satellite archival tags in the

same region revealed that other tagged Atlantic halibut used the eastern part of the Northumberland strait as a summer feeding area (James et al. In Review).

The focus report did not consider the Atlantic halibut fisheries in its review because the likelihood of occurrence of Atlantic halibut in the LAA was evaluated as low. The likelihood of occurrence of Atlantic halibut in the LAA was evaluated as low because it was based on information from one study with data up to 2013. **Thus the evaluation did not consider the recent changes in Atlantic population abundance and distribution.** Based on information provided here, the likelihood of occurrence in the LAA in the Appendix 7.3 should be revised from low to medium. Atlantic halibut should be included in the list of species likely to Inhabit the study area (table 3-11 of Appendix 7.3) and in the Commercial, Recreational and Indigenous Fisheries Resources and Use in the Study Area part of the focus report.

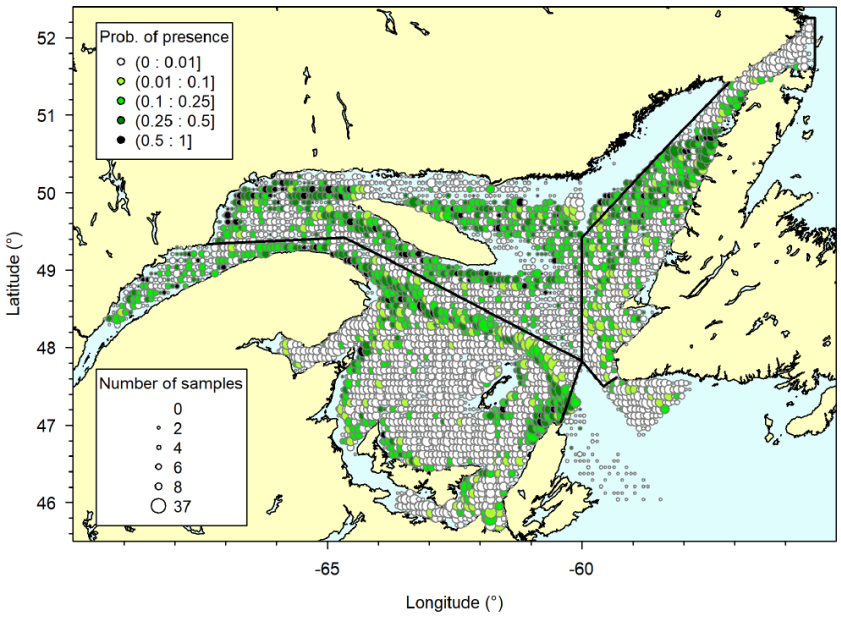


Figure 2. Probability of occurrence of Atlantic halibut in catches made during mobile gear research surveys, per 5-minute square. Figure from DFO (2019).

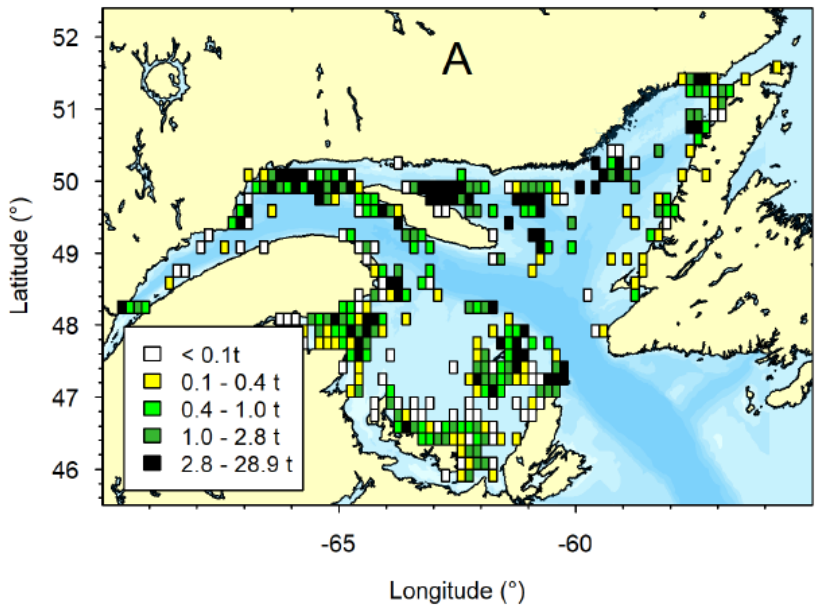


Figure 3. Distribution of Atlantic halibut catches per 10-minute square for the 2017-2018 and 2018-2019 fishing seasons combined. Figure from DFO (2019).

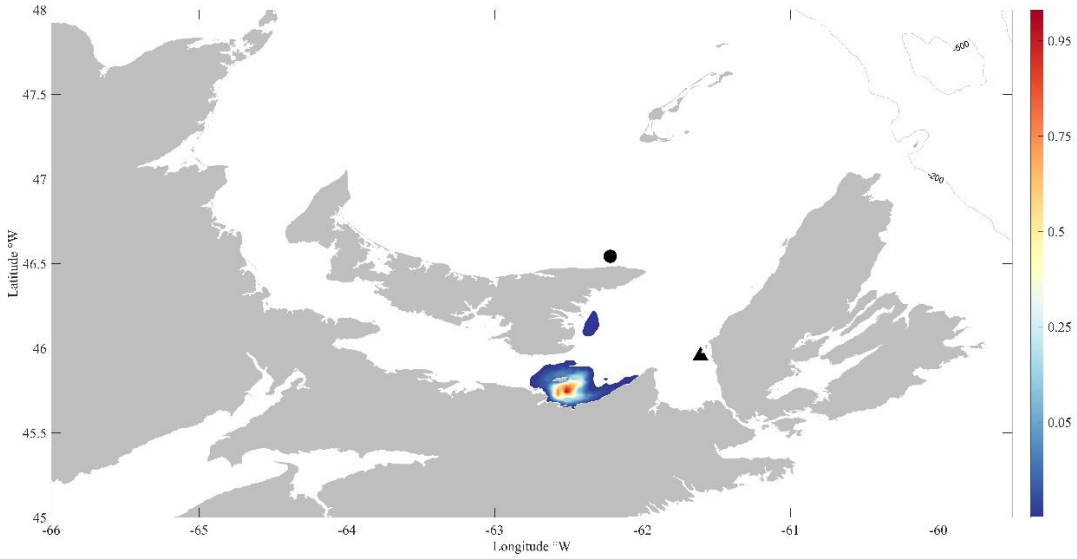


Figure 4. Probability distribution of Atlantic halibut equipped with pop-up satellite archival tag #14P0060 between June 18 and June 30, 2015. Black circle and triangle indicates tagging and tag pop-up locations, on November 11, 2014 and August 20, 2015, respectively. Data from James et al. (In review).

Other minor issues.

- In the summary of section 7.3., the additional work listed on page 122 is incorrect. No survey of benthic, planktonic and fish species was done in section 4.1. or 7.1. as indicated.
- Plaice (*Hippoglossoides platessoides*) is often referred to as Atlantic Plaice (pages 132, 133 and 142 of focus report and 3.29, 3.37, 4.22, and Appendix D of Appendix 7.3.). The proper common name is American plaice.

7.5 Clarify what contingency measures will be in place to mitigate potential impacts (e.g., thermal shock to fish) due to potential large and rapid fluctuations in water temperature in the winter at the diffuser location during low production or maintenance shut down periods.

This question is more related to the engineering part of the project and is outside the scope of my expertise.

Discussion and Conclusions

The first question that I address here is: **Is the Northern Pulp's assertion that the effluent released into the Strait through the proposed treatment system will be less harmful than the effluent currently entering the Strait via the current Boat Harbour treatment system (particularly with respect to the release of metals) is valid?**

The comparison of the treated and untreated effluents from current Boat Harbour treatment system and predicted effluents from new proposed treatment system suggested that they will have similar characteristics regarding Total Suspended Solid, Total Nitrogen and Total Phosphorus. However, no information is provided on the concertation of metals (i.e. arsenic, lead, manganese, cadmium, etc.) that will be released in the new treatment facility in comparison to the current Boat Harbour treatment system. The new treatment facility will increase the dilution of the effluent in the Strait because it is located in a zone with more intense currents; however, **it cannot be concluded that it will be less harmful to the environment because we do not have information on the concentrations of metals that will be released with the new treatment facility**.

The second question that I address here is: **Does the materials submitted by Northern Pulp adequately address the potential risks of bioaccumulation of toxins in the marine environment?** In my opinion, the focus report from NPNS does not adequately address the potential risks of bioaccumulation of toxins in the environment.

The evaluation of the risks of bioaccumulation of toxins in the marine environment in the focus report relies mostly on the results from the receiving water study. A major assumption of the receiving water study is that the one-month simulation conducted in the far-field modelling is representative of the entire time period (possibly several decades) during which effluent will be discharged. The model assumes that no background effluent concentrations are present at the start of the one-month simulation period. By the end of the one-month simulation period, effluent concentrations are still low; however, we can notice an increase in these concentrations through time (see details above in part 4.2). Thus an important question is: **what would be the values of effluent concentrations and dilution factors if the simulation period was extended to several years**? This is a very important point that aligns with the focus report addendum point 3.0, which requires clarification on potentially overestimated dilution ratios and distances.

A second assumption is that climatic and oceanographic conditions in July and February are representative of the full year, and that conditions observed in 2019 are representative of future climatic and oceanographic conditions. This assumption is unlikely to be met given the seasonality in climatic and oceanographic conditions in the region with predominant storms in the late summer and fall, and given the risks for an increase in the frequency and intensity of storms with climate change. No uncertainty around predictions are provided with the results of the receiving water study, and little sensitivity analyses of the input parameters such as temperature, salinity, wind forcing were conducted. Modelling exercises always have limitations and characterizing uncertainty and conducting sensitivity analyses are required to gain trust of the results of any modelling study. Without in depth uncertainty characterization and thorough sensitivity analyses, the precautionary principle should apply.

To conclude,

i) the focus report does not demonstrate that the new effluent treatment facility will be less harmful to the environment that the current Boat Harbour treatment system (**medium confidence**)
ii) the focus report does not adequately address the risks of bioaccumulation of toxins in the marine environment (**medium confidence**)
iii) the baseline surveys are insufficient to evaluate the impacts of the effluent on the marine environment in the future (**high confidence**).

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Appendix Attached. Curriculum Vitae

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Review of the Northern Pulp Nova Scotia's Focus Report Replacement Effluent Treatment Facility from an Animal Health Perspective with a Focus on Crustaceans

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EXECUTIVE SUMMARY

CrustiPath was engaged by Juniper Law on behalf of the Gulf Nova Scotia Fleet Planning Board, PEI Fishermen's Association, and Maritime Fishermen's Union to review the October 2019 Focus Report provided by Northern Pulp Nova Scotia (NPNS) on its proposed replacement effluent treatment facility and provide opinions, within the limits of their expertise, on the potential environmental impacts of the proposed project on fisheries and the marine environment within the Northumberland Strait.

Inconsistencies were noted in NPNS's Focus Report regarding the reporting of the Reportable Detection Limits (RDLs) and summary statistics for metals in the Caribou Harbour background water samples and associated summary statistics in Appendices B-1 (*n* =14) and B-2 (*n* = 5) of Appendix 7.3 and Appendix 2.3 (*n* = 6). These inconsistencies could not be investigated completely as portions of the raw data and associated quality assurance information could not be found within the Focus Report documents or the EARD. Review of available data and quality assurance information from other water sampling sites (Raw Water, Point 'A', Point 'C') suggests that the background concentration of many metals in Caribou Harbour are 'not detectable', as reported in Appendix 2.3, and so are at least 10—fold lower than the concentrations indicated in Appendix 7.3, Table 4-3 and Table 7.3-1 '*Marine Water Quality COPCs and Estimated Dilution*'. If these much lower background values are confirmed, then the values for '*Distance (m) from Diffuser Ambient Condition is Reached based on Dilution Ratios*' in Table 7.3-1 will need to be reviewed and possibly revised. This could be significant if some of the revised values are greater than the Local Assessment Area (LAA) which is defined in the Focus Report, in part, as a 200 m radius around the effluent discharge point.

From a crustacean health perspective, it is concerning that of the nine metals (aluminum, barium, cadmium copper, iron, manganese, mercury, phosphorus, zinc) which had higher concentrations in the effluent than background water, all but cadmium were dropped from the screening process for Chemicals of Potential Concern (COPC) with respect to water quality due to a lack of Canadian Water Quality Guidelines. If many background water metal levels are confirmed to be 'not detectable', the list of metals in effluent higher than background water will likely expand. Metals, especially copper, are recognised as acute (short term) toxins to American lobster and other marine crustaceans. There is insufficient information in the literature, the Focus Report or the EARD on the effects of sub-acute (medium term) or chronic (long-term) exposure to low levels of metals, directly or through bioaccumulation, on the American lobster. The Focus Report indicates custom toxicity tests have been developed for lobster larvae. It would be preferable to see an unequivocal commitment to use them in any future effluent toxicity testing. Inclusion of chronic exposure of adults, eggs and generational testing is also encouraged.

Anthropogenic noise (seismic testing, mechanical) is increasingly recognised as potentially harmful to marine life, including warm water lobster species, with even short exposures having long term negative effects on behaviour or increasing mortality levels. Exposure to high intensity sound is listed as a recognised interaction during the construction (three months) and operation and maintenance (several decades) phases of the project. These interactions were not considered significant as the exposures were short. Assessment of the potential for negative effects on larval, juvenile and adult American lobsters and eggs exposed to high intensity sounds is warranted.

No reference to the potential impact, if any, of the high temperature effluent in the 4 km of pipeline might have on the temperature of the overlying sediment or water column was found. This may be relevant as larval lobster drifting in the water column are susceptible to high temperatures. The movements of juvenile and adult lobsters on the ocean floor could be modified as they would likely move to avoid temperatures above their tolerance limits.

Overall, there were reporting errors noted that need to be evaluated for any effect on 'distance from diffuser that ambient conditions are reached' and screening for COPCs. The exclusion of many metals from the list of COPC and minimal information on bioaccumulation is concerning as metals are known to be toxic to American lobster. A stronger commitment to the inclusion of developed custom lobster larval effluent toxicity assays in EEM and long-term adult and generational studies is encouraged. Further evaluations on the potential effects of exposure to high intensity sounds and thermal effects, if any, from the 4 km of pipeline, during the life of the project are recommended.

EXPERTISE

SCOPE OF REVIEW

A general review of the pertinent sections of the Focus Report and associated Appendices (1.2, 2.3, 2.4, 4.1, 4.2, 7.3, 7.4, 9.1, and 9.2) and EARD was completed with a specific interest on potential effect of the treated effluent on crustaceans. Provided references in the Focus Report and Appendices, as available, were reviewed. This led to a focus on metal concentrations in the current treated effluent as these are meant to be surrogates for metal concentrations in the proposed treated effluent and background water quality. Inconsistencies in reporting were noted in the raw data summary tables for metals in Caribou Harbour (background). These were followed up in detail including how inconsistencies might affect other tables and calculations and implications as carried through the associated Appendices and the Focus Report. This represents the bulk of the material presented in this report given time constraints. Information on the known toxic effects of metals on American lobsters and other crustaceans and, short- and long-term effects of seismic testing on plankton and adult warm water lobsters, respectively is also provided.

GLOSSARY

CMC	Criterion Maximum Concentration
CCC	Criterion Continuous Concentration
CCME	Canadian Council of Ministers of the Environment
CWQG	Canadian Water Quality Guidelines
COPC	Chemicals of Potential Concern
DACVP	Diplomate American College of Veterinary Pathology
Dataset	the numbers, or values, used for evaluation
DVM	Doctor of Veterinary Medicine
EARD	Environmental Assessment Registration Document
EEM	Environmental Effects Monitoring
Maximum	the largest value in a dataset
Mean	the average value in a dataset (sum of all values / number of values)
Median	the middle value of set of values arranged in ascending order
Minimum	the smallest value in a dataset
MVSc	Master of Veterinary Science
n	The number of values in a dataset
ND	*"A non-detect value is a laboratory assigned concentration that indicates the concentration of that parameter in the sample is below the level that could be detected or reliably quantified by the laboratory using a particular analytical method*."
NG	not given
NPNS	Northern Pulp Nova Scotia
PPER	Pulp and Paper Effluent Regulations
Range	the difference between the largest and smallest values in a dataset
RDL	reportable detection limit; the lowest value that an assay/test can detect in a sample
Standard Deviation	a measure of the amount of variation in a dataset

INCONSISTENCIES NOTED IN THE PROVIDED DATA BY SECTION

Throughout the Focus Report, tables often reported means without standard deviations and/or reported medians without a range or did not indicate if a mean or median value was being presented. Attempts were made to examine the raw data to better understand which values were being reported in the tables; however, some of the data could not be found in the Appendices. As metals e.g., copper, cobalt, cadmium and zinc, are recognised toxins for American lobsters and other crustaceans (Johnson & Gentile, 1979; Maharajan, Rajalakshmi, Vijayakumaran, & Kumarasamy, 2012; Maharajan et al., 2011; McLeese, 1974; Mercaldo-Allen & Kuropat, 1994) the raw data for tables with information on metal concentrations in water were examined in the most detail.

1. **Focus Report Section 2. 'Project Description'**
   In Section 2.3 of the Focus Report 'Characterization of the Effluent' and its associated Appendix 2.3, neither the raw data for the indicated May 29, 2018 Point C (treated effluent) nor the data collected during annual testing by NPNS since 2015 could be located. Appendix E-2 of Appendix 7.3 suggests sampling dates of Feb 25, 2015, Oct 2, 2016 and Feb 23, 2017. Consequently, verification or determination of range (max and min) or standard deviations was not possible. Providing standard deviations and range in addition to the average, or mean, values would have provided a better indication of the variation in the data.

Table A. Summary of water quality and effluent samples that were indicated as collected for use in the focus report and those for which raw data could be found.

Freshwater 'Raw'		Point 'A'		Point 'C'		Caribou Harbour	
Sampled	**Data Available**	**Sampled**	**Data Available**	**Sampled**	**Data Available**	**Sampled**	**Data Available**
Apr 24/18	Yes	May 29/18	Yes	May 29/18	**Not found**	May 24/19 13:00 (CH-BOF 1-2 outfall, flooding, bottom 20m)	Yes
May 14/19	Yes	May 14/19	Yes	May 14/19	Yes	May 24/19 13:30 (CH-BOF 1-1 outfall, flooding, surface 0.5 m)	Yes
				July 17/19	Yes	May 25/19 17:00 Caribou Seawater 1 (Caribou Harbour, ebbing, surface 0.5m)	Yes
				Annual testing data collected since 2015 (dates in Appendix E-2, of Appendix 7.3 suggest *n* = 3)	**Not found**	May 25/19 17:00 Caribou Seawater 2 (Caribou Harbour, ebbing, bottom 3m)	**Not found**
						May 25/19 18:15 (CH-B 2-1 outfall, ebbing, surface 0.5m)	Yes
						May 25/19 18:15 (CH-B 2-2 outfall, ebbing, bottom 21m)	Yes
						May 25/19 18:15 (2-W1) Not defined in Table 4.1-1	phenol results only
						October 2018 for chemical characterization at diffuser site?	**Not found**
						June 2019 for chemical characterization at diffuser site?	**Not found**

Water quality data for 'May 25/19 17:00 Caribou Seawater 2', October 2018, and June 2019 could not be located. Only phenol data were available for site labelled '2-W-1, Caribou Harbour, May 25, 2019'. These findings are summarised in Table A of this report.

Table 1-3 'Analytical Results, Metals', in Section 1.3.2 'Metals' of Appendix 2.3 (*n* = 6) reports some metal concentrations in Caribou Harbour as ND, defined in Table 2.3-2 of the Focus Report as "*ND = Non-Detect. A non-detect value is a laboratory assigned concentration that indicates the concentration of that parameter in the sample is below the level that could be detected or reliably quantified by the laboratory using a particular analytical method*." This is consistent with results from the five May 2019 samples which are available for review. This contrasts markedly with results presented in Table 4-3 'Marine Water Quality COPCs and Estimated Dilution' of Appendix 7.3 (which also appears as Table 7.3-1 in the Focus Report) where the 'Median Background Quality' values for 2019 are reported. Here, median background levels for metals are 10-fold greater than their reportable detection limits (RDLs) (see item 2, following).

Table 1-3: 'Analytical Results, Metals' also has a footnote for the Caribou Harbour cadmium results *"Cadmium of 0.12 µg/l was detected in one Caribou Harbour sample, all others were below the 0.1 µg/l detection limit*." The actual detection limit for cadmium appears to be 0.01 µg/l (see item 2, following).

2. **Appendix 7.3, Section 3. 'Existing Environment'**

Section 3.1.1 'Background Water Quality' indicates that water samples were collected for chemical characterisation in October 2018, May 2019, and June 2019 (eight within Caribou Harbour along the pipeline and 14 within the effluent mixing zone). The summary and individual values are supposed to be found in Appendix B. No individual data or quality assurance data were found other than that for the five May 24 and May 25, 2019 samples at the end of Appendix 2.3 'Raw and Treated Effluent Characterisation' under 'Caribou Harbour' (see Table A, this report). Summary data for **'Background Water Quality at Diffuser Location (2018-2019)** are provided in **Appendix B-1** (with 1 - 14 samples evaluated depending on parameter = 'count'; all metals indicate *n* = 14). Summary data for '**Background Water Quality at Pipeline Corridor (2018 – 2019)**' (from 1 - 5 samples evaluated, depending on the parameter; *n* = 5 for all metals) are presented in **Appendix B-2**.

All (14/14 and 5/5) values for copper in Appendices B-1 and B-2, respectively, were recorded as below their RDL in the column 'Count (<RDL)'. According to the quality assurance data in Appendix 2.3, water quality results for other sites, and suggested by a value of <0.5 µg/l appearing in the minimum value column in Appendix B-1, the RDL for copper is assumed to be 0.5 µg/l. Yet, Appendix 7.3, Section 3.1.6 'Metals', states that "*Two metals (copper and nickel) were reported in one or more surface water samples, taken along the pipeline route or diffuser location, above the EPA chronic screening level criteria (3.73 µg/L and 8.28 µg/L, respectively*)." A value of 3.73 µg/l is above the apparent reprotable detection limit (RDL) and so the result for column 'Count (< RDL)' should be either 13/14 for Appendix B-1 or 4/5 for Appendix B-2 depending on where the sample was collected. It is also unclear why the median and maximum values would be reported as < 5 µg/l when the RDL appears to be 0.5 µg/l (see item 3, following).

3. **Appendix 7.3, Appendices B-1 and B-2**

Some of the raw data and quality assurance data for Appendices B-1 and B-2 could not be found (see item 1 above, Table A). The May 2019 water samples had RDLs provided in their quality assurance data (found in Appendix 2.3). These RDLs, rather than the value presented in the result tables, will be assumed to be correct.

Inconsistencies in the reporting for metals are noted when low, non-detectable (ND) values are encountered, particularly evident in Appendix B-1. While it is not incorrect that e.g., a value that is less than 0.5 µg/l is also less than 5.0 µg/l, it is not as accurate as it could be. The convention would be to report a non-detectable value as less than the reportable detection limit (RDL) for the parameter (as done in the results for 'Raw Water', Point A, and Point C, Table 3-1 in Appendix 2.3, and the minimum value column in Appendix B-1, Appendix 7.3). This is particularly important for the median values as these are carried forward to Table 4-3 of Appendix 7.3 (Table 7.3-1 in the Focus Report) for comparison to the modelled values for COPCs to determine the distance from the diffuser where dilution reaches ambient conditions.

As an example, values for ***copper*** are reported as < 0.5 µg/l (minimum) but < 5 µg/l (median and maximum) in Appendix B-1. The RDL is reported as 0.5 µg/l in the accompanying Quality Assurance information in all but one water quality assessment report for Raw water, all Point A and Point C sites. As all values for copper are reported as being less than the RDL (column 'count < RDL'), which is similar to 'not detected' or ND, in Appendices B-1 and B-2, all values (minimum, median, and maximum) should be reported as < 0.5 µg/l or ND (as in the tables in Appendix 2.3). As a result, a median value of < 5.0 µg/l rather than < 0.5 µg/l (a minimum 10-fold increase) for copper in background water at Caribou Harbour is carried through to Appendix E-1 '*Step 1 in Screening Process: Comparisons of Concentrations in Treated Effluent (represented by current treated effluent concentrations) to Background Concentrations (represented by concentrations at the location of the proposed diffuser)*'and Table 4-3 in the Appendix 7.3 and the Focus Report Table 7.3-1. Note that even with a value for copper of 3.73 µg/l (see item 2 above) in Appendix B-1 or B-2, this would not affect the median (or middle) value for copper as the rest were < RDL.

This occurs with all metals (***aluminum***, ***barium***, ***iron***, ***manganese***, ***zinc***) where values are below the RDL e.g., median cadmium concentrations reported as < 0.1 µg/l *vs* < 0.01 µg/l. These changes are summarised in Table B of this report.

A cursory screen of the minimum and median values for the '***Dioxin and Furans'*** category also reveals variability in the reporting of what appears to be the RDL. No obvious patterns were recognised. This was not investigated further in the current report.

The values reported for ***mercury***: minimum (<0.002 µg/l), median (<0.00225 µg/l), and maximum (<0.013 µg/l) in Appendix B-1; and, minimum (<0.002 µg/l), 5th percentile (<0.00202) 50th percentile, (0.0034 µg/l), 95th percentile (<0.013 µg/l) and maximum (<0.013 µg/l) are not

consistent with the available raw data, values in the 'count < RDL column', nor the RDL of 0.013 µg/l as shown in the quality assurance data. When the RDL of an assay is 0.013 µg/l, values less than that cannot be reported. Such values should have been listed as < 0.013 µg/l or ND. Two of 14 results in Appendix B-1 and two of five results in Appendix B-2 are indicated as being above the RDL. As a result, values of 0.013 µg/l or greater should have been reported as the maximum value in each table but both are shown as < 0.013 µg/l. A result of 0.013 µg/l is reported in the May 25, 2019 18:15, CHB 2-1 raw data for Caribou Harbour. With 3/5 and 12/14 values below the RDL in Appendix B-1 and B-2 respectively, the minimum and median values would have to be reported as ND or < 0.013 µg/l. Of note, the averaged or mean (not median) value for mercury in the effluent (Point C) presented in Table 1-3 of Appendix 2.3 'Raw and Treated Effluent Characterization' is 0.022 µg/l while the result for Caribou Harbour is ND.

For ***manganese***, Appendix B-2 indicates only 4/5 values were below the RDL but the maximum value is reported as less 20 µg/l. (note that the RDL is reported as 2.0 µg/l for other sites and suggested as 2.0 µg/l in Appendix B-1, minimum value for manganese)

4. **Appendix 7.3, Appendix E-1 'Step 1 in Screening Process: Comparison of Concentrations in Treated Effluent (represented by current treated effluent concentrations) to Background Concentrations (represented by concentrations at the location of the proposed diffuser)**

The column 'Median Background Concentrations (Proposed Diffuser Location)' contains values generated in Appendix B-1 of Appendix 7.3. The 'less than' symbol '<' has been dropped from all values with the consequence that a median value that was e.g., <10 µg/l (includes values from 0 - 10 µg/l) becomes 10 µg/l. This error is compounded by the fact that median values for most metals in Appendices B-1 and B-2 suggest RDL values which are at least 10-fold higher than shown in the quality assurance data. For example, copper was reported as ND in all available background water sample data and in Appendix 2.3. Using the RDL from the quality assurance data for the copper assay, all values including the median value, were less than 0.5 µg/l (includes 0.0 – 0.49 µg/l) or ND rather than 5.0 µg/l as shown in Appendix E-1. This represents at least a 10-fold increase. The median background levels for cadmium are reported as 0.1 µg/l and should be reported as either less than 0.01 µg/l (includes 0.00 – 0.009 µg/l) or ND. Similar minimum 10-fold increases are noted for aluminum, iron, manganese, and zinc. The median background level for mercury should be less than 0.013 µg/l (includes 0.00 – 0.012 µg/l) or ND, rather than 0.00225 µg/l.

5. **Appendix 7.3, Table 4.3 'Marine Water Quality COPC and Estimated Dilution'**

Assuming that the numbers used to populate the column 'Median Background Quality' are drawn from Appendix B-1 (*n*=14) only and that the available quality assurance data is the best indicator of the RDLs, and results in Appendix 2.3 are correct, the median levels for ***copper***, ***iron***, ***manganese*** and ***zinc*** are more correctly reported as either ND or as less than their RDLs which are 0.5 µg/l, 50 µg/l, 2.0 µg/l, and 5 µg/l, respectively as all values for all four metals were reported as less than their RDLs (<RDLs) in Appendix B-1. For ***aluminum***, the median value should be

reported as ND or less than 5 µg/l, not 50 µg/l, as 13 of 14 values were less than the RDL of 5 µg/l. The median value for mercury should be ND, as 12 of 14 values were ND, or less than 0.013 µg/l.

Multiple inconsistencies are noted for background water quality for ***cadmium*** where 13 of 14 values were reported as ND in Appendix B-1 subsequently, the median value should also be ND or less than 0.01 µg/l. Appendix 7.3, Table 4-3 currently shows a value of 0.084 µg/l for both the median background concentration and for the concentration at 100 m based on dilution ratios. Table 4.1-2, Focus Report '***Background Water Quality at Caribou Harbour used in RWS'*** also shows a value of 0.084 (median or average not specified) for cadmium, with the accompanying text indicating that the value was derived from the May 2019 water samples. All but one (0.12 µg/l) of these results (raw data on five of six samples are available in Appendix 2.3) were ND or, less than the RDL of 0.01 µg/l. The median value would be ND or less than 0.01 µg/l. An averaged value of 0.084 µg/l is shown in Table 14 'Background Water Quality' of Appendix 4.2 'Receiving Water Study' and described in the text as "*water quality data for Northumberland Strait around the CH-B location collected in May and June 2019*". Water quality data for June 2019 could not be found in the Focus Report documents to verify this result. It is noted that values for many metals and other compounds at 100 m are identical to the currently reported 2019 median background levels in Table 4.3, Appendix 7.3.

The maximum value for **cadmium** in effluent at Point C should be 1.4 µg/l (see raw data for cadmium in Appendix E-2 of 0.66, 0.73, 0.898, 1.11, and 1.4 µg/l). The value shown is 1.03 µg/l which is also the value shown in Appendix 2.3, Table 1-3 'Analytical Results, Metals' and is described as the average value using data from the current study and "*test data collected during annual testing done since 2015*".

The values for ***mercury*** at Point C, and 5 m and 100 m from the diffuser are all 0.028 µg/l suggesting no dilution is occurring with increasing distance from the diffuser. This is likely an entry error. The values for aluminum, barium, copper, zinc are also the same for 5 m and 100 m from the diffuser suggesting either no dilution is occurring with increased distance or, a table entry or calculation error.

The final column in Table 4-3 shows the 'Distance (m) from Diffuser Ambient Condition is Reached Based on Dilution Ratios'. The dilution ratios used to determine the distances are taken from Table 4-4 'Dilution Ratios at Distance'. As the median background, or 'ambient', levels, shown in Appendix 2.3, Table 1-3 as ND, have decreased by a factor of at least 10-fold for most metals if the RDLs from the available quality assurance data are used or, need to be adjusted for reasons mentioned above, the 'Distance from Diffuser Ambient Condition is Reached based on Dilution Ratios' should be recalculated to determine if the values currently listed (most at less than 2 m) remain valid. As all background medians for metals are less than their RDLs, any distance values calculated using the RDLs would be minimum distances. The table currently shows values of 0.028 µg/l for mercury at both 2 m and 100 m from the diffuser, neither of which are below the current reported median background value of '0' µg/l or the RDL of 0.013 µg/l. The value of <2 m as the distance from diffuser ambient condition is reached is therefore incorrect. Using the values currently presented in Table 4-3 it should be >100 m.

It is unclear why the 'Distance from Diffuser Ambient Condition is Reached based on Dilution Ratios' is often reported as <2 m while column heading indicates 'Concentration at 5 m from Diffuser based on Dilution Ratios'.

Values for total Dioxans and Furans, Phenanthrene (PAH), Total Resin Acids, Total Fatty Acids, Total P&P Phenols and other water quality parameters presented in Table 4-3 were not evaluated for the purposes of this report.
Table B summarises the points raised in items 1 – 5 above.

6. Appendix 7.3. Figure 3-7: Benthic Invertebrate Relative Abundance in Representative Substrate Types

These values represent EEM cycles 3, 4, 5, and 7 spanning a 14-year period from 2002 through 2016. The data is presented as pie charts. The accompany text does not indicate whether these are averaged values or medians. Results from the most recent cycle in 2016 would be more representative of the current situation. Of interest, would be a presentation of changes, if any, that have occurred from 2002 to 2016.

Table B. Partial replication information presented in Table 4-3 of Appendix 7.3 (presented in the Focus Report as Table 7.3-1) and Appendix 2.3, Table 1-3, showing the effects of reporting median background levels of metals as less than the Reportable Detection Limit (RDL) derived from the available quality assurance information for the parameter. Shaded and outlined boxes contain values of particular interest discussed in the accompanying text.

Parameter	unit	RDL[1] from Quality Assurance Data	CWQG[2] (marine)	Median Background (Caribou Harbour) Quality		Appendix 2.3 Average Caribou Harbour Results	Maximum Effluent Quality Point C – original values	Maximum Effluent Quality Point C – corrected values	Fold Increase Point C over Revised Median Background Quality	Concentration at 5 m from Diffuser based on Dilution Ratios	Concentration at 100 m from Diffuser based on Dilution Ratios	Distance (m) from Diffuse Ambient Condition is Reached based on Dilution Ratios - Original	Distance (m) from Diffuse Ambient Condition is Reached based on Dilution Ratios – Revised[7]
				2019 Original Value (*n* =14)	2019 Revised Value (*n* = 14)	(*n* = 6)	(*n* = 6?[3])	(*n* = 6)					
Aluminum	µg/l	5.0	NG[4]	50	<5.0 (ND)[5]	ND	2330	nc[6]	≥466	50	50	<2 m	?
Barium	µg/l	1.0	NG	10	<1.0 (ND)	13	450	nc	≥450	10	10	<2 m	?
Cadmium	µg/l	0.01	0.12	0.084	<0.01 (ND)	ND	1.03	1.4	≥140	0.1	0.084	<2 m	?
Copper	µg/l	0.5	NG	5	<0.5 (ND)	ND	7.5	nc	≥15	5	5	<2 m	?
Iron	µg/l	50	NG	500	<50 (ND)	ND	718	nc	≥14.36	≤500	≤500	<2 m	?
Manganese	µg/l	2.0	NG	20	<2.0 (ND)	ND	2800	nc	≥1400	54	19	≈50 m	?
Mercury	µg/l	0.013	0.016	0	<0.013 (ND)	ND	0.028	nc	≥2.15	0.028	0.028	<2 m	?
Zinc	µg/l	5	NG	50	<5.0 (ND)	ND	160	nc	≥32	50	50	<2 m	?

[1] RDL = Reportable Detection Limit
[2] CWQG = Canadian Water Quality Guidelines
[3] dates in Appendix E-2, of Appendix 7.3 suggest *n* = 6 total (cadmium), includes the 'annual testing data since 2015' (Feb 25, 2015; Oct 2, 2016; Feb 23, 2017)
[4] NG = not given
[5] ND = not detectable
[6] nc = no change

POTENTIAL ENVIRONMENTAL IMPACTS OF NORTHERN PULP NOVA SCOTIA'S PROPOSED PROJECT ON FISHERIES AND THE MARINE ENVIRONMENT WITHIN THE NORTHUMBERLAND STRAIT

METAL CONCENTRATIONS IN CARIBOU HARBOUR

Appendix 2.3 states "*Other metals, such as cobalt, titanium, copper, zinc and aluminum are also likely coming from the pulping process as non-process elements in the wood itself. As described earlier, these non-process elements are regularly purged from the system, either via the effluent or solid waste, in order to protect the integrity of the equipment and the process. Except for aluminum, which is used as alum (aluminum sulphate) in the treatment of raw water from Middle River, none of these metals are components of additives used in the pulping process."*

While 'naturally' occurring from the wood itself these metals are still toxic to crustaceans. A 1994 report summarises acute and subacute effects on American lobsters of a wide range of contaminants including metals (Mercaldo-Allen & Kuropat, 1994).

Lack of a CCME, Canadian Water Quality Guideline for the Protection of Aquatic Life resulted in all of metals that were found in higher levels in the effluent than in the background water, but cadmium, being dropped from the review process for COPC in Appendix 7.3 Section 4.1.3.2 'Potential Effects Arising from Project-Related Emissions' , Figure 4-1 'Overview of Process for Identifying COPCs in Treated Effluent.

The maximum values for copper at Point C (7.5 µg/l) and modelled values at 100 m (5 µg/l) (Table 7.3.1 and Appendix E-1) are below reported acute toxicity levels 48 µg/l (larvae) and 56 – 100 µg/l (adults) (Johnson & Gentile, 1979; McLeese, 1974) but are above the US Environmental Protection Agency list of National Recommended Water Quality Criteria levels of 4.8 µg/l , acute CMC (criterion maximum concentration) and 3.1 µg/l, chronic CCC (criterion continuous concentration) (US EPA, 1994.). This was also mentioned in Appendix 7.3, Section 3.1.6. Susceptibility to copper increases with increasing water temperature (McLeese, 1974) which may prove relevant in a world of increasing water temperatures and climate change. Subacute copper toxicity levels for *H. americanus* were not found. Levels of 9.55 µg/l and 19.1 µg/l over 28 days, caused damage to muscle, hepatopancreas, gills and heart tissue and chromosomes in the spiny lobster *Panulirus homraus* (Maharajan et al., 2012, 2011).

Cadmium has been associated with moult inhibition in the crab, *Chasmagnathus granulatus* and *Daphnia magna,* and inhibition of ovarian growth in fiddler crabs (*U. pugalotor*) exposed for two weeks (Rodríguez et al., 2007). Changes (transient increases (hyperglycemia) in acute exposures, decreases in chronic exposures) in hemolymph (blood) glucose levels in response to metal exposure have been documented in crayfish and in the shrimp *Palaemon elegans* exposed to mercury, cadmium, and copper (Rodríguez, Medesani, & Fingerman, 2007). Heavy metal exposure can also inhibit food intake by small crustaceans (Rodríguez et al., 2007).

Acute, lethal concentrations (LC-50 at 96 hours) of cadmium, copper, and mercury for stage I *Homarus americanus* larvae were determined to be 78 µg/L, 48 µg/L, and 20 µg/L, respectively (Johnson & Gentile, 1979) and 56 to 100 µg/L for copper in adult American lobsters, depending on temperature (McLeese, 1974). Although the current maximal effluent and modelled levels at 100 m of these metals are below the few toxic levels known for American lobsters, and PPER Guidelines do not require it, it would be advisable to regularly monitor the level of all metals in the sediment, water, plant and animal life during the anticipated life of the mill project as part of an EEM program were the project to go ahead. The information available on the longer term, or subacute, toxic levels of these metals in American lobsters is limited and more studies would be advisable. The potential for bioaccumulation was not addressed in the Focus Report but is of concern given the anticipated lifetime of 'several decades' for the mill and the potential for change in the system.

NEED FOR ENVIRONMENTAL EFFECTS MONITORING

If 'Distance (m) from Diffuser Ambient Condition is Reached based on Dilution Ratios' values are changed, an EEM program could be required. In Appendix 7.3, Section 5.1 'Environmental Effects Monitoring Program' states:

> *"Within the regulations there are provisions for the removal of the requirements for specific components of the EEM program based on the dilution of effluent to <1%. If the mill demonstrates that the effluent concentration is <1% at a distance of 250 m then the EEM does not require a fish community study component. Likewise, if the mill demonstrates that the effluent concentration is <1% at 100 m from the discharge then a benthic invertebrate community study is not required. The most recent 3D modeling of effluent dispersion in the local study area as part of the updated receiving water study (RWS) indicates that dilution to less <1% effluent will occur at approximately 20 m from the discharge (Stantec ,2019).*"

The importance of lobster is recognised, and it is indicated that "*custom tests have been developed that can be completed using larval lobster and herring embryos. The tests will include Stage I-IV larval lobster and include a live-dead (acute) assessment of the various stages, as well as the assessment of sublethal effects on moulting time and growth.*" This is very encouraging. Of concern is the preceding statement of "*NPNS will continue to investigate the feasibility of performing toxicity testing to determine both potential acute and sublethal effects on immature stages of lobster and herring*". Given the major economic value of lobster to the region, it would be preferable to see that NPNS has committed to run these tests unequivocally. As the tests have been developed, it is regrettable that they were not performed over the summer of 2019 when larvae were present. It is possible that the tests were being developed during this time, however. Inclusion of chronic exposure of adults and generation testing would also be encouraged.

Section 4.2, 'Receiving Water Study' presents information on one month simulated spatial distribution studies in July and February showing only a few traces of highly diluted effluent in the region (Figures 4.2-3 and 4.2-4). It would be preferable to see simulated distributions of effluent at 12-, 24-, 36-months or 'decades' of operation of the mill. This might provide information on the risk of bioaccumulation.

HIGH INTENSITY SOUNDS

Seismic testing is used to examine the sea floor when doing oil and gas exploration. A 2017 paper describes the dramatic, deadly and widespread effect on plankton within 1.2 km a test site (McCauley et al., 2017). A two- to three-fold increase in number of dead larval (included decapod larvae) and adult plankton was detected. Larval lobster, decapods, are part of the plankton community. In a separate study, noise from seismic testing was shown to have prolonged (>365 days and a moult) damaging effect to the sensory hairs of the statocyst (a structure involved in coordinating body position and movement) and a delay in righting reflex in adult rock lobsters, *Jasus edwardsii*, (Day, McCauley, Fitzgibbon, Hartmann, & Semmens, 2019). The study also discusses how other anthropogenic noises can negatively impact behaviour in other crustaceans. The plain language summary section of Appendix 7.3 mentions exposure to high intensity sounds as seismic testing for three months during construction and as part of Operations and Maintenance for several decades commencing 2021. Section 4.1.6 'Consideration of Significant Residual Effects', Table 6 does not include noise in Potential Physical Effects. Further study to identify what effects, if any, the expected high intensity sounds might have on life stages of American lobster is warranted.

SEDIMENT AND WATER TEMPERATURE CHANGES ASSOCIATED WITH THE BURIED PIPELINE

Modelling of water temperature of effluent (35 ^{o}C) at the diffuser outflow site anticipates that the temperature of the receiving water will reach background summer levels of 17.2 ^{o}C and 16.8 ^{o}C at 5 m and 100 m from the diffuser, respectively. These temperatures are below the reported 31.1 ^{o}C – 29.1 ^{o}C range of lethal temperatures, for exposures of one to 24 hours, for larval lobsters and the sublethal temperatures of 20 ^{o}C - 26 ^{o}C, for short and long term exposures, as summarised by Quinn (Quinn, 2017).

The project proposal indicates 4 km of buried pipeline carrying water of around 35^{o}C. Information on what, if anything, this might do to the temperature of the 4 km of overlying sediment and surrounding water column was not found in the Focus Report. Adult lobster can easily move away and avoid or go around an area if the temperature proves inhospitable while larval stages cannot. Information on expected temperature effects on associated sediment and water column, including any anticipated effects on baseline water temperatures due to climate change over the expected lifetime of the project (several decades), could be relevant.

CONCLUSIONS & RECOMMENDATIONS

- The missing raw and associated quality assurance results for Appendices B-1 and B-2 in Appendix 7.3, should be provided so that the values listed can be verified.

- Minimum, median, maximal, and percentile values should be reported as less than the RDL values where appropriate (will also provide consistency with summary tables for other sample sites) and Appendices B-1 and B-2 updated.

- Values in Table 4-3 of Appendix 7.3 and Table 7.3-1 in the Focus Report should be updated as required and the values for 'Distance (m) from Diffuse Ambient Condition is Reached based on Dilution Ratio' revised as needed.

- There is inadequate information available on the acute, chronic and generational toxic effects of metals on crustaceans, particularly American lobster. Further studies are warranted given all life stages may be exposed to diluted effluent over several decades should the project be approved.

- It would be preferable to see simulated distributions of treated effluent at 12-, 24-, 36-months or 'decades' of operation of the mill. This might provide information on the risk of bioaccumulation.

- There is inadequate information available on the acute, chronic and generational effects of marine noise on crustaceans, particularly American lobster. Further studies are warranted given all life stages may be exposed to seismic and mechanical noise for months and over several decades, respectively, should the project be approved

- There is inadequate information on the temperature effects, if any, the hot effluent travelling in the 4 km of buried pipeline might have on the overlying sediment and water column. Further studies are warranted as warmer temperatures could potentially present a mobility barrier to adult lobster or heat stress to larvae.

- The language for inclusion of lobster larval assays for determining effluent toxicity in any future EEM program is not as strong as it could be. Given the economic importance of lobster to the region, lack of CWQG values for most metals in marine waters and known toxic effects of metals to larval and adult crustaceans, close monitoring of these populations would be advisable. Inclusion of chronic exposure of adults and generation testing would also be encouraged.

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APPENDIX

Resume for

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Review of Northern Pulp's Focus Report

PREPARED FOR:
GULF NOVA SCOTIA FLEET PLANNING BOARD, PEI FISHERMEN'S ASSOCIATION AND MARITIME FISHERMEN'S UNION

NEXUS Coastal Resource Management Ltd. | November 2019

NEXUS COASTAL

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1 INTRODUCTION

NEXUS Coastal Resource Management Ltd. (NEXUS) was contracted by on behalf of Gulf Nova Scotia Fleet Planning Board, PEI Fishermen's Association and Maritime Fishermen's Union to undertake a comprehensive review of the Focus Report regarding the Replacement Effluent Treatment Facility Project proposed by Northern Pulp Nova Scotia Corporation (NPNS).

1.1 EXPERTISE

NEXUS has assembled a group of experienced professionals and academics for this work. The following provides an overview of the qualifications of our team to provide this expertise.

Name	Education	Qualifications/Experience	Contributions to this Report
Chris Milley	M.M.M., M.Sc., B.Sc.	• Specialization in oceanography, chemical oceanography, fisheries, fisheries management, fisheries economics, environmental impact assessments, socio-economic analysis, stakeholder engagement methods/practices	Senior Review of all Sections Sections 1.3, 2.1, 2.2, 2.3, 2.4, 2.5
Dr. Ian Stewart	Ph.D., M.A., B.Sc.	• Research specialization in environmental science, science policy and public dimensions of science, environmental impact assessments	Section 2.1, 2.2, 2.3, 2.4, 2.5
Chris DeBow	CAPM, MDE, B.Comm	• Specialization in economic analysis, socio-economic analysis, fisheries economics	Section 2.3, 2.4, 2.5
Maria Delesalle	M.M.M., B.A.	• Specialization in stakeholder engagement methods/practices, socio-economic analysis	Section 1.3, 2.1, 2.2, 2.3, 2.4, 2.5

1.2 ISSUES ADDRESSED

The following summarizes the key issues NEXUS was asked to address during our review of Northern Pulp's Focus Report.

1. NEXUS specifically addressed the following areas of the EA, including the bio-physical, social and economic impacts of the project on fisheries in the Northumberland Strait.
    a. Major findings and conclusions expressed in the materials filed by Northern Pulp

   b. Reliability of the underlying research relied upon in reaching the findings and conclusions
   c. Information gaps within the materials filed by Northern Pulp
   d. Impacts on the reliability of conclusions made in the materials filed by Northern Pulp
   e. Assumptions that were relied upon in the materials filed by Northern Pulp and their reliability of these assumptions and their impact on conclusions made in the materials
2. Review of the Focus Report and associated supporting documentation, including but not limited to the Terms of Reference for the Focus Report, and relevant sections of the EA registration documents;
3. Desktop research to compile relevant knowledge and supporting experience from other jurisdictions and similar projects to support analysis and preparation of recommendations.

1.3 Approach

NEXUS used the following principles and questions to guide our review of the Focus Report:

Principles:

1. The review is unbiased. Efforts were made to avoid positional perspectives such that NEXUS did not undertake the review in an attempt to prevent or promote the NPNS project.
2. To provide honest, transparent and useful advice.

Questions:

Efforts were made to answer the following questions for each section of the Focus Report reviewed.

1. Is the information in the Focus Report complete?
2. Is the information in the Focus Report reasonable?
3. Are the assumptions made in the Focus Report valid?
4. Are there outstanding issues that should be considered or addressed, particularly from the perspective from the Fishermen's Organizations?
5. Based on the above, what questions or recommendations should the Fishermen's Organizations pose to the Nova Scotia Environment?

2 REVIEW & KEY FINDINGS

2.1 FORMAT AND FOCUS

In undertaking this review NEXUS was cognizant of the fact that during the development of the EARD and the subsequent Focus Report changes were being introduced in the nature and approach to impact assessments in Canada. Accordingly, the review of the Focus Report took a broader approach in keeping with the principles of impact assessment that were introduced in Bill C68 (An Act to amend the *Fisheries Act* and other Acts in consequence) and Bill C69 (An Act to enact the *Impact Assessment Act* and the *Canadian Energy Regulator Act,* to amend the *Navigation Protection Act* and to make consequential amendments to other Acts). All of these associated Acts with Bill C68 and Bill C69 have received Royal Ascent. It is clearly understood that the Province of Nova Scotia's Environment Act *(Nova Scotia Environment Act)* is the governing legislation for the Northern Pulp Nova Scotia's EARD and subsequent Focus Report, changes made at the federal level are likely to be reflected in provincial legislation due to the increased awareness of the need to consider social, economic and cultural impacts of projects. In the past, the need to consider project effects on Indigenous communities was similarly adopted by provincial environmental assessment processes after becoming a requirement in federal EAs. The results of NEXUS' review is presented in table format in Section 3.5. Some of the observations made during the review that are pertinent and may be of concern to Fishermen's Associations are also included as reviewers' comments in Table 2 below.

2.2 BIO-PHYSICAL IMPACTS

Many of the concerns that precipitated the need for the Focus Report were both scientific and non-scientific regarding the potential and perceived impacts of the introduction of effluent into the marine environment through a dispersion pipe in Caribou Harbour. Northern Pulp Nova Scotia (NPNS) engaged several environmental engineering consultants and scientists to conduct studies to address the questions raised and set out in the Terms of Reference for the Focus Report (including Addenda).

For the most part, NPNS has provided sufficient information to technically and scientifically address the questions raised, albeit, many of these responses may not satisfy public perception concerns which were based on emotion or lack of trust. NEXUS' review of the Focus Report and Appendices did, however, identify some areas where the level of content and scope of the information provided are not fully satisfactory, in that they either did not fully answer the question or the level of content was inadequate.

In general, the approach to disposal of Compounds of Public Concern (COPC) and Total Suspended Solids (TSS) by discharge into the marine environment has been a contentious issue, internationally, for decades. Consensus within the scientific and technical community is that COPC disposal in marine environments is unacceptable. Considering mounting concerns over the need for more stringent attention to cumulative effects and consideration

of increasing stress indicators of ocean health (Bernier et al, 2018) greater study is required. For this reason, better design options should be considered that make use of best available technologies for minimizing absolute volumes of effluent discharged, or that maximize removal of effluent content of potential concern (Suhr et al, 2015; Kamali et al, 2019).

The results of this Focus Report confirm that the major difference between the proposed ETF and current ETF is simply that comparable effluent (in terms of volumes and content) will be discharged further out to sea, with more rapid dilution performance. This assumption appears to be based on the fact that settlement ponds are ineffective in removing dissolved heavy metals from effluent without the use of additional direct use of physical-chemical processing of effluent water (adsorption on new adsorbents, ion exchange, membrane filtration, electrodialysis, reverse osmosis, ultrafiltration and photocatalysis) or bio-absorption (Gunatilake, 2015 Ayres et al, 1994). Each of these processes involve additional investment and create their own problems, such as the creation of concentrated sludge, with significant potential but unspecified risk to the local environment.

Detailed observations and responses are provided in the Compliance Table (Table 1) and Reviewers Additional Comments and Considerations Table (Table 2) below.

2.3 Economic Impacts

A motivation for those advancing and opposing any new development relates to the economic impact that the project will have on their livelihood and economic wellbeing (economic competition, economic displacement, changes in property values, changes in cost of living etc.). This is true for the NPNS project as well. As noted in Section 3.1, While Impact Assessments, under the new federal *Impact Assessment Act* now include economic considerations as part of the assessment process, it is likely that these considerations should be included in NSE-led assessments to avoid conflict and economic uncertainty in other resource sectors. However, there is little detail in the Focus Report regarding the longer-term economic impacts of the project on other resource users in the area. This should include the impacts of the project on the changing perceptions of the fishery due to the presence of the ETF outflow, changes such as confidence in the fishery as a viable source of income that can impact intergeneration transfer of licenses, value of licenses, public perception of the health safety of the harvest from the area which can change market price, etc.

General comments and recommendations to mitigate potential impacts are provided in the in the Compliance Table (Table 1) and Reviewers Additional Comments and Considerations Table (Table 2) below.

2.4 Social Impacts

Similar to the lack of a robust economic impact assessment, social impacts and concerns were not specifically part of the Focus Report Terms of Reference; however, considering the nature and content of several public responses in the Concordance Table, NPNS should have taken social impact concerns into consideration when preparing responses in the Focus Report. This is also in keeping with the principles set out in the new *Impact Assessment Act,* and which should be considered under a robust and complete assessment under the provincial EA process.

Social considerations and impacts are of particular importance for coastal fishing communities, First Nations and fishing industry participants who are the groups most likely to be impacted by the project with little or no direct benefit from the project.

Specific comments regarding the participation of these most vulnerable groups are provided in the Compliance Table (Table 1) and Reviewers Additional Comments and Considerations Table (Table 2) below.

2.5 COMPLIANCE TABLE

The following table summarizes NEXUS' key findings, comments and considerations during the review of the NPNS Focus Report.

Table 1: Compliance Table

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
1. Public, Mi'kmaq and Government Engagement			
1.1 Provide a response (via a concordance table) to questions and comments raised by the public, Mi'kmaq and government departments, and incorporate these comments into the Focus Report where applicable. Comments may be summarized prior to providing the response.	Concordance Table is complete, however, the nature and level of detail of responses is lacking in several cases (addressed below)	1) Although the Concordance Table seems to address all questions and comments provided by public, Mi'kmaq and government departments in some cases responses are inadequate or incomplete. In particular, with respect to the Marine Refuge Buffer Zone within Scallop Fishing Area 24 (Appendix 1.1 p. 27 of 40), the answers provided do not address the concerns raised.	R1: The responses to the Focus Report by the initial reviewers of the EARD (as recorded in the Concordance Table in Appendix 1.1) should be publicly available. This is advisable, especially given the serious levels of concern expressed by both federal departments (Health Canada, ECCC, DFO) and local communities.
1.2 Provide a plan to share future reports and/or studies relevant to this project with the public and the Mi'kmaq such as the Pictou Landing First Nation, including but not limited to the future Environmental Effects Monitoring results for the new effluent treatment facility.	Incomplete	1) There is not enough specificity as to how and the frequency in which engagement will occur with each stakeholder group within the Stakeholder Engagement Plan. 2) It is important for all stakeholders to understand fully how project information and reports will be communicated so they can be properly prepared.	R1: NPNS should provide reports in a format that are understandable as well as sufficient information to meet the needs of fishermen on a timely basis. R2: Reports should be provided on a routine and regular basis. A timetable should be provided to all stakeholder groups.

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
2. Project Description			
2.1 Provide the following information regarding the on-land portion of the effluent pipeline: o A re-alignment route for the effluent pipeline, given Department of Transportation and Infrastructure Renewal does not permit the pipeline to be placed in the shoulder of Highway 106; o Maps and/or drawings of the new pipeline location; o A list of properties (i.e.., Premises Identification number or PID) that will intersect with the new pipeline alignment.		N/A	
2.2 Conduct geotechnical surveys and provide the survey results to confirm viability of the marine portion of the pipeline route. The surveys must determine the potential impacts of ice scour on the pipeline.	Incomplete	1) The Report does not provide information on the specific sediment types other than size. 2) With respect to ice scouring the survey only used a single year study. There is no mention as to whether this was an average for ice conditions and there was no determination of extreme weather events during ice breakup. These factors could have a significant implication to ice scouring.	R1: Information on the mineral composition of the sediment will be useful in understanding the dynamics between effluent and the sediment, such as chelation and adsorption, which is useful in regard to contaminant dispersion. R2: A multi-year ice scouring survey should be conducted, including an analysis of the effects of changing ice conditions due to climate change.
2.3 Submit data regarding the complete physical and chemical characterization of NPNS' raw wastewater (i.e.., influent at Point A for the Project), to support the assessment of the appropriateness of the proposed treatment technology. The influent characterization results must be	Complete	No comment	

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
compared against the proposed treatment technology specifications.			
2.4 Submit a complete physical and chemical characterisation of NPNS's expected effluent following treatment by the proposed technology. To assess the efficacy of the proposed treatment technology, the following must be included: o Data from laboratory trials on NPNS's raw wastewater that were conducted at Veolia/AnoxKaldnes in Lund, Sweden in May 2018; o Modelling results using the raw wastewater parameters and quality; o A comparison of the effluent characterization results from the laboratory trials and modelling work, against appropriate regulations and/or guidelines.	Complete (partially)	1) It is noted in the Report that "effluent is similar to published effluent composition data from other Canadian jurisdictions indicates that the mills effluent is similar to effluent from other bleached Kraft mills in Canada operating either an ASS or ASF system". There is no mention or discussion as to whether the receiving environments are similar to that of Northern Pulp. More information should be provided to determine specific local environmental efficacy of the system.	R1. While the information provided meets the requirement for the Focus Report, it does not provide sufficient detailed information to assist interested and affected stakeholders to confidently determine the efficacy of the system in the specific local environment.
2.5 Provide any proposed changes to the pipeline construction methodology and other associated pipeline construction work, related to the potential changes to the marine portion of the pipeline route (e.g., infilling, trenching, temporary access roads, excavation, blasting, disposal at sea, and others where applicable).		N/A	

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
3. Facility Design, Construction & Operation and Maintenance			
3.1 Submit treatment technology specifications (e.g., optimal performance range of the technology) and an assessment of the efficacy of the proposed treatment technology for use at the NPNS facility, to the satisfaction of NSE. For example, peak effluent temperature is proposed to be above the generally accepted range of temperatures to achieve optimal biological treatment. Explain how the proposed higher than optimal treatment temperature would affect the treatment performance.		N/A	
3.2 Provide effluent flow data to support the proposed peak treatment capacity of 85,000 m3 maximum flow of effluent per day. At a minimum, data from 2017 and 2018 is required. Provide flow data for Point A, clarify source of the effluent flow volumes given in the EARD, and provide other relevant data and information to support the proposed treatment system design. If the 85,000 m3 cannot be justified based on historical data, identify water reduction projects, or re-evaluate the treatment system design and update the receiving water study accordingly.		N/A	
3.3 Effluent discharge parameters must be updated (where necessary) based upon the results of the effluent characterization in Section 2.4 and relevant additional studies. Refer also to Addendum item 2.0	Complete	1) While characterization of the effluent discharge parameters has been updated, there remains the issue related to the impact on the receiving environment.	R1: See "R1 in Section 2.4"

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
3.4 Provide the following information regarding the spill basin: o Submit information to assess the sizing and appropriateness of the design of the spill basin. The EARD indicates a retention time of 10-13 hours at a design capacity of 35,000 m3. The basis of this design has not been provided. If flows exceed 85,000m3 per day on a consistent basis (e.g., during summer months), confirm that there will be sufficient recovery time in the treatment system to empty the basin before the additional volume is required; o Explain where the overflow will be directed in the event of unforeseen scenarios (e.g., power outage).		N/A	
3.5 Provide the following information regarding the effluent pipeline: o Provide viable options including the selected option for leak detection technologies and inspection methodologies, with specific consideration to any portion of the pipeline located in the Town of Pictou's water supply protection area; o Provide viable options including the selected option for the enhanced pipeline protection, such as trench lining and justify how the chosen option is an adequate option for secondary containment. Be sure to address any potential changes in flow regimes, especially within the Town of Pictou's water supply protection area, due to the installation of the pipeline and secondary containment. If different options are provided for different areas of the proposed re-aligned pipeline route, the locations for each option must be identified.	Incomplete	1) The proposed pipeline will have <u>NO</u> leak detection capacity in its marine phases (Focus Report, p. 62). Effluent in final 4km of pipe to diffuser will flow under gravity (from max height of 1300m; Focus Report. p. 60). Assumption is that subsurface burying of the pipeline (3m) will protect against vessel traffic and ice scour to the marine portion of the pipe (Focus Report p. 39 and Appendix 3.5). Precise location of the diffuser and its integrity are a significant part of the proponent's plan to mitigate environmental impacts. Thus, compromises to this marine portion of the pipe or the diffuser could impact this plan. 2) Relatedly, the integrity of the diffuser ports (Focus Report 4.2.2, p. 86) depend on	R1: It is suggested that an installation of a detection system or regular monitoring of the marine portion of the pipeline be conducted to determine whether leaks, of any scale, result in local non-dispersed effluent accumulate in the local marine environment. R2: Request that information regarding the selected inspection regime be available to all stakeholders in order to properly assess and monitor the diffuser port integrity.

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
		the flexibility of the one-way rubber valves being maintained. The diffusion capacity of these ports is a significant part of NPNS's argument that the new system constitutes an improvement, and that rapid dilution will take place as per modelling in RWS.	
3.6 Clarify where the potential releases of waste dangerous goods at the Project site will be directed for treatment and/or disposal. It is important to note that the new treatment facility is not proposed to treat waste dangerous goods based on the information provided in the EARD and requirements of NSE.		N/A	
4. Marine Water and Marine Sediment			
4.1 Conduct baseline studies for the marine environment (such as marine water quality and marine sediment) in the vicinity of proposed marine outfall location.	Complete	1) The baseline studies do not examine mineral composition of sediments (other than grain size). Information on sediment composition would be useful in understanding the nature of the interaction between the receiving environment and the effluent.	
4.2 Update the receiving water study to model for all potential contaminants of concern in the receiving environment (based on the results of the effluent characterization and/or other relevant studies such as Human Health Risk Assessment). Baseline water quality data for Caribou harbour must be applied to this study. Refer also to Addendum 3.0.	Complete	No comment	

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
4.3 Provide results of sediment transport modelling work to understand the impacts of potential accumulation of sediment within near field and far field model areas. This should include chemical and physical characterization of the solids proposed to be discharged by NPNS as well as a discussion of how these solids will interact with the marine sediments and what the potential impact will be on the marine environment as a result.	Incomplete	1) According to Focus Report, App. 4.3, 90% of the Total Suspended Solids (TSS) will, depending on diffuser height (from seabed), and depending on which mean current speeds are used, be deposited within 1 to 4.8 kms or 4.2 to 21.1 kms of the diffuser. Given the wide range of these figures, and given that a high proportion of TSS will be non-easily biodegradable (refractory) cellulose fibres (Focus Report p. 25), there is a reasonable concern of impacts to fish habitat (benthic smothering) by sediment of such fibrous material within fishing grounds (see Focus Report figures 7.3-4 - 7.3-7). 2) The potential effect of TSS is dependent on the type of raw material introduced to the natural environment and the nature of the receiving environment. Therefore, comparison of models using effluent from mills in other regions is irrelevant and can lead to inaccurate conclusions.	R1: NPNS should give consideration to alternative and newer treatment technologies (e.g. centrifugal systems widely used in other mills) to reduce TSS, including cellulose fibres, not currently planned to be captured by the proposed new ETF system. R2: NPNS should review the statement regarding confidence levels of the conclusion of Appendix 4. 3 that "it is unlikely that sediment will build up in either the near- or far-field." (p. 6). The data presented in Appendix 4.3 undermines this confidence.
5. Fresh Water Resources			
5.1 Complete a wetland baseline survey along the proposed re-aligned effluent pipeline route (if wetlands are expected to be altered).		N/A	

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
5.2 Provide monitoring methodologies for areas with significant risk of pipeline leaks or spills (e.g., two areas where the pipeline crosses the Source Water Protection Delineated Boundary for the Town of Pictou wellfields; below water table; important wetlands; watercourse crossings; etc.).		N/A	
6. Air Quality			
6.1 Provide a revised inventory of all potential air contaminants to be emitted from the proposed project, including but not limited to, speciated volatile organic compounds, semi-volatile organic compounds, reduced sulphur compounds, polyaromatic hydrocarbons and metals.		N/A	
6.2 Update the air dispersion modelling for the pulp mill facility for all potential air contaminants of concern related to the Project.		N/A	
6.3 Complete an updated ambient air monitoring plan for the Project site based on the air dispersion modelling results. This plan must include the potential air contaminants to be monitored and proposed air monitoring location(s).		N/A	

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
7. Fish and Fish Habitat			
7.1 Conduct fish and fish habitat baseline surveys for the freshwater environment, to the satisfaction of Fisheries and Oceans Canada.		N/A	
7.2 Conduct fish habitat baseline surveys for the marine environment, to the satisfaction of Fisheries and Oceans Canada.	Incomplete	1) As noted in the Focus Report, baseline surveys have not been completed.	R1: Baseline surveys should be completed for all commercially important species before a final decision is reached.
7.3 Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. Assessment methodology must first be agreed upon by NSE in consultation with relevant federal departments.	Incomplete	1) The Focus Report deals with Valued Ecological Components (VECs) related to fisheries. In the EARD the social and economic ('socio-economic') environment was identified as a VEC in consideration of the potential interactions with local communities, how land and water is used in the vicinity of the project, and the potential interaction between the project and the economic well-being of these communities. These potential interactions are of concern to regulatory agencies, non-governmental organizations, and the general public because they can have a direct influence on the everyday lives of those living and working in the vicinity of a project. The socio-economic environment VEC includes land and water uses such as community resources and recreation, and economic industries, infrastructure. Furthermore, Appendix 7.3 references the socio-economic	R1: NPNS should commit to undertaking a socio-economic effects monitoring program related to the implementation of the NPNS ETF on local commercial fishing activities.

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
		importance of American lobster, rock crab and Atlantic mackerel that may have a higher potential for interaction with the project than some other indicators that were assessed specific to the Marine Fish and Fish Habitat VEC, it is recommended that EA Follow-up Monitoring be undertaken. There is, however, no indication of the intention to monitor socio and economic effects on this important resource sector.	

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
7.3 Continued.	Incomplete	1) Spatial boundaries for the assessment of environmental effects on the socio-economic environment include the following: a) the project footprint area (PFA) is defined as the physical footprint of the project including the location of the new replacement ETF on the NPNS mill property, the overland portion of the effluent pipeline, and the marine portion of the effluent pipeline and the marine outfall. The PFA is defined in Section 5.1.1. b) the local assessment area (LAA) is the maximum area within which environmental effects from the project activities and components can be predicted or measured with a reasonable degree of accuracy and confidence. The LAA can be thought of as the "zone of influence" of the project. For the socio-economic environment, the LAA is represented by the communities whose regular activities intersect with the PFA: Pictou Landing First Nation, local residents, and local industries located in the Municipality of Pictou County or the towns of New Glasgow, Stellarton, Pictou, Westville, and Trenton. Since the PFA is deemed to terminate at the marine outfall downstream impacts were not considered.	R1: Downstream impacts, such as drift of the effluent and its impact on adjacent fisheries, should be considered. Accordingly, a socio-economic baseline study should be conducted, which will include all the communities in the LAA to determine future socio-economic effects. This survey should include demographic profile of the towns and regions, industrial profile, including business counts, and labour force profile.

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
7.3 Continued.	Incomplete	1) The Impact Assessment only addressed biophysical environmental impacts. There was no consideration of social and economic impacts, particularly in relation to other key economic sectors in the region. See comments in "Reviewers Comments and Considerations" Section. 2) Monitoring is only for the bio-physical and chemical effects in the physical environment. There is no monitoring of bioaccumulation of effluent born compounds (for example, PAHs, mercury, dioxins and furans, etc.) in commercially important species. 3) Section 5.4 of Appendix 7.3 states "...will continue to investigate the feasibility of performing toxicity testing...". There is documented evidence that pulp and paper mill effluent cause physiological changes in fish as well as changes in physical and reproductive behaviour (Lehtinen et al 1990 Munkittrick et al, 1998). Thus, NPNS should agree to conducting toxicity testing on local fishery species of importance. 4) Section 5.3 of Appendix 7.3 states "Following completion of the HHRA, the potential utility of a continued fish tissue monitoring program following commissioning of the effluent treatment system and subsequent discharge will need	R1: Consideration should be given to the social and economic impacts that the treated effluent may have on key marine fish species (key economic sector). R2: Fishermen should be involved in all aspects of the EEM program, including selecting the EEM parameters and in monitoring activities. R3: It is requested that more information be provided on the predicted effects of effluent on resident species of fish, shellfish and crustaceans, including foraging species, through regular toxicity testing. R4: These discussions should commence **prior** to the initiation of construction to ensure certainty that tissue sampling and analysis studies be conducted by NPNS. R5: The Fishermen strongly urge the NSE to require **ALL** baseline studies to be completed prior to the approval of the NPNS ETF EARD.

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
		to be discussed with First Nations, stakeholders and government agencies. 5) The Focus Report further states in Appendix 7.3 that "The potential studies are still likely to target: lobster, rock crab, scallop, blue mussel, softshell clam, oyster, and locally relevant finfish (e.g., Eel, Smelt, Gaspereau, Striped Bass, Mackerel, Atlantic Herring). Given the likely timing for EA approval and the subsequent construction and commissioning of the proposed ETF, it will be possible to target collections of any of the species identified above that have not already been collected for baseline purposes (i.e., predevelopment) should engagement indicate the need."	R6: The Fishermen further request that NPNS consult closely with the Fishers Associations to ensure baseline studies include a broader range of species, to include commercially important species, and the foraging species upon which these economically important resources depend.
7.4 Submit an updated Environmental Effects Monitoring (EEM) program based on the results of various relevant baseline studies and an updated receiving water study. Refer also to Addendum item 4.0	Incomplete	1) Beyond the existing design of the effluent diffuser, no indication is made in the Focus Report about what mitigation steps could be taken if a post-construction EEM program discovers an unacceptable toxicological effect on fisheries resources. 2) The Environmental Effects Monitoring (EEM) program does not include studies on the bioaccumulation of effluent within key economically important species. This has significant social and economic implications as well as biological implications to the viability of the local resource. 3) There is insufficient information regarding the specificity and processes	R1: Fishermen should be involved in all aspects of the EEM program, including selecting the EEM parameters and in monitoring activities. R2: Fishermen should be involved in discussion and decisions regarding appropriate mitigation measures.

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
		involved in the EEM program. As a result, the opportunity for stakeholder groups to provide input and recommendations on how to enhance the EEM program so that monitoring measures are acceptable is not apparent or available.	
7.5 Clarify what contingency measures will be in place to mitigate potential impacts (e.g., thermal shock to fish) due to potential large and rapid fluctuations in water temperature in the winter at the diffuser location during low production or maintenance shut down periods.	Complete	1) There remains a question that while the Focus Report addresses routine contingencies there is no discussion on what measures are in place for catastrophic events that could result in rapid or unmanaged discharge of effluent into coastal waters.	R1: NPNS should consider an emergency response plan as a part of their contingency measures.
8. Flora and Fauna			
8.1 Complete a plant baseline survey along the proposed re-aligned effluent pipeline route.		N/A	
8.2 Complete a migratory bird survey along the re-aligned pipeline route.		N/A	
8.3 Complete a bird baseline survey for common nighthawk (Chordeiles minor), double crested cormorants (Phalacrocorax auratus), owls, and raptors and raptor nests, for the entire project area which includes the re-aligned pipeline route.		N/A	

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
8.4 Complete a herptile survey for the Project area which includes the re-aligned pipeline route.		N/A	
9. Human Health			
9.1 Complete baseline studies for fish and shellfish tissue (via chemical analysis) of representative key marine species important for commercial, recreational and Aboriginal fisheries in the vicinity of the proposed effluent pipeline and diffuser location.	Incomplete	1) The baseline surveys did not include several commercially important species, such as scallops and other benthic invertebrates. 2) While the baseline survey includes tissue analysis of commercially important species and food resources for First Nations, the EEM does not indicate that this will be continued to determine the level of bioaccumulation of effluent in these species.	R1: A complete baseline survey is necessary to ensure compliance with the requested information in the Focus Report Terms of Reference and useful for the development of an effective EEM program. R2: The EEM should include tissue analysis to determine health risks resulting from potential bioaccumulation and to determine potential economic impacts on the fishery.
9.2 Commence a Human Health Risk Assessment (HHRA) to assess potential project-related impacts on human health. The risk assessment must consider human consumption of fish and other seafood, consumption of potentially contaminated drinking water, exposure to recreational water and sediment, outdoor air inhalation, and any other potential exposure pathways. The analysis must inform the identification of contaminants of concern and updating of the receiving water study.	Incomplete	1) The Seafood Intake Survey did not include an analysis of the food ingested to determine the presence or absence of compounds that may be present in effluent (useful and essential background information for future studies). 2) Impact from consuming commercially important species from the area can have wider impact on the economic viability of the fishery in the region as a whole (e.g. amnesic shellfish poisoning in PEI affected the Atlantic fishery).	R1: The Food Intake Survey should include analysis of presence of heavy metals, PAHs, dioxins and furans in the foods after preparation for consumption. R2: See "R2 in Section 9.1"

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
10. Archaeology			
10.1 Complete an Archaeological Resource Impact Assessment for the marine environment related to the Project.		N/A	
10.2 Complete shovel testing for areas in the terrestrial environment that are identified to have elevated or medium potential of archaeological resources, to confirm the presence or absence of these resources.		N/A	
11. Indigenous People's Use of Land and Resources			
11.1 Complete a Mi'kmaq Ecological Knowledge Study (MEKS) for the Project.		N/A	
ADDENDUM: Items Raised by Reviewers Requiring Clarification			
1.0 Provide information regarding whether and when new technology and equipment will be installed at the NPNS pulp mill to improve the effluent quality, including but not limited to the following: o Will O_2 delignification be installed at the NPNS pulp mill? o What other technology and equipment will be installed at the NPNS pulp mill? o How will each proposed new technology and/or equipment improve the effluent quality?	Complete	No comment	

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
2.0 With respect to the effluent discharge parameters: o Explain why the total nitrogen parameter has changed to 6 mg/L (daily maximum) from the 3 mg/L (proposed in the August 11, 2017 receiving water study); o Provide data to support assertions that chemical oxygen demand (COD) can be reduced to the proposed limit.		See Section 3.3 above.	
3.0 With respect to the updating of the Receiving Water Study: o Provide a response to questions and comments on the receiving water study (not already outlined in this document) from Environment and Climate Change Canada's EARD review submission dated March 18, 2019, and update the receiving water study as applicable; o Explain how the initial mixing and dispersal of the plume was taken into account when simulating far-field extent and concentrations of effluent in Section 3 of Appendix E1 of EARD. It appears that the far-field model simulations were run before the near-field model. One could expect that the behaviour of the plume further afield depends a large extent on how it behaved at the diffuser, i.e. how quickly it mixed and spread and rose to the surface; o Confirm dilution ratios and distances required to achieve background level for water quality parameters in Appendix E1 of the EARD, as the dilution ratios and distances may be overestimated; o Explain if the salinity and temperature differential between the effluent and the receiving waters has been accounted for in the model. When the buoyancy differential between the effluent and receiving waters are	Complete	No comment	

Requirements from Terms of Reference	Completeness	Review Comments & Considerations	Additional Issues/Suggestions for Consideration
greater in winter, it results in a faster rising plume. This can potentially affect the visibility of the effluent in the receiving environment. Has this been accounted for in the model? Also provide results for winter conditions; o Explain if re-entrainment of effluent and sediment at the diffuser location was accounted for in the one-hour period surrounding slack tide. Support this explanation with model results using a smaller time step (30 minutes) if necessary.			
4.0 It is important to note that the following field study and monitoring are likely to be required as part of an EEM program regulated under the Pulp and Paper Effluent Regulations for the Project if it is approved: o Field delineation of treated effluent plume to confirm the prediction from the receiving water study; o Monitoring of marine water quality and marine sediment quality; o Sublethal toxicity testing and chemistry testing of the treated effluent; and o Biological monitoring studies including benthic invertebrate community study, fish population study, and dioxin and furan levels in fish as applicable.	Complete	See Section 4 above	

Table 2: Additional Reviewer General Comments & Considerations

Additional Reviewers Issues	Review Comments and Considerations	Comments for Consideration
Issue: Major Findings and Conclusion from the Report	1) In the Focus Report it is summarized that "through appropriate mitigation, no significant adverse residual environmental impacts have been predicted" (vi) which is a reflection of the overall content and conclusions of the Focus Report and its appendices. However, despite the Focus Report's presentation of this overall finding as "scientific" and "science-based" (i, ii), there are significant questions and uncertainties that remain. 2) Predictions based on modelling in the Focus Report suggest that the proposed ETF will meet current federal and provincial regulatory requirements. However, new federal guidelines (e.g. PPER in accordance with the *Fisheries Act*) have not yet been published; assumptions about the content of the new PPER are acknowledged within the Focus Report as being "speculative" (n. 1, Table 2.4-2). Thus, the Focus Report's overall conclusion that "proposed future" (Focus Report, p. xxxi) regulations will also be met by the new ETF is premature and introduces additional uncertainty. 3) The Focus Report does not conform to best practice of impact assessments that clearly requires full disclosure of uncertainties so as to adhere to the precautionary principle, for many years now a guiding principle in impact assessment in Canada. Such disclosure is necessary to allow for full participation of potentially impacted communities to contribute to determination of acceptable levels of risk.	R1,2,3: The responses to this Focus Report should be included in a continued engagement process that allows for a collaborative review of public responses, and collaborative decision-making involving impacted stakeholder groups, proponents and regulators as an extension of this review process prior to regulatory approval. This will enable stakeholder groups to be fully aware of uncertainties that are unstated in the Focus Report. This will be consistent with the principles of Free, Prior and Informed Consent (FPIC) that should guide this process.
Issue: Assumptions in the Focus Report	1) The assumption made within the Focus Report is that dilution of the effluent in receiving water is sufficient to avoid significant, adverse and residual impacts on the environment. However, there is growing evidence that this assumption is being questioned in other jurisdictions whereby environmental monitoring programs are requiring more stringent	R1,2,3: Greater effort must be made to fully characterize the receiving ecosystem, particularly completing all baseline studies and economic analysis of the receiving environment (bio-physical and socio-economic). These

Additional Reviewers Issues	Review Comments and Considerations	Comments for Consideration
	regulations for Environmental Effects Monitoring (EEM), including cumulative effects, lower toxicity thresholds (sub-lethal effects), and introduction of more advanced technologies for effluent treatment and disposal. 2) The assumption in the Focus Report that meeting current Pulp and Paper Effluent Regulations (PPER) is enough to ensure that the new Effluent Treatment Facility (ETF) will not cause an acceptable significant adverse residual negative impact is questionable considering changes being proposed to create new and enhanced PPER (Bill C-68). 3) The impact assessment methodologies employed by NPNS and documented in the Focus Report (and EARD) rely on the comparability of effluent parameters to other kraft mills operating in Canada and internationally (e.g. Focus Report pp. xxvi-xxviii; App. 2.4). Best practices of impact assessments now follow ecosystem (social, economic, and biophysical) assessment approaches. Conclusions drawn in this Focus Report on the basis of such comparisons, particularly those with respect to "significant adverse residual impacts", ought to be treated with caution. The proposed NPNS ETF is the first in Atlantic Canada, and certainly for this distinctive ecosystem of the Northumberland Strait, which is different and unique even to other areas within Atlantic Canada. The closest relevant ecosystem comparison is to the existing BHETF, which clearly has left a "negative legacy" (Focus Report, p. xxxix). 4) iv. The approach to disposal of COPC and TSS by discharge into the marine environment has been a contentious issue, internationally, for decades. Consensus within the scientific and technical community is that COPC disposal, particularly those identified as endocrine disruptors and persistent (not or not easily and safely biodegradable) pollutants in marine environments is of mounting concern (Singh and Chandra, 2019; Chandra et al, 2018) and that conventional treatment options (including activated sludge processes as proposed in this ETF) are considered to be insufficient	studies will help determine cumulative effects and appropriate mitigation strategies. R4: The corporate social responsibility and public interest should be married through greater collaboration between affected stakeholders, regulators, and NPNS in decision-making, such that conditions of approval include strategies to continually strive to reduce and eliminate at-sea effluent disposal.

Additional Reviewers Issues	Review Comments and Considerations	Comments for Consideration
	to address concerns regarding commercial fisheries (Hubbe et al, 2016). This is particularly in light of mounting concerns over the need for more stringent attention to cumulative effects and consideration of increasing stress indicators of ocean health (DFO state of the ocean report 2019). For this reason, better design options should be considered that make use of best available technologies for minimizing absolute volumes of effluent discharged, or that maximize removal of effluent content of potential concern (COPC, TSS). The results of this Focus Report confirm that the major difference between the proposed ETF and current ETF is simply that a comparable effluent (in terms of volumes and content) will be discharged further out to sea, with more rapid dilution performance. (It has been noted in the review of the Focus Report that heavy metals require the use of additional direct use of physical-chemical processing of effluent water (adsorption on new adsorbents, ion exchange, membrane filtration, electrodialysis, reverse osmosis, ultrafiltration and photocatalysis) or bio-absorption (Gunatilake, 2015 Ayres et al, 1994)	
Issue: General comments regarding Socio-economic Assessment	1) The Focus Report makes reference to and draws conclusions about socio-economic impacts but provides no analysis, quantification, or justification to support these conclusions. a) Identified socio-economic impacts are not quantified, including the economic impact of construction spending. b) The EARD contains no apparent socio-economic analysis. c) Reference to disruption of economic activity during construction is too narrowly defined as disruptions to use of land and water resources. Potential changes to market and consumer perception / behaviour resulting from the project are not addressed (e.g. changes in demand for seafood harvested in the PFA).	R1: Socio-economic impact assessment should consider: what is the nature of the impact (e.g. employment, production, revenue, cost, etc.)? What could drive it (i.e. changes in labour demand, consumer perception)? What is the potential scale and direction of the interaction (i.e. size of the impact, positive or negative)? There appears to have been no effort made to estimate the extent (qualitatively or quantitatively) of these potential interactions between the NPNS ETF and other economic sectors during and after construction. Therefore, NPNS should undertake an assessment of potential interactions to

Additional Reviewers Issues	Review Comments and Considerations	Comments for Consideration
	d) EARD does not include an analysis of potential economic opportunities related to the project (e.g. supply chain, employment, training, local industry capacity-building, local construction / employment income spending). e) Impacts to property values in the PFA have not been considered. f) Potential interactions and impacts to fisheries, tourism, transportation, and other sectors have not been estimated or quantified. It should be noted that some impacts to sectors such as tourism can be "sticky", meaning temporary changes in access to or perceptions of tourism destinations and activities can result in longer-term consumer behaviors that are difficult to alter. Similarly, temporary changes in seafood markets because of public perceptions from the environment in which they are harvested can have long-term implications to the local as well as regional marketability of seafood products.	determine and describe the nature and extent of the impact on the local and wider Nova Scotia economy.
Issue: Significance Criteria	1) The significance criteria defined for NPNS ETF project does not fully consider the social and economic environment. A significant adverse residual environmental effect on the socio-economic environment is one where project-related activities directly interfere with the use of the land or water such that their intended use is no longer possible. This would include interference with land uses, recreational uses, employment and economic impacts in the community, region, or province. A significant positive residual environmental effect of the project on the socio-economic environment is one that results in project-related sustained increased level of employment and economic activity in the community, region, or province, or enhances land and water uses.	R1: Criteria could be expanded beyond "the use of land or water such that their intended use is no longer possible." Could include: Impacts to land or water such that their intended or desired use is affected in any way (negatively or positively). Impacts to fisheries – increase or decrease in fish stocks, changes in consumer perception of or demand for seafood originating from the PFA. Impacts to tourism / recreation based on actual or perceived impacts of the project. Negative residual environmental effects of the project on the socio-economic environment resulting in decreased levels of (or negative shifts in) employment and economic activity in the

Additional Reviewers Issues	Review Comments and Considerations	Comments for Consideration
		community, region, or province. For example: demand for local project-related labour causing shifts away from existing local industry.
Issue: Compensation	1) The Focus Report discusses compensation only in terms of habitat compensation as it relates to HADD, however, the EARD does address compensation in the commercial fishery in only general terms. As stated in the EARD: a) "In advance of and during construction, communication with the fishing industry will allow for strategic planning and limit risk of impacting movement through Caribou Harbour into the Northumberland Strait." b) "The area of disturbance will be small, particularly in comparison to the licensed fishing areas. Impact, if it occurs, would be limited to a small number of individual fishers who may be able to compensate for that loss by adjusting their fishing patterns. The impact to income is not expected to be significant."	R1a: Since communication and strategic planning requires cooperation measures should be taken to ensure that effective communication and cooperation and NPNS and fishermen takes place. This important to ensure mitigation will include opportunities to avoid detrimental effect on the commercial fishery and that suitable compensation can be negotiated. R1b: The area of disturbance may be physically small; however, the impact can be global because of the fact that the Atlantic lobster fishery is perceived as a common resource in the marketplace. Consumer perception and demand for seafood is important and consumers are becoming increasingly sensitive to the environment from which seafood products are harvested. Therefore, NPNS is well advised to effectively engage the commercial fishery on an ongoing basis.

APPENDIX A: REFERENCES

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APPENDIX B: CVS





NEXUS COASTAL



NEXUS COASTAL



NEXUS COASTAL



From: @juniperlaw.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:48:03 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Comments on behalf of three fishing industry associations have been just submitted via email to EA@novascotia.ca. Name: @juniperlaw.ca Address:
Municipality: Halifax Postal-Code: Fax: ### ### - ####
email_message: Privacy-Statement: agree x: 80 y: 17

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:48:05 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I do not believe that Northern Pulps proposed Replacement Effluent Treatment Facility Project should not proceed. I hold this opinion due to the impact on the tourism potential of Pictou and the surrounding area, the negative impacts on the fisheries within the Northumberland Strait, the negative impacts on the environment and ecology, and the risks to human health in the town of Pictou and surrounding areas. Northern Pulps Focus Report does not fully establish that this proposed effluent pipe will not adversely impact the environment, human health, and the tourism economy. Some of my concerns are as follows: 1. The proposed pipeline follows the Pictou causeway. This seems dangerous and is inviting an accident to occur. The unfortunate event of accidents and leaks are not a question of if but a question of when. As such, this location is a risk that is not worth taking. 2. The proposed pipeline travels through the watershed of the town of Pictou. As accidents and leaks are inevitable, this location poses too high of a risk to human, wetland, and terrestrial ecology health. 3. Mercury is known to be one of the chemicals that is discharged in the mills effluent. Mercury is known to be extremely harmful to both human and ecological health. I noticed that mercury is absent from the breakdown of the chemical composition of the of the effluent. Has it been lumped into a broader category? Name: @gmail.com Address:
Municipality: Hubley Postal-Code: Fax: ### ### - ####
email_message: Privacy-Statement: agree x: 75 y: 24

From:
To: Environment Assessment Web Account
Subject: [PROBABLE-SPAM] No Pipe
Date: November 8, 2019 5:48:24 PM
Attachments: Replacement Effluent Treatment Facility Project.pdf

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** EXTERNAL EMAIL / COURRIEL EXTERNE **
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CANOE KAYAK NOVA SCOTIA

5516 Spring Garden Road, Halifax
Nova Scotia, Canada. B3J 1G6
(902)425-5450, ext.

Government of Nova Scotia
EA@novascotia.ca

Replacement Effluent Treatment Facility Project — Environmental Assessment
November 7, 2019

To Whom It May Concern:

I am writing to you on behalf of Canoe Kayak Nova Scotia; an association of recreational canoeists, kayakers, and standup paddleboarders throughout the province. We are concerned with Northern Pulp's proposal to pump only partially treated effluent from its Abercrombie Point, Pictou County, pulp mill some 15 km and then release it into the Northumberland Strait.

We have reviewed the proponent's voluminous Focus Report and find that it doesn't answer the important questions asked of the Proponent in the Terms of Reference. From the information supplied we are not convinced that the pulp mill's effluent is essentially harmless, and that it will not adversely effect the local marine environment, locally harvested seafood, and human health.

Moreover, based on the information supplied, we are concerned that diffusing the effluent, rather than concentrating it in Boat Harbour as is done now, will reduce the water quality of a much larger area and thus further harm local tourism and outdoor recreational opportunities. This Proposal should be rejected for the above reasons.

From:
To: Environment Assessment Web Account
Subject: Northern Pulp focus report response.
Date: November 8, 2019 5:50:33 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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I would like to start of by stating that I'm am against Northern Pulp effluent in our Strait.I've been a resident of Pictou Landing first nation as long as I can remember.I am years old not and have endured environmental racism in the whole time I've been here.My mother was a residential school survivor.I believe that to be a large contributing factor to how we were brought up.Although we had a lot of love in our family.We lacked the proper fundamentals required to grow up as healthy children both physically and mentally.
Knowing your own government is trying to kill you kinda wears on the human psyche.Watching family and friends suffer with minor ailments to full out cancer.I think the Northern pulp pollution is affecting us through the water and air.I for one am having a hard time keeping my unhealthy thoughts to myself sometimes.I don't have that part of the brain that filters out what I shouldn't say in mixed company sometimes...
With the risk of sounding smarter than I really am I will conclude by saying five years is more than enough time to resolve any effluent problems they knew they would encounter with the surrounding people being affected on a daily basis.
#cleanboatharbor
#honortheact
#nopipe
Sin-cerely

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 5:53:50 PM

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Project: replacement_effluent_treatment_facility_project Comments: For women and men depending on the forest industry for their livelihood I think that northern pulp should get the time to complete the waste project and continue to operate as normal. From what I have seen and read northern pulp is not producing as much pollution as people are saying but are willing to work with the people to make things better and have a bright future in Nova Scotia for years to come. Name: @eastlink.ca Address: Municipality: New Germany Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 63 y: 24

From:
To: Environment Assessment Web Account
Subject: Northern Pulp
Date: November 8, 2019 5:54:27 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister of the Environment!
Do the right thing. Be bold. You can spin this decision, but the next generation will bear the burden. Those millions of salmon dying in their farms are a
warning. You are making a decision on behalf of marine life and irreplaceable habitat. Piping effluent into the waters that nourish our spirits and our bodies here in Nova Scotia is morally wrong, and serves the wrong masters. We have lived with the narrative of economic prosperity , but when the fish and birds are gone, profit is a hollow comfort.

Be bold. A climate crises dictates risk for truth
Sincerely,

I acknowledging that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People. This territory is covered by the "Treaties of Peace and Friendship" which Mi'kmaq and Wolastoqiyik (Maliseet) Peoples first signed with the British Crown in 1725. The treaties did not deal with surrender of lands and resources but in fact recognized Mi'kmaq and Wolastoqiyik (Maliseet) title and established the rules for what was to be an ongoing relationship between nations.

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 5:55:10 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,
I am writing in relation to Northern Pulp's Focus Report for their Replacement Effluent Treatment Facility project.

My name is I am a resident of Pictou. My wife and I raised our family in Pictou and I have worked and volunteered in recreation, tourism, health field, environmental, museum and heritage associations, education foundations and more. I am heart and soul dedicated to this community, our province and a greener more environmental clean and sustainable future for those to follow us. There is nothing in
Northern Pulp's EA submission that gives me comfort that their operation should be part of that future.

The primary concern I have with Northern Pulp's plan has to do with their inability to meet the terms of their IA. One of the points that was brought up as a concern by the Town of Pictou was Northern Pulp's plan to pump water through our watershed. In NP's response they said they would use thicker pipes with leak detection capabilities. NP has a proven track record of failing to either prevent leaks or to monitor their pipes adequately. They did not even explore the idea in the context of the concern brought up through their EA application for their ETF to move the pipe route away from our water. I would be concerned with this proposal even if I trusted a company to do what they said they were going to do. Northern Pulp have not done anything to earn that trust.
Where is the accountability for Northern Pulp's inability to meet the terms of their industrial approval? What influence does being on Canada's Environmental Offenders Registry have on this ETF proposal?

There is a lot of language in both NP's EA submission as well as their Focus Report response that says they 'will' do something or that the details will be explained in their Industrial Approval.
There is even reference to their seeing improvement in air emissions with the adding of an oxygen delignification system and it directs the reader to the appendum 1.0 for 'more details'. In that addendum it states "the future Oxygen Delignification system was considered in the design of the ETF and will be managed as a separate project to be undertaken after the ETF project is completed." There is nothing in the focus report or NP's original EA application that says when this will be added. First of all, I don't really believe this will be added at any point or they would have stated a time frame. Secondly, NP's "using BATEA (Best Available Technology Economically Achievable) principles" tells me that they aren't going to pay for it if they don't have to. If they are granted an IA based on a new ETF that doesn't have the oxygen delig, then those BATEA principles says that either the taxpayer is on the hook or it's not getting installed because they can Economically Achieve the goal of operating without it. And most importantly, if this is a component that isn't part of the current

ETF plan, it shouldn't be in the Focus Report because it has nothing to do with what Northern Pulp is planning to build right now. It should have no affect on any decisions. I feel that Northern Pulp are asking for a leap of faith that they have not earned.

From page iv) of the report "Constructing and operating methodologies conducted in a manner consistent with Northern Pulp Environmental Management System (EMS) which incorporates operational policies and practices for monitoring and management of, for example, land and soil resources, air and water, noise and vibration, hazardous materials and waste, community health and safety, and cultural heritage; and Developing and implementing an overall Environmental Management Plan (EMP) and Environmental Protection Plan (EPP) for construction activities that will be included in, and enforced through, construction contracts."

Has Northern Pulp's "Environmental Management System" with its "operational policies and practices for monitoring and management" been in place the entire time that they have been working under their Industrial Approvals? Was this the practice that lead to failing their emissions tests in Dec 2016 and June 2017 while failing one of the 3 stack tests in June 2019 only getting a pass thanks to averaging three tests? Is their "Environmental Management Plan (EMP) and Environmental Protection Plan (EPP)" practices showing up in their receiving a ministerial order on October 10th, 2017 or the Directive issued in February 2018 after the slurry ash leak?

Now we're being asked to trust their plan to move upwards of 85 million litres of effluent per day through Pictou Harbour, across the Town of Pictou's watershed, through various water courses exiting into Caribou Harbour at an as yet undecided location, pumped about 4kms into the Northumberland Strait after passing by Munroe's Island which is part of the province's 12% protected area because of its delicate eco system.

Just when we are celebrating a new modern water treatment facility our water quality could be threatened again by the inept practises of a corporation.

I do appreciate the opportunity to express my concerns regarding NP’s proposed Waste Water Treatment.

Also, please continue to respect the Boat Harbour Act. No Extension.

Pictou, NS

From:
To: Environment Assessment Web Account
Subject: Submission to Nova Scotia department of environment on the focus report...
Date: November 8, 2019 5:56:53 PM

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Submission to Nova Scotia department of environment on the focus report by northern pulp Nova Scotia for replacement effluent treatment facility.

To
Mr. Gordon Wilson
Minister Nova Scotiadepartment of environment.

Mr. Stephen MacNeil
Premier of Nova Scotia

Gentlemen thanks for the opportunity to consult on this very controversial project. I have been fishing out of Caribou Harbour since 1979. For the past 40 years I have fished lobsters ,herring ,scallops ,ground fish , mackerel,rock crab snow crab and tuna. I have resided on Caribou island since 1983 and am very familiar with the Harbour and the surrounding area both water and land. Therefore I feel compelled to write to try and stop this environmental disaster before it's too late.
Caribou harbour is tidal with no large rivers to create more flushing action. Therefore there is a yearly sediment buildup ,with the Harbour getting shallower as the years pass. The twice-daily falling tides create the only flushing. With placement of the effluent pipe diffusers in the centre of the entrance to Caribou Harbour the Effluent will enter the harbour on the rising tides. With fall and winter ,come Northeast storms. With wind from the north east for several days and the larger than normal rising tides the effluent will accumulate in the farthest shallows ,coves ,marshes and inner tidal areas of Caribou Harbour. With no flushing action the bio-accumulation of chemicals from pulp effluent will eventually put the entire ecosystem of Caribou Harbour in jeopardy.
With the winter weather the Northumberland Strait becomes choked with heavy sea ice. This alone will be a huge risk to the pipeline and diffusers. As stated by NorthernPulps consultants the fibre optic cable to Prince Edward Island was severed by ice at a depth of 18 m. The ice break up in the spring and prolong northeast wind cause massive pile ups of ice in the entrance to Caribou Harbour. A break in the diffusers or pipe line at this time of year could not be detected and could not be repaired.
The harbour itself becomes covered in fast ice which has been measured at over 36 inches deep. This could cause large areas of oxygen deprivation with no wave action to encourage

mixing inside the Harbour. The lack of oxygen and the introduction of total suspended solids in the eelgrass beds , effluent will accumulate until the Harbour is a dead zone destroying a vital Fisheries nursery.
The current employment at NorthNovaSeafoods, (where water is inspected by the Canadian food inspection agency), The shellfish leases within the Harbour and lobster buyers that store up to 100,000 pounds of lobsters a day ,in season ,within Caribou harbour will all be put at great risk. All of these depend on clean water within Caribou Harbour.
The harm to the fishery and fish stocks are a very real concern. There has been no lobster larvae study done by Northern pulp , as was requested by the fisherman their reply in the focus report states “we will check into the feasibility of doing this study “ .hardly reassuring for fisherman.
The protection of American juvenile lobster was addressed by fisherman more than 25 years ago ,with a 1 mile (from land),buffer zone. Now a marine refuge which the pipe and diffusers fall completelywithin these boundaries. Their reply on the Marine refuge in the focus report states they did not see any scallops on the video survey ,therefore no scallop fishery in this area. They completely missed the point or do not understand that it is to protect “juvenile lobsters” not scallops.
Any harm to lobster in the area would not be local . We ship Canadian lobsters worldwide damage to the Canadian brand would have ramifications throughout Atlantic Canada. We do not ship Caribou or Nova Scotia lobster’s they are all marketed as Canadian lobsters. Damage would be industry wide.
The fall herring stocks in this area are placed in the cautious zone by DFO. Stocks are in a rebuilding phase currently. The main spawning areas for fall herring are in very close proximity to the outfall pipe. this past fall has seen larger herring with the quota being caught in 12 nights of fishing which is a slight improvement. We cannot afford to put these stocks at risk without A complete assessment on the efects of the effluent by the Canadian environmental assessment agency.
Their assessment on rock crab is totally false stating it is fished in shallow water and not at the depth of the diffusers. Rock crab is heavily fished in the direct location off the diffusers. The information from the crew on the survey boat in the fall of 2018 stated there was many bouys in the area they were supposed to survey.
There is no detailed plan for the construction of the Marine portion of the pipeline in the focus report. Only the beginning where the pipe enters the water and the outfall are factual. Everything in between is an “opinion”. Without a detailed construction plan by the contractor how can there be responses from the public. And how can the Department of fisheries and oceans except this, for making decisions and recommendations.
There is no leak detection for the Marine portion of the pipeline. Any leak entering Caribou harbour area would not meet PPER and would cause even greater ecological damage. Very hard for experts to analyze the damage that the affluent would cause ,because there is no information on the characteristics or make up off the Effluent. This alone has to raise red flags with the Department of Environment. Without the characteristics of the affluent make up ,how can you verify any of the statements made in the report that no harm will be done to fish or fish habitat.
Do not be fooled by the focus report with very few answers involving science. The first mistake was made in 1966 with boat harbour with the estimated cost today at $250 million to clean it up. Do not follow the same path and make an even bigger mistake by putting effluent in the shallow, slow moving currents of the Northumberland Strait. The people of Nova Scotia cannot afford the cost of the cleanup or the responsibility for the destruction of this self sustaining fishery.

Conclusion and recommendations

The issues are very real with serious consequences and all of the risk is being placed squarely on the Fisheries.
1. Lack of leak detection in Marine area.

1. No consultation with stakeholders. “Fisherman”
2. No detailed construction plan for Marine portion and outfall.
3. No lobster larvae study.
4. Not enough study done on ice in the Northumberland Strait and the damage it could cause.
5. The lack of any internal environmental upgrades in the mill itself including oxygen delignification.
6. The recent ruling by the Nova Scotia supreme court identifying a conflict of interest with the government paying for the project and also being the regulator.
7. Not including a complete report on the characteristics of the effluent.

My recommendation would be The rejection off this proposal. The only action to move forward on this project and have the public feel it was being reviewed fairly and consistently would be to handed it over to the Canadian impact assessment agency.

Caribou Island
Nova Scotia

Sent from my iPad

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 6:01:45 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is and I live in Halifax but spend the year fishing north shore rivers for trout and salmon and I'm concerned about Northern Pulp's Effluent Treatment Facility Proposal.

I believe that Northern Pulp's plan to pump up to 85 million litres (31 Billion Litres per year) of effluent into the Northumberland Strait is a bad idea. I do not believe the Northumberland Strait and its marine life, which is already under a lot of stress, can withstand this incredible influx of effluent.

In addition to what it would do to the marine environment, I worry about the potential risk that this poses to our fisheries. The livelihood of our fishers is being threatened by both the make up of the effluent as well as the temperature. I do not believe the province would have even considered a proposal from Northern Pulp if that proposal was one that would put the Michelin plant next door at risk. I don't see how this is different.

Thanks,

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 6:03:38 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is . I've lived in various areas of Pictou County over the last 28 years and I'm concerned about Northern Pulp's Effluent Treatment Facility Proposal.

Premier Stephen McNeil stated that it would be wrong to move one disaster into a new location when he referenced Northern Pulp's ETF proposal. Of course that wasn't a statement on whether Northern Pulp's project was a disaster, simply that it would be wrong for the province to approve a project that could be characterized as creating a new disaster.

Mr. McNeil also rightfully stated many times over that the company was given 5 years to come up with a plan and that was more than enough time. Not only did the 5 year plan give ample time to Northern Pulp but this wasn't an 'arbitrary date' picked out of thin air. The Jan 31, 2020 Boat Harbour closure date in the Boat Harbour Act also falls on the last day of Northern Pulp's current Industrial Approval.

Northern Pulp were slow to get moving on their attempt to complete the project. When they filed their EARD in February, they stated that they would need an extension 'until they built their ETF or they would have to shut down'.

That ask is for an indefinite extension as Northern Pulp's plan to build an ETF that pumps effluent described by their own technical engineer as being worse than what comes out of Boat Harbour, would set up the risk to move the disaster that is Boat Harbour and make it the disaster in the Northumberland Strait.

They cannot be given an extension. That would break the deal that was made in good faith and written into law between the PLFN and the province that saved Northern Pulp from having to close in 2014. They also cannot be given an extension because they don't have a sound plan for a new ETF so it may never be built. Northern Pulp cannot be given an indefinite extension.

Northern Pulp have been given ample opportunity over their time owning the mill to ensure it runs properly. At some point you have to admit it can't be done.

Thank you for your time,

Westville, NS

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:04:54 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: The new owner has improved air, effluent and odour since 2011 Name: Email: @gmail.com Address: Municipality: Lower branch Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 79 y: 14

From:	
To:	Environment Assessment Web Account
Cc:	
Subject:	Submissions of the Friends of the Northumberland Strait in Response to the call for Public Comments on the Focus Report
Date:	November 8, 2019 6:06:32 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Good evening,

Please see the attached link enclosing comments in regard to the Focus Report for the Replacement Effluent Treatment
Facility Project proposed by Northern Pulp Nova Scotia Corporation.

https://ln2.sync.com/dl/858181470/2htdvp2c-9ghkj6qt-hsrjaesy-dfyi6anz

Please confirm that this link has been accepted by the Environmental Assessment Branch at your earliest convenience. If there should be a technical difficulty, we shall arrange for alternate submission.

Best regards,

| Ecojustice
520-1801 Hollis Street, Halifax, NS B3J 3N4
T: 902-417-1700 | 1-800-926-7744 ext.
F: 902-417-1701

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Submissions of the Friends of the Northumberland Strait in Response to the call for Public Comments on the Focus Report for the Replacement Effluent Treatment Facility Project

Ecojustice
1801 Hollis Street, Suite 520
Halifax, NS B3J 3N4

November 8, 2019

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1. Overview

1. This submission is filed on behalf of the Friends of the Northumberland Strait (FONS). FONS is a society registered under Nova Scotia's *Societies Act* and its members are residents of Pictou and the surrounding area. These materials are filed in response to the call for public comments regarding the Focus Report submitted by Northern Pulp Nova Scotia (NPNS) in respect of the proposed project to build a new Effluent Treatment Facility (ETF or the "project").

2. These submissions are made within the Environmental Assessment (EA) process for the ETF under Nova Scotia's *Environment Act*[1] (the *Act*) and *Environmental Assessment Regulations*[2] (the *EA Regs*). FONS filed its original submissions with Nova Scotia Environment (NSE) and the Minister on February 12, 2019 and March 8, 2019[3], in response to NPNS' original Environmental Assessment Registration Document (EARD) of January 31, 2019.[4] FONS relies on all of these materials in respect of this EA process and asks that all of its submissions and those of other members of the public be properly and thoroughly considered by the Minister prior to making any decisions.

3. FONS' concerns as expressed in its February 12 and March 8 submissions, and the concerns of many other Pictou and area residents, have not been addressed by the Focus Report, and NPNS and its consultants have not cured the fundamental defects in the NPNS EARD materials. The project presents significant environmental effects and adverse effects, and must

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[1] *Environment Act*, S.N.S. 1994-1995, c. 1, Part IV.
[2] *Environmental Assessment Regulations*, NS Reg 26/95 ["*EA Regs*"].
[3] Ecojustice's submissions on behalf of FONS are posted to the Environmental Assessment website of Nova Scotia Environment in four parts:
   1. Part A - February 12, 2019 submission, at https://www.novascotia.ca/nse/ea/Replacement_Effluent_Treatment_Facility_Project/comments/4-Ecojustic-comment-A-part-1.pdf and https://www.novascotia.ca/nse/ea/Replacement_Effluent_Treatment_Facility_Project/comments/5-Ecojustic-comment-A-part-2.pdf
   2. Part B, March 8, 2019 submission, at https://www.novascotia.ca/nse/ea/Replacement_Effluent_Treatment_Facility_Project/comments/6-Ecojustic-comment-B-part-1.pdf and https://www.novascotia.ca/nse/ea/Replacement_Effluent_Treatment_Facility_Project/comments/7-Ecojustic-comment-B-part-2.pdf

[4] NPNS EARD, as posted to the Environmental Assessment website of Nova Scotia Environment, at https://www.novascotia.ca/nse/ea/Replacement_Effluent_Treatment_Facility_Project/.

be rejected. NPNS' proposed mitigations will not prevent harm to the terrestrial and marine environment and to local communities, and will not perform as predicted in the EARD and Focus Report.

4. The process followed by the Minister is flawed and unfair. The Minister and his cabinet have demonstrated a conflict of interest and are biased toward approving this project. The Minister and his predecessor have repeatedly and unfairly limited the public's ability to participate in the process, despite the high level of concern and anxiety regarding this project in the Pictou area, in Nova Scotia, and within the Atlantic Region. The Minister's procedural choices within this EA process have undermined public confidence in the EA process and are contrary to the letter and spirit of the *Act*.

5. The Focus Report package made available to the public was incomplete and the public may never have the chance to comment on some contemplated reports and submissions before the Minister makes his decision. The various processes chosen appear to have been deliberately designed to prevent the public from reviewing and understanding the thousands of pages of technical materials, obtaining advice from experts, and making considered and focused submissions, all of which would have been of benefit to the process and to the Minister in making an appropriate decision. FONS and other interested groups and individuals requested more time for review, but all such requests were rejected by the Minister.

6. As in NPNS's original EARD, the Focus Report once again attempts to characterize the risks of this project as minimal. Some key concerns identified by FONS and others are not discussed at all, despite the clear obligation to address and respond to public concerns under the *Act* and the *EA Regs*.

7. The updated and original receiving water studies put forward by NPNS and its consultants, and the impact assessments based on those studies, are poorly done, fundamentally flawed and unreliable. Dr. Oliver Fringer, an oceanographer and expert in modelling coastal systems, is of the opinion that the Stantec modelling does "not provide science-based evidence that can be used to assess the potential environmental impacts of the near- and far-field dilution from the

proposed outfall site."[5] The Stantec reports overpredict effluent dilution rates and under predict the likelihood of sediment deposition and accumulation, both by significant margins.

8. Inaccurate information and inappropriately selective information is provided about the marine ecosystem, including fish habitat and the fisheries that are conducted there.

9. NPNS' Focus Report was filed before all requirements of its Terms of Reference were completed, although NPNS has known since 2015 that a new ETF would be required and an EA would be triggered. The Focus Report contains omissions, errors and inaccuracies. It neither complies with its Terms of Reference nor satisfactorily addresses the many omissions, information gaps and inadequate assessment in the original EARD. Important baseline studies have still not been done, planning and detailed designs are incomplete, and a number of studies are withheld from public comment. The Minister is once again asked to consider an incomplete set of materials.

10. NPNS' consultants make optimistic predictions that there will be no significant effects from this proposed ETF. As a reality check, the Boat Harbour Basin has been receiving effluent from this pulp and paper mill for over 50 years. The effects of continuous flow of the mill's treated effluent into that ecosystem are devastating and lasting and have negatively impacted generations of members of the nearby Pictou Landing First Nation. The planned cleanup of Boat Harbour will require a massive effort and is estimated to cost over $200 million dollars, all at public expense. It strains credibility to assert that the same effluent, when discharged at a similar rate into a pristine nearby ecosystem within the Caribou Channel, will somehow have no significant impact.

11. The risks associated with this project are significant. Despite two opportunities to do so, NPNS has failed to discharge its burden to show that the project will not cause significant environmental effects or adverse effects, or that any such effects can be mitigated. As discussed in detail below, ample evidence is before the Minister requiring rejection of the

[5] Fringer, O.B., *Review of updated modeling studies by Stantec Consulting for the Northern Pulp effluent treatment facility replacement project*, 5 November 2019 at p. 16, **Appendix A-1** (Fringer update report).

project pursuant to ss 35(3)(d) and 40(c) of the *Act*, as the project is likely to cause adverse effects or significant environmental effects that cannot be mitigated and are unacceptable.

2. Introduction

12. In its original submissions to the Minister in February and March 2019, FONS set out its concerns which had not been addressed by the EARD. Most of these concerns remain unaddressed, as set out in the following list:

(i) The registration materials filed by NPNS are incomplete and do not comply with the requirements of section 9(1A) of the *Environmental Assessment Regulations*. The Project is therefore improperly registered and the current EA process is a nullity.

(ii) The Focus Report, as submitted, does not comply with the Terms of Reference as discussed within this submission;

(iii) All studies identified in the Terms of Reference should have been finalized and included in the Focus Report, in order that the entire Focus Report would be available to enable meaningful public comment and additional time must be granted to allow public comment on the entire Focus Report, once it is finalized;

(iv) The ongoing EA process is inadequate and unfair, as it does not allow the public to assess the large amount of scientific documentation and conduct a comprehensive review of the information contained in NPNS's EA submission and Focus Report, and all comments on each. NPNS failed to hold promised public information sessions, and held back from the public the majority of the scientific studies until registration; requests for more time to review the materials were rejected by the Minister;

(v) The Minister's connection to this project, as a member of cabinet, gives rise to a reasonable apprehension of bias, and renders the process as a nullity;

(vi) The EARD and Focus Report submissions, although lengthy, lack critical information, or sufficient detail, in crucial areas such as:

(a) Studies showing the nature and frequency of process interruptions and disruptions, leaks and spills at the NPNS facility and the impacts of same on effluent composition and effective operation of the proposed ETF;

(b) Studies showing that the proposed ETF, which is not yet constructed, can and will in fact reliably and consistently discharge effluent which will meet any particular parameter, or whether it will meet the parameters which form the basis of the

discussion in the NPNS submission; and that NPNS actually will operate its facility in a manner that achieves the required parameters and in an optimally environmentally sustainable manner;

(c) Studies and analyses regarding mercury issues associated with the project, including methylmercury, mercury and other metals in effluent, and mercury contamination of the NPNS/Canso site;

(d) Full sets of baseline data obtained over full annual cycles and over the entire affected areas for all aspects of the ecosystems that will be affected;

(e) Complete ecosystem studies in relation to the marine and terrestrial environments;

(f) Thorough and accurate modelling to determine mixing capabilities in Caribou Channel and how the effluent will fare as it circulates in the Strait;

(g) Drawings or mapping/chart coordinates and detailed plans showing the precise pipeline route proposed on land, in Caribou Harbour, and in Caribou Channel;

(h) Reliable leak detection for all portions of the pipeline,

(i) Modelling in regard to spills or other accidental events;

(j) Air emissions data from current operations from all stacks and vents; and

(k) Clear, effective and comprehensive mitigation plans, with substance and that take into account actual conditions in the local environment.

The above defects, individually and collectively, show that the NPNS EA and Focus Report materials remain incomplete, are based on inaccurate information and unproven assumptions, and are not supported by credible scientific studies in relevant disciplines.

3. Procedural Issues

13. As stated in FONS March 8, 2019 submission, there is "[…] a duty of procedural fairness lying on every public authority making an administrative decision which is not of a legislative nature and which affects the rights, privileges or interests of an individual."[6]

[6] *Cardinal v Kent Institution,* [1985] 2 SCR 643 at 653.

14. A number of procedural issues have fundamentally compromised the fairness of the environmental assessment process for NPNS' proposed new ETF. Those procedural issues, each of which has been raised with the Minister on previous occasions, are as follows:

    (a) the Minister's reasonable apprehension of bias;

    (b) the insufficient public comment period on NPNS' Focus Report; and

    (c) the Province's failure to make certain portions of NPNS' Focus Report available for public comment.

15. In FONS' submission, each of these issues constitutes a violation of the Province's and/or the Minister's duty of procedural fairness in the context of the ongoing environmental assessment. FONS therefore calls on the appropriate authority to remedy these failings in order to restore the fairness and integrity of the environmental assessment process.

16. The following sections examine each of the three procedural issues identified by FONS in turn.

a) **Reasonable Apprehension of Bias**

17. On February 12, 2019, we submitted a package to both the Minister and the Environmental Assessment Branch on behalf of FONS. In our submission, we asked the former Minister of the Environment, Margaret Miller, to recuse herself from the EA process for NPNS' proposed ETF due to a significant conflict of interest.[7] On March 6, 2019, we received a letter dated March 5, 2019 from the former Minister Miller advising that she would not be recusing herself from the EA process.

18. On March 8, 2019, on behalf of FONS we submitted a package of substantive comments on NPNS' Registration Document for its proposed ETF. In those submissions, FONS maintained its position that the former Minister Miller's involvement in the EA process gave rise to a

[7] FONS' February 12, 2019 submission to the Minister is available on NSE's Replacement Effluent Treatment Facility Project webpage at the following addresses: https://novascotia.ca/nse/ea/Replacement_Effluent_Treatment_Facility_Project/comments/4-Ecojustic-comment-A-part-1.pdf and https://novascotia.ca/nse/ea/Replacement_Effluent_Treatment_Facility_Project/comments/5-Ecojustic-comment-A-part-2.pdf.

reasonable apprehension of bias.[8] FONS therefore continued to call on the Minister to recuse herself in order to maintain public confidence and ensure the integrity of the EA process.

19. Following the conclusion of the first stage of the EA process, additional evidence has come to light about the extensive financial ties between NPNS and the Province, and in particular about the strong financial incentives for the current Minister to approve the proposed ETF.

20. In the recently decided *Pictou Landing First Nation* case, the Nova Scotia Court of Appeal (NSCA) identified an Agreement and an Amendment between NPNS and the Province that provide for reimbursement by the Province to NPNS for engineering, design, and environmental assessment expenses for the new ETF. The Agreement is dated December 28, 2016, and the Amendment is dated September 27, 2017. In conjunction, the Agreement and the Amendment provide that the Province will reimburse NPNS for "Eligible Expenses," including reasonable costs for the design and engineering of the new ETF (up to $300,000) and the EA (up to $250,000) and "other costs approved by the Province in writing."[9]

21. The NSCA also noted that the Province and NPNS signed a second agreement on December 13, 2017. That agreement provided that the Province would reimburse NPNS' detailed design and engineering costs for the new ETF, up to a maximum of $8 million. Under the December 13, 2017 agreement, the Province can choose to use any contribution it makes to NPNS under the terms of the agreement to offset any future award NPNS may be granted for damages against the Province.[10] It appears that the Province is particularly concerned about potential compensation owed to NPNS as a result of the statutorily mandated closure of the Boat Harbour ETF.[11]

22. The December 28, 2016 and December 13, 2017 agreements, and the September 27, 2017 amendment will be referred to herein as the "**Funding Agreements**."

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[8] FONS's March 8, 2019 comments on the Registration Document are available on NSE's Replacement Effluent Treatment Facility Project webpage at the following addresses: https://novascotia.ca/nse/ea/Replacement_Effluent_Treatment_Facility_Project/comments/6-Ecojustic-comment-B-part-1.pdf and https://novascotia.ca/nse/ea/Replacement_Effluent_Treatment_Facility_Project/comments/7-Ecojustic-comment-B-part-2.pdf.

[9] *Nova Scotia (Aboriginal Affairs) v Pictou Landing First Nation*, 2019 NSCA 75 at para 44 ["***PLFN***"].

[10] *Ibid.*

[11] *Ibid.*

23. The NSCA commented on the impacts of these Funding Agreements on the Minister's decisions to issue approvals for the new ETF under Parts IV and V of the *Environment Act* (which include the Minister's decision to approve or reject the new ETF following the current environmental assessment). The Court wrote as follows:

> 136 […] the Funding Agreements inject their own incentives into the process of ministerial approval.
>
> 137 Those incentives include the following:
>
> • Provincial funds have already been paid, with more to come, toward the design, engineering, environmental assessment or capital cost of the New ETF. Without the ministerial approvals, the Province's payments would be wasted, The New ETF would not operate. Ministerial approvals are needed for the Province's investment to be productive.
> • The Funding Agreements say the Province "approves" the items of design, engineering and environmental assessment before paying Northern Pulp. Once the Province approves under the Funding Agreement, would there be an about-face that denies approval under the *Environment Act*? Likely, the contractual approval would facilitate the statutory approvals. In the past, the Province has contracted to give approvals for a new ETF. The 1995 [Memorandum of Understanding], articles 4.01(k) and (l), said the Province would "obtain all required…approvals…for the continued operation of the Reconfigured Facility." In 2008, the Province signed an acknowledgement that this provision would continue to benefit Northern Pulp. […]
> • The Funding Agreements embody partial terms of settlement of a threatened lawsuit by Northern Pulp against the Province for early termination of the Lease. A settlement is meaningful only with ministerial approvals under the *Environment Act.* The approvals would allow the Mill to operate toward the expiry date of the terminated Lease, reducing Northern Pulp's claimed damages. Denial of approval could leave Northern Pulp's alleged losses mostly intact, subject to issues of mitigation, for pursuit in litigation against the Province. The Minister might consider an avoided lawsuit to be beneficial for the Province. [12]

24. In light of the NSCA's findings, and in alignment with its previous submissions on this issue, FONS maintains its position that the Minister's role in the EA process for NPNS' proposed ETF gives rise to a reasonable apprehension of bias. As a result, FONS repeats its call for the Minister to recuse himself from the EA in order to restore public confidence in the process.

[12] *Ibid,* at paras 136-137.

b) Insufficient time for public comment on the Focus Report

25. On October 10, 2019, we wrote to Minister Wilson on behalf of FONS to request that he grant additional time for both the public and the Administrator to review NPNS' Focus Report.[13] Specifically, FONS requested that the Minister:

    (a) Grant additional time for the submission of public comments on the Focus Report, with a new deadline of Monday, December 9, 2019; and

    (b) Add 30 more days to the 25-day period within which the Administrator must submit all comments and a recommendation to the Minister, following the deadline for public comments.

26. The current public comment period is exactly 30 days, running from October 9, 2019, the date on which NSE announced receipt of the Focus Report in the Nova Scotia Gazette.[14] This is the minimum public comment period required by the *Regulations.* The Minister has the authority to grant both extensions requested by FONS, pursuant to ss 16(2) and 17(2) of the *Regulations,* respectively, if the default timelines are insufficient for public comment or the Administrator's review.

27. Following the Minister's receipt of FONS' letter, the Minister made comments in the media indicating that he would not grant the requested extensions.[15] However, he did not respond directly to FONS.

28. On October 23, 2019, we wrote to the Minister on FONS' behalf once again to request a response to our letter of October 10.[16] We received a reply from the Minister denying our requested extensions that same day.[17]

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[13] Letter from James Gunvaldsen Klaassen and Sarah McDonald to the Honourable Minister Gordon Wilson, dated October 10, 2019, **Appendix E-1**.
[14] Release of Focus Report Pursuant to the Nova Scotia *Environment Act,* (2019) NS Gaz I, 1529, **Appendix E-2.**
[15] Michael Gorman, "Minister not considering extension to comment period on Northern Pulp report," CBC News, October 10, 2019, **Appendix E-3**; Taryn Grant, "More time needed for review of Northern Pulp pipeline proposal: community group," The Star, October 10, 2019, **Appendix E-4**.
[16] Letter from James Gunvaldsen Klaassen and Sarah McDonald to the Honourable Minister Gordon Wilson, dated October 23, 2019, **Appendix E-5.**
[17] Letter from the Honourable Minister Gordon Wilson to James Gunvaldsen Klaassen, dated October 23, 2019, **Appendix E-6**.

29. Without prejudice to its submissions on the Minister's bias, FONS maintains its position that the Minister should extend the timelines for both public review and comment on the Focus Report, and for the Administrator to review the various submissions and provide a recommendation to the Minister. FONS reiterates the concerns expressed in its October 10, 2019 letter about the volume, complexity, and highly technical nature of the materials that the general public is now tasked with reviewing within a very short timeframe. A 30 day comment period is entirely insufficient to allow the general public to review, understand, and provide thoughtful comments on thousands of pages of complex, technical scientific materials. Indeed, the former Minister Miller herself echoed that concern when NPNS filed its original registration document.[18]

30. In addition, as reviewed in detail in FONS' February 12, 2019 submission to Minister Miller, the proposed ETF is highly controversial and has generated high levels of public interest and concern within the Pictou area and across Nova Scotia. As a result, it is all the more important to ensure that the public has ample time to review the Focus Report, the EARD, the many comments offered on the EARD, including government responses and determine how to respond, and what to say. Without adequate time, there is no meaningful opportunity for either the public or the Minister to understand the potential impacts of the proposed ETF on their communities and on Nova Scotia's environment and economy.

31. The Terms of Reference for the Focus Report recommended that NPNS engage with relevant stakeholders and share relevant studies and reports in the process of preparing its Focus Report. However, our understanding is that NPNS shared nothing with FONS or with numerous other affected groups who have consistently expressed strong concerns about the proposed ETF before submitting the various studies comprising its Focus Report *en masse* to the Province. This approach created additional and entirely unnecessary barriers to meaningful public participation in the EA process.

[18] Jean Laroche, "Northern Pulp's plans for pipeline, effluent treatment plant now public," CBC News, February 7, 2019, **Appendix E-7**.

32. FONS therefore renews its call on the Minister to extend the timelines as requested in its October 10, 2019 and October 23, 2019 letters, in order to restore fairness and integrity to the current EA process.

c) Failure to provide documents for public comment

33. In the October 10, 2019 and October 23, 2019 letters to the Minister, FONS identified the following documents as missing from the Focus Report posted on the NSE website:

    (a) Appendix 7.2 – states it includes as Appendix A an "Underwater Benthic Habitat Survey Video." However, no such video or link to any such video appears in this Appendix or elsewhere in the Focus Report.

    (b) Appendices 10.1 and 10.2 both refer to reports which are not provided.

    (c) Appendix 11.1 refers to a Mi'kmaq Ecological Knowledge Study but no such study is included in this Appendix or elsewhere in the Focus Report.

34. FONS letter went on to say: "[…] it is unclear as to whether reports are intended to be included, or submitted late, under Appendices 3.3, 3.5, 5.2, 6.1 and 7.5 of the Focus Report. If any such report will be submitted for your consideration, it must also be made available for public comment prior to any decisions being made […]".

35. The Minister did not address FONS' submission about these missing documents in any way in his comments to the media following the October 10, 2019 letter, or in his written response to the October 23, 2019 letter.

36. Jill Graham-Scanlan, president of FONS, has also corresponded with NSE's environmental assessment department via email about additional information missing from the Focus Report. On October 16, 2019, Ms. Graham-Scanlan sent two emails to EA@novascotia.ca noting the following errors and omissions:[19]

[19] Email chain between Jill Graham-Scanlan and the Environmental Assessment Web Account, dated October 23, 2019, **Appendix E-8**; Email chain between Jill Graham-Scanlan and the Environmental Assessment Web Account, dated October 24, 2019, **Appendix E-9**

(a) The Focus Report does not include information that would allow the public to determine whether the "fish and fish habitat baseline surveys for the freshwater environment" and "fish habitat baseline surveys for the marine environment" were completed to the satisfaction of Fisheries and Oceans Canada, as required by the Terms of Reference;

(b) The Focus Report does not include details of the assessment methodology for additional impact assessment of treated effluent on representative key marine fish species agreed upon by NSE in consultation with relevant federal departments, as required by the Terms of Reference; and

(c) A number of Figures in the Focus Report are blurry, and therefore partially illegible, both in the online version and in the hardcopy at the Pictou Library.

37. NSE did not address these errors and omissions in response to Ms. Graham-Scanlan's concerns. Shockingly, in one response NSE stated that "[t]he NS EA process does not include a conformity review or other check that the Focus Report contains all of the items listed in the Terms of Reference." This is in clear contrast to the press release NSE posted online upon receipt of the Focus Report, which stated that "[t]he report will be available online within 14 days once department staff have done a preliminary check to confirm it is complete."[20]

38. NSE's failure to ensure that the complete Focus Report was made available for public comment clearly undermines the public's ability to participate meaningfully in the EA process. NSE requested this information from NPNS because it is necessary in order to fully understand the potential impacts of the proposed ETF. If the public cannot understand the potential impacts on their communities and environment, then they cannot provide fulsome comments and the integrity and fairness of the EA process is compromised.

39. As a result, and without prejudice to its position on the Minister's bias, FONS calls upon the Minister to make the missing documents available to the public and to provide additional time for the public to review and comment on those documents. FONS notes that the Province's failure to make the complete Focus Report available for public comment at the outset further

[20] NSE news release, "Northern Pulp Focus Report Submitted," October 2, 2019, **Appendix E-10**.

supports FONS' request for the Minister to extend the timelines for review under the *Regulations,* as outlined in the previous section.

4. Effluent and Sediment Transport Modelling

40. The modelling exercise conducted by Stantec, NPNS' consultants, is summarized in the set of receiving water studies contained in the original EARD. For the Focus Report, Stantec conducted a further modelling exercise and summarized those conclusions in an "Updated Receiving Water Study", dated September 27, 2019.[21] The findings of the full set of receiving water studies, including the Updated RWS, are fundamental to the overall and entirely questionable conclusion that none of the impacts of any aspect of this project will be significant. The accuracy and reliability of the modelling exercise is essential for a fulsome and in-depth evaluation of the project. If the modelling is not reliable, many of the conclusions asserted by NPNS' other consultants in relation to marine impacts and water quality will likewise be unreliable.

41. Stantec's central premise is that all contaminants will be quickly diluted. Stantec relies heavily on the questionable mixing zone concept as discussed below.

42. The Stantec Receiving Water Studies, on which much of the NPNS EA is founded, are unreliable and fundamentally inaccurate. The modelling exercise undertaken was not appropriate for the receiving environment and is not an accurate representation of effluent and sediment interaction with that environment. FONS submits that the Receiving Water Studies, and other materials based on the conclusions of those studies, must be disregarded and no assessment of environmental effects can be undertaken based on those studies.

43. FONS relies on the critique of the Receiving Water Studies prepared by Dr. Oliver Fringer. Dr. Fringer is an Associate Professor (with tenure), Department of Civil and Environmental Engineering, Stanford University. He is an oceanographer with expertise in numerical modelling of coastal dynamics.[22]

[21] Appendix 4.2, Focus Report.
[22] Oliver Fringer, CV, **Appendix A-3**

44. Dr. Fringer's original report regarding the Stantec Receiving Water Studies was submitted within the FONS submission of March 8, 2019.[23] We have again appended it to this submission. Dr. Fringer has also prepared a new report, which critiques Stantec's updated Receiving Water Study.[24] Dr. Fringer's reports speak for themselves and should be read together. We hereby submit them to the Minister for a detailed and thorough review. FONS submits that Dr. Fringer's two reports in combination make clear that all effluent modelling work done for NPNS in relation to this project is defective and unreliable, and all conclusions based on that modelling must be discounted and disregarded.

45. Dr. Fringer notes that his concerns regarding Stantec's original modelling work were not addressed within the updated receiving water study and the same flaws inherent in the original Stantec studies were carried forward into the updated study.

46. Dr. Fringer concludes that the updated studies prepared by Stantec based on the MIKE 21 and CORMIX system models are both inaccurate and misleading. They do not provide science-based evidence that can be used to assess the potential environmental impacts of the near- and far-field effluent dilution from the proposed outfall site.

47. The problems with these models arise from deficient modelling practices that Dr. Fringer criticized in his original report but were not addressed in the new studies. Dr. Fringer concludes that the Stantec studies suffer from fundamental problems associated with model setup, validation and analysis. Despite some additional measurements obtained in early summer 2019, the validation of the currents near site CH-B indicates that the Stantec model performs poorly and cannot be trusted to accurately predict the far-field transport of the effluent.

48. The models fail to take into account the stratification within the water column, which prevents the total mixing assumed by both the near-field and far-field modelling exercise. Stantec's near and far field models therefore over-predict mixing and dilution of effluent.

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[23] Fringer, O.B., *Review of near- and far-field modeling studies by Stantec Consulting for the Northern Pulp effluent treatment facility replacement project*, 7 March 2019 **Appendix A-4**

[24] Fringer, O.B., *Review of updated modeling studies by Stantec Consulting for the Northern Pulp effluent treatment facility replacement project*, 5 November 2019 **Appendix A-1** (Fringer update report)

49. Dr. Fringer finds that Stantec significantly overestimates the dilution by at least a factor of 3.5 based solely on its selection of parameters regarding effluent and receiving water density.[25] If different parameters are used, the dilution factor at 100 m from the diffuser is only 42, and not the much higher figures used by Stantec.[26] Dr. Fringer further concludes:

> This dilution factor is expected to be even lower when taking into account the effects of vertical density stratification, weaker slack currents during neap tides, and receiving water densities that should be at their lowest during late summer/early fall.[27]

50. Dr. Fringer's report also critiques the sediment transport report prepared by Stantec at Appendix 4.3. Dr. Fringer concludes that the sediment transport study is fundamentally flawed because it ignores the effect of flocculation and fails to use MIKE software designed for sediment transport modelling. Had Stantec accounted for flocculation, it would have concluded that solids within the effluent would deposit and accumulate much more rapidly and much closer to the outfall. Dr. Fringer finds:

> …owing to the use of floc diameters that are too small, and because the settling velocity is proportional to the square of this diameter, the settling velocities are vastly underpredicted and the resulting transport distances are substantially overpredicted. Substantially more flocculated effluent particulate matter will accumulate around the outfall….[28]

> The second flaw of the sediment transport study is that it is overly simplistic. The tidal currents are highly variable in the region in both space and time, and it is naïve to imply that the suspended particulate matter in the effluent will not pose an environmental or ecological problem based simply on an approximate distance it is expected to propagate away from the outfall. Not only do we expect flocculation to promote particle settling in the vicinity of the outfall, but the particles that settle far from the outfall may accumulate in sensitive fisheries habitats in deeper water or in Caribou Harbour.[29]

[25] The parameters selected by Stantec do not match the trends shown by sampling results within Appendix 2.3. And where there is a range of results in 4.3, density and salinity factors most favourable to a higher level of dilution is selected, without explanation or justification.
[26] Fringer update report, at pp .14 and 18.
[27] Fringer update report at p 1. See also pp 10-13.
[28] Fringer update report pp 15-16.
[29] Fringer update report p. 16.

51. Stantec fails to assess the potential for fine particulate matter to accumulate within Caribou Harbour or other ecologically sensitive sites in the region.[30] Likewise, Stantec's statements that no effluent buildup will occur within Caribou Harbour are in doubt. Dr. Fringer writes:

> It is noted that "no effluent concentration buildup was found in the harbour basins, along the shorelines and in the entire model domain."[31] There is no scientific justification for this statement. Not only do the figures show buildup of effluent along the shorelines and signatures of effluent entering Caribou Harbour, but it is straightforward to compute the exact amount of effluent entering the harbour with the MIKE 21 model.[32]

52. In respect of winter scenario modelling, the report says:

> The winter scenario models ice cover simply by removing winds and waves, yet ice cover should be modeled with reduced tidal currents at the model boundaries and higher friction at the free surface. Improper ice modeling leads to an overprediction of the near- and far-field dilution.[33]

53. Dr. Fringer also finds that the modelling done by Stantec in relation to the existing Boat Harbour Facility is unreliable and incapable of being simulated accurately within the two-dimensional model used by Stantec.[34]

54. Based on the above and Dr. Fringer's detailed findings and analysis, the Stantec reports must be viewed as fundamentally unreliable, and an inappropriate tool to assess the effectiveness of the dilution of effluent, proposed as the main mitigation measure in relation to impacts on the marine environment.

55. Contrary to Stantec's assertions, it is therefore likely that there will be effluent buildup within Caribou Harbour and sediment deposition near the outfall. The effluent will not dilute to the degree asserted by Stantec, making the proposed mitigation ineffective. The proposed effluent discharge at the outfall will therefore present significant environmental effects and adverse effects for which no effective mitigation is proposed.

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[30] Fringer update report, pp 17-18.
[31] Dr. Fringer is quoting from p ii of the executive summary of the Stantec Updated Receiving Water study, Focus Report, Appendix 4.2.
[32] Fringer update report, at p. 9.
[33] Fringer update report, at p. 2 – see also p. 9.
[34] Fringer update report at p. 17.

5. Modelling and Marine Impact assessment

56. NPNS's consultant, Ecometrix, provided a report on its conclusions as to impacts on the marine environment and marine species.[35] The Ecometrix report relies heavily on the findings of the Stantec receiving water studies, including the last study which is dated September 27, 2019. Consequently, to the extent Ecometrix based portions of its report on unreliable or incorrect findings made by Stantec, then those Ecometrix findings must also be considered unreliable or wrong.

57. Ecometrix did not record any independent assessment or evaluation of Stantec's conclusions, but nonetheless carries them forward into the Ecometrix report. The timing of the two reports shows that, within 3 days of receiving the Stantec report, Ecometrix produced its own report which repeats Stantec's conclusions. Like Stantec, Ecometrix makes no allowance for error in respect of the modelling conclusions. Neither mentions Dr. Fringer's report and critique dated March 7, 2019, which seriously questions the reliability of the fundamentals of Stantec's work on the initial Receiving Water Studies and the accuracy of Stantec's predictions.

58. Stantec's fundamental conclusion is that all contaminants and other effluent substances will quickly dilute, within a few metres of the diffuser. Ecometrix's Marine Environment Impact Assessment (Table 4-6) characterizes the dilution effect as a "proposed mitigation", described as: "[t]he diffuser configuration promotes rapid mixing of effluent to minimize the spatial extent over which constituent concentrations are expected to be distinguishable from "background" or ambient conditions."[36] Once diluted, neither Stantec nor Ecometrix considers any effluent component to present any significant concern or risk, including by way of bioaccumulation and concentration within food chains. Underlying Ecometrix's report is the notion that dilution renders all contaminants as essentially benign despite their continuous flow into Caribou Channel, the Strait and beyond. Determining impacts to marine ecosystems and organisms is therefore mostly a mathematical exercise, dependent on dilution rates.

[35] Focus Report, Appendix 7.3.
[36] Ecometrix Report, at, for example p. 4.31 (see column under the heading "proposed mitigation").

59. As discussed above, Dr. Fringer's expert opinion is that the Stantec models are fundamental defective and unreliable. If Stantec is incorrect, Ecometrix's conclusions and predictions must also be in doubt. Some of Ecometrix's conclusions that rely on Stantec modelling are:

(i) Definition of study areas - the Marine Local Assessment Area (LAA) and the Regional Assessment Area (RAA) - in terms of Stantec's predicted dilution factors i.e areas which are predicted to be exposed to relative effluent concentrations exceeding 1% and those predicted to be lower than 1%;[37]

(ii) Assumption that effluent dispersion in winter is very similar to summer;[38]

(iii) Dilution ratios set out in table 4-4;[39]

(iv) Calculation of distances from the diffuser at which each substance reaches "ambient condition" per Table 4-3; [40]

(v) There will not be a requirement to conduct a fish community or benthic community study as part of an Environmental Effects Monitoring study[41] under the *Pulp and Paper Effluent Regulations*;[42] and,Purported impacts (or no impacts) on marine species, including Atlantic herring,[43] Rock crab,[44] American lobster,[45] Marine shellfish,[46] plankton,[47] and benthic invertebrates.[48]

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[37] Ecometrix Report, page 2.4, Appendix 7.3.
[38] Ecometrix Report, page 4.12, Appendix 7.3. "As shown by MIKE 21 2D modelling presented in Stantec (2019c), effluent dispersion in winter is very similar to summer."
[39] Ecometrix Report, "Table 4-4: Dilution Ratios at Distance"; page 4.15, Appendix 7.3.
[40] Ecometrix Report, "Table 4-3: Marine Water Quality COPCs and Estimated Dilution"; page 4.13, Appendix 7.3.
[41] Ecometrix Report, p. 5.3, Appendix 7.3.
[42] *Pulp and Paper Effluent Regulations*, SOR/92-269, Schedule IV.1, s. 3.
[43] Ecometrix Report, p. 420 and p. 4.25, Table 4-6, "Significance Determinations of Residual Effects after Mitigation on the Marine Environment VEC", Atlantic herring, Appendix 7.3.
[44] Ecometrix Report, Table 4-6, "Significance Determinations of Residual Effects after Mitigation on the Marine Environment VEC", Rock crab, page 4.27, Appendix 7.3.
[45] Ecometrix Report, Table 4-6, "Significance Determinations of Residual Effects after Mitigation on the Marine Environment VEC", American lobster, page 4.29, Appendix 7.3. "Effects are considered to be minor and encompass a small area within 5 m of the diffuser area."
[46] Ecometrix Report, Table 4-6, "Significance Determinations of Residual Effects after Mitigation on the Marine Environment VEC", shellfish, page 4.31, Appendix 7.3.
[47] Ecometrix Report, Table 4-6, "Significance Determinations of Residual Effects after Mitigation on the Marine Environment VEC", plankton, page 4.32, Appendix 7.3.
[48] Ecometrix Report, Table 4-6, "Significance Determinations of Residual Effects after Mitigation on the Marine Environment VEC", benthic invertebrates, page 4.34, Appendix 7.3.

60. The Ecometrix report provides little assessment as to what will happen to individuals of marine species that come into contact with effluent discharging from the diffuser. Based on Stantec's modelling, Ecometrix treats the "mixing zone" as a small area, and mostly concludes that the effluent will dilute quickly and any contact with marine organisms will be fleeting.[49]

61. This conclusion is reached despite the reality that an average of 65 million litres of effluent will be discharged at the site each day, amounting to 23.7 billion litres a year. At that rate, over 30 years of operation, the total effluent discharge will be 711 billion litres. As stated above, there is no indication that any testing was conducted to assess impacts of such discharges over time on marine species at all life stages, despite the nature of the ecosystem being examined and the concerns raised by the public as to potential toxicological effects of the effluent on the ecosystem. In this regard, Ecometrix simply states:

> To address these concerns, NPNS will continue to investigate the feasibility of performing toxicity testing to determine both potential acute and sublethal effects on immature stages of lobster and herring.

62. "Investigating the possibility" of doing such a test does not satisfy the requirement to consider and assess the potential risks to lobster and herring from this project. NPNS has chosen to leave this requirement unsatisfied.

<u>Further potential errors in with application of the dilution rates</u>

63. The information provided by NPNS' consultants in Table 7.3-1[50] of the NPNS Focus Report, appears to contain significant internal errors, in addition to being based on the erroneous predictions from the Stantec modelling exercise. The table purports to set out the distances by which each parameter in the effluent will reach "ambient conditions".

64. The right hand column of the table is clearly erroneous. That column, entitled "distance from diffuser ambient conditions are reached", says, for the most part, that concentrations of various effluent components will reach ambient conditions <u>within less than 2 m</u> of the diffuser. A quick look at the table shows that this is obviously not true. As the most glaring example,

[49] Ecometrix Report, page 4.20, Appendix 7.3.
[50] Table 7.3-1: Marine Water Quality COPCs and Estimated Dilution, Focus Report p. 138.

Mercury is shown not to be present in seawater in either 2018 or 2019. As it is contained in the effluent entering the seawater at the diffuser, those concentrations will be at 0.028 µg/L[51] 5m from the diffuser and the same at 100m. Yet the right hand column concludes that it will reach ambient conditions (of 0 µg/L) within 2m of the diffuser. It cannot reach 0 µg/L at 2m if it is still at 0.028 µg/L at both 5 m and 100 m. Moreover, it shows that it still exceeds the CWQG guideline of 0.016 even at 100m.

65. As another example, ambient concentrations for cadmium were measured at n/a in 2018, and 0.084 µg/L in 2019. The table says that the effluent discharge of 1.03 µg/L will reach ambient conditions by "<2m", but shows that by 5 m it has only reached 0.1 µg/L, and only reaches 0.084 µg/L by 100m. Obviously, if the ambient concentration for cadmium is n/a, then it has not reached ambient conditions even by 100m and certainly not <2m The <2m prediction is therefore not even borne out by the modelling result presented, yet it is the conclusion given in the Dillon table.

66. The table lists measurements of Caribou seawater from 2018 and 2019 and the concentrations vary from one year's measurement to the other. It is important to note that there are only a couple of measurements for each year, and no attempt was made to conduct an intensive sampling program to obtain a full set of measurements over one or more annual cycles.

67. But despite this very limited data set, Dillon consistently selects the higher level of concentrations as ambient conditions. There is no discussion as to why one is chosen over the other. Rather than attempting a balanced and neutral analysis, the table consistently uses the highest level of a particular parameter, even though a lower level was measured in another year. Again, repeating the cadmium example, measured ambient concentrations for cadmium were measured at n/a in 2018, and 0.084 µg/L in 2019. Yet 0.084 is used as the ambient condition, even though it was not measured at all in 2018. No explanation is provided as to why 0.084 was selected.

[51] Micrograms per litre

6. Canso chemical site and mercury contamination

68. In its March 8, 2019 submission FONS identified mercury contamination present on the NPNS property in close proximity to the proposed site for the ETF and its potential to be disturbed via construction activities.[52] FONS provided a report by Dr. Margaret Sears describing the basis for the concerns and the adverse environmental effects that can be caused by mercury contamination.[53] As shown by Appendix 1.1, many members of the public expressed similar concerns.[54]

69. FONS also provided supporting technical materials documenting the risks and known problems with mercury contamination on the NPNS/Canso Chemicals site.[55] In a Canso site decommissioning report dated January 26, 2000, Dillon consulting concluded that mercury was present in the bedrock at the site[56] and there was "potential for mercury to migrate and discharge to Pictou Harbour in the future."[57]

70. Neither the Focus Report nor the original EARD contains any discussion or assessment of this risk in connection with the proposed ETF project, or provides any mitigation measures. In response to the numerous concerns raised regarding site mercury contamination, NPNS' report only says: "Monitoring will be conducted as part of construction. Contingency plans will be in place to address contaminant if identified."[58]

71. This approach is not acceptable as the Minister must consider, *inter alia*, the "potential and known adverse effects or environmental effects of the proposed undertaking...[.]" [59] This must be done before the work commences, not after it has proceeded and a foreseeable problem has been encountered. One would expect to see an identification of the risks, delineation of the contamination, and the steps that are proposed to avoid and mitigate the risk.

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[52] FONS submission, March 8, 2019, at p. 29 and Appendices F-1 and H-2; Dr. Margaret Sears, *Comments regarding the Northern Pulp Nova Scotia Environmental Assessment Registration Document, Replacement Treatment Facility*, March 8, 2019 (Appendix F-1). Partial decommissioning report for Canso site (Appendix H-2).
[53] Dr. Sears' report, at p. 4 (Appendix F-1).
[54] Focus Report, Appendix 1.1, Public Comments, for example at pp. 20 and 122 of 125.
[55] Canso Chemicals Site materials, FONS submission, March 8, 2019, Appendix H-2.
[56] Canso Chemicals Site report, p. 35, FONS submission, March 8, 2019, Appendix H-2.
[57] Canso Chemicals Site report, p. 37, FONS submission, March 8, 2019, Appendix H-2.
[58] Focus Report, Appendix 1.1, Public Comments, for example at pp. 20 and 122 of 125.
[59] *EA Regulations*, ss 9(1A)(b)(vi) and 12(e).

72. As Dr. Sears says, gathering information and conducting analysis relating to the Canso site mercury issue should be an essential component of the EA process.[60] However, its potential impacts have not been assessed and no information has been provided regarding mercury contamination at the site. Despite advance knowledge of mercury contamination, NPNS proposes only to wait and see if any mercury is encountered while the project is underway, without assessing any associated risk within this EA process prior to beginning the work. Without any information and evaluation regarding mercury contamination, an EA cannot be conducted and the obligation to consult Indigenous peoples and the public has not been discharged.

73. Consequently, the project description and assessment cannot be considered complete and NPNS's proposed ETF must be rejected.

7. Failure to conduct primary studies and obtain baseline data

74. As discussed above in the context of site mercury contamination, the *EA Regs* require that NPNS provide environmental baseline information in respect of its proposed project.[61] Despite this requirement, as discussed in FONS' March 8, 2019 submission, in many cases NPNS did not provide such information when it submitted its original EARD. The subsequent Terms of Reference for the Focus Report provided NPNS with another opportunity to submit baseline information. As one example, paragraph 7.2 of the Terms of Reference requires NPNS to:

> 7.2 Conduct fish habitat baseline surveys for the marine environment, to the satisfaction of Fisheries and Oceans Canada.

75. However, in its Focus Report, while NPNS asserts that its current evaluation regarding the benthic community is comprehensive, it then suggests that more information will be gathered in the area of the effluent diffuser in fall 2019 to supplement the existing database.[62] It also appears to concede that it has not achieved a baseline for phytoplankton and zooplankton presence, diversity and relative abundance.[63] No information has been provided to the public

[60] Dr. Sears' report, at p. 4 (Appendix F-1).
[61] *EA Regulations*, ss 9(1A)(b)(x) and 12(da).
[62] Focus Report, p. 126.
[63] Focus Report, p. 126.

as to whether any surveys were conducted to DFO's satisfaction. Consequently, it appears that the requirement to provide comprehensive baseline information has not been met.

76. As well, paragraphs 7.3 and 9.1 of the Terms of Reference require:

> 7.3 Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries.
>
> 9.1 Complete baseline studies for fish and shellfish tissue (via chemical analysis) of representative key marine species important for commercial, recreational and Aboriginal fisheries in the vicinity of the proposed effluent pipeline and diffuser location.

77. While Appendix 9.1 shows some limited testing was done in September 2019, many more species have yet to be tested.[64] No testing of juvenile or larval stages was apparently conducted, even though, in its original EARD at Appendix H, Ecometrix stated that the environmental effects monitoring program would include toxicity testing to determine both potential acute and sublethal effects of effluent on immature stages of lobster and herring.[65] Despite the requirements of paragraph 7.3 of the Terms of Reference, Ecometrix's most recent report appears to indicate that no toxicity testing was done, and that NPNS is now only "considering" doing such testing.[66] It is submitted that a complete set of such tests is necessary baseline information and without a full set of tests, the Focus report is incomplete and does not satisfy the Terms of Reference.

78. Moreover, the limited testing conducted thus far provides no assurance that effluent exposure at any concentration and duration is benign for lobster, herring, rock crab or other species, at all life stages. Until comprehensive test results are available, such effects cannot be reliably assessed and the Minister will not be in a position to evaluate the risks of effluent exposure during the full life cycle of marine organisms.

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[64] Focus Report, Appendix 9.1, p. 2.
[65] NPNS EARD, January 2019, Appendix H, at p. 2.1.
[66] Ecometrix Report, p. 5.4,

79. FONS further states that the area within which the surveys were conducted appears to be relatively small, and was confined to the immediate area of the proposed pipeline corridor and diffuser location. It also appears that the Terms of Reference unduly narrowed the area in which baseline information was to be gathered. Even according to the Stantec predictions, diluted effluent will still be present in the wider area surrounding the immediate location of the diffuser. Consequently, appropriate baseline data should have been gathered beyond the pipeline corridor and diffuser location.

80. As well, the baseline data gathered represents only one point in time, and is not being conducted over a full year cycle. As effluent will be discharging year round, the full impacts of same cannot be measured against baseline data taken only in one small window of time.

81. Included with FONS March 8, 2019 was a commentary by Arthur MacKay.[67] Mr. MacKay is an experienced fisheries biologist and consultant.[68] He recommended that at least 12 monthly surveys should be conducted in order to establish a clear baseline.[69] While the Minister provided NPNS with ample time to gather significantly more baseline information, it is clear that no such comprehensive baseline has been established. No explanation is provided to explain the failure to use the allotted time to gather this crucial information.

82. FONS therefore submits that the requirement to gather baseline data in relation to the marine environment, fish and fish habitat has not been satisfied.

8. Herring Spawning, Fisheries and Mixing Zones

83. When responding to the original EARD, FONS[70] and many other groups and individuals raised a major concern regarding the impacts of NPNS's effluent discharge on herring spawning.[71] More specifically, the proposed outfall will discharge an average of 65,000,000 litres of treated effluent each day into one of the last remaining herring spawning grounds in the Southern Gulf

[67] MacKay, A.A., *Northern Pulp's Effluent Disposal Plans – Issues and Answers*, February 2019 (MacKay report)(Appendix C-1)
[68] Art MacKay cv (Appendix C-1).
[69] MacKay report, p. 3 (Appendix C-1).
[70] FONS March 8, 2019 submission, at pp.
[71] Focus Report, Appendix 1.1 – Concordence [sic] Table [get references to comments]

of St. Lawrence.[72] The discharged effluent will contain Persistent Organic Pollutants, as discussed further below in relation to Dr. Cameron's report.

84. The Minister directed NPNS to respond to all comments raised by the public. The Concordence [sic] Table at Appendix 1.1 of the Focus Report package records many concerns being expressed about impacts to herring spawning. In virtually every case, NPNS's response to this concern is "[r]efer to section 7.3 for comments concerning the impact assessment of treated effluent on representative key marine fish species."

85. However, section 7.3 of the Focus Report makes no mention of herring spawning. Appendix 7.3, on which section 7.3 is based, refers only twice to herring spawning, and makes no attempt to assess impacts on spawning.[73] The reference to herring spawning appears in table 3-10 of Appendix 7.3.[74] The entry from table 3-10 relating to Atlantic Herring is set out below:

Occur-rence	**Group**	**Com-mon Name**	**SARA**	**COSEWIC**	**Likely Occur-rence in LAA***	**Notes**	**CRA Fishery ?**
Pelagic	Migra-tory	Atlantic Herring	No Status	No Status	High	Migratory and passing through the LAA to spawning areas, limited spawning habitat within the LAA	Yes

86. Beyond this entry, and a virtually identical entry in Appendix D,[75] nothing in Appendix 7.3 or the Focus Report establishes where herring spawning takes place and how that relates to the outfall. The sparse information included in the table simply confirms the clear evidence from the fishers that NPNS proposes to place the outfall and the LAA inside a herring spawning area.

[72] FONS March 8, 2019 submission at Appendix B-1- Egilsson, G., and MacCarthy, A., Caribou Harbour and Caribou Channel - dynamics, tides, ice, marine species and fisheries, February 21, 2019 (Appendix B-1).
[73] Focus Report Appendix 7.3.
[74] Table 3-10: Potential Fin Fish Species in the RAA, Focus Report Appendix 7.3, p. 3.31. See also p. 3.33.
[75] "Appendix D: Marine Fin-Fish Species Status, Occurrence, Habitat and Resource Use", Appendix 7.3, last page of table (pages not numbered).

87. An excerpt from a May 2018 DFO report states:

> Fall spawning occurs from mid-August to mid-October at depths of 5 to 20 m. Herring also show high spawning site fidelity. In recent years, the largest spring spawning areas are in the Northumberland Strait and Chaleur Bay and the largest fall spawning areas are in coastal waters off Miscou and Escuminac N.B., North Cape and Cape Bear P.E.I., **and Pictou, N.S**. When spawned, the eggs are attached to the sea floor.[76] [emphasis added]

88. The report also concludes that the estimated likelihood that the herring fall fishery will be in the "cautious zone in 2020" is 94%.[77] This is an indicator that the fishery is in decline and becoming vulnerable, consistent with the information provided by Greg Egilsson and Alan MacCarthy, both experienced herring fishers.[78]

89. As per FONS' submission dated March 8, 2019, NSE has stated that "mixing zones should not impinge upon…important fish spawning and/or fishing areas".[79] FONS's concern is noted at p 12 of 125 in the Concordence [sic] table at Appendix 1.1. NPNS' and its consultants respond by saying "refer to section 3.3 for comments concerning effluent discharge parameters". Section 3.3 says nothing about spawning and makes no attempt to explain how mixing zones can be situated within spawning areas or areas of active fisheries, despite the clear direction from NSE. In the same letter, NSE also states that persistent substances cannot be discharged in mixing zones, although we see that NPNs proposes to discharge a number of AOX substances.

90. A DFO report from 2016 makes clear that the Northumberland Strait supports many species which are fished commercially in the area. Ecometrix cites this report as "Rondeau et al. 2016".[80] The Rondeau 2016 report confirms evidence from fishers that intensive fishing for

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[76] DFO, Assessment of the Southern Gulf of St. Lawrence (NAFO Div 4T) Spring and Fall Spawner Components of Atlantic Herring (*clupea harengus)* with Advice for the 2018 and 2019 Fisheries, May 2018, Canadian Science Advisory Secretariat, Science Advisory Report 2018/029, at page 3 (DFO Herring Assessment May 2018).
[77] DFO Herring Assessment May 2018, at p. 28.
[78] FONS March 8, 2019 submission at Appendix B-1- Egilsson, G., and MacCarthy, A., Caribou Harbour and Caribou Channel - dynamics, tides, ice, marine species and fisheries, February 21, 2019 (Appendix B-1), at p. 3.
[79] FONS submission March 8, 2019, paras. 106-110 and Appendix H-6, Letter to the NPNS General Manager, from Nova Scotia Environment, Engineering Specialist, dated 14 June 2017, p. 1.
[80] The Report cited by Ecometrix is: Rondeau, A, et al. 2016 *Identification and Characterization of Important Areas based on Fish and Invertebrate Species in the Coastal Waters of the Southern Gulf of St. Lawrence,* Canadian Science Advisory Secretariat, 2016/044. It is attached to this submission at **Appendix D-4.**

lobster and herring, and other species, takes place in the area where NPNS wishes to discharge its pulp and paper effluent.

91. Via the Terms of Reference, the Minister directed NPNS to respond to public concerns about this project and to incorporate the comments in the Focus Report, where applicable.[81] The concern about the proposed position of the outfall is real and based in clear evidence from fishers.

92. NPNS and its consultants do not discuss or justify placement of a mixing zone in the middle of a spawning ground and active fishery. As stated in FONS' March 8, 2019 submission, NPNS and its consultants purport to rely on CCME and other guidance regarding mixing zones, but make no attempt to explain how the proposed ETF meets the preconditions for use of such a mixing zone.

93. The information provided in the Focus Report discussing active fisheries at or near the proposed outfall is biased, selective and unsupported. A map included in the Focus Report purports to depict lobster fishing in the vicinity of the outfall by counting density of "lobster buoy clusters". This is apparently based on 3 days of data, instead of one or more full seasons. No explanation is given as to what constitutes a "lobster buoy cluster", why data from only those dates was chosen for the map, or whether surveys were also conducted on other days. It appears designed to show that no lobster fishing takes place near the outfall, despite the direct evidence from fishers to the contrary. Likewise, the maps included in the Ecometrix report (Appendix 7.3),[82] and reproduced in the Focus Report, state that they show fishing areas of various commercial species. No source or raw data is provided to support the lines which purport to demark areas where fishing activity does or does not take place. There is no indication that the information comes from those who actually fish in those areas. Without seeing Ecometrix's sources and raw data the maps' accuracy cannot be assessed and must be viewed as unreliable. Further, the maps depict only a tiny area immediately around the outfall, despite the Stantec predictions of a much wider distribution of effluent at diluted

[81] Terms of Reference, paragraph 1.1.
[82] Focus Report, Appendix 7.3, pp 3.35-3.39.

concentrations along with sediment deposition as far away as 4.8 km from the outfall. No explanation is provided as to why the maps show only this very small area.

94. The Focus Report provides no assessment or discussion about herring spawning, and minimizes the active fisheries in the LAA and RAA. As stated in FONS' original submission, the mixing zone concept is not appropriate for the proposed outfall and ETF. It is being used to mask the fact that NPNS wishes to discharge 65,000,000 litres of treated effluent each day, which is likely to contain persistent and bioaccumulative substances such as dioxins, furans, cadmium and other harmful substances, into a vibrant ecosystem containing essential fish habitat, and an active fishery.

9. Toxic Substances - Dioxins and Furans

95. Test results produced as part of the Focus report show that the NPNS mill currently discharges effluent containing detectable amounts of certain dioxins and furans at Point C (into Boat Harbour Basin).[83] At table 1-12 of Appendix 2.3,[84] KSH summarizes those test results demonstrating that several dioxins, including TCDD (2,3,7,8-Tetra CDD)[85] and TCDF (2,3,7,8-Tetra CDF) are present in the effluent at Point C. These substances are toxic and bioaccumulative.

96. The KSH summary (in which the tables are included) concludes that Point C effluent "is an accurate representation of what the effluent from the new ETF will resemble."[86] If that is in fact accurate, then dioxins and furans will also be discharged at the proposed outfall in Caribou Channel.

97. Throughout the Focus report and Receiving Water Studies, NPNS and its consultants suggest that they must achieve compliance with discharges of dioxins and furans, and other problematic substances, within the mixing zone. This assumes that they are permitted to

[83] Focus Report, Appendix 2.3, Table 1-12, page 32.
[84] Focus Report, Appendix 2.3, p. 32.
[85] TCDD is considered to be the most toxic of all dioxins and furans. See Health Canada handout
[86] Focus Report, p. 33; and Focus Report Appendix 2.3, p. 33.

discharge at exceedance levels at the diffuser, provided it dilutes to "background" within a certain distance. They purport to apply CCME guidance in this regard.

98. There is no CCME guidance as to permissible discharge of dioxins and furans. Discharge of such substances by pulp mills is governed by the *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations*,[87] made under the *Canadian Environmental Protection Act, 1999.*

    Section 4 of those *Regulations* prohibits a pulp mill operator from releasing "measurable amounts" of TCDD and TCDF. It does not matter whether concentrations of these substances could be diluted after discharge into a "mixing zone" or whether the background conditions already show some concentration of such substances. If measurable amounts as defined by the *Regulations* are discharged at the diffuser, it would constitute a breach of section 4.

Report of Dr. Lynn Cameron

99. Dr. Lynn Cameron has provided commentary on the Focus Report detailing several significant risks associated with the proposed ETF project.[88] Dr. Cameron has a PhD in organic chemistry[89]. We submit Dr. Cameron's entire commentary to the Minister for consideration. The following summarizes only some highlights from that report.

100. Dr. Cameron states that the proposed treatment facility is unacceptable as it will not sufficiently remove substances within a grouping referred to as AOX (Adsorbable Organic Halides). Most AOX are toxic to marine and human health, and some are considered Persistent Organic Pollutants. AOX substances include dioxins, furans and PCBs.[90]

101. Dr. Cameron advises that the concentrations of AOX are likely to be higher than predicted by KSH (as depicted in the Focus Report at Figure 2.3-1). This is because Point C effluent has had about 8.5 days in the Boat Harbour Effluent Treatment Facility process to permit the

[87] *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations*, SOR/92-267.
[88] Dr. Lynn Cameron, *Comments on the Focus Report*, Nov. 8, 2019 **Appendix C-1 (**Cameron Commentary).
[89] Dr. Cameron's Resumé, **Appendix C-2**
[90] Cameron Commentary, 2d page.

heavier molecular weight AOX compounds to settle out. In contrast, the new ETF would allow for less than 13 hours settling time for such compounds.[91]

102. As well, the sampling referred to in the Focus Report, conducted to determine concentrations of AOX and other effluent constituents, was done using HDPE sampling bottles. As AOX adheres to HDPE (as well as to organic tissue and sediment), the actual amount of AOX in effluent would be expected to be higher had the appropriate glass bottles been used for sampling.

103. Dr. Cameron also identifies problems associated with effluent constituents nitrogen and phosphorous. Once again, she is concerned that these concentrations will be higher in the effluent coming from the new facility than those drawn from Point C effluent, as the 8.5 day settling time is a factor in reducing the concentrations at Point C. Nitrogen and phosphorous can cause areas of depleted oxygen or "dead zones" in marine environments. The algal blooms associated with these compounds produce toxins which cause health issues for marine life and human consumption of seafood.[92]

104. Consequently, based on Dr. Cameron's assessment, it can be concluded that the adverse effects and significant environmental effects of AOX, nitrogen and phosphorous concentrations in NPNS effluent have been underestimated by NPNS' consultants.

10. Outstanding pipeline issues

105. No automated leak detection system is proposed for the marine portions of the proposed pipeline.[93] There has been no explanation offered for this, nor any substantive response to any of the concerns expressed regarding serious impacts of spills due to leakage or pipe rupture within Caribou Harbour, or pipe ruptures or diffuser damage in Caribou Channel. No information is provided as to how pipe leaks, ruptures or malfunctions will be detected and addressed during storms, rough seas or in winter when ice covers the Strait and the pipeline route. The only response to any concerns expressed regarding leakage or rupture is that a

[91] Cameron Commentary, 2d page.
[92] Cameron Commentary, 3rd page.
[93] Focus Report, p. 62.

properly installed and maintained pipeline will be leak-free. Given the documented leaks over the years due to NPNS' failure to inspect and maintain its existing pipelines, this cannot be a satisfactory answer.

106. None of the precise routes to be followed by any segment of the pipeline have been determined. Regarding the land-based section of the pipeline from Pictou to Caribou, Nova Scotia Transportation and Infrastructure Renewal (TIR) says that it is "continuing to hold talks with Northern Pulp regarding a possible pipeline route."[94] Until certainty is achieved as to whether the TIR will allow the proposed pipeline, the project description cannot be viewed as complete since major changes to it would be required if a new route had to be proposed.

107. The precise route through the marine areas is also still unclear. Without a complete route which has been precisely defined via a detailed design, the impacts of this project cannot be described and assessed.

11. Receiving environment – air quality

108. The ETF proposal includes the burning of sludge generated from the effluent treatment. Via Terms of Reference paragraph 6.2, the Minister required NPNS to undertake Air Dispersion modelling for all potential contaminants of concern related to the project.

109. Dr. Elaine MacDonald, Senior Staff Scientist with Ecojustice has reviewed the Air Dispersion modelling report. Dr. MacDonald's written comments[95] and CV[96] are appended to this submission and are submitted in their entirety for the Minister's review within this EA and Focus Report process.

110. Dr. MacDonald concludes that the air quality analysis included with the Focus Report should be considered unreliable and incomplete. The input data is not site-specific and the chosen model is not appropriate for a coastal location with complex terrain. Transitional operating conditions such as unit start-ups and shutdowns when air emissions peak were not considered.

[94] Focus Report, Appendix 2.1, letter of September 21, 2019 from TIR to General Manager, NPNS.
[95] Dr. Elaine MacDonald, Review of the Northern Pulp Nova Scotia Focus Report Section 6.0 and Appendix 6.2 Expanded Air Dispersion Modelling Study, FONS submission **Appendix B-1**
[96] CV of Dr. Elaine MacDonald, Ecojustice Senior Staff Scientist, **Appendix B-2**

Even if these limitations in modelling quality and methodology are ignored, the air dispersion modelling predicted exceedances of several air pollutant standards, including exceedances of cancer-causing substances benzo(a)pyrene and hexavalent chromium. The analysis also estimated that several residents would experience frequent and elevated concentrations of highly odorous reduced sulphur compounds, resulting in an unacceptable adverse impact on the community.[97]

111. As well, paragraph 6.3 required an updated air monitoring plan for the Project site based on the air dispersion modelling results. The plan must include the potential air contaminants to be monitored and proposed air monitoring location(s). However, as the air dispersion modelling exercise cannot be relied upon, and as the updated air monitoring plan provided by NPNS (section 6.3) does not include all of the contaminants for which exceedances are predicted (pp 113-114), paragraphs 6.2 and 6.3 of the Terms of Reference have not been satisfied and the environmental impacts cannot be evaluated.

12. Conclusion

112. In the Executive Summary of NPNS' Focus Report, the consultants advise of their prediction that, on all aspects of the project, there will be no "significant adverse residual environmental impacts".[98] This conclusion is not supportable and must be rejected, due to the evidence and material submitted within this EA and Focus Report process and referenced herein, as well as per the submissions of Pictou Landing First Nation, the fishing community and their associated organizations, the Town of Pictou, the Caribou Harbour Authority, the expert reports from qualified experts, and the vast amount of information provided others, including concerned residents and organizations within Pictou County and in other areas of Nova Scotia. FONS submits that the information and analysis provided to the Minister shows that adverse effects and non-mitigable unacceptable significant environmental effects will occur in respect of the ETF project.

[97] Dr. MacDonald Commentary, at p. 3 **Appendix B1.**
[98] Focus Report, Executive Summary, p. vi.

13. Decision Requested –ss 35(3)(d) and 40(c) of the *Environmental Assessment Act* and ss. 18(c) of the *Environmental Assessment Regulations*

113. This submission and the accompanying Appendices, as well as the information and evidence provided in FONS' previous submissions,[99] and the evidence, comments and concerns of Pictou Landing First Nation and many other participants in this EA and Focus Report process, have established that it is likely that the ETF project will cause adverse effects and/or significant environmental effects that are unacceptable and cannot be mitigated. FONS therefore requests that the Minister reject the proposed undertaking pursuant to subsection 35(3)(d) of the *Environment Act* and subsection 18(c) of the *Environmental Assessment Regulations.*

114. The Decision requested above is without prejudice to the following relief which is requested in the alternative:

(a) that the Minister recuse himself from any and all decisions in relation to the ETF project as his involvement creates a reasonable apprehension of bias that invalidates the EA process;

and,

(b) that the Minister, or alternatively the decision-maker appointed following the Minister's recusal, take all necessary steps to remedy the procedural defects that have fundamentally compromised the fairness and integrity of the process before any final decisions are made regarding the ETF project. This includes making all of the missing documents from the Focus Report available for public review, and providing an appropriate period of time for both the public and the Administrator to comment on the additional documents pursuant to ss 16(2) and 17(2) of the *EA Regs.*

115. Further and in any event of the above, FONS requests that it be provided with a written statement of the decision rendered after review of the Focus Report in respect of the EA of the

[99] See footnote 3 above.

ETF project, setting out the findings of fact upon which it is based and the reasons for the decision, pursuant to subsection 10(4) of the *Environment Act.*

Dated November 8, 2019, at Halifax Nova Scotia.

Barrister and Solicitor

Barrister and Solicitor

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APPENDIX A-1

Review of updated modeling studies by Stantec Consulting for the Northern Pulp effluent treatment facility replacement project

Prepared by:

San Francisco, CA, USA

November 5, 2019

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1. Executive summary

Stantec, Ltd., conducted an updated receiving water study to assess the near- and far-field mixing and dilution of effluent discharged from the proposed outfall at site CH-B. They also conducted a study to assess the transport of suspended particulate matter from the outfall. For the reasons enumerated below, these studies are flawed and provide no evidence that the environmental impact of the outfall will be minimal:

1) Although additional measurements were made in the vicinity of site CH-B to justify the use of a two-dimensional model, the measurements indicate exactly the opposite because they show strong density effects that can only be simulated with a three-dimensional model. Three-dimensional currents can transport effluent in a direction that is opposite to that of the two-dimensional currents, and thus the two-dimensional far-field results are meaningless.

2) The two-dimensional MIKE 21 model does not accurately predict the observed currents, and hence we can have no confidence in its ability to simulate the far-field effluent dilution, even if the flow were two-dimensional. Although the simulated temperature matches observations, this is misleading because the temperature has no bearing on the computed currents. Similarly, a wave model accurately predicts the surface, wind-generated waves when compared to the measurements, yet no assessment as to their impact on the effluent dilution

is discussed.

3) The winter scenario models ice cover simply by removing winds and waves, yet ice cover should be modeled with reduced tidal currents at the model boundaries and higher friction at the free surface. Improper ice modeling leads to an overprediction of the near- and far-field dilution.

4) Plots of far-field effluent concentrations around site CH-B are misleading: the two-dimensional MIKE 21 model overestimates the dilution by assuming complete mixing over the water column. These plots are used to show that there is no buildup in Caribou Harbour[1], although there is clear buildup that could easily be quantified with the model.

5) The updated near-field modeling using CORMIX overpredicts the near-field dilution by a factor of 3.5 because it assumes the receiving waters are too dense. Factoring in the correct receiving water density gives a dilution factor of just 42 at the edge of the 100-m mixing zone. This dilution factor is expected to be even lower when taking into account the effects of vertical density stratification, weaker slack currents during neap tides, and receiving water densities that should be at their lowest during late summer/early fall.

6) The sediment transport study is fundamentally flawed because it ignores the effect of flocculation which will cause the fine suspended particulate matter to settle much faster and deposit in the vicinity of the outfall. The sediment transport study is also overly simplistic and does not assess the potential for fine particulate matter to accumulate in Caribou Harbour or in other ecologically sensitive sites in the region.

Stantec also conducted a study to simulate the far-field dilution of effluent discharged from the Boat Harbour weir. The results are inaccurate and cannot be trusted because (1) the hydrodynamic model is based on the poorly validated model used in the original study and (2) the buoyant surface plume emanating from Boat Harbour is highly three-dimensional and cannot be simulated with a two-dimensional model like MIKE 21.

2. Introduction

In this report I evaluate modeling studies conducted by Stantec Consulting, Ltd., as part of the Focus Report for the Replacement Effluent Treatment Facility Project for environmental assessment, that was submitted by Northern Pulp Nova Scotia on October 2, 2019. I review the following three components of the report:

1) Appendix 4.2: Far-field Dispersion Modelling of Treated Effluent Discharge at the Existing Weir in Boat Harbour, Pictou, Nova Scotia.
2) Appendix 4.2: Northern Pulp Effluent Treatment Facility Replacement Project: Updated Receiving Water Study, Caribou, Nova Scotia.
3) Appendix 4.3: Estimate of Sediment Transport of the NPNS treated effluent.

These three reports will be referred to as (1) The Boat Harbour study, (2) the updated receiving water study or just the updated study, and (3) the sediment transport study.

[1] In this report, Caribou Harbour refers to the semi-enclosed shallow water body with a mouth defined by the opening between Caribou Point to the north and Munroes Island to the south.

This review references my review of the original receiving water study (the Original Study) conducted by Stantec Consulting, Ltd. In the Original Study, the MIKE 21 hydrodynamic model was used to simulate the far-field transport and dilution of effluent discharged from the proposed CH-B location. The CORMIX near-field model was used to compute the dilution within 100 m of the outfall due to turbulence and mixing of the buoyant effluent. The Boat Harbour and updated studies I review in this report use the same models and setup as the Original Study.

→ *The updated study includes a wave model to compute the wind-generated waves around site CH-B. This model computes both wind-generated waves and remote swell waves, although swell is not included in the updated study.*

The primary differences between the Original Study and the updated study are the additional validation of temperature, currents, and surface wave heights at site CH-B. To compute the waves, the updated study includes a wave module that computes the distribution of surface waves driven by winds in the region. This wave module is needed to compute the surface waves because wind-generated surface waves have wavelengths less than 50 m and periods less than 5 s. These spatial scales are not resolved by the computational grid and must be modeled with what is referred to as a spectral wave model. Instead of modeling individual waves as they are generated and propagate on the free surface, which would require a three-dimensional grid with thousands to millions more grid cells, spectral wave models compute the energy of waves at different frequencies and directions in each computational cell. This gives a measure of the average wave height (the significant wave height, or the average height of the largest 1/3 of the waves) in each grid cell in response to winds, breaking, refraction and diffraction by bathymetry, and currents computed by the hydrodynamic model. The effect of waves is also fed back into the hydrodynamic model to drive currents. Such currents are strongest on beaches where waves break and drive alongshore flows. Although the spectral wave model can compute the evolution of both locally wind-generated and remotely-generated swell waves, swell waves are not considered in the updated study.

→ *New measurements of currents were obtained with an ADCP, an instrument that measures currents using sound waves in the water. New measurements of salinity and temperature were also obtained.*

Stantec conducted additional field surveys to measure currents, salinity, and temperature in the vicinity of site CH-B. Profiles, or measurements at different depths below the surface, of temperature and salinity were measured to assess their vertical variability. Currents were measured with an ADCP, or acoustic Doppler current profiler, which uses sound waves to measure the current magnitude and direction at different depths, and is a very common instrument used in oceanography. The ADCP was mounted to a boat that was driven back and forth to measure transects of currents as a function of depth and horizontal position around site CH-B. Such measurements are useful for assessing the vertical and horizontal variability of currents at different snapshots in time, for example during flood and ebb tides. The ADCP was also mounted to a bottom mooring to measure currents as a function of depth and time near CH-B. These moored measurements are useful to understand the variability of currents over a tidal cycle at a fixed location in space. The ADCP also measures water levels which can be used to

validate the tidal water levels computed by the hydrodynamic model and the wave heights computed by the spectral wave model.

3. Review of the far-field modeling of the discharge from the Boat Harbour weir

The far-field modeling of discharge from the Boat Harbour weir is inaccurate and cannot be trusted because (1) the hydrodynamic model is based on the poorly validated model used in the Original Study and (2) the buoyant surface plume emanating from Boat Harbour is highly three-dimensional and cannot be simulated with a two-dimensional model like MIKE 21.

Stantec used the MIKE 21 model setup from the Original Study to simulate far-field transport of effluent from the Boat Harbour weir during the month of July 2016. The MIKE 21 model setup was identical to that in the Original Study except for the location of the outfall source: instead of being located at one of the proposed outfall sites, it was located at the location of the Boat Harbour weir. The advantage of models like MIKE 21 is that they do not distinguish between an effluent source on the bed and one at a shoreline model boundary. Both are identical in that they are simply a source of effluent into one of the model grid cells.

→ *The plume emanating from the Boat Harbour weir is confined to the surface and cannot be simulated with a three-dimensional model.*

Since this model setup is identical to that in the Original Study, all of the criticisms I made in my review of that study are applicable to the Boat Harbour study. ***The Boat Harbour study is perhaps the best possible example of a problem that should NOT be studied with a two-dimensional model like MIKE 21.*** Based on the parameters indicated in the study, the effluent is roughly 20 kg/m^3 less dense than the receiving waters. Therefore, the effluent discharged from Boat Harbour remains confined to a thin, near-surface layer as it flows into Pictou Harbour. Owing to the rotation of the earth, the plume turns to the right of Boat Harbour and propagates along the shoreline to the east and south. Because the plume is confined to the surface and arises as a direct result of three-dimensional, density-driven processes, it cannot be simulated with the MIKE 21 model. Nevertheless, owing to the inclusion of the earth's rotation in the MIKE 21 model, the results still indicate transport to the right of Boat Harbour (e.g. Figure 13 in the Boat Harbour study), albeit in a vertically well-mixed plume. I note that none of the results in the Boat Harbour study are validated beyond the substandard validation performed in the Original Study.

→ *Weak currents at the Boat Harbour weir lead to weak mixing and high effluent concentrations. These are underpredicted by the MIKE 21 model because it assumes complete mixing over the water column.*

It is no surprise that the far-field effluent transport simulated with the MIKE 21 model does not disperse very efficiently as it emanates from Boat Harbour, leading to effluent concentrations that are much higher than those in the original and updated studies of effluent discharged from site CH-B. Because the two-dimensional MIKE 21 model assumes complete and instantaneous mixing over the water column, these results emphasize the point I made in my original review about how the concentrations and dilution factors are a strong function of the

depth. In a two-dimensional model, we expect at least a factor of 8 or greater dilution at site CH-B than we do at the Boat Harbour weir simply because the weir has a depth of 2.5 m (based on Figure 2 in the Boat Harbour study) while site CH-B has a depth of 20 m. Further lack of dilution occurs at the Boat Harbour weir because of the weak currents in the shallow waters near the weir. The two-dimensional nature of the MIKE 21 model actually overpredicts the dilution, since the effluent should remain trapped in a high-concentration buoyant surface layer with limited vertical mixing owing to the strong effects of stratification (Discussed in Section 4.1 below).

4. Review of the updated receiving water study offshore of Caribou Harbour

4.1. Two- vs. three-dimensional modeling

In the updated study, Stantec collected field data in the vicinity of the proposed outfall location which they use to further justify the use of a two-dimensional model. This field data demonstrates exactly the opposite, in that there are strong three-dimensional currents that can transport effluent in a direction that is opposite to that in a two-dimensional model. Such transport can lead to more buildup of effluent in, for example, Caribou Harbour.

In the updated study, Stantec used the ADCP to measure currents in two ways:

1) The ADCP was mounted to a boat and the boat was driven back and forth across a transect line stretching from the mouth of Caribou Harbour through site CH-B. The measurements extended 1.2 km on either side of site CH-B and were taken during the flood tide on May 24, 2019, and ebb tide during May 25, 2019. These data are shown in Figures 7-10 in the updated study.
2) The ADCP was attached to a fixed mooring on the bed 490 m northwest of site CH-B and measured currents as a function of depth and time during June 17-19, 2019. These data are shown in Figure 11 in the updated study. The ADCP also has a pressure sensor that measures water level as a function of time to calculate tidal water levels and wave heights. The wave-height data are shown in Figure 19.

In addition to the ADCP data, measurements of temperature and salinity over the depth were obtained near CH-B during flood and ebb tides on May 24 and 25, 2019. These data are shown in Figures 13 and 14 of the update study.

→ *The ADCP boat transect data are too noisy to justify that the currents do not vary with depth.*

In the updated study, Stantec justifies use of a two-dimensional model by noting that the velocity profiles from the ADCP data indicate "weak stratification from near the water surface to the seabed" and that "temperature and salinity were relatively homogeneous throughout the water column, ranging from 12.6ºC to 12.9ºC and 28.8 to 29.0 ppt, respectively". Indeed, the ADCP transect data show weak vertical variability, although these data are very noisy and cannot be trusted to infer vertical variability of currents. Furthermore, the transects reflect the velocity field at an instant in time, and thus do not reveal the potential for three-dimensionality over the entire tidal cycle. This is precisely the purpose of the moored ADCP data which very clearly indicate vertical variability in the currents that is consistent with strong density effects, as discussed below.

→ *The ADCP mooring data very clearly show the presence of three-dimensional, density driven currents that cannot be simulated with the two-dimensional MIKE 21 model.*

Figure 1 below shows how the moored ADCP data nicely captures the variability of the currents with depth and time over several tidal cycles. In the absence of density effects, the tides drive currents that are strongest near the surface and weakest near the bed where they are impeded by friction. This gives the "expected" velocity profiles that occur during flood tides indicated by the sketch in Figure 1. During the ebb tides, however, there is a peak in the velocity profile at a depth of 15 m instead of the surface. ***The only mechanism that can drive currents at this depth arises from horizontal differences in density between water masses in the region.*** Unfortunately, the ADCP boat transects were taken at times that did not coincide with the ADCP mooring observations nor were the transects taken at different phases of the tidal cycle to reveal the source of the vertical variability in currents during ebb tides. Furthermore, salinity and temperature were not measured at sufficient points in time and space needed to obtain a complete picture of the density effects over a tidal cycle or over the course of the year (i.e. during winter ice cover or during late summer/early fall when runoff is highest). Therefore, while the measurements clearly indicate the presence of density-driven currents, there is insufficient data to ascertain the source of the density-driven circulation. Regardless, these data strongly indicate that MIKE 21 is not an appropriate tool to model the three-dimensional circulation in this region. Three-dimensional currents can transport effluent in a direction that is opposite to that in a two-dimensional model and lead to more buildup in, for example, Caribou Harbour.

4.2.Model validation

The validation of the far-field model with additional data indicates that the model performs poorly and cannot be trusted to assess far-field dilution of the effluent. The validation of temperature is misleading because it implies inclusion of density effects, yet these have no bearing on the two-dimensional MIKE 21 model.

→ *There is no quantitative validation of the MIKE 21 model to indicate that it performs well.*

Like the Original Study, in the updated study Stantec included validation of currents and water level, but with new data from the moored ADCP near site CH-B. Stantec added validation of wind-generated waves and water temperature that were also measured with the moored ADCP. The validation is conducted for a simulation during May 26-June 26, 2019. As I noted in my review of the Original Study, no quantitative metrics that are well established in the coastal modeling community are computed, and only qualitative comparisons are made. Despite the addition of new data for validation, the validation is poor and provides no confidence that the model is accurately reproducing the far-field dynamics in the region.

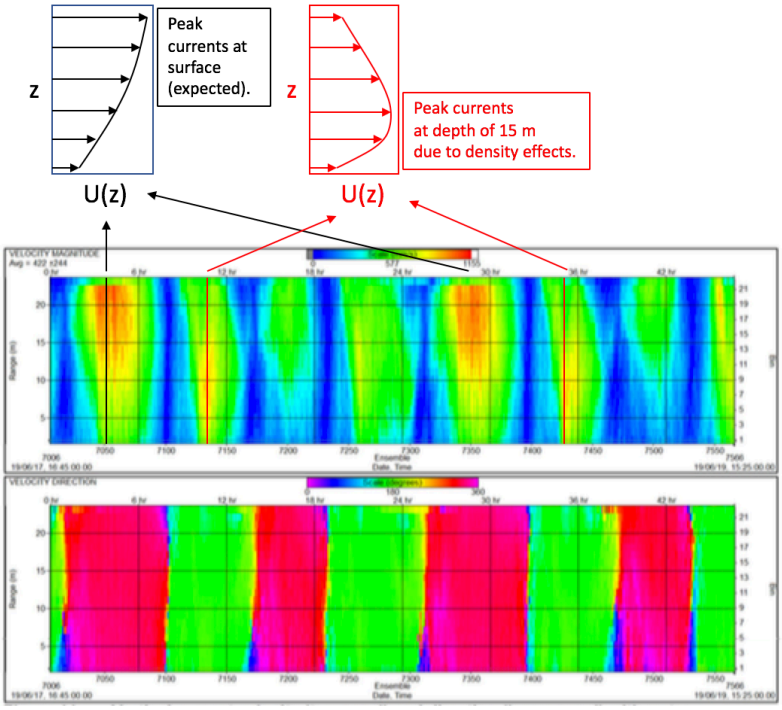


Figure 1: ADCP mooring data from Figure 11 in the updated study. The top panel shows current magnitude while the bottom panel shows current direction. The sketches illustrate velocity profiles that produce the observed ADCP data.

→ *The MIKE 21 model does not accurately predict the tidal water levels or currents. The three-dimensional nature of the density-driven currents explains in part the failure of the two-dimensional model to predict them.*

The simulated water levels in Figure 20 of the updated study appear to match the observations, but closer inspection reveals that the model fails to predict the full tidal range for most of the tides, particularly after June 9. Similarly, the simulated currents appear to match the observations, but closer inspection reveals that the strength of the currents only qualitatively matches the growth and decay over the spring-neap cycle. The peak magnitudes of the simulated currents only match a small fraction of the observed peaks, while the model over- or under-predicts a majority of the peaks by 25-100%. Stantec explains these errors by noting that the ADCP-derived observations are depth-averaged, while the model is two-dimensional. This is not correct, because a two-dimensional model should reproduce the depth-averaged currents if they arise from two-dimensional processes. However, as explained in Section 4.1 of this report, the processes in the region are highly three-dimensional, making it impossible for the two-dimensional MIKE 21 model to reproduce them. The substantial errors between the simulated and observed currents are not reflected by the metrics in Table 10 of the updated report because these metrics tend to obscure errors incurred during individual tidal cycles. As I discussed in my review of the Original Study, a better representation of the error is obtained with metrics like the root-mean-square error or skill score, which would show that the model performs poorly.

→ *Surface wind-generated waves are validated, yet there is no discussion of how they affect the currents. Temperature is also validated, but temperature has no bearing on the results because the model is two-dimensional.*

The addition of a wave model to simulate wind-generated waves in the updated study was validated with observations at the moored ADCP in Figure 19 of the updated report. While the simulated waves appear to match the observed waves, they have no bearing on the observed currents and no discussion is made as to the relevance of the waves to the characteristics of the far-field dispersion. Similarly, the temperature is validated via comparison of simulated to observed temperature at the moored ADCP in Figure 22 of the updated report. As discussed in Section 4.3, because the temperature field has no effect on the two-dimensional currents, validation of the temperature field as predicted by the two-dimensional MIKE 21 model is irrelevant. Furthermore, it is odd that the salinity field is not validated given that the salinity has a much stronger effect on the density than the temperature.

4.3.Model setup and scenarios

The updated report is misleading because there is extensive discussion of temperature and salinity modeling, yet these play no role in the circulation of the two-dimensional MIKE 21 model. Furthermore, simply removing winds and waves to account for ice cover does not correctly account for the more significant reduction in currents that is expected during winter.

→ *The two-dimensional MIKE 21 model in the updated study only has the ability to predict two-dimensional tidally-driven currents. It cannot predict the effects of temperature or salinity since these only affect the three-dimensional dynamics.*

On p 2.19 of the updated study, it is noted that "A coupled hydrodynamic model was developed to simulate the physical oceanographic conditions under the complex forcings of tide, current, wind, wave, air heat, and water temperature and salinity." As discussed in my review of the Original Study, the updated study only demonstrates the ability to simulate the effects of tidal currents in the region. Winds and waves can impact the circulation, and while wave heights are validated in the updated study, their effects on the currents are not validated or discussed. Although there is extensive discussion of details related to modeling the effects of air, heat and water temperature and salinity, this is misleading because the temperature and salinity fields have little to no effect on the currents predicted by the MIKE 21 model because it is two dimensional. Density dynamics can only be computed with a three-dimensional model like MIKE 3. Furthermore, it is very difficult if not impossible to correctly predict temperature and salinity dynamics in a two-dimensional model because these quantities vary strongly in the vertical, as clearly indicated by the temperature and salinity profiles in Figures 13 and 14 of the updated study (also Figure 3 below). It is also difficult to model temperature and salinity because these quantities require a lot more data than indicated in the updated report, which only mentions use of air temperature and humidity but does not say anything about other important quantities like incoming solar radiation, cloud cover, optical clarity, and evapotranspiration. Given that these details were not mentioned, it is likely that the parameters needed to compute the

temperature field in the model were simply tuned to obtain a match to the observations. Predictions of salinity are also very sensitive to freshwater inflows, yet these are not mentioned in the updated study, nor is the model-predicted salinity validated.

→ *The winter scenario does not correctly account for the effects of ice cover which should act to reduce the effects of the tidal currents and the associated mixing and dilution.*

To assess the effects of winter ice cover, a scenario is devised to simulate far-field dispersion during February 2019. The effects of ice cover are modeled by eliminating waves, winds, and air heat exchange. A constant ice sheet thickness of 0.7 m was assumed based on observations, yet it is unclear how this was exactly implemented in the MIKE 21 model. Was the mean water level lowered by 0.7 m, or was the depth data raised by 0.7 m? Nevertheless, as discussed in my review of the Original Study, the scenario simulates absolutely no physical mechanisms that one would expect to occur in the presence of ice. There is no added friction by the ice cover which would reduce the magnitude of the tidal currents, and the strength of the tides at the boundaries is not reduced as it should be when there is large-scale ice cover in the Northumberland Strait during winter. The result is a "winter" scenario that simply evaluates the effect of the tides in February. Given the inaccuracy of the results as indicated by the validation, elimination of winds and wave effects in this scenario is meaningless because their effects are smaller than the overall errors in the modeled currents.

4.4.Analysis of model results

The plots of effluent concentrations are misleading because the two-dimensional MIKE 21 model overestimates the dilution by assuming complete mixing over the water column. These plots are used to show that there is no buildup in Caribou Harbour, although there is clear buildup that could easily be quantified with the model.

→ *Far-field dilution results cannot be trusted because they are overpredicted by the two-dimensional model.*

As in the Original Study, the far-field dilution results in the updated study are misleading because they assume complete mixing over the water column. This gives an instantaneous dilution of roughly 100 at the location of the outfall that is a strong function of its depth. This instantaneous dilution would be significantly reduced in a three-dimensional model that included the effects of stratification in the region, as discussed in Section 4.5.

→ *It would be straightforward to show that there is effluent buildup in Caribou Harbour.*

It is noted that "no effluent concentration buildup was found in the harbour basins, along the shorelines and in the entire model domain." There is no scientific justification for this statement. Not only do the figures show buildup of effluent along the shorelines and signatures of effluent entering Caribou Harbour, but it is straightforward to compute the exact amount of effluent entering the harbour with the MIKE 21 model. Such a calculation would quantitatively assess the rate at which effluent enters the harbour under different conditions, yet this is ignored in favor of misleading plots of effluent concentrations at the end of the one-month simulations.

4.5.Near-field modeling

The updated near-field modeling using CORMIX overpredicts the near-field dilution factor by at least 3.5 because it assumes the receiving water is too dense, implying that the dilution factor 100 m from the outfall should be at most 42 instead of the worst-case value of 145.7 in the updated study. The true worst-case dilution scenario is expected to be even lower when accounting for the effects of vertical density stratification, weaker neap tidal currents, and a receiving water density that is at its lowest in late summer/early fall.

→ *The currents used in the updated study are stronger than they should be and hence they overpredict the mixing. The salinity in the updated study is too high and also overpredicts the effluent buoyancy and associated mixing.*

As in the Original Study, the near-field modeling with CORMIX gives near-field dilution results using parameters that do not reflect the possible worst-case scenarios. Table 1 compares values used in Scenario 2 of the Original Study and Scenarios A, B, and C of the updated study. The main parameters that differ between the original and updated studies are:

1) The updated study employs cases with weaker slack tidal currents (Scenarios B, C)
2) The updated study employs a denser receiving water for all cases
3) The updated study employs a less dense effluent for all cases
4) The updated study includes a case with a lower effluent flow rate (Scenario C)

The CORMIX results in the updated study show that, when compared to dilution with average currents, weaker slack currents reduce the near-field dilution factor from 113.5 to 33.0 at a distance of 2.0 m from the diffuser (Scenario A vs. Scenario B in Table 2 below). In this regard, the use of slack tidal currents represents a more realistic scenario in which dilution is significantly weaker in the presence of slack tides. However, these slack tidal currents still do not represent the worst-case scenario in which the slack tidal currents are even weaker during a neap tide. Furthermore, the updated study uses an ambient receiving water salinity of 30 ppt as opposed to 28 ppt as in the Original Study. It also assumes an effluent salinity of 2 ppt, 50% lower than the value of 4 ppt used in the Original Study (No justification for the lower effluent salinity is provided). This leads to an effluent that is 28.2 kg/m^3 less dense than the receiving waters in the updated study, significantly more than the value of 23.7 kg/m^3 used in the Original Study. As a result, the mixing induced by the effluent buoyancy in the Original Study is weaker, leading to a dilution of 32.4 at a distance of 2.0 m from the diffuser, roughly the same as Scenario B in the updated study which has a lower dilution factor than Scenario A due to the slack tidal currents (See Table 2 below).

→ *The receiving water density is expected to be at its minimum, giving the worst-case scenario for buoyancy-driven effluent mixing, in late summer/early fall when waters are warmest and salinity is lowest.*

Unlike temperature, Stantec did not conduct a historical analysis of salinity in the updated study that can be used to estimate the minimum receiving water salinity at the outfall. However, the salinity profiles in Figure 14 of the updated study (and Figure 3 below) indicate a minimum salinity closer to 29.25 ppt (0.75 ppt lower than the assumed value of 30 ppt), a value that is

expected to decrease as precipitation and the associated runoff in the region increase to their maximum in September, as shown in Figure 2 below. As indicated by the temperature data in Figure 16 of the updated study, the decreased salinity of the receiving waters is accompanied by an increase in temperature that peaks at a maximum of 20°C in August, further decreasing the density of the receiving waters beyond the scenarios in the updated study, which assume a receiving water temperature of 16.8°C. Therefore, the worst-case scenario should employ slack neap tides and receiving water density values that are at their lowest in the late summer/early fall.

→ *The vertical variations in density are strong enough to decrease or eliminate vertical mixing, yet this effect is not accounted for in the CORMIX modeling.*

In addition to using parameters that do not reflect worst-case scenarios for the near-field effluent mixing, the updated near-field CORMIX studies also do not include the effects of vertical density stratification, even though the ADCP, salinity, and temperature data discussed in Section 4.1 clearly show that vertical stratification effects are important. In Figure 3 below I show salinity and temperature profiles taken from Figures 13 and 14 in the updated study. These data show that the top-bottom temperature and salinity differences are roughly 0.3^0C and 0.4 ppt, respectively, which translates to a top-bottom density difference of 0.4 kg/m^3. While these may seem small, an assertion employed by Stantec to justify ignoring vertical stratification effects, the CORMIX manual suggests including stratification effects when the vertical variation in density exceeds 0.1 kg/m^3 (Page 33 of Jirka et al. 1996).

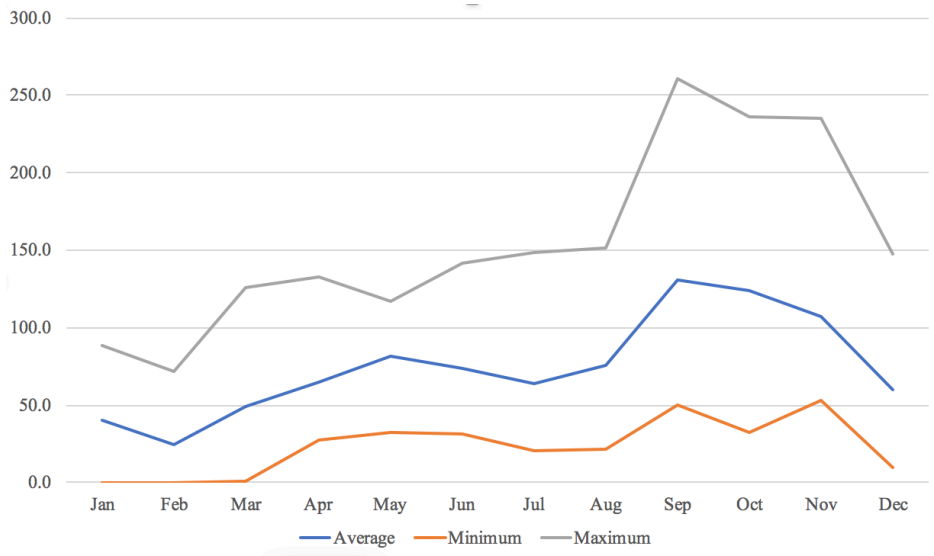


Figure 2: Monthly-averaged precipitation in mm during 1994-2005 in Tatamagouche[3], Nova Scotia (data from climate.weather.gc.ca).

[3] There is insufficient monthly precipitation data at the nearby Caribou Point station, so Tatamagouche was used as a representative station which reflects the precipitation patterns at Caribou Point.

	Original Study	Updated study
Avg depth in mixing zone (m)	18.0	18.9
Depth at outfall (m)	20	20.3
Avg slack currents (m/s)	-	0.10
Max currents (m/s)	0.27	0.85
Mean currents (m/s)	0.10	0.41
Avg winds (m/s)	3.75	3.79
Ambient temperature (°C)	17.6	16.8
Ambient salinity (ppt)	28.0	30.0
Ambient density (m^3/s)	1020.06	1021.76
Effluent temperature (°C)	37.0	37 (Scenario A) 35 (Scenarios B+C)
Effluent salinity (ppt)	4.0	2.0
Effluent density (kg/m^3)	996.32	993.36 (Scenario A) 993.55 (Scenarios B+C)[4]
Difference between receiving water and effluent density (kg/m^3)	23.74	28.4 (Scenario A) 28.2 (Scenarios B+C)
Wastewater flow rate (m^3/s)	0.980	0.984 (Scenarios A+B) 0.579 (Scenario C)

Table 1: Comparison of CORMIX values used in Scenario 2 of the Original Study and Scenarios A, B, and C of the updated study.

Scenario	Distance from Diffuser (in m) and Dilution Factor						
	2	5	10	20	50	100	200
Updated Scenario A	113.5	178.6	251.6	353.8	407.5	427.2	454.3
Updated Scenario B	33.0	51.4	71.8	100.1	129.9	145.7	164.1
Updated Scenario C	50.1	78.3	109.6	152.8	195.6	219.0	247.9
Original Scenario 2	32.4	50.5	70.8	99.1	128.3	144.1	159.8

Table 2: Comparison of dilution results from Scenarios A, B, and C in the updated study to those from Scenario 2 in the Original Study.

[4] The density of 955.55 kg/m^3 is unreasonably small in the updated report, likely a typo. Here I assume it to be 993.55 kg/m^3, slightly more dense than Scenario A due to the colder temperature by 2°C.

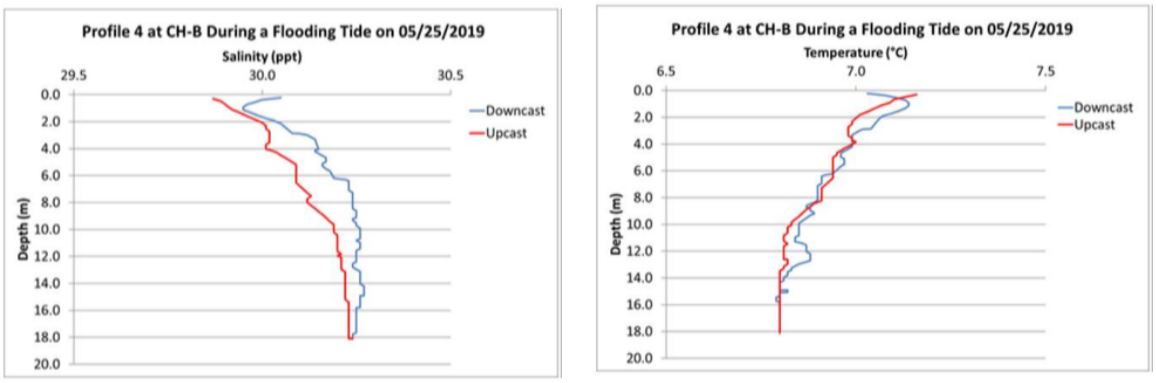


Figure 3: Vertical profiles of salinity (left) and temperature (right) taken from Figures 13 and 14 in the updated study. "Downcast" implies measurements taken with the instrument as it sinks downward, while "upcast" implies measurements taken as the instrument is raised to the surface.

→ *Theory can be used to show that the vertical density stratification in the region reduces effluent mixing and dilution.*

The potential effects of stratification on the near-field mixing can be assessed by noting that mixing occurs because of turbulence driven by differences in the horizontal velocity with depth: a large change in the velocity in the vertical is likely to produce strong turbulence and mixing. This explains why turbulence and mixing are strongest near the free-surface and bed, since these are locations where the vertical changes in velocity strong. At the same time, however, vertical density stratification damps the turbulence and mixing by creating layers of different densities that stabilize the water column, making it harder for layers to mix. The strength of the damping effect of the stratification relative to the potential to generate turbulence by the currents is given by the gradient Richardson number, which is defined by

$$Ri_g = \frac{g\Delta\rho D}{\rho_0(\Delta U)^2}.$$

The different terms in this equation and the source of data from which values were approximated are shown in Table 3. Using these values, the gradient Richardson number around location CH-B is roughly $Ri_g = 0.31$, which is a lower bound given that this value is estimated during a period in which the bottom-top difference in currents (ΔU) is large. It is well known that, when the gradient Richardson number is larger than 0.25, the damping effect of stratification is so strong that it all but eliminates mixing. This suggests that the mixing and dilution will be substantially reduced by the vertical stratification, an effect that is ignored in the near-field CORMIX modeling. It also suggests that the far-field effluent transport is likely to be confined to shallow vertical layers and not mix over the water column, further justifying the use of a three-dimensional far-field model. The resulting dilution factors are thus significantly overpredicted in both the near- and far-field modeling in the updated study.

→ *When accounting for the correct lower receiving water density in addition to slack tidal currents, the dilution factor 100 m from the outfall should be at most 42, which is 3.5 times lower than the value of 145.7 in the updated study. This dilution factor will be further reduced when accounting for vertical density stratification, slack water during neap tides, and the lowest receiving water densities during late summer/early fall.*

The data from the original and updated near-field studies in Table 2 show that the effect of using slack tides reduces the dilution by a factor of 3.4 (Updated Scenario A dilution of 113.5 compared to Updated Scenario B dilution of 33.0, both 2 m from the outfall). However, the Original Study essentially shows that the effect of less buoyancy-driven mixing when the receiving water is less dense is also to reduce the dilution by a factor of 3.5 (Updated Scenario A dilution of 113.5 compared to Original Scenario 2 dilution of 32.4). This suggests that the combined effects of both slack tides and reduced buoyancy of the effluent can reduce the dilution factor from that in Scenario A of 113.5 by a factor of 11.9 (3.5×3.4) to just 9.5. The dilution factor 100 m from the outfall will thus be closer to 42 instead of 145.7 (based on the dilution in Scenario B at 100 m of 145.7, reduced by 3.5 due to decreased buoyancy). This dilution of 42 is likely an upper bound, since neap slack tides are weaker and the receiving water density is expected to be even lower during late summer/early fall. The reduction of vertical mixing due to density stratification will reduce the dilution factor even further. The result is that the near-field effluent concentrations will be in excess of the estimates in the updated study by at least a factor of 3.5, thus making it unlikely that many of the CCME water quality guidelines will be met in the mixing zone for the true, worst-case scenario.

Variable	Name/description	value	Source
D	Approximate water depth at ADCP mooring.	20 m	ADCP mooring; Figure 1.
g	Gravitational acceleration.	9.81 m/s^2	Known constant.
$\Delta\rho$	Bottom-top density difference.	0.4 kg/m^3	Salinity and temperature profiles; Figure 3.
ΔU	Bottom-top difference in currents.	0.5 m/s	ADCP mooring; Figure 1.
ρ_0	Reference density (average density of profile).	1023.6 kg/m^3	Salinity and temperature profiles; Figure 3.

Table 3: Variables used to estimate the gradient Richardson number, Ri_g.

5. Review of the sediment transport modeling

The sediment transport study is fundamentally flawed because it ignores the effect of flocculation which will cause the fine suspended particulate matter to settle much faster and deposit in the vicinity of the outfall. Furthermore, it is much too simplistic and does not accurately reflect where we expect the fine particulate matter to accrete in the region – such an assessment should be made with the sediment transport modules that are part of the MIKE modeling software.

→ *The distance from the outfall at which fine particulate matter settles can be estimated based on the distance it travels due to the tidal currents over the time it takes to settle onto the bed.*

Stantec, Ltd., analyzed samples of suspended particulate matter, or "sediment", from treated effluent similar to what is expected at the proposed outfall. To estimate the distance at which the sediment is expected to settle onto the bed after ejected from the outfall, Stantec assumed that the particles will settle from some height above the outfall while transported horizontally by the ambient currents. The distance they will travel is proportional to the time it takes for them to settle onto the bed while they are transported horizontally. Since a sediment sample consists of a distribution of particle sizes, it is common to refer to the 50^{th} or 90^{th} percentile particle diameters D_{50} or D_{90}, corresponding to the particle diameter that is larger than 50 or 90 percent of the particles in the sample. The distance at which a particle with size D_{50} or D_{90} is then the minimum distance we expect 50% or 90% of the total volume of particles to be transported.

→ *A simple analysis shows that fine particulate matter will settle at least 1 km from the outfall, which is an overestimate.*

Average slack tidal currents of 0.08 m/s and average total tidal currents of 0.35 m/s are obtained from the updated receiving water study. Owing to the small particle sizes of the samples, particles originating 1 m above the bed settle slowly enough to allow 90% of the sediment to be transported at least 1 km from the outfall for the average slack tidal currents and 4.2 km for the average total tidal currents. The same analysis shows that 50% of the sediment (based on the settling velocity of D_{50}) is expected to be transported at least 33.4 km and 148.2 km from the outfall for the slack and average currents, respectively. This is confirmed by analysis of sediment samples at location CH-B which indicate the presence of medium- to coarse-grained sand. The lack of fine-grained particles on the bed is proof that the local currents are too strong to enable settling of fine suspended particulate matter in the effluent.

→ *The analysis is flawed because fine particulate matter aggregates into larger particles, or flocs, which will deposit in the vicinity of the outfall because they settle faster.*

This sediment transport analysis is suitable to estimate the approximate distance at which particles are expected to travel under the influence of tidal currents. However, the analysis is flawed in two ways. First, the effluent is composed of organic material which has the tendency to make the fine-grained particles flocculate, or stick together to form "flocs". Therefore, the particle size distribution based on the laboratory sampling is not representative of the actual distribution of floc sizes at the outfall which can be much larger. Because flocs are composed of loosely packed suspended particulate matter, they are composed mostly of water, and hence their densities are much smaller than the density of individual mineral particles. This is why the density of 1060 kg/m^3 was used in the study rather than the value of ambient marine sediment density of 2650 kg/m^3. While this is a fair estimate, one cannot use such a low floc density to estimate the settling velocity without also assuming a floc diameter that can be much larger than the individual sizes based on the laboratory sampling. Therefore, owing to the use of floc diameters that are too small, and because the settling velocity is proportional to the square of this diameter, the settling velocities are vastly underpredicted and the resulting transport distances are

substantially overpredicted. Substantially more flocculated effluent particulate matter will accumulate around the outfall.

→ *A sediment transport model should be employed with the MIKE modeling software to predict with more confidence whether the fine particulate matter is expected to settle in sensitive fisheries habitats in the region.*

The second flaw of the sediment transport study is that it is overly simplistic. The tidal currents are highly variable in the region in both space and time, and it is naïve to imply that the suspended particulate matter in the effluent will not pose an environmental or ecological problem based simply on an approximate distance it is expected to propagate away from the outfall. Not only do we expect flocculation to promote particle settling in the vicinity of the outfall, but the particles that settle far from the outfall may accumulate in sensitive fisheries habitats in deeper water or in Caribou Harbour. A more science-based and quantitative study of the fate of the suspended particulate matter should be done with the sediment transport modules that are part of the MIKE modeling software. A well calibrated hydrodynamic model that accurately computes the three-dimensional currents in the region would enable use of the sediment transport modules that could provide an accurate assessment of the potential environmental impacts of fine effluent particulate matter throughout the region.

6. Conclusions

The updated studies using the MIKE 21 and CORMIX models are both inaccurate and misleading. They overpredict the mixing and dilution of the effluent and do not provide science-based evidence that can be used to assess the potential environmental impacts of the near- and far-field effluent dilution from the proposed outfall site. This is based on sloppy modeling practices that I criticized in my original report but were not addressed in the new studies.

→ *New data show that density effects are very important in the region. Therefore, not only does the two-dimensional model give meaningless effluent concentration fields, but both the near- and far-field models overpredict the mixing and dilution.*

The most important aspect of the dynamics in the region that continues to be ignored by Stantec is the effect of density stratification. In the updated study, while Stantec set out to discount the importance of density effects with a series of oceanographic measurements, these measurements only serve to strengthen a case for their importance in the region. The ADCP data reveal peaks in the horizontal currents 15 m below the surface that arise from three-dimensional, density-driven flows that cannot be simulated with the two-dimensional MIKE 21 model used in the studies. The vertical profiles of salinity and temperature show that the density varies by 0.4 kg/m^3 over the water column. Nevertheless, Stantec argues that this density variability is small and ignores its effects even though the CORMIX manual suggests a threshold of just 0.1 kg/m^3. Because the vertical density variability is large enough to damp vertical turbulent mixing, ignoring its effects has important ramifications for both the near- and far-field modeling. The near-field dilution with CORMIX is overpredicted because the turbulence and mixing at the outfall are not damped as they should be. The far-field dilution is also overpredicted because the

two-dimensional MIKE 21 model assumes complete mixing over the water column even though the stratification promotes effluent transport in shallower layers with higher concentration.

→ *The simulations of the far-field dilution of effluent discharged from the Boat Harbour weir are meaningless because the buoyant effluent can only be simulated with a three-dimensional model.*

Three-dimensional, density-driven effects are particularly important for simulating the effluent discharged from the Boat Harbour weir, where the effluent plume is confined to a near-surface, buoyant layer that cannot be represented with the two-dimensional MIKE 21 model. The effluent concentrations are expected to be higher at the Boat Harbour weir than at site CH-B because of the shallow water, weaker tidal currents and a lack of an outfall diffuser to promote near-field mixing. The shallowness and the effect of the weak tidal currents can be simulated with the MIKE 21 model to produce far-field effluent concentrations at the Boat Harbour weir that are significantly higher than those simulated at site CH-B. However, the dynamics of the buoyant plume are not accurately simulated with a two-dimensional model, and so the results do not accurately reflect the far-field dilution of the effluent discharged from Boat Harbour.

→ *Based on the validation results, the far-field model performs poorly and the resulting effluent fields cannot be trusted. Waves and temperature are validated yet they have no bearing on the results, and sea ice is not correctly represented in the model.*

Regardless of the lack of density effects, the studies suffer from fundamental problems associated with model setup, validation and analysis that I pointed out in my review of the Original Study. Despite the additional measurements, the validation of the currents near site CH-B indicates that the model performs poorly and cannot be trusted to accurately predict the far-field effluent transport. Although validation shows reasonably accurate predictions of wind-generated waves, their impacts are not quantified, and the relatively minor impact they may have is overwhelmed by errors in simulation of the tidal currents. The simulated temperature is shown to match observations to a reasonable degree, and there is extensive discussion of temperature and salinity modeling in the updated study. However, this discussion is misleading because the associated density effects related to temperature and salinity have no effect on the circulation in the two-dimensional MIKE 21 model. Also misleading is the implementation of the winter scenario, which accounts for sea ice simply by eliminating wind and waves from the study without accounting for reduced tidal currents due to the ice.

→ *Stantec states that there is no effluent buildup in Caribou Harbour, although this is clearly not the case and could easily be quantified with the MIKE 21 model.*

In the end, the MIKE 21 model setup as it is implemented can only assess the effects of tidal currents on the far-field effluent transport during different months of the year – in this case February and July 2019. Not only are the results inaccurate, but the resulting plots of the effluent at the end of each month are misleading because the two-dimensional MIKE 21 model overpredicts the dilution factors. Nevertheless, Stantec uses these plots to falsely claim that there is no effluent buildup in Caribou Harbour even though this is clearly not the case. It would be straightforward to compute the effluent accumulation in the Harbour with the model and assess

the relative impact of realistic scenarios on this buildup. However, such science-based analysis is clearly beyond the scope of the Stantec studies.

→ *Including the correct receiving water density in the near-field CORMIX model, the dilution factor 100 m from the outfall is 42, 3.5 times lower than the value of 145.7 in the updated study. A more realistic worst-case scenario would give an even lower dilution factor when accounting for vertical density stratification effects, weaker slack tidal currents during neap tides, and less buoyant effluent during late summer/early fall.*

While the updated near-field modeling with CORMIX correctly accounts for the potential for reduced mixing during slack tidal currents, the scenario employs a receiving water density that is too high. Use of a more realistic, less dense receiving water gives less vigorous buoyancy-driven mixing and an effluent dilution factor of 42 at the edge of the mixing zone 100 m from the outfall, 3.5 times lower than the value of 145.7 with the denser receiving water. Although this scenario includes less dense receiving waters and slack tides, a more realistic worst-case scenario should include slack tidal currents during neap tides, which can be significantly weaker. The worst-case scenario should also use a receiving water density in late summer/early fall when waters are expected to be at their warmest and freshest, or least dense. Finally, the potential for reduced vertical mixing due to strong vertical density stratification should be accounted for in the CORMIX model. The full nature of the temperature and salinity dynamics and the vertical stratification in the region would need to be assessed with more observations of salinity along with three-dimensional modeling.

→ *Fine particulate matter will settle in the vicinity of the outfall due to particle aggregation and setting rates that are much faster than those predicted by Stantec. Accurate sediment transport modeling should be conducted with the MIKE sediment transport modules.*

The sediment transport modeling conducted by Stantec is fundamentally flawed because it does not account for flocculation of fine particulate matter in the presence of organic material in the effluent. Flocculation produces large particles, or flocs, that settle much faster than the fine particulate matter, thus incurring settling and buildup in the vicinity of the outfall. The fate of the smaller particles that are transported further from the outfall cannot be assessed with the model employed by Stantec, since it makes too many overly simplistic assumptions about the currents. Instead, transport of fine particulate matter can be computed with the sediment transport modules in the MIKE modeling software. This would enable assessment of the ultimate fate of the particles and their potential to impact sensitive fisheries habitats in the region.

7. Reference

Jirka, G. H., Doneker, R. L., and S. W. Hinton, 1996, User's manual for CORMIX: A hydrodynamic mixing zone model and decision support system for pollutant discharges into surface waters, DeFrees Hydraulics Laboratory, School of Civil and Environmental Engineering Cornell University, (https://www.epa.gov/sites/production/files/2015-10/documents/cormix-users_0.pdf).

APPENDIX A-2

The **tidal period (PERIOD)** must be supplied; in most cases it is 12.4 hours, but in some locations it may vary slightly. The **maximum tidal velocity (UAmax)** for the location must be specified; this can usually be taken as the average of the absolute values of the two actual maxima, independent of their direction. A CORMIX design case consists then of an instantaneous ambient condition, before, at or after one of the two slack tides. Hence, the analyst must specify the **time** (in hours) **before, at, or after slack** that defines the design condition, followed by the actual **tidal ambient velocity (UA)** at that time. The ambient depth conditions are then those corresponding to that time.

In general, tidal simulations should be repeated for several time intervals (usually hourly or two-hourly intervals will suffice) before and after slack time to determine plume characteristics in unsteady ambient conditions.

Strongly unsteady conditions can also occur in other environments, such as in wind-induced current reversals in shallow lakes or coastal areas. In this case, any typical reversal period can be analyzed following an approach similar to the above.

4.3.4 Ambient Density Specification

Information about the density distribution in the ambient water body is very important for the correct prediction of effluent discharge plume behavior. CORMIX first inquires whether the ambient water is **fresh water** or **non-fresh** (i.e. brackish or saline). If the ambient water is fresh and above 4 ^{o}C, the system provides the option of entering ambient temperature data so that the ambient density values can be internally computed from an equation of state. This is the recommended option for specifying the density of fresh water, even though ambient temperature per se is not needed for the analysis of mixing conditions. In the case of salt water conditions, Figure 4.3 is included as a practical guide for specifying the density if "salinity values" in parts-per-thousand (ppt) are available for the water body. Typical open ocean salinities are in the range 33 - 35 ppt.

The user then specifies whether the ambient density (or temperature) can be considered as **uniform** or as **non-uniform** within the water body, and in particular within the expected plume regions. As a practical guide, vertical variation in density of less than 0.1 kg/m^3 or in temperature of less than 1 ^{o}C can be neglected. For uniform conditions, the **average ambient density** or **average temperature** must be specified.

When conditions are non-uniform, CORMIX requires that the actual measured vertical density distribution be approximated by one of three schematic stratification profile types illustrated in Figure 4.4. These are: Type A, linear density profile; Type B, two-layer system with constant densities and density jump; Type C, constant density surface layer with linear density profile in bottom layer separated by a density jump. Corresponding profile types exist for approximating a temperature distribution when it is used for specifying the density distribution.

Note: When in doubt about the specification of the ambient density values it is reasonable to first simplify as much as possible. The sensitivity of a given assumption can be explored in subsequent CORMIX simulations. Furthermore, if CORMIX indicates indeed a flow configuration (flow class) with near-field stability, additional studies with the post-processor option CORJET (see Section 6.1) can be performed to investigate *any arbitrary density distribution*.

After selecting the stratification approximation to be used, the user then enters all appropriate density (or temperature) values and **pycnocline heights (HINT)** to fully specify the profiles. The pycnocline is defined as zone or level of strong density change that separates the upper and lower layers of the water column. The program checks the density specification to insure that stable ambient stratification exists (i.e. the density at higher elevations must not exceed that at lower elevations).

Note that a dynamically correct approximation of the actua ldensity distribution should keep a balance between over-and under-estimationof the actual data similar to a best-fit in regression analysis. If simulation results indicate internal plume trapping, then it is

APPENDIX A-3

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APPENDIX A-4

Review of near- and far-field modeling studies by Stantec Consulting for the Northern Pulp effluent treatment facility replacement project

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1. Executive Summary

This report provides a review of computer modeling of the fate and transport of effluent from proposed discharge locations in and around Pictou Harbour and offshore of Caribou Harbour near Pictou, Nova Scotia. The modeling work was carried out by Stantec Consulting for assessment of the Replacement Effluent Treatment Facility Project registered by Northern Pulp Nova Scotia Corporation. Simulations were conducted with accepted industry-standard models including the near-field CORMIX model and the far-field MIKE 21 model.

Owing to several problems related to the implementation of the CORMIX and MIKE 21 models, they overestimate the near- and far-field mixing and dilution of the effluent from the proposed outfalls, including the final outfall at site CH-B offshore of Caribou Harbour. This leads to the incorrect conclusion that the environmental impacts will be negligible because the effluent concentrations are predicted to be unphysically low. Instead, correct implementation of the models with more conservative and physically realistic scenarios would show that effluent concentrations in the region could be much larger and that effluent accumulation in Pictou and Caribou Harbours is likely.

The principle problems related to the far-field MIKE 21 modeling include:

1) Agreement between the model simulated currents and water levels and observed currents and water levels in Pictou Harbour is poor. Therefore, we can have no confidence that the model accurately predicts the far-field fate and transport of the effluent at any of the proposed outfall locations.

2) Use of the two-dimensional MIKE 21 model is inappropriate given the potentially strong vertical variability of currents driven by winds and river inflows in the region. These three-dimensional effects can significantly impact the far-field transport by exaggerating accumulation in Pictou and Caribou Harbours.

3) The far-field model scenarios using MIKE 21 omit or incorrectly simulate the impacts of winds, river inflows, offshore currents in the Northumberland Strait, ice, waves, and storm surge. These processes may significantly impact far-field mixing and dilution of effluent and lead to higher effluent concentrations throughout the region.

4) The figures showing maps of low effluent concentrations offshore of Caribou Harbour are misleading because the far-field model artificially dilutes the effluent. Nevertheless, the dilution factors are reported to be over 100 in most of the region surrounding the CH-B outfall, which is an overly optimistic result.

The principle problems related to the near-field CORMIX modeling include:

1) The ambient tidal current used to drive the CORMIX model offshore of Caribou Harbour is much stronger than the expected current during a neap tidal period. Tidal currents are even weaker during winter when there is ice cover which decreases the strength of the tides. Overestimation of the tidal currents gives an unrealistic overprediction of the near-field mixing and dilution of effluent, particularly during slack tides.

2) The ambient density employed in the CORMIX model is too saline because it does not take into account potential effects of river inflows. This makes the receiving waters too dense and leads to too much buoyancy-driven mixing of the effluent plume, thus leading to an overestimate of the near-field mixing and dilution. The CORMIX modeling also ignores the effect of vertical variability in salinity, which could be strong during periods of high river inflows and reduce the near-field mixing and dilution because fresh water layers near the surface may trap the effluent beneath them.

It should be noted that these problems are related to the implementation and choice of models, not to the models themselves. When implemented correctly, CORMIX and far-field models like MIKE 21 or its three-dimensional counterpart, MIKE 3, yield very reliable near- and far-field predictions of effluent transport.

2. Introduction

2.1. Overview

In this report I review the near- and far-field modeling studies conducted by Stantec Consulting to understand the fate of effluent from proposed outfalls located in and around Pictou and Caribou Harbours which are connected to the Northumberland Strait in Pictou County, Nova Scotia, Canada. These studies are part of the Environmental Assessment of the Replacement Effluent Treatment Facility Project registered by Northern Pulp Nova Scotia Corporation (Northern Pulp). Specifically, in this report I analyze the modeling studies contained in the following appendices included in the Environmental Assessment:

1) Appendix E1 – Stantec final Caribou discharge receiving water study (The final study)
2) Appendix E2 – Stantec response to questions
3) Appendix E3 – Stantec receiving water study effluent treatment plant replacement (The preliminary study)

In the preliminary study (Appendix E3), scenarios were conducted to study the effluent transport from two outfalls in (sites Alt-A and Alt-B) and offshore of (sites Alt-C and Alt-D) Pictou Harbour. It was deemed that the suggested outfall location Alt-D was not appropriate because of the potential for ice scour of the outfall in the relatively shallow water (11 m). The final study (Appendix E1) was then undertaken to assess the effluent transport from outfalls located offshore of Caribou Harbour in 20 m of water at sites CH-A and CH-B. Site CH-B was recommended as the location with the least environmental impact. In what follows, I will refer to these appendices as the "final study", the "response to questions", and the "preliminary study". Collectively, they will be referred to as "the studies" or "the Stantec studies".

Simulating the transport and fate of effluent from a coastal wastewater outfall requires two kinds of models. Roughly within 100 m of the outfall, effluent is diluted relatively rapidly by mixing with ambient ocean waters. This mixing is due to strong turbulence related to jet-like flow from the outfall ports and buoyancy arising from the difference in density between relatively warm and fresh effluent and colder and saltier receiving waters. In the studies reviewed here, this dilution process is simulated with CORMIX (Jirka et al. 1996), an industry standard near-field model that takes into account diffuser geometry and properties of the effluent and receiving waters. After the near-field turbulence and buoyant mechanisms have decayed, the fate and transport of the effluent is dictated by the larger-scale circulation in the coastal region surrounding the outfall. The far-field currents, salinity, and temperature are obtained with a hydrodynamic model that computes circulation in response to winds, tides, river inflows, and other relevant coastal processes. These currents are then used to compute the far-field transport and fate of the effluent. In the studies reviewed here, the MIKE 21 model (DHI 2017) was used to compute the far-field circulation and transport. This model is also an industry standard that has been applied extensively to study circulation and transport in coastal regions. While the CORMIX model is an appropriate choice for the near-field modeling, the MIKE 21 model is not appropriate for this study because it is a two-dimensional model, as discussed in Section 3.1 below.

It is common practice to use far-field models to supply ambient currents and environmental parameters like temperature and salinity to the near-field model. The near-field dilution results including the near-field concentration and vertical distribution of the effluent plume can be supplied to the far-field model. In the Stantec studies, the ambient currents needed

for the CORMIX model are taken from the MIKE 21 model, while the ambient density field for CORMIX is taken from measurements of temperature and salinity. The far-field MIKE 21 model does not use results from CORMIX. This is common given that only relative concentrations are needed to assess the far-field dilution when using a two-dimensional model like MIKE 21. As will be discussed in this report, however, a three-dimensional far-field model is needed, and this model requires information about the vertical distribution of the effluent plume from the near-field model.

2.2. Currents and dispersion in the coastal ocean

In coastal areas like the regions in and around Pictou and Caribou Harbours, the currents arise from a multitude of processes, although a simple categorization is to distinguish between the tides and all other non-tidal processes, such as wind-driven, river-driven, and large-scale ocean currents in the Northumberland Strait. A prevailing and misleading theme in the Stantec studies is the suggestion that, although some non-tidal processes are included in the modeling (albeit incorrectly), these non-tidal processes are not important because the tidal currents dominate the near- and far-field effluent transport. However, as discussed throughout this review, the non-tidal processes are extremely important for predicting the fate of the effluent in both the near-field and far-field.

Because of their oscillatory motion in time, tides transport effluent back and forth over an outfall, and with each oscillation the effluent is dispersed, leading to horizontal spreading of the effluent plume. This so-called tidal dispersion is strongest in regions where the tidal currents are both large and vary strongly in space, such as at the mouths of Caribou and Pictou Harbours. Although an outfall plume will spread due to tidal dispersion, there will not be much dilution of the effluent after many tidal cycles unless there are non-tidal currents that can transport the effluent away from the outfall. Without non-tidal currents, effluent would simply accumulate around outfall location CH-B and in nearby Caribou Harbour.

Accumulation of effluent in the vicinity of an outfall is strongest during slack tides, periods of low or negligible currents that occur twice during every tidal period, which is approximately 12 hours (the tidal period due to the moon is 12.42 hours and that due to the sun is 12 hours). The effects of slack tides are most pronounced during neap tides when tidal currents are weakest. For example, the maximum neap tidal current is approximately 10 cm/s at outfall location CH-B (based on the discussion presented in Section 4.2 below). With this tide, the tidal currents will be weaker than 2.5 cm/s for the one-hour period surrounding slack, or for approximately two hours (17%) of the entire tidal cycle. During each one-hour slack tide period, 173 kg[1] of suspended solids would be discharged into the ocean from outfall CH-B. The solids that were discharged 30 minutes before slack tide would find themselves just 45 meters from the outfall, only to be transported back over the outfall again at the end of the next 30 minutes to be re-entrained into the outfall plume. This demonstrates the importance of slack tide in the accumulation of effluent over an outfall diffuser due to the prolonged periods of relatively weak currents, particularly during the neap period of the spring-neap tidal cycle. Furthermore, owing to the reduction in vertical turbulent mixing because of the weak currents during slack tides, there is a strong potential for the suspended solids in the effluent to settle out of the water

[1] Based on a concentration of 48 mg/L and effluent flow rate of 1 m^3/s, from Table 3.2 of the final study.

column and onto the bed in the vicinity of the outfall. The effects of slack tides and the potential for settling of suspended solids is not discussed in the Stantec studies.

Fortunately for the health of coastal ecosystems, non-tidal currents exist to varying degrees in all coastal regions. In fact, the tides themselves produce non-tidal currents, much like ocean swell waves produce rip currents that have no wave-like signature. Non-tidal currents that are produced by the tides are generally smaller than other non-tidal currents in the region, such as wind-driven, river-driven, and large-scale ocean currents. While river flows and winds are included in the far-field modeling, these effects are not accurately simulated, as discussed in Section 3.1 below. There are large-scale ocean currents that are predominantly from the west to east in the Northumberland Strait at speeds ranging from 6-9 cm/s (Lauzier 1965). Another non-tidal current in the region is the counterclockwise circulation around Pictou Island that has been observed by local fisherman (MacCarthy and Egilsson 2019). This non-tidal current is likely driven by a combination of winds and tides. Although they are important in dictating the far-field transport of effluent, these non-tidal currents are regarded as not important and not included in the Stantec studies.

3. Review of the far-field modeling

3.1. Two- vs. three-dimensional modeling

The MIKE 21 model employed in the far-field simulations is not appropriate because it is two-dimensional and does not represent important three-dimensional processes in the region, such as wind-driven circulation and density effects arising from freshwater flows from rivers. A more appropriate model like MIKE 3 would need to be used to account for these effects.

The MIKE 21 model employed by Stantec is a two-dimensional model in that it computes the depth-averaged currents at each grid cell in the computational domain. Therefore, it assumes that the currents are constant with height above the bed in each grid cell. The three-dimensional equivalent of MIKE 21 is the MIKE 3 model (also by DHI), which computes the variability in currents as a function of height above the bed. The principal advantage of two-dimensional, depth-averaged models is that they are computationally efficient because three-dimensional models require addition of grid cells in the vertical direction. In the case of the Stantec simulations, a three-dimensional model would require at least 20 layers in the vertical which would increase the model runtime by at least a factor of 20.

Despite its computational efficiency, a two-dimensional model is not appropriate to simulate the far-field effluent transport because of the importance of three-dimensional processes in the coastal region around Pictou and Caribou Harbours arising from variations in salinity and temperature, which affects the density stratification. Density stratification due to salinity arises along coastlines where river inflows bring fresh water into the ocean. Because the river water is fresh, it is less dense than the salty ocean, thus inducing vertical variations in the salinity field in which the denser, salty water lies beneath the lighter, fresher water above. Temperature stratification also exists throughout the oceans since the upper layers tend to be heated by the sun, leaving warmer and lighter waters above colder and denser waters. Temperature stratification is weakest in winter months when incoming heat is weakest.

Salinity stratification is more important than temperature stratification in coastal waters where river effects can be important. For example, the top and bottom salinities in the Pictou

Road region in July 1995 were 23.7 and 31.2 ppt (parts per thousand by mass), respectively, while the top and bottom temperatures were 13.5°C and 14°C, respectively (Preliminary study, p. 2.21). This translates to a top-bottom difference in density of 5.8 kg/m^3 due to the salinity and 0.1 kg/m^3 due to temperature, using the UNESCO equation of state calculator (UNESCO 1981). In December 1998, the salinity stratification at the same location was weaker (top-bottom salinity difference of 2 ppt) although the temperature stratification was slightly stronger (top-bottom temperature difference of 2°C). The salinity stratification generally increases with increasing river flow and decreases with tidal flow strength, since tidal currents generate turbulence that tends to mix the salinity and temperature field and weaken the vertical density stratification. Measurements indicate that the surface salinity near the East River in the Pictou Harbour region varied from 20 ppt during low-flow periods to just 5 ppt during high-flow periods (Preliminary study, p. 2.21).

Ocean water is generally stratified in the vertical because density increases with depth, with lighter, less dense waters overlying heavier, denser waters. However, in the coastal ocean there is also horizontal variability in the salinity-induced density. At a river mouth, the water is fresh and there is no vertical salinity stratification, while in the ocean far from the river mouth the salinity is high, yet there is also weak vertical salinity stratification. The most important effect of this horizontal variability in density is to induce a three-dimensional circulation in which fresh, river waters flow seaward over denser ocean waters which flow landward. In addition to the implications for the near-field transport (See Section 4.2 below), the implication for far-field transport is that effluent may be transported into the harbours with the landward-flowing denser currents. This effect is accentuated in deeper waters, implying that it will be stronger in Pictou Harbour (which also has higher freshwater flows), although the shipping channel in Caribou Harbour can act as a conduit to transport effluent-rich ocean waters into the harbour.

A second three-dimensional effect that cannot be captured by a two-dimensional model is related to the winds. When aligned with the main axes of Pictou or Caribou Harbours, winds will drive currents downwind along the shallow edges while the flow in the central, deeper portions will be driven upwind. Since the dominant westerly winds (August-April[2]) in the region are generally aligned with the main axes of the harbours, they have the potential to drive surface effluent seaward and that at depth into the harbours. Wind-driven circulation is typically not as strong as that driven by the rivers or tides, although it can be important during periods with neap tides and low river inflows.

A two-dimensional model also cannot capture the variability of the effluent with depth. The assumption of two-dimensionality in the effluent field is reasonable when the three-dimensional effects in the flow field are relatively weak. In fact it is possible to approximate some three-dimensional processes quite well with a two-dimensional model, such as a process known as shear-flow dispersion. Because of bottom friction, currents are slower near the bed, and if there is wind-driven circulation, the currents may be stronger near the surface. Therefore, tracers[3] that are in regions of the water column with slower-moving currents will be transported more slowly in the horizontal than those in the faster-moving regions of the water column. This process can be thought of as horizontal dispersion of the tracer field because it is spreading horizontally, and can be approximated reasonably well in a two-dimensional model with a shear-

[2] https://weatherspark.com/y/28559/Average-Weather-in-Pictou-Canada-Year-Round

[3] A tracer is a substance that is transported passively with the flow without buoyancy effects.

flow dispersion coefficient. The MIKE 21 model includes many approximations like this to account for three-dimensional effects in the two-dimensional transport module, although these were not employed in the Stantec studies (Preliminary study Table 2-1; Final study Table 2-11: "No decay and no dispersion in the particle tracking module"). Indeed, these approximations are not suitable for estuarine environments given that they work best in riverine environments that are weakly stratified, weakly wind-driven, and lack tidal influence.

Regardless of the influence of dispersion on the two-dimensional transport, the lack of vertical variability in the modeled tracer prevents simulation of an effluent that in reality can vary quite strongly in the vertical. The proposed effluent will typically be less dense than the receiving waters (it is both fresher with a total dissolved solids concentration, or salinity, of 1-4 kg/m^3, and warmer, with a winter temperature of 25^{o}C and summer temperature of 37^{o}C; Preliminary report p. 3.54). Therefore, if the receiving waters are sufficiently salty and cold (See Section 4.2 below) the effluent is expected to rise to the surface and propagate as a surface plume that is just 1-2 m thick based on the CORMIX near-field results in the Stantec studies. Furthermore, the depth at which the plume propagates is not necessarily at the surface, particularly under high flow conditions in which the effluent may be more dense than the receiving waters (See Section 4.2 below). Therefore, it is possible that the effluent could be driven in a direction that is opposite to that in a two-dimensional model if a three-dimensional model were used.

In summary, while three-dimensional effects may not be important during some periods of the year, such as during periods of low river flows and weak winds, in general a three-dimensional model is needed to accurately simulate the far-field fate and transport of effluent from the proposed discharge locations. Indeed, the MIKE 21 manual (Page 2 of DHI 2017) states, "In water bodies with stratification, either by density or by species (ecology), a 3D model should be used. This is also the case for enclosed or semi-enclosed waters where wind-driven circulation occurs." One might argue that three-dimensional models take too much time to run because of the need to include many grid points in the vertical. However, the Stantec final study employed a computational mesh with 24,645 grid cells (15,872 were employed in the preliminary study). Three-dimensional effects would be resolved with reasonable confidence using 20 or more grid cells in the vertical, which would result in 492,900 grid cells in three dimensions. This problem size is well within the reaches of a model like MIKE 3 using modern desktop computers and is relatively low compared to the problem size in other modeling studies in which three-dimensionality is important, both for consulting and academic projects (see, e.g. MacWilliams et al. 2008). Therefore, Stantec should have used a three-dimensional model like MIKE 3 because the circulation in the region is highly three-dimensional and the computational overhead is not restrictive.

3.2. Model setup and forcing

Although rivers and winds are included in the MIKE 21 model, these have no bearing on the far-field results because the effects of winds and rivers are not correctly reproduced with a two-dimensional model. Other processes like waves, storm surges, and large-scale currents were also not included in the MIKE 21 model even though they are important. Finally, the MIKE 21 simulations were conducted over a one-month period which is not long enough to assess the potential for effluent to accumulate in the harbours over much longer periods.

Data from tidal, wind, and river inflow measurements were supplied to the MIKE 21 model using standard practices in coastal ocean modeling. However, owing to the two-dimensional nature of the model, the winds and river inflows have little to no bearing on the far-field results in the studies. Wind and river inflow data could be supplied to a three-dimensional model in a similar manner as it was supplied to the MIKE 21 model in the studies, although estimates for flows in all rivers and streams would need to be included (only the East River was included). As suggested in the Stantec studies, river inflows should be based on stream gauges when available, and based on approximations using the relative catchment area when unavailable (the East River inflow was inferred from measured flows in the Middle River at the Rocklin hydrometric station). With regard to tidal forcing, the standard practice was performed in which the observed tides at Wood Islands were reconstructed based on superposition of the most important components of the tides (using software such as T_TIDE; Pawlowicz 2002). However, the reduction in tidal amplitudes due to large-scale ice cover was not included in the tidal forcing (See Section 3.4 below).

The influence of wind-generated waves and swells were not included in the MIKE 21 model which is a reasonable assumption, although waves should be included during storms, as should the effect of storm surges (See Section 3.4 below). Finally, the west-to-east currents in the Northumberland Strait at speeds ranging from 6-9 cm/s (Lauzier 1965) should be included. These large-scale currents can have an important impact on transport by flushing a region that might otherwise accumulate with effluent without river flows or winds. While this will contribute to flushing of the proposed outfall at location CH-B near Caribou Harbour, it will drive the effluent southward with the potential to be entrained into Pictou and Boat Harbours. This effect is likely to be pronounced with three-dimensional modeling.

To evaluate the far-field dilution characteristics of effluent discharged from the proposed outfall locations, the MIKE 21 model was run over a total simulation time of one month during July 2016 for each outfall. This length of time is not sufficient to evaluate the effects of the effluent plumes given that the flow of effluent is not yet in equilibrium over such a short time period. The appropriate time period is dictated by the flushing time of the estuaries which can take days to months depending on the tides, river flows, winds, and large-scale circulation in Northumberland Strait. It is impossible to determine equilibrium from the spatial distributions of the effluent dilution factors (such as Figure 2.13 in the final study, showing the spatial distribution of the effluent dilution factor from the CH-B discharge location in the vicinity of Caribou Harbour after one month), since the effluent may still be accumulating in one of the harbours at the end of the month. A quantitative measure would need to be computed to demonstrate that the model is in equilibrium. For example, the total effluent mass in each harbour would need to be relatively constant in time, at least when averaged over a tidal cycle. Variations in forcing from processes that act over intervals that are longer than the tides (e.g. the spring-neap cycle, rainfall and associated river flow events, seasonal variations in winds), lead to associated slow variations in the effluent transport, and so these would need to be accounted for when assessing whether the total mass in the harbours is in equilibrium (see, e.g. Rayson et al. 2016).

In summary, the tides are the only component of the forcing in the far-field simulations that have any significant impact on the far-field dilution results. The other components of the forcing, including wind, river inflows, waves, storm surges, and large-scale currents are either not included or have little to no impact. Accurate representation of all of these effects would

need a three-dimensional model that is run for much longer than one month to account for possible accumulation in the harbours.

3.3. Model validation

Model validation is an important step in coastal ocean modeling because it demonstrates that the far-field model accurately predicts realistic currents, water levels, and other parameters. Not only is there no quantitative model validation in the studies, but the comparisons of water levels and currents to observations in Pictou Harbour demonstrate that the MIKE 21 model performs poorly. Therefore, the MIKE 21 model cannot be used to assess, with any level of confidence, the far-field behavior of the effluent discharged from the proposed outfall locations.

Validation is the most important step in coastal ocean modeling because it proves that the model is a faithful representation of what is happening in the real world. This gives the user confidence to use the model to analyze results obtained during the validation period, but more importantly during periods when there is no data so that predictions under a wide variety of scenarios can be made. An important component of validation is the availability of appropriate observational datasets. For two-dimensional modeling, these datasets should include time series of observations of sea-surface height and the east and west components of depth-averaged currents. Depending on the instrument, depth-averaged currents can be computed if the instrument measures currents throughout the water column (such as an acoustic Doppler current profiler, or ADCP), since these measurements can be averaged to produce an accurate representation of the depth-averaged currents. However, it is more common to measure currents at a point above the bed. If three-dimensional effects are weak, then the depth-averaged model result can be validated with the point measurement. Strong three-dimensionality makes it difficult to compare a point measurement to the result from a two-dimensional model, which should not be expected to produce the correct currents when three-dimensional effects are important. Three-dimensional models should be validated with velocity data at different heights above the bed in the water column and with time series of salinity and temperature near the bed and free-surface (to assess model ability to reproduce the stratification). Since three-dimensional models compute the vertical distribution of turbulent mixing, then it is desirable to obtain measurements of turbulence to validate the turbulence models. Ideally, models could validate the results of effluent transport, although such observational datasets are rare and so this is not common.

A common step that is often performed in coastal ocean model validation is what is referred to as calibration, in which model parameters that cannot be measured are varied to improve the results. Despite the availability of accurate bathymetry datasets, the bed roughness is rarely measured although it plays an important role in dictating the resistance by the bed on the flow. For example, beds covered with sands or gravels are rougher than beds that are covered with silts or muds, and so the resistance over sands and gravels should be higher. Sometimes, the roughness may be very large if there are bedforms like sand ripples or dunes. Even the drag by vegetation, corals, and kelp is modeled with an effective roughness (Fringer et al. 2019). In some cases, the roughness is approximated with knowledge of the distribution of sediments (this was accounted for in the near-field CORMIX modeling). However, the bottom roughness is more commonly used as a calibration or tuning parameter and varied to give the best match between observations and simulations. In the MIKE 21 model, the roughness is represented specifically

by the Manning's roughness parameter, which is used to compute the drag in flows with a free surface with given bed roughness properties.

After performing the appropriate calibration, it is standard practice to compare observations to simulations with quantitative metrics. There are many metrics available in the literature, although the most common are the mean error (also known as the bias), root-mean-square error, the coefficient of determination ("r-squared") and the lag, which is a measure of the time error between the observations and predictions. Another common metric is the skill score, which is a measure of the simulation error normalized by a measure of the spread in the observations. It is generally agreed upon in the coastal modeling community that a skill score greater than 0.65 characterizes excellent agreement between the model and observations (Allen et al. 2007). For simulations with tides, it is common to compare the amplitudes and phases of observed and modeled tidal constituents of both currents and water levels. These are particularly important to show that the model correctly captures the directions and magnitudes of the tidal currents. Examples of comprehensive validation of three-dimensional estuarine modeling studies can be found in MacWilliams et al. (2008) and Wang et al. (2011).

The MIKE 21 validation presented in the preliminary study by Stantec indicates that the model performs poorly because there is weak agreement between the simulations and observations. The validation is performed by running the model over a period in April 1990 when observations of water levels and currents in Pictou Harbour are available. Some statistics are computed, such as minimum, maximum, mean, and standard deviation, yet these statistics are computed separately for the observations and simulations and provide no objective measures for comparison like those found in the literature and discussed above. Despite a lack of quantitative comparisons, the qualitative comparisons represented by the figures in the preliminary study clearly indicate that the agreement between simulations and observations is poor. For example, Figure 1 below shows a comparison between simulated and measured water levels in Pictou Harbour (Figure 2-8 from the preliminary study). While the agreement in timing of the water level is good, most of the high- or low-water levels (indicated by the horizontal blue lines) are visibly incorrect. This lack of agreement could be due to wind and river forcing that was omitted from the model because of a "…lack of the simultaneous records of wind and river discharge during the period of model calibration in April 1990" (Preliminary study, p. 2.27). However, wind or flow events would produce disagreement in the tides over the duration of these events (over a few days each, such as during April 17-21), not throughout the entire record. Furthermore, attributing errors to incorrect forcing implies that the validation period is inappropriate because it does not allow for a demonstration of model fidelity through proper validation. Comparison of observed and simulated currents in Pictou Harbour in Figure 2-9 of the preliminary study shows that the model underpredicts the current speeds by roughly 20% at Location #1 and roughly 50% at Location #2, and in some cases by 80%. This level of disagreement is unjustifiable. Furthermore, there is no indication that the model correctly simulates the direction or timing of the currents since only current speeds are compared.

The differences between observations and simulations is attributed to "the nature of stratified currents through the water column from surface to the seabed, as well as the difference in bathymetry between the existing condition and that in 1990" (Preliminary study, p 2.28). If the difference is indeed due to stratification effects, then this justifies the need for a three-dimensional model. Differences in bathymetry would indicate that the choice of the validation period is not suitable because the circulation in the region was fundamentally different in 1990 than it was when the bathymetry datasets were collected over the past decade. Of course, it is

always desirable to use more recent observations to ensure that the results are not contaminated by differences between the dates in which the bathymetry and flow measurements were made. However, a more careful validation procedure and use of an appropriate model should be able to indicate whether this is the case and if more recent data is needed. Regardless, the bottom line is that simply more observations are needed to prove that the model simulations are accurate. Even if the validation indicated that the simulations of currents and water levels in Pictou Harbour were excellent, it would be difficult to argue that the model also correctly reproduced currents in and around Caribou Harbour unless there were observations of water levels and currents from at least one station in that region.

In summary, the validation suggests that the model does not correctly predict the magnitude, direction, or timing of the currents. Therefore, in addition to a lack of validation in or near Caribou Harbour, the results provide no confidence that the model can accurately compute the currents and simulate the subsequent far-field fate and transport of the effluent from any of the proposed outfall locations. Furthermore, the validation provides no measure of confidence that can be ascribed to the predictions of ambient currents or directions at any of the six sites for use in the near-field modeling studies (See Section 4.2 below).

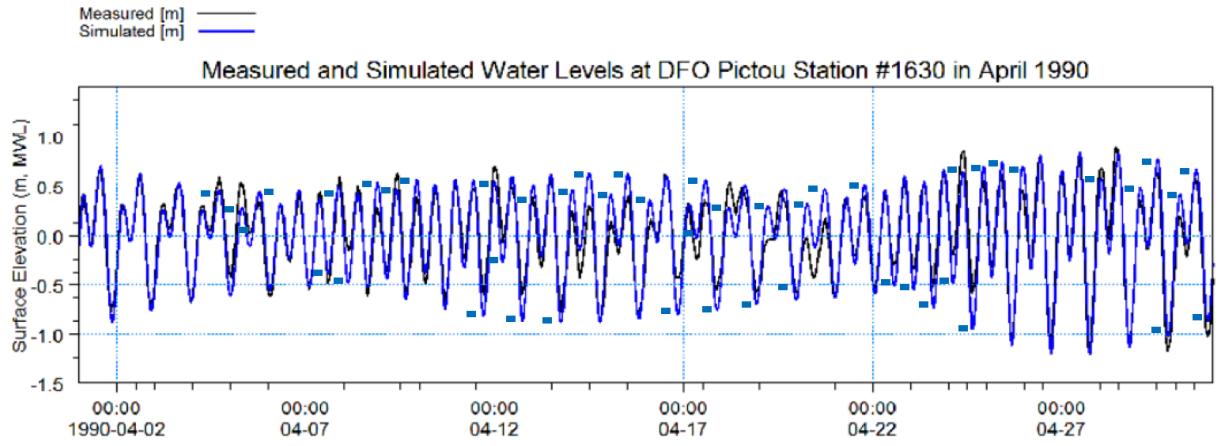


Figure 1: (Figure 2-8 from the preliminary study): Comparison of simulated to measured water levels in Pictou Harbour during April 1990. The blue horizontal lines were added to indicate incorrectly predicted low or high water levels.

3.4. Model scenarios

The scenarios that were conducted in the studies could only evaluate (unsuccessfully) the effect of the tides in a two-dimensional model. Many more scenarios are needed using a three-dimensional model to assess the potential impacts of winds, river inflows, large-scale currents in the Northumberland Strait, waves, storm surges, and ice during winter.

The far-field model scenarios in the studies were carried out with environmental conditions that are stated to minimize mixing of the effluent plume, thus producing conservative results. The conditions include use of "smaller tidal ranges, warmer ambient waters, less wind-driven surface currents, and lower freshwater flows from rivers" (Final report, p. 3). Warmer ambient waters during summer are conservative because, "in winter, mixing is effectively enhanced due to the larger difference in temperature and salinity (density) conditions" (Final report, p. 3). Wave and

storm surge conditions are not included in the model given that "surge tides generate turbulence and ultimately provide better and faster mixing conditions" (Answer #2, Response to questions).

While some of these conditions are indeed conservative, not all are relevant or necessarily conservative, particularly in a two-dimensional model. Because the far-field model is two-dimensional and there is no vertical density stratification, the far-field plume dynamics are insensitive to the density of the effluent plume. Therefore, two-dimensional results should be the same for ambient summer or winter temperature conditions. A difference between two-dimensional effluent transport results in summer and winter could, in principle, be based on different initial effluent concentrations derived from the near-field model while taking into account the different ambient conditions from observations. However, the discharged effluent concentration in the far-field model is arbitrary because the dilution factor is a ratio of the far-field to discharged effluent concentration, and thus the actual concentration discharged from the outfall is irrelevant. A reduction in tidal and wind-driven currents reduces the vertical mixing of the plume, although again this has no bearing on the far-field results because the plume is vertically well-mixed in the two-dimensional model. However, different tidal conditions affect the tidal dispersion in the two-dimensional model and thus the tides have a significant impact on the far-field results. Wind-driven currents also affect the far-field results, but these effects are weak in a two-dimensional model since it does not account for wind-driven recirculating currents. Smaller river inflows may also be more conservative because they would be less likely to flush effluent out of the harbours. However, wind and river inflow effects can only be correctly simulated with a three-dimensional model, since both winds and river inflows can transport effluent into the harbours (See Section 3.1 above). Finally, while waves and storm surges indeed provide more mixing and dilution in the near-field, the surge has the potential to transport offshore effluent into the harbours, thus it may potentially be less conservative in terms of far-field transport.

Ice plays a significant role in the circulation and far-field effluent transport in coastal areas like Pictou and Caribou Harbours, yet its effects were not incorporated into the MIKE 21 model in the Stantec studies. While there are frameworks that can couple a model for ice formation and melting to a model like MIKE 21 (e.g. Kusahara and Hasumi 2013), it is possible to approximate the effects of ice sheets by imposing friction at the ice-water interface in the circulation model that impedes the flow of water due to the friction from the ice (Georgas 2012). In smaller domains like those in the Stantec studies, in addition to friction from the ice, the tidal boundary conditions must be altered to account for the significant reduction in tidal amplitude due to ice cover over the Gulf of St. Lawrence (Smith et al. 2006). Alternatively, these boundary conditions must be obtained from data measured during winter when there is large-scale ice cover. In shallow areas, the flow may be completely blocked when ice freezes over the entire water column, in what is referred to as "fast ice" by fishermen in the Pictou area (MacCarthy and Egilsson 2019). In the final Stantec study (p. 3), it is indicated that a winter scenario and the associated effects of ice are not considered because "the presence of ice cover would increase turbulence at the ice/water interface by providing resistance to the ambient water currents, resulting in higher mixing and dilution". Indeed, higher mixing and dilution may take place and can be modeled in the near field with CORMIX, but turbulent mixing at the ice/water interface is not accounted for in the far-field model because it is two-dimensional. Instead, the effect of ice in the far-field model is to reduce the magnitude of the currents and reduce the potential for far-field dilution. Therefore, a winter model run with extensive ice cover and appropriate boundary

conditions is needed to represent a worst-case scenario for the far-field dispersion despite the substantial initial dilution of the strongly buoyant effluent during this period.

Overall, the scenarios in the Stantec reports do not reproduce the impact of different physical processes over the course of the year on the effluent transport in the region. In its current form, the far-field model can only be used to simulate the influence of tides on the far-field dispersion of the effluent plumes during low flow and low wind conditions in the absence of ice and large-scale currents. To obtain a good understanding of all of the possible scenarios that might impact the far-field transport, a three-dimensional model would need to be run under scenarios that demonstrated the effects of (1) strong/weak winds, (2) strong/weak river flows, (3) with/without ice cover (including the associated weaker tidal forcing and possibly fast ice), and (4) with/without large-scale currents through the Northumberland Strait. In each of these scenarios, the model would need to be run for at least as long as the flushing time to ensure that the far-field effluent field reaches equilibrium. If the flushing time is not much longer than a spring-neap tidal cycle, then additional scenarios would need to be run to understand the impact of strong (spring) vs. weak (neap) tides. The freshwater inflows would need to include all possible rivers and effluent from municipal wastewater treatment plants, given that the worst-case scenario may include freshening of the receiving waters to a point that significantly impacts the near-field dilution (See Section 4.2 below). Finally, storm surge scenarios would need to be studied given the possibility of strong waves and surges in the region, which could lead to significant accumulation in the harbours.

3.5. Results

The particle tracking module in MIKE 21 over-approximates the far-field mixing and dilution because of the assumption of uniformly distributed effluent mass throughout the volume of each grid cell. This gives the best-case scenario because it mixes the effluent from a point discharge completely over the water column, thus eliminating the possibility of higher concentrations confined to near-surface or mid-water layers of effluent. As a result, the assessment by Stantec that the far-field dilution factors for most of the region surrounding site CH-B are above 100 at the end of the one-month simulation period is overly optimistic. Accounting for vertical variability in the plume could lead to much smaller dilution factors but this would require a three-dimensional model. Dilution factors are also over-approximated in Caribou Harbour because the simulations are not run for long enough time to allow for accumulation of effluent in the harbour due to tidal dispersion.

As they are presented in the reports, the far-field modeling results provide only qualitative, and in some cases misleading, information about the far-field fate and transport of effluent from the proposed outfalls. The focus of this section is on Figures 2.5-2.13 in the final study, which depict extremely low concentrations of the effluent field around site CH-B. For example, in Figure 2.5 there is a small patch of effluent located over the outfall which appears to have a concentration of 2-3 mg/L. It is hard to imagine how the concentration of the effluent from the outfall could have diluted by nearly a factor of 50 (from 100 mg/L) even though this figure depicts the concentration field at slack tide during a neap tidal cycle. As discussed in Section 2.2 above, during slack tide we expect higher concentrations due to buildup of effluent because currents are too weak to induce any significant transport away from the outfall. Higher effluent concentrations are also expected because turbulent dispersion is ignored in the particle tracking

module of MIKE 21 to promote conservative dilution factors. It is possible that a diluted concentration from the outfall is imposed in the far-field model based on the near-field modeling results, although an arbitrary concentration of 100 mg/L is assumed given that the relative concentration is of interest.

The low concentrations in the figures can be explained by the particle tracking module that is used to transport effluent in MIKE 21. In the particle tracking module, the outfall is modeled as a point source from which particles with a given amount of mass are released at specified time intervals. After being released, the particles are transported by currents computed with the MIKE 21 hydrodynamic module. In the Stantec final study, the mass flow rate from the outfall is given by 0.1 kg/s, based on the assigned concentration of 100 mg/L and flow rate of 1 m^3/s. Therefore, if we assume that one particle is released from the outfall every hydrodynamic time step of 60 s (the details of how often particles are released are not provided, although this is a safe assumption), then it must be assigned a mass of 6 kg. It is possible to release particles at shorter intervals or multiple particles at each time step, with mass divided equally among the particles to ensure the same prescribed mass flow rate of 0.1 kg/s. However, there would be no difference between transport of a single particle and a group of particles because particles in a group do not spread over time due to a lack of turbulent dispersion, which is ignored by Stantec in the particle tracking simulations. In addition to a lack of dispersion, there is no decay assigned to the particles in the Stantec studies, and hence the mass of each particle remains fixed during the simulations.

To convert the distribution of particles to a concentration field on the hydrodynamic grid, the total mass in each grid cell (which is the sum of the masses of all of the particles in each cell) is divided by the volume of the grid cell. Assuming the grid resolution around site CH-B is approximately 25 m (based on the mesh shown in Figure 2.3 in the final study), then the volume of the prismatic grid cell containing the point release at the location of outfall CH-B is approximately 6000 m^3, based on a depth of 20 m and cross-sectional area of approximately 300 m^2. The minimum concentration in this cell can be estimated by assuming it is empty and then filled with 6 kg of effluent after one 60-s time step. Since it is assumed that this mass is uniformly distributed over the cell volume, the resulting effluent concentration will be 1 mg/L, implying a dilution factor of 100 relative to the assumed inflow concentration of 100 mg/L. This shows that conversion of the particle mass to a concentration field results in artificial mixing of the effluent, giving rise to effective mixing and dilution that depend to great extent on the mesh resolution, depth, and details of the particle release at the outfall (i.e. particle release time interval, mass per particle, number of particles per interval). Although these details are not provided in the Stantec studies, it is clear that much of the far-field dilution is an artifact of the way in which the concentration fields are calculated.

The artificial dilution arising from two-dimensional particle tracking simulations like that in the MIKE 21 model is a common feature of coastal ocean modeling. It is possible to reduce the dilution by increasing the particle release rate or by decreasing the grid size. However, decreasing the grid size is often difficult given computational constraints associated with far-field studies on grids that are finer than those in the Stantec studies. Regardless of grid resolution or the details of the particle tracking module, conclusions about far-field mixing and dilution derived from particle tracking results in a two-dimensional model should take the inherent overestimation of mixing and dilution factors into account. In this regard, Figures 2.5-2.13 in the final study cannot be used to conclude that the environmental impacts of the effluent from outfall CH-B are negligible simply because the dilution factor is at least 100 in most of the domain at

the end of the 1-month period. Instead, these dilution factors represent the best-case scenario in which the effluent is mixed over the water column instantaneously upon being released from the outfall. Owing to the buoyant nature of the near-field plume and other three-dimensional effects, the effluent could be confined to a layer much smaller than the depth (as discussed in Section 3.1). As indicated by the near-field modeling results in the final study, this layer can be as small as 1-2 m, which would lead to a reduction in the dilution factor in the region surrounding the CH-B outfall by a factor of 10 or more because the effluent is not completely mixed over the water column. A three-dimensional model would be able to account for the vertical variability of the effluent plume through use of the near-field model to inform the vertical variability in the vicinity of the outfall. This would reduce the artificial dilution associated with the assumption of complete mixing over the water column in a two-dimensional model.

An additional perplexing aspect of Figures 2.5-2.13 in the final study is that they appear to depict transport of patches created by pulses of effluent discharges rather than trails of effluent emanating from the continuous-in-time discharge at outfall CH-B. Examples of such an effluent field showing trails emanating from the outfall locations are depicted in Figures 2-20 and 2-21 from the preliminary study, which show the effluent concentration field surrounding sites Alt-C and Alt-D near Pictou Harbour. Effluent trails are not visible around site CH-B in Figures 2.5-2.13 from the final study because the overestimated dilution due to the particle tracking module produces concentrations in the trails that are too low to be visible with the given color scale. Instead, higher-concentration patches (that also have artificially low concentrations) oscillate with the tides while slowly propagating away from the outfall with the weak non-tidal flow produced by the tides (see Section 2.2 for a discussion of tidal vs. non-tidal flows). While these simulations indicate that there is some dilution of the effluent patches since their concentrations decay in time, the dilution is representative of the best-case scenario when compared to the effluent concentration at the outfall of 100 mg/L.

Another process that is likely reducing dilution factors but is not represented in the simulations is accumulation in Caribou Harbour. Figure 2.11 in the final study clearly shows a patch of effluent in the harbour at slack high tide, indicating that it was transported into the harbour during the previous flood tide. Although the patch appears to be leaving the harbour during the subsequent ebb tide (Figure 2.12 in the final study), tidal dispersion is expected to transport effluent into the harbour over many tidal cycles. Furthermore, although inclusion of turbulent dispersion in the particle tracking module would act to dilute the patches, it would accentuate the tidal dispersion and promote transport into the harbour, thereby reducing the dilution in the harbour after many tidal cycles. As discussed in Section 3.4, accumulation in Caribou Harbour would need to be quantified with simulations that were run for sufficient time to demonstrate that the effluent mass in the harbour was not changing in time.

In summary, when computing concentration fields from the particle tracking results, uniform and instantaneous mixing over the grid cell volumes leads to artificially low concentrations and high dilution factors associated with far-field effluent transport from site CH-B. While it is impossible to eliminate this effect, it can be thought of as the best-case scenario in which the outfall plume is uniformly mixed over the water column. As demonstrated by the near-field modeling results in the Stantec studies, this is clearly not the case. Instead, the plume is typically confined to a smaller region in the water column, which implies a much smaller dilution factor when compared to that arising from assuming a uniform effluent concentration over the depth. The artificially low concentrations and high dilution factors produce far-field effluent concentrations in the region surrounding the CH-B outfall after a month-long simulation

that are greater than 100, which is an overly optimistic result. The artificial dilution eliminates most of the visible effluent in the figures except for a few small patches that oscillate with the tides. Some of these are transported into Caribou Harbour, indicating the potential for accumulation in the harbour due to tidal dispersion, an effect that should be assessed with simulations over much longer time periods than the 31-day simulations conducted in the final study.

4. Review of the near-field modeling

4.1. Overview of CORMIX

The CORMIX model was used to compute the three-dimensional effluent concentration field in the near-field mixing zone, which is generally defined as the region within 100 m of the outfall. Near-field mixing involves detailed flow and turbulence processes over length scales that are much smaller than the grid in the far-field model. Therefore, they cannot be simulated with MIKE 21 and must be modeled with a near-field model like CORMIX. According to the CORMIX model, the "near-field" is defined as the region between the outfall and the point at which the buoyant plume interacts with a boundary, which can be the bed, the free surface or some intermediate layer in the water column. In this near-field region, the plume dynamics are initially dictated by the high velocity flow and turbulence emanating from the outfall ports which rapidly mix the effluent with ambient waters. Once the high momentum fluid has decelerated (typically within 5-10 meters of the outfall ports), buoyancy-driven turbulence and mixing take over as the plume rises to the surface or at some point in the water column where the plume density matches the density in the water. This could be the thermocline (a point below the surface that separates the warmer, surface waters from the colder, bottom waters) or the halocline (a point at which fresher river waters are separated from the denser, saltier ocean waters below). After reaching the surface or intermediate layer, subsequent dynamics are referred to as the "far-field" zone in CORMIX. In this zone, the plume is transported by the ambient currents while spreading laterally due to weaker buoyancy effects. Once the density of the plume mixes with that of its surroundings, it propagates as a passive plume (i.e. no longer spreading due to buoyancy) with the ambient currents while spreading laterally and horizontally due to the ambient turbulence. This stage of plume development is modeled in CORMIX in a way that is similar to how it would be modeled under similar ambient conditions in a three-dimensional circulation model like MIKE 3.

The CORMIX model predicts the shape of the near-field plume in three dimensions based on the relatively complex geometry of an outfall diffuser, including the ability to specify different numbers of ports and the specific geometry of how they are attached to the diffuser pipe resting on the bed. Because CORMIX solves for the plume characteristics in a much smaller area and over much shorter time periods when compared to those in the far-field model, the characteristics of the flow needed to drive CORMIX are much simpler than the boundary conditions needed to drive the MIKE 21 model. As a result, parameters in CORMIX are generally not tuned, unlike the far-field modeling which requires tuning of, for example, the bottom roughness to improve agreement between observed and simulated currents (See Section 3.3 above). Furthermore, validation of CORMIX results is generally not required given that, at least under the scenarios that can be simulated with the CORMIX package, we expect the model to produce a good approximation of the near-field dynamics. The downside to this simplicity is

that the results depend critically on choosing the effluent and ambient parameters that are representative of realistic worst-case conditions that would give the least amount of near-field dispersion and thus representative of the most conservative design scenario. As discussed in the next section, the receiving water conditions do not represent worst-case scenarios.

4.2. Near-field results at location CH-B

The receiving water current and ambient density field supplied to the CORMIX model to predict the near-field mixing and dilution at site CH-B are not representative of worst-case scenarios because the current is too strong and the ambient density is too high. This gives an over-prediction of the mixing and near-field dilution within the 100-m mixing zone surrounding site CH-B. The near-field effluent concentrations are expected to be higher, particularly during periods of high river inflows and when the tidal currents are weaker, such as during neap tides or when there is winter ice cover.

In the final study, two scenarios for the near-field mixing at site CH-B were conducted. The only difference between the two scenarios is the use of one port in the diffuser in the first scenario and three ports in the second. The dilution factor for the three-port design was roughly twice as large as that for the one-port design 100 m from the outfall (Table 3.4 in the final study). The three-port design at site CH-B had a dilution factor that was roughly 30% larger than the six-port design at site Alt-D (Table 4.1 in the final study shows results from site CH-B obtained in the final study and results from site Alt-D, which are repeated from the preliminary study). Despite the likely increase in the dilution factor at CH-B with six ports, it was concluded that the three-port design had a favorable seabed footprint with a lower potential to interact with the seabed than the six-port design, and hence the six-port design was not evaluated at site CH-B. Given the incorrect estimates of the worst-case currents and receiving water density discussed below, studies need to be conducted with three- and six-port designs to understand their characteristics under worst-case scenarios, particularly in the presence of vertical density stratification of the water column.

The inputs to the CORMIX model that have the most significant impact on the near-field mixing in the final study are the effluent flow rate and density and the ambient tidal currents and density. The effluent flow rate was fixed at the annual average rate of 0.98 m^3/s, while the effluent salinity was assumed to be 4 g/L = 4 kg/m^3, the densest value in the reported range of 1-4 g/L. The effluent temperature was reported to be 25°C in winter and 37°C in summer. The summer effluent temperature was chosen under the assumption that the plume would be least buoyant in summer when the receiving waters were at their warmest. The values chosen for the effluent salinity and temperature are stated to give an upper bound for its density, thus giving a conservative estimate for the dilution because more buoyancy-driven mixing is expected to take place if the effluent is less dense than the receiving waters. Using the UNESCO equation of state (UNESCO 1981), a salinity of 4 kg/m^3 and temperature of 37°C give an effluent density of 996 kg/m^3, the value used in the final study.

A key assumption in the CORMIX model is that the ambient currents are steady. Therefore, approximations are needed when applying CORMIX to tidal flows that are unsteady in that the ambient currents flowing past the outfall vary in magnitude and direction over the tidal cycle. When currents are weak, the effluent accumulates above the outfall and dilution is poor. However, the worst-case scenario occurs roughly one hour before or after slack tide when

currents are weak yet sufficient to re-entrain the effluent that was recently transported away from the discharge location in the opposite direction before slack tide. CORMIX requires information about the tidal period and peak currents and the magnitude of the ambient currents one hour before or after slack tide in order to provide an estimate of the worst-case scenario. The CORMIX manual (Page 33 of Jirka et al. 1996) also recommends that additional scenarios be conducted with tidal currents at intervals of one or two hours at different stages of the tidal cycle to ensure that all possible scenarios are analyzed.

Based on the information provided in the preliminary and final studies, the ambient current supplied to the CORMIX model does not represent the worst-case mixing scenario. The preliminary report mentions the use of tidal information in the CORMIX simulations, stating that, (p. 3.54) "The results are presented for a time step corresponding to 1 hour before slack tide conditions." However, in the final report only average (10 cm/s) and maximum (27 cm/s) tidal currents are supplied based on MIKE 21 simulations in July 2016 at site CH-B. There is no mention of the tidal current speed expected within one hour of slack tide, as needed for the worst-case calculation in CORMIX. Furthermore, simulations are not conducted during different phases of the tidal cycle as suggested in the CORMIX manual. These would demonstrate the impact of current speed and direction on the dilution factor. The direction, in particular, could impact the effect of the diffuser and port alignment relative to the oscillatory flow. An important implication of the worst-case slack tide is that suspended solids may settle onto the bed within 100 m of the outfall because of the weak currents, as discussed in Section 2.2 above. This possibility is not mentioned or modeled in the Stantec studies.

Regardless of whether the details of the tide are incorporated into CORMIX, the ambient currents applied to CORMIX in the final study are too large to represent a worst-case scenario. Based on Figure 2-14 in the preliminary report, which shows the Northumberland Strait water levels over the 31-day MIKE 21 simulation period, the weakest neap tide on July 14 has a tidal range of 0.6 m, which is more than three times smaller than the strongest spring tidal range of 2 m on July 5. Therefore, the average and maximum tidal currents used in the CORMIX scenarios are much larger than they would be in the worst-case scenario because they are impacted by the large spring tides. A more conservative, worst-case tide would be given by the weakest neap tide during the period, since the weaker currents would have significantly less near-field dilution than the average tide over the 31-day period. It is important to note that, given the insufficient far-field model validation presented in Section 3.3 above, the simulations of the currents at CH-B may not be representative of the actual currents. This implies that if the currents are underpredicted in Pictou Harbour, they will not necessarily be underpredicted at site CH-B, and therefore it is not valid to justify use of inaccurate far-field model results based on the notion that the errors would lead to a more conservative worst-case scenario.

The ambient density field supplied to the CORMIX model is equally as important as the ambient currents. Estimates of the ambient density of the receiving waters were based on observations because the far-field model is two-dimensional (See Section 3.1 above). However, because observations of temperature and salinity at site CH-B were not available, the ambient density was based on observations in the Pictou Road region in August 2014 and September 2006 (Appendix B, Preliminary study). In principle, this would provide a conservative receiving water density given the likelihood that the receiving water salinity, and hence its density, was lower in this region due to more inflows into Pictou Harbour than Caribou Harbour. However, as discussed below, this is not the case. Using data from Pictou Road region, the receiving water density was calculated as 1020 kg/m^3 based on a temperature of 17.6^oC and salinity of 28 ppt,

which are averages of the observations. With these salinities and temperatures, the effluent is (1020 kg/m^3 – 996 kg/m^3) = 24 kg/m^3 less dense than the receiving waters. According to Stantec, this provides sufficient buoyant mixing to produce far-field dilution factors computed by CORMIX that are within established water quality guidelines for the 100-m mixing zone. Owing to the strong near-field mixing by the three-port diffuser, the plume interacts with the bed up to 25 m away from the outfall. However, the dilution factor of 71 at 10 m indicates this should not be a source of concern for this value of the ambient density.

Rather than using average salinity and temperature values of observations for the ambient, a more conservative scenario for the near-field modeling would have been to use the freshest and warmest observations in the region, which should be 23 ppt instead of 28 ppt and 19.4^{o}C instead of 17.6^{o}C (Appendix B, Preliminary study). This would give a receiving water density that is 4 kg/m^3 less dense than the value used in the final study, yielding a less buoyant effluent plume and less near-field dilution. While it is unlikely that the water temperature would be much warmer than 20^{o}C in the region, waters warmer than 20^{o}C would contribute much less to potential reductions in ambient density than lower salinity values. This is because the density can vary by as much as 25 kg/m^3 due to the 0-31 ppt salinity range in the region (based on data from Galbraith et al. 2014), while it can only vary by 3 kg/m^3 due to the 0-20^{o}C temperature range. In fact, the salinity value of 28 ppt that was used for the scenario is close to the maximum observed salinity in the region of 31 ppt, thus reflecting close to the best- rather than worst-case salinity for buoyancy-driven near-field dilution at site CH-B. A worst-case salinity is likely much smaller given that salinity observations in the East River range from 20 ppt during low-flow periods to as low as 5 ppt during high-flow periods (Preliminary study, p. 2.21). Lower salinity values are also likely near Caribou Harbour, although perhaps not as low given that flows into Caribou Harbour are weaker than those into Pictou Harbour. Nevertheless, all inflows in the region are expected to lower the salinity of the receiving waters surrounding the proposed outfalls in the studies.

The effect of salinity on the near-field dilution is weakest in winter when inflows are at their lowest. Combined with the colder receiving waters, winter ambient density scenarios are not needed given their potential to drive more buoyancy-driven turbulence and near-field dilution. However, given the weaker tidal currents due to ice cover in winter, scenarios would need to be conducted with worst-case winter density values for the ambient and effluent combined with model-derived worst-case weak winter tides during the period of peak ice cover.

In addition to the potential for low salinities to impact the near-field dilution by reducing the effluent buoyancy at site CH-B, low salinities indicate the existence of vertical stratification in which fresher, river water overlies saltier, denser ocean water. For example, observations in the Pictou Road region indicate a top-bottom salinity difference in July 1995 of 7.5 ppt (Preliminary study, p. 2.21), which is the dominant driver of the top-bottom density difference of 5.8 kg/m^3 (See Section 3.1 above). The stratification can reduce near-field dilution by trapping the effluent in a layer beneath the ocean surface where the density of the effluent matches that of the water column. Additionally, the trapping leads to far-field transport at depth rather than at the surface, thus having the potential to propagate toward the fresh water source. In the case of site CH-B, this would mean transport of the effluent into Caribou Harbour (See Section 3.1 above for a more thorough discussion of three-dimensional far-field effects). The CORMIX model has the ability to simulate near-field dilution in the presence of vertically-stratified waters, and the manual suggests including these effects when the vertical variation in density is greater than 0.1 kg/m^3 (Page 33 of Jirka et al. 1996), significantly smaller than the observed top-bottom density

difference of 5.8 kg/m^3 mentioned above. Therefore, worst-case dilution scenarios at CH-B should be devised that take into account the potential for low salinity and stratification arising from high freshwater inflows in the region. These scenarios would need to be devised using results from three-dimensional, far-field modeling.

5. Summary

The MIKE 21 and CORMIX models were used to simulate the distribution of near- and far-field effluent discharged from proposed outfall locations in and near Pictou and Caribou Harbours. Although there are numerous metrics that are commonly used to validate far-field model results like those in the MIKE 21 simulations, these are not calculated in the study. Instead, only qualitative comparisons to observations are made, and these indicate that the far-field model is poorly reproducing the currents and water levels throughout the domain. Therefore, as it is implemented, the far-field model is inaccurate and cannot be trusted to faithfully represent actual circulation and transport dynamics in the region. Given the strong three-dimensional nature of the circulation and transport dynamics due to the winds and fresh water flows in the region, three-dimensional processes are expected to significantly impact the far-field transport. Therefore, the two-dimensional MIKE 21 model is not appropriate for use in this study.

In addition to the inaccurate nature of the far-field model, the scenarios that are presented are not representative of the multitude of processes that can impact the far-field circulation and effluent transport. While there is some qualitative evaluation of the impacts of tidal currents on the far-field fate of the effluent, the two-dimensional nature of the MIKE 21 model makes it impossible to predict the effects of strong winds or strong river inflows, effects that can significantly impact the far-field dynamics. For example, freshwater flows and wind-driven circulation can drive effluent into Caribou Harbour from site CH-B, leading to more accumulation than what might be predicted by the two-dimensional model. Furthermore, although near-field dilution may be accentuated in winter owing to the stronger temperature difference between the effluent and receiving waters, there is no assessment of the potential worst-case winter scenario in which reduced tidal currents due to ice cover may significantly reduce both near- and far-field dispersion. Similarly, while the turbulence and mixing due to storm surges and waves would likely increase near-field dilution, there are no simulations conducted to assess their impact on far-field transport, including the potential for accumulation of effluent in the harbours. Finally, the simulations are not conducted over sufficiently long time periods that are needed to ensure that the simulated far-field dilution factors are in equilibrium, making it impossible to assess the potential for accumulation of effluent in regions of the domain with weaker dispersion and flushing, such as the harbours.

Qualitative representation of the far-field dilution dynamics around site CH-B in the figures indicates fundamental inconsistencies with how the effluent concentrations are being computed and interpreted. The concentrations are unphysically low because the model assumes uniform effluent concentrations within each grid cell. This leads to an over-approximation of the far-field mixing and dilution and overly optimistic conclusions about the far-field dilution factors in the vicinity of the outfall at site CH-B, which are reported to be above 100 in most of the region after a one-month simulation. In reality, the effluent concentrations can vary significantly in the vertical, since effluent plumes can be confined to layers near the surface or mid-water, leading to higher concentrations and smaller, more realistic dilution factors. Due to the artificial dilution, trails of effluent emanating from the outfall are not visible in the figures because their

concentrations are too small to appear with the given color scale. Instead, small patches of effluent oscillate with the tides, with some propagating into Caribou Harbour. These indicate the potential for accumulation of effluent in Caribou Harbour by tidal dispersion, an effect that can only be captured with simulations that are run over much longer time periods.

Based on the near-field results obtained with the CORMIX model in the final study, Stantec concluded that the dilution factors near the outfall located at site CH-B are within established water quality guidelines for the 100-m mixing zone. However, the ambient currents and densities supplied to CORMIX are not representative of worst-case near-field dilution scenarios. The currents are based on the average and peak tidal currents at site CH-B over the 31-day simulation period, which are too high because the data include two spring tides. A worst-case tidal current would be better represented by a neap tide during this period, which has smaller currents and is therefore expected to induce less near-field dilution, particularly when accounting for accumulation during slack tide. Weaker tidal currents due to winter ice cover further reduce the potential for near-field dilution, although this scenario is also not investigated. Finally, despite the potential for settling of suspended solids during slack tides within 100 m of the outfall, this is not mentioned in the Stantec studies.

In addition to the overestimated tidal currents, the ambient density supplied to CORMIX is also not representative of a potential worst-case scenario. The salinity used to compute the receiving water density is more representative of the maximum salinity in the region, which gives an effluent that is far too buoyant and thus an overprediction of the near-field buoyancy-driven mixing and dilution. The worst-case salinity, and hence receiving water density, should be much lower given the potential for high river flows to reduce the salinity in the region. Furthermore, high river flows would produce vertical salinity stratification or layering in which fresh water overlies salt water, an effect that can be included in the CORMIX model and further acts to reduce near-field dilution.

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Supporting Materials to Review of near- and far-field modeling are available at:
https://novascotia.ca/nse/ea/Replacement_Effluent_Treatment_Facility _Project/comments/6-Ecojustic-comment-B-part-1.pdf

APPENDIX B-1

Review of the Northern Pulp Nova Scotia Focus Report Section 6.0 and Appendix 6.2 Expanded Air Dispersion Modelling Study

Commentary by **Ecojustice**

This commentary is provided in response to the Northern Pulp Focus Report and Stantec's Expanded Air Dispersion Modelling Study regarding the air emissions associated with the proposed Effluent Treatment Facility Project. The proposed Replacement Effluent Treatment Facility Project will produce two new sources of air emissions:

1. fugitive emissions from the replacement ETF facility; and

2. emissions of combustion gases from the burning of sludge from the replacement ETF in the power boiler.

Sections 6.1 and 9.2.7 and Appendix 6.2 of the Focus Report estimate the impacts of air pollution from the mill including the proposed new sources from the Replacement Effluent Treatment Facility.

The estimate is based on a revised emissions inventory developed "from a variety of sources and methods"[1] and emissions rates "based on a combination of site-specific data, data from alternative kraft pulp mills, and published emission estimation methods."[2] The chosen emissions inventory and emission rate data are used to drive the air dispersion model to estimate offsite ground-level concentrations.

As the inventory of emission sources and the emission rates used to conduct the air dispersion modelling come from a variety of sources and methods, many of which are not specific to the mill, the estimated ground-level concentrations are highly uncertain. Further uncertainty arises due to use of the chosen model, AERMOD. AERMOD is a simple plume dispersion model that assumes steady-state conditions.[3] However, given the coastal location of the mill and the surrounding complex terrain, a non-steady state model such as CALPUFF that contains modules for complex terrain, overwater and coastal interaction effects may be more suitable and may provide more accurate estimates.[4]

The air dispersion modelling conducted by Stantec does not take into account transitional operating conditions that occur during unit start-up, shut-down, upsets or malfunctions when air pollutant emissions often spike. The modelling appears to assume only normal operating

[1] Focus Report, Section 6.1, page 108
[2] Focus Report, Section 6.1, page 110
[3] Focus Report, Appendix 6.2, Section 5.1, page 21.
[4] CALPUFF View
<https://www.weblakes.com/products/calpuff/resources/lakes_calpuff_view_brochure.pdf>

conditions and must, therefore, be viewed as incomplete and not representative of potential mill operations.

The estimated ground-level concentrations are compared to applicable ambient air quality criteria. Where Nova Scotia or Canadian standards, Stantec uses Ontario Reg. 419/05 standards for some contaminants.[5] The air quality analysis predicted emissions of ammonia, calcium oxide, hexavalent chromium, manganese, chloroform, benzo(a)pyrene, and total reduced sulphide above the Ontario standards.[6] Some of these contaminants, specifically hexavalent chromium (CrVI) and benzo(a)pyrene are known human carcinogens (Group 1) according to the classification by the World Health Organization International Agency for Research on Cancer.[7]

Section 6.1 of the Focus Report downplays the risk of these exceedances, stating that the frequency of the exceedances of health-based- standards occurred at discrete receptors less than 1% of the time but also notes that TRS was predicted to exceed the odour-based 10-minute standard more frequently.[8] The discrete receptors are the locations of residences near the North Pulp mill.

In terms of the amount of the exceedances and the frequency of the exceedances, total reduced sulphur (TRS) presents the greatest risk. As acknowledged on page 38 of Expanded Air Dispersion Modelling study, the effects of exposure to TRS are similar to the effects of exposure to hydrogen sulphide (e.g., irritation, respiratory and central nervous system effects). Although the TRS 10-minute standard is based on odour impacts, there have been many documented incidents of acute health effects from exposure to low concentrations of TRS, including incidents that have resulted in charges against facilities for releases of TRS compounds that have impacted neighbouring communities.[9]

The exceedances of TRS are estimated to occur frequently and at concentrations far greater than the standard at several homes (receptors). For example exceedances are noted of up to 19 percent of the time at receptor five and as much as 18 times the standard at receptor three. The most impacted home is estimated to experience an exceedance of the 10-minute odour based standard by as much as 13 times 19 percent of the time. Other receptors also have high predicted impacts from TRS either in the amount over the standard, or frequency, or both.[10]

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[5] Focus Report, Appendix 6.2, page vi and revised table 6.1 (6.1 rev.1)
[6] Focus Report, Appendix 6.2, page vi and 37
[7] <https://monographs.iarc.fr/list-of-classifications>
[8] Focus Report, p. 110.
[9] Ontario Ministry of the Environmental and Climate Change, Court Bulletin, "Refinery, Shell Canada fined $500,000 for Permitting a Discharge of Odour into the Environment", November 27, 2015, online: <https://news.ontario.ca/ene/en/2015/11/refinery-shell-canada-fined-500000-for-permitting-a-discharge-of-odour-into-the-environment.html>. Ontario Ministry of the Environmental and Climate Change, Court Bulletin, "Pulp and Paper Mill fined $175,000 for Environmental Protection Act Violations"< https://news.ontario.ca/ene/en/2018/11/pulp-and-paper-mill-fined-175000-for-environmental-protection-act-violations.html>
[10] Focus Report, Appendix 6.2, Tables 6.2 and 7.1

Ontario also has a ten-minute odour based standard of 13 µg/m^3 for Hydrogen Sulphide (H_2S) that is not referred to in the report.[11] If half of the composition TRS is H_2S, the ten-minute H_2S standard would also be exceeded at the receptors.

Conclusion

The air quality analysis included with the Focus Report should be considered unreliable and incomplete. The input data is not site-specific and the chosen model is not appropriate for a coastal location with complex terrain. Transitional operating conditions such as unit start-ups and shutdowns when air emissions peak were not considered. Even given these limitations the air dispersion modelling predicted exceedances of several air pollutant standards include cancer-causing substances benzo(a)pyrene and hexavalent chromium. The analysis also estimated that several residents would experience frequent and elevated concentrations of highly odorous reduced sulphur compounds resulting in an unacceptable adverse impact on the community.

November 3, 2019

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[11] O. Reg. 419/05: Air Pollution – Local Air Quality, Schedule 3.

APPENDIX B-2

APPENDIX C-1

Comments on the Focus Report

By

November 8, 2019

I am writing in relation to the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project. My name and I live in Three Brooks. My house is a tidal tributary of Caribou Harbour. Spring through fall, on the water every day.

Since I live close to the harbour and spend much of my time on or in the water I feel quite passionately against the pumping of pulp effluent into the Northumberland Strait and I urge you once again to reject the proposal.

I am writing this letter with emphasis on 3 of the terms of reference.

Term of Reference *"2.3 Submit data regarding the* ***complete physical and chemical characterization*** *of NPNS' raw wastewater (ie., influent at Point A for the Project),* ***to support the assessment of the appropriateness of the proposed treatment technology****. The influent characterization results must be compared against the proposed treatment technology specifications."*

The proposed treatment facility falls short of acceptable with respect to AOX removal (concentration measurements and lack of AOX degradation) and dangerous nitrogen and phosphorous loads that could lead to eutrophication and possible harmful algal blooms (HABs).

The proposed treatment facility is **not appropriate** because it will not sufficiently remove AOX which is composed of toxic organic chlorides including PCBs and chlorinated dioxins and furans. Nor does the facility remove excess nitrogen and phosphorous which can lead to eutrophication and ultimately harmful algal blooms (HABs).

1. **AOX Removal**

AOX is a term for a general group of organic compounds that contain 1 or more halogen atoms (in the case of bleached pulp effluent the halogen is predominately chlorine). In general, the compounds in this category are hydrophobic meaning they will adhere to fatty tissue, sediment or plant life.

Retention Time Comparison:
One of the factors affecting the amount of AOX in the water is the length of time the effluent is allowed to settle, often referred to as retention time. The authors use Point A for untreated effluent and use Point C (Boat Harbour influent) to represent the treated effluent (page 24 of the Focus Report, Figure 2.3-1).
Point C has a much longer retention time (8.5 days) which allows for the settling out of the heavier molecular weight AOX compounds compared to the proposed new ETF (less than 13 hours - Focus Report page 45). Given this fact, one can conclude that the AOX concentrations entering the marine environment from the proposed ETF will be higher than KSH predicts, and that the risk presented by such substances is greater than predicted. It is important to note that the higher the flow, the less retention time is available, which is counter to cleaning up the effluent.

Lack of AOX Degradation:
In Appendix 2.3 page 6 the authors claim the AOX is degraded into Cl- ions and carbon dioxide by photochemical and biological processes

This claim is not tenable. By the authors' own admission there can be up to 663 kg/day released into the Northumberland Strait (Focus Report, Table 2.4-3). Any AOX that can be degraded is done so during the retention time. This time is longer, as discussed above, in the current system than it will be in the proposed process. In fact, the authors show (Appendix 2.4, page 13, Table 1-5) that the concentration of AOX is lower in the current system (87 kg/day) than what was produced by Veolia (less than or equal to 225 kg/day). The RWS study shows 663 kg/day so the AOX released at the outfall could be more than half a metric tonne per day.

They claim that proof of the degradation is that the values for chloride ion are much greater at Point A than in the raw water (Appendix 2.3, page 6). The values for chloride are higher at Point A because chloride is produced during the bleaching process using ClO_2 as the bleaching agent which is what is used at Northern Pulp. The high chloride results are what we would expect based on the bleaching chemistry. Not because the AOX is degraded.

Persistent Organic Pollutants, Bioaccumulation and Biomagnification
Most AOX are toxic to marine and human health and some are considered Persistent Organic Pollutants (POPs). Persistent organic pollutants are organic compounds that do not degrade by chemical, biological, or photolytic processes.
Under the United Nations environmental program the Stockholm Convention lists 12 original, plus 16 newly classified compounds as Persistent Organic Pollutants (POPs). (1)
Included in the initial 12 are hexachlorobenzene; polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans and PCBs which are also found in the pulp effluent.
Because of their persistence and lipid solubility they tend to bioaccumulate. POPs have been found in the deep ocean so they do not just disappear no matter how dilute the concentration.(2)
The chlorinated dibenzo-p-dioxins (CDDs) that are eaten by marine organisms biomagnify in the food chain. The half-life in the human body for the family of

compounds known as CDD is anywhere from 5 to 15 years. (3) The ETF project entails continuous release of these harmful compounds into the Northumberland Strait. They will bioaccumulate over time and create an escalating risk as the flow continues year over year. This fact alone dictates that dilution is not the solution for pollution when it comes to chemicals that bioaccumulate.

Incorrect Sampling Technique:
The sampling reported in the Focus Report (Appendix 2.3 Pg 104 of 541 Job#B9C9662 , Pg 368 of 541 Job#B9E4451, Pg 413 of 541 Job#B9E4487, Pg 497 of 541 Job#B9E4476 , pg 541 of 541 Job# B9E4405) was done using HDPE containers. Sampling for halogenated organic compounds is typically carried out using amber glass bottles (4, 5) because the AOX molecules of interest are known to adhere to surfaces that are less hydrophilic. They stick to plastic, organic tissue (like plankton, fish and plants), sediment and HDPE. We would expect the AOX numbers to be higher if they used the proper glass bottles for sampling.

Nitrogen and Phosphorous
In Appendix 2.4 at page 10 the authors admit there is a large variation in the phosphorous content of the untreated effluent (0.12 to 5.8 mg/l) and they will not be able to attain the decreased level. Rather, they used the value from Point C (1.5 mg/L where the effluent has already settled for 8.5 days). Point C is once again not representative of actual effluent content and it is clear the phosphorous content will be variable and high.

Excessive amounts of nitrogen and phosphorous lead to algal blooms which deplete the area of oxygen and create "dead zones" in the ocean where many species can no longer live or thrive. The algal blooms can produce toxins which lead to health issues for marine life and ultimately to humans who ingest them. Algal blooms containing toxins are referred to as harmful algal blooms (HABs). Different ratios of nitrogen to phosphorous will encourage different species of algae growth. This phenomenon is not completely understood and is a current area of research. Not all algae contain toxins at all times but it is unpredictable and can change at any time. Alexandrium spp. and Pseudonitzschia spp. are both known to be present in the Northumberland Strait. (6) They have been known for producing paralytic shellfish poisoning and the neurotoxin domoic acid respectively. When conditions are not favourable for algae growth they remain in the environment as cysts. When favourable conditions arise they grow. Nitrogen and phosphorous in the effluent will surely lead to an increase in the number of blooms. With an increase in the number of blooms there is a chance that the HABs will also increase.

2. Baseline studies for fish and shellfish

"9.1 ***Complete baseline studies for fish and shellfish tissue*** *(via chemical analysis) of representative key marine species important for commercial, recreational and Aboriginal fisheries in the vicinity of the proposed effluent pipeline and diffuser location."*

It is important to note not all of the chemicals present in the effluent are tested nor are the chemical components of the effluent fully understood. The following statement is from a *Canadian Environmental Protection Act* Priority Substances List assessment report(7):
"Although approximately 250 individual compounds have been characterized in bleachery effluents, they have been estimated to represent only 10 to 40% of the total low molecular weight materials present."
I am not confident that we truly know the effect of the chemical mixture on biological systems and therefore cannot confidently predict the risks associated with effluent exposure.

It should be noted that "not detected" does not mean the substance is not present. They are known to be generated during the pulping process and the amounts of each individual substance changes based on the type of wood that is used. Some toxins are capable of accumulating in fish up to 25 000 times the concentration in water.(7) Given that the proposed treatment facility only removes about half of the organic chemicals that will be released into the Northumberland Strait, we need further investigation into the long-term health effects before the risks can be predicted accurately.

The experiments used to determine the effect of stress (toxins, temperature, salinity, pH, turbidity, etc.) on an organism have come a long way since the early 1990s. Consequently, the Acute Lethality test (LC50) should no longer be considered sufficient. Sublethal exposure may still affect the physiology and gene expression of the fish and/or shellfish and more work is required to understand this. We know many of the halogenated organic compounds affect the reproductive and immune systems, and can lead to developmental disorders or cause cancer. Gene expression experiments help gain a better understanding of the exposure effects on protein and enzyme production which gives us an idea of how the effluent will influence the function of biological processes. Popesku et al (8) look at the effects of pulp effluent (3 Kraft and 2 Thermomechanical) on gene expression of the neuroendocrine brain of fathead minnows. They conclude that pulp effluent does inhibit spawning by females by decreasing the levels of key enzymes in the hypothalamus. They conclude that effluents contain neuroactive substances that have yet to be characterized which is made more difficult because of the complex mixture that composes pulp mill effluent. The paper by Brockmeier et al (9) use gene expression to investigate exposure of mosquitofish to kraft pulp mill effluent on the Fenholloway river and demonstrates endocrine disrupting properties of the pulp mill effluent. They found 121 genes upregulated (over-expressed) and 91 genes downregulated by effluent exposure. Sixty-two of the genes are involved in metabolic pathways and are consistent with experimental results of the fish exposed to androgens. They conclude the effluent is responsible for masculinizing the female mosquitofish.
In order to understand and assess the risk presented by the effects of effluent components, further gene expression profiling experiments must be performed on fish and shellfish that are exposed to the effluent at concentrations consistent with what will exit at the diffuser as final effluent, and not once it is diluted. The results should then be compared to those from unexposed samples from the same species.
While the toxicity of each individual compound can be taken into account, as I mentioned in my comments on the EARD, the cumulative **effect of the mixture of toxins** in the

effluent on sea life and ultimately human health is unknown and the risk cannot be assessed with the information as summarized in the Focus Report and EARD. (10)

3. Assessment of impacts on Human Health

9.2 Commence a Human Health Risk Assessment (HHRA) to ***assess potential project-related impacts on human health****. The risk assessment must consider human consumption of fish and other seafood, consumption of potentially contaminated drinking water, exposure to recreational water and sediment, outdoor air inhalation, and any other potential exposure pathways. The analysis must inform the identification of contaminants of concern and updating of the receiving water study.*

In Appendix 9.2, Table A.6a the dioxin 2,3,7,8-TCDD is flagged as a contaminant of potential concern in the seafood ingestion pathway and is present in the effluent sought to be discharged at the outfall for the proposed ETF. This compound, 2,3,7,8-tetrachloro dibenzo-p-dioxin (2,3,7,8-TCDD), is the most toxic of the dioxins known. It is believed to cause liver damage, increased risk of diabetes and abnormal glucose tolerance along with possible reproductive or developmental effects as demonstrated in animal studies and may increase the risk of cancer in people. (3) As a CDD it is included in the POP as designated by the Stockholm convention mentioned above.

In Appendix 9.2, Table A-4 the authors maintain that total phosphorous is not a parameter considered to be of potential human health concern.
"Phosphorus is a required dietary mineral. Phosphorus exists in the environment as phosphate anion, where it acts as a nutrient, and has not been associated with adverse effects in humans. Human health concerns are primarily related to increased productivity (eutrophication) in aquatic systems, which is outside the scope of this human health risk assessment (CCME, 2004)."

The conclusion is not accurate: Eutrophication is an issue. Various levels of nitrogen and phosphorous will lead to algal blooms and potentially **harmful** algal blooms (HABs). (11, 12, 13, 14, 15)

Comments on Table: Understanding Water Measurement Units

As a final point, I have attached a revision to the Table found at page xix of the Focus Report as Appendix 1 to these comments. In my view, the time analogy presented in that table is misleading and fails to properly depict the presence and significance of various compounds in the effluent. The Dillon table suggests that the presence of certain compounds is miniscule and they are therefore harmless. This is dangerous and misleading as the risks from many of these substances is very high even at extremely low concentrations. My revised table provides a better summary based on molecules per litre and molecules per day of these substances. I provide further explanatory comments following my revised table.

Conclusion

Thank you for taking the time to read this letter and please consider that we could potentially be destroying the sensitive aquatic ecosystem of the Northumberland Strait and rendering it uninviting for aquatic species and human recreation if the current proposal is granted. We could also be poisoning and/or killing the fish and thereby poisoning ourselves. I beg you to ensure the proper and current experiments are performed before pulp effluent is pumped into the strait. It is my opinion that the limits of allowable toxins and effects of said toxins are not well established and some risks remain unidentified, while others are much more significant than predicted in the Focus Report and EARD.

References:

1. The 12 initial POPs under the Stockholm Convention
http://chm.pops.int/TheConvention/ThePOPs/The12InitialPOPs/tabid/296/Default.aspx

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&MaximumDocuments=15&FuzzyDegree=0&ImageQuality=r85g16/r85g16/x150y150g16/i500&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionE&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1

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Appendix 1

	Symbol	Multiplying Factor	Exponent Form	Parameter Measurements	Units	Part per	**molecules per L** (assume ave molecular weight of 300)	**molecules/day** (assume ave. molecular weight of 300 and 85 million litres per day)
Base Unit	*Base unit*	1	1.00E+00	gram/litre	g/L	1 part per thousand	2,047,000,000,000,000,000,000	174,000,000,000,000,000,000,000,000
deci	d	0.1	1.00E-01	decigram/litre	dg/L	1 part per ten thousand	204,700,000,000,000,000,000	17,400,000,000,000,000,000,000,000
centi	c	0.01	1.00E-02	centigram/litre	cg/L	1 part per hundred thousand	20,470,000,000,000,000,000	1,740,000,000,000,000,000,000,000
milli	m	0.001	1.00E-03	milligram/litre	mg/L	1 part per million (ppm)	2,047,000,000,000,000,000	174,000,000,000,000,000,000,000
micro	u	0.000001	1.00E-06	microgram/litre	ug/L	1part per billion (ppb)	2,047,000,000,000,000	174,000,000,000,000,000,000,000
nano	n	0.000000001	1.00E-09	nanogram/litre	ng/L	1 part per trillion (ppt)	2,047,000,000,000	174,000,000,000,000,000,000
pico	p	0.000000000001	1.00E-12	picogram/litre	pg/L	1 part per quadrillion (ppq)	2,047,000,000	174,000,000,000,000,000

For the purpose of this exercise I used an average molecular weight of 300. The calculation is shown below.

As you can see, in the mg/L range, the number of molecules per litre is in the billions of billions order of magnitude! My point is that a part per million is not as dilute a solution as the time analogy would imply. So, even if we assume the best case scenario after "cleanup" is correct, the amount of AOX is estimated to be approximately 1.02mg/L (which calculates to 87kg/day) from Table 2.3-3 we can expect somewhere around 2 billion billion halogenated molecules per litre (that is 174 trillion trillion halogenated molecules per day).

The number of molecules present in a given mass is dependent on the chemical structure (number and type of atoms that make up the molecule), therefore, an average molecular weight of 300 was used. Typically, in chemistry terms, we refer to that as 300 grams per mole (or 300g/mol).
If molecular weight is half of the assumed value, ie half of 300 is 150, the final number of molecules per litre would be doubled. Conversely, if the molecules were larger, say a MW 600, then molecules per litre would be halved.

Calculation:
Molecular weight: 300g/mole
Avogadro's number: 6.022×10^{23} molecules/mole (this is a constant)

molecules/gram: 6.022×10^{23} molecules/mole ÷ 300g/mole = 2.007×10^{21} molecules/g
molecules/mg: 2.007×10^{21} molecules/g x 0.001g/mg = 2.007×10^{18} molecules/mg
molecules/L in a 1 ppm (mg/L) solution:
2.007×10^{18} molecules/mg x 1.02 mg/L = 2.047×10^{18} molecules/L
molecules/day in a 1ppm (mg/L) solution at a flow rate of 85 million L/day (peak flow, page 38 Focus Report):
2.047×10^{18} molecules/L x 85,000,000L/day = 1.74×10^{26} molecules/day

APPENDIX C-2

supported customers and salespeople in North America

APPENDIX D-1

Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Canadian Science Advisory Secretariat
Gulf Region | Science Advisory Report 2018/029

ASSESSMENT OF THE SOUTHERN GULF OF ST. LAWRENCE (NAFO DIV. 4T) SPRING AND FALL SPAWNER COMPONENTS OF ATLANTIC HERRING (*CLUPEA HARENGUS*) WITH ADVICE FOR THE 2018 AND 2019 FISHERIES



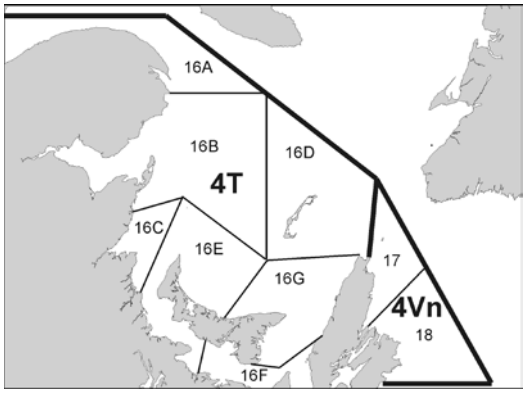


Figure 1. NAFO Divisions 4T and 4Vn and the corresponding herring fishery management zones.

Context:

The stock area for southern Gulf of St. Lawrence Atlantic Herring extends from the north shore of the Gaspe Peninsula to the northern tip of Cape Breton Island, including the Magdalen Islands (Fig. 1). Available information suggests that adults overwinter off the east coast of Cape Breton primarily in NAFO Division 4Vn. Southern Gulf of St. Lawrence herring are harvested by a fixed gear (gillnet) fleet on spawning grounds and a mobile gear (purse seine) fleet (vessels >65') in deeper water. The fixed gear fleet harvests almost exclusively the spring spawner component in the spring, except for June, and almost exclusively the fall spawner component in the fall. The mobile fleet harvests a mixture of spring and fall spawner components during their fishery. The proportions of spring and fall spawner components in the catch vary according to season. In recent years, spring herring have been sold primarily for bait but historically were also used for the bloater (smoked herring), and filet markets. Fall landings are primarily driven by the roe, bloater and filet markets. Annual quota management was initiated in 1972. In 2017, there were 2,339 fixed gear licenses and 8 seiner licenses.

Assessments of the spring and fall spawning herring from the southern Gulf of St. Lawrence (NAFO Div. 4T) are used to establish the total allowable catch. A meeting of the Regional Advisory Process was held March 15, 2018 in Moncton, N.B. to assess the status of the spring and fall spawner components of 4T herring and to provide advice for the 2018 and 2019 fisheries. Participants at the meeting included DFO Science (Gulf, Newfoundland and Labrador, Quebec Regions), DFO Fisheries Management (Gulf and Quebec Regions), provincial governments, the fishing industry, and aboriginal organizations.

SUMMARY

- Atlantic Herring in the southern Gulf of St. Lawrence are comprised of spring spawning and fall spawning components which are considered to be distinct stocks and as such are assessed separately.
- Fishery dependent indices are an important component of the assessment. Indices such as the commercial gillnet CPUE, may not be proportional to abundance due to changes in catchability over time. For example, catch rates can remain elevated despite decreases in abundance (increased catchability) due to contractions in stock distribution and targeting of aggregations by fishing fleets, as well as due to improved fishing technology and fishing practices.

Spring Spawner Component (SS)

- The preliminary estimated landings of SS herring in 2016 and 2017 were 966 t and 1,189 t, respectively, from annual total allowable catch values of 2,000 t.
- A virtual population analysis model that incorporated changes in catchability in the fixed gear fishery has been used since the last assessment.
- The estimates of Spawning Stock Biomass (SSB) at the beginning of 2017 and 2018 were 11,744 t (95% confidence interval: 6,463 – 28,171) and 12,446 t (95% CI: 6,418 – 30,365), respectively. The SSB has been in the critical zone of the Precautionary Approach framework since 2004 and the probabilities that SSB remained in the critical zone at the beginning of 2017 and 2018 were over 90%.
- The average fishing mortality rates on ages 6 to 8 for the SS exceeded $F_{0.1}$ (the removal reference level in the healthy zone, F = 0.35) during 2000 to 2011. F declined below $F_{0.1}$ in 2012, reaching its lowest value of 0.19. The fishing mortality rate during 2015 to 2017 averaged 0.24 (annual exploitation rate of 0.21).
- Due to variable recruitment in recent years, projections were conducted under three different recruitment scenarios during the projection period: (1) high recruitment, (2) low recruitment, and (3) mixed recruitment.
- SSB at the start of 2019 and 2020 was projected to increase slightly at annual catches less than 500 t, remain roughly stable at annual catches of 1,000 t, but decline at catches of 1,500 t or more. However, uncertainty in projected SSB is high. Even in the absence of any removals of SS herring in 2018 and 2019, the SSB is expected to only increase slightly with a high probability that the stock will remain in the critical zone.
- Since 2009, the TAC has been set to 2,000 t annually. At a catch of 2,000 t, the probability of an increase in SSB ranges from 0% (low recruitment scenario) to 19% (high recruitment scenario) with only a 10% chance of exceeding the LRP even under the high recruitment scenario.
- Elevated fishing mortality, declines in weights-at-age, and variable but low recruitment rates are further impeding the rebuilding of the stock.

Fall Spawner Component (FS)

- The preliminary estimated landings of the FS herring component in 2016 and 2017 were 24,677 t and 20,523 t respectively, from a total allowable catch of 35,000 t annually.

- Beginning in 2015, the FS herring assessment model incorporated the dynamics of three regional sub-stocks (North, Middle, South) which jointly comprise the NAFO Div. 4T stock. The catch options are evaluated at the level of the southern Gulf of St. Lawrence.
- Catchability to the fixed gear fishery was estimated to differ between regions and to have changed over time, being lowest with little variation in the North region in contrast to increases in the Middle and South regions over the time series.
- For the southern Gulf of St. Lawrence, the median estimate of SSB at the start of 2018 is 112,000 t. The probabilities that the SSB was below the Upper Stock Reference (USR) level of 172,000 t at the beginning of 2017 and 2018 were 98% and 97%, respectively.
- The average fishing mortality rate on ages 5 to 10 for the FS exceeded $F_{0.1}$ (the removal reference level in the healthy zone, F = 0.32) from 1994 to 2011 except in 2004, but declined from 2012 to attain the lowest levels in 2016. F averaged 0.20 during 2015 to 2017.
- Estimated abundances of age 4 herring at the start of 2017 and 2018 were very low, but with very large uncertainty.
- The median of the projected SSB at the start of 2019 and 2020 remains below the USR at all annual catch levels of 10,000 t or greater with a probability of at least 90%.
- At catches of 20,000 t (the catch in 2017) in 2018 and 2019, the probability of the SSB remaining under the USR in 2020 was estimated at 94%. At the 20,000 t catch level, the probability of the fishing mortality rate being above the removal rate reference was estimated at 46%. $F_{0.1}$ is a removal reference for when a stock is in the healthy zone of the Precautionary Approach.
- Current retrospective patterns indicate that the assessment model may overestimate the exploitable biomass. Consequently, harvest options presented may be optimistic relative to attainment of management objectives.
- When a stock is below the USR (in the cautious zone), consideration should be given to increasing the SSB. A 5% increase in SSB by 2020 would only be likely (greater than 50%) at annual catches below 16,000 t.
- Elevated fishing mortality, during the mid-1990s to 2010, declines in weights-at-age, and low recruitment rates are contributing to declines in SSB, further impeding the rebuilding of the stock.

INTRODUCTION

The Atlantic Herring (Clupea harengus) is a schooling pelagic species. Age at first spawning is typically four years. The herring population in the sGSL consists of two spawning components: spring spawners (SS) and fall spawners (FS). Spring spawning occurs primarily in April-May at depths <10 m. Fall spawning occurs from mid-August to mid-October at depths of 5 to 20 m. Herring also show high spawning site fidelity. In recent years, the largest spring spawning areas are in the Northumberland Strait and Chaleur Bay and the largest fall spawning areas are in coastal waters off Miscou and Escuminac N.B., North Cape and Cape Bear P.E.I., and Pictou, N.S. When spawned, the eggs are attached to the sea floor.

Herring fisheries in NAFO Div. 4T of the southern Gulf of St. Lawrence (sGSL) are managed across seven herring fishing areas within area 16 (A-G; Fig. 1). The SS and FS herring of the sGSL are considered distinct stocks and are assessed separately. For the fall spawner component, a regionally-disaggregated assessment model (North, Middle, South regions) was first used to update advice for the 2015 fishery (DFO 2015).

Fisheries

Over the period 1978 to 2017, total landings of Atlantic Herring from NAFO Div. 4T and 4Vn peaked at 93,471 t in 1995 and dropped to 20,523 t in 2017 (Fig. 2). A Total Allowable Catch (TAC) for the combined harvest of both components in 4T and 4Vn has been in place since 1972. The total landings have generally been less than the TAC since 1988. The TAC values in 2016 and 2017 were 37,000 t.

In the sGSL, herring are harvested by a gillnet fleet (referred to as “fixed” gear fleet) and a purse seine fleet (“mobile” gear fleet). The fixed gear fishery is focused in NAFO Div. 4T whereas the mobile gear fishery occurs in Div. 4T and occasionally in Div. 4Vn. As in previous years, 77% of the TAC for both seasons was allocated to the fixed gear fleet and 23% to the mobile gear fleet. The majority (73% to 97%) of the reported landings since 1981 have been from the fixed gear fleet with percentages in 2016 and 2017 of 94% and 99%, respectively (Fig. 2). Local stocks are generally targeted by the fixed gear fishery which takes place on the spawning grounds.

Separate TACs for the spring spawner component and for the fall spawner component have been established since 1985. The TACs are attributed to the fishing seasons. Reported landings from the fall season have represented the majority (65% to 98%) of the total landings of sGSL herring throughout the time series (Fig. 2). Landings in the fall fishing season were estimated to have represented 94% and 95% of the total herring harvested in 2016 and 2017, respectively.

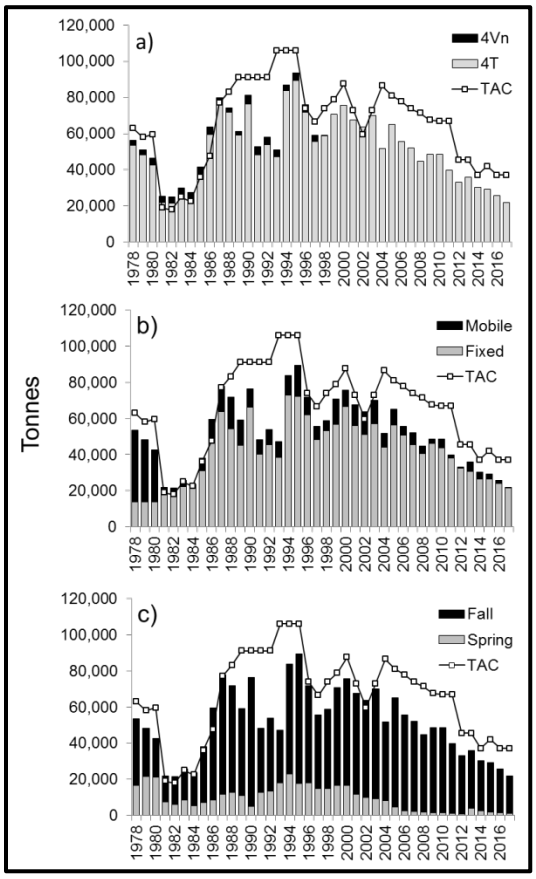


Figure 2. Reported landings (tonnes) of southern Gulf of St. Lawrence Atlantic Herring (spring and fall spawners combined) by NAFO Division (upper panel), by gear fleet (middle panel), and by fishing season (lower panel), 1978 to 2017. In all panels, the corresponding annual total allowable catch (TAC; tonnes) is shown. For landings by season, the landings in NAFO Div. 4Vn were attributed to the fall fishing season. Data for 2016 and 2017 are preliminary.

Spring spawners and fall spawners are not exclusively captured in their corresponding spawning seasons and the landings are attributed to spawning groups based on macroscopic characteristics of individual herring obtained from samples of the fishery catches.

Spring spawner component (SS)

The 2016 and 2017 TAC for the SS herring was set at 2,000 t annually, the same value since 2010 (Fig. 3). The preliminary estimated landings of SS herring in 2016 and 2017 were 966 t and 1,189 t, respectively. With few exceptions, most of the SS herring were estimated to have been landed in the fixed gear fleet over the 1981 to 2017 period. In 2016 and 2017, the fixed gear fleet was estimated to have landed 82% and 96%, respectively, of the total harvests of SS herring (Fig. 3). Generally more than 90% of the SS herring landed by the fixed gear fleet is landed during the spring fishing season, whereas most (> 75%) of the SS herring landed by the mobile fleet is landed in the fall season (Fig. 3).

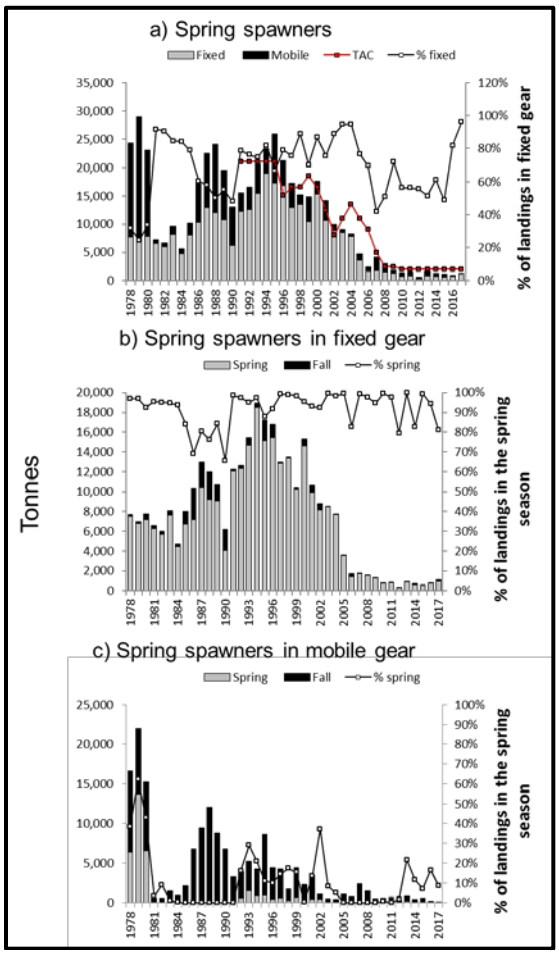


Figure 3. Estimated landings (tonnes) of the spring spawner component (SS) of Atlantic Herring from the southern Gulf of St. Lawrence, 1978 to 2017. The upper panel shows the estimated landings by gear type and the proportion of the landings attributed to the fixed gear fleet. Also shown in the upper panel is the SS herring TAC (red symbols) for 1991 to 2017. The middle panel shows the estimated landings of SS herring in the fixed gear fleet that occurred in the spring fishery season and the fall fishery season as well as the proportion of total SS herring landed by the fixed gear fleet in the spring fishing season. The lower panel shows the estimated landings of SS herring in the mobile gear fleet that occurred in the spring fishery season and the fall fishery season as well as the proportion of the total SS herring landed by the mobile gear fleet in the spring fishing season. For landings by season, the landings in NAFO Div. 4Vn were attributed to the fall fishing season. Data for 2016 and 2017 are preliminary.

Catch-at-age and weight-at-age

The dominant age in the 2016 SS catch was age 7 belonging to the 2009 year-class. In 2017 it was age 5, belonging to the 2012 year-class (Fig. 4).

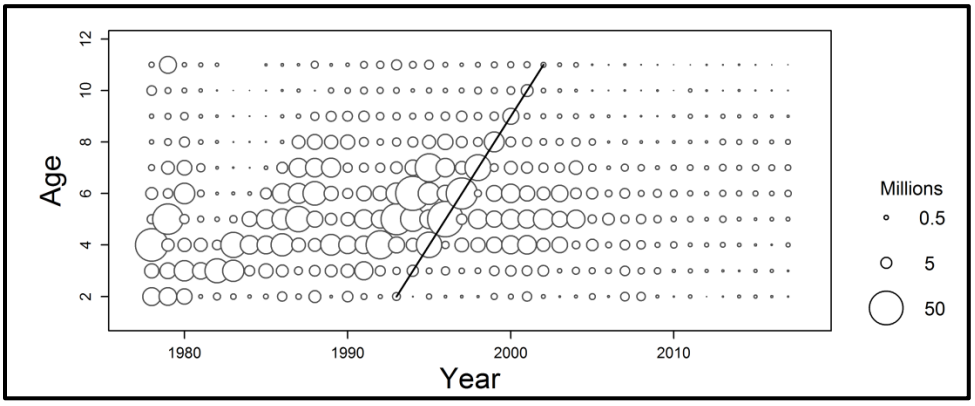


Figure 4. Catch-at-age of the spring spawner component of Atlantic Herring from the southern Gulf of St. Lawrence fishery, all gears combined, 1978 to 2017. Size of the bubble is proportional to the catch numbers by age and year. The diagonal line tracks the most recent strong year-class (1991).

Mean weights-at-age of the SS caught in the mobile and fixed gears in the spring season have declined since the 1990s for mobile gear, and since the mid-1980s for the fixed gear (Fig. 5).

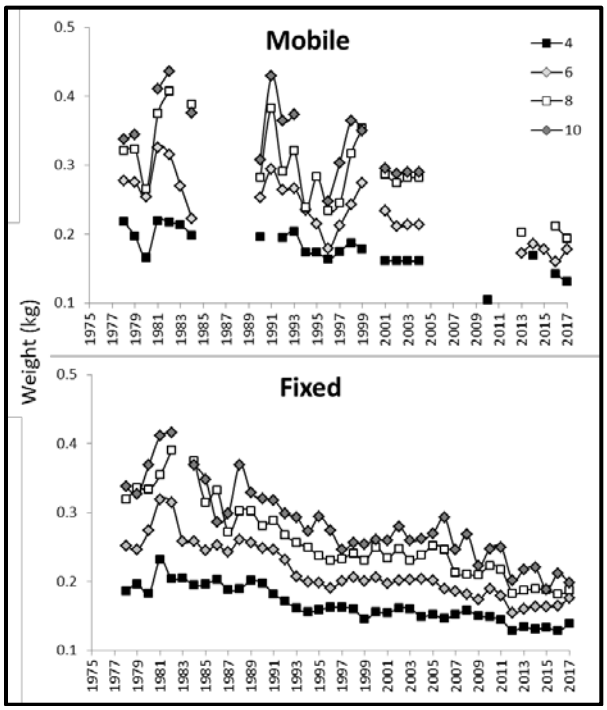


Figure 5. Mean weight (kg) for ages 4, 6, 8 and 10 years of the spring spawner component of Atlantic Herring from the southern Gulf of St. Lawrence sampled from catches during the spring season in the mobile (upper panel) and fixed (lower panel) commercial gears, 1978 to 2017.

Fall spawner component (FS)

The fishery TAC for the fall spawner component is set for the NAFO Div. 4T stock unit. The preliminary estimated landings of FS herring in 2016 and 2017 were 24,677 t and 20,523 t

respectively (Fig. 6). The TAC was 35,000 t in 2016 and 2017. With few exceptions, over the 1978 to 2017 period, most of the FS herring were estimated to have been landed in the fixed gear fleet. In 2016 and 2017, the fixed gear fleet was estimated to have landed 94% and 95%, respectively, of the total harvests of FS herring (Fig. 6). The majority (generally almost 100%) of the FS herring captured in the fixed gear fishery are landed during the fall fishing season. The mobile fleet has landed varying amounts of FS herring in the fall, 31% to 45% during 2016 to 2017 (Fig. 6).

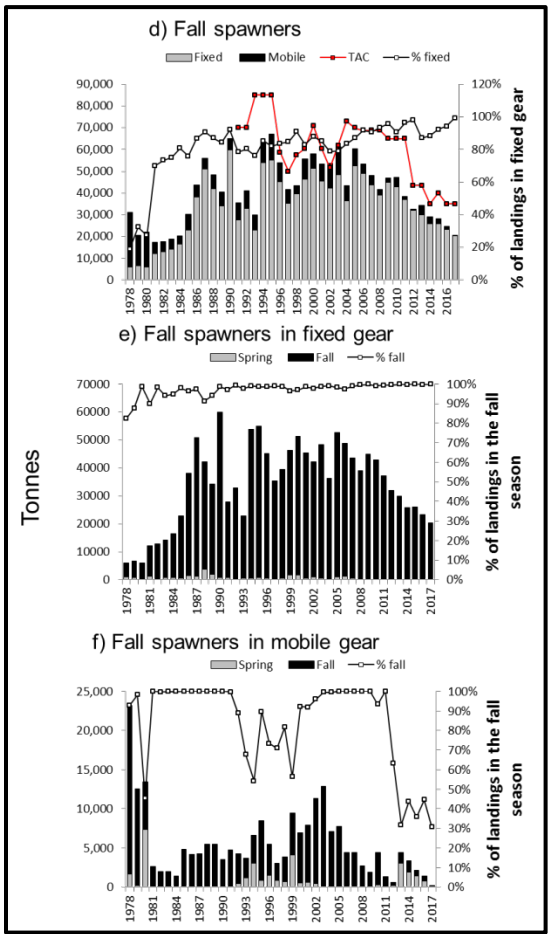


Figure 6. Estimated landings (tonnes) of the fall spawner component (FS) of Atlantic Herring from the southern Gulf of St. Lawrence, 1978 to 2017. The upper panel shows the estimated landings by gear type and the proportion of the landings attributed to the fixed gear fleet. Also shown in the upper panel is the FS herring TAC (red symbols) for 1991 to 2017. The middle panel shows the estimated landings of FS herring in the fixed gear fleet that occurred in the spring fishery season and the fall fishery season as well as the proportion of the total FS herring landed by the fixed gear fleet in the fall fishing season. The lower panel shows the estimated landings of FS herring in the mobile gear fleet that occurred in the spring fishery season and the fall fishery season as well as the proportion of the total FS herring landed by the mobile gear fleet in the fall fishing season. For landings by season, the landings from NAFO Div. 4Vn were attributed to the fall fishing season. Data for 2016 and 2017 are preliminary.

Catch-at-age and weight-at-age

Catches-at-age from the fisheries were compiled by region (North, Middle, South) and year. Catches from the fixed gear fleet were attributed to the region of capture. Catches by the mobile fleet in NAFO Div. 4T were attributed to the region which is most proximate to the location of

capture. Catches made in NAFO Div. 4Vn during a winter seiner fishery (prior to 1999) were attributed to each region in proportion to the other catches from each region in the same year.

Catch-at-age and weight-at-age matrices for NAFO Div. 4T FS herring include catches made by both fixed and mobile gear fleets. These were derived using age-length keys and length-weight relationships from sampling for each principal fishing area and season.

Region-specific catches-at-age used in the model fitting for both gears combined are presented in Figure 7. The catches of younger ages (less than 6 years) have recently decreased in the fisheries consistent with the estimated changes in selectivity in the fixed gear fleet and changes in size-at-age of FS herring.

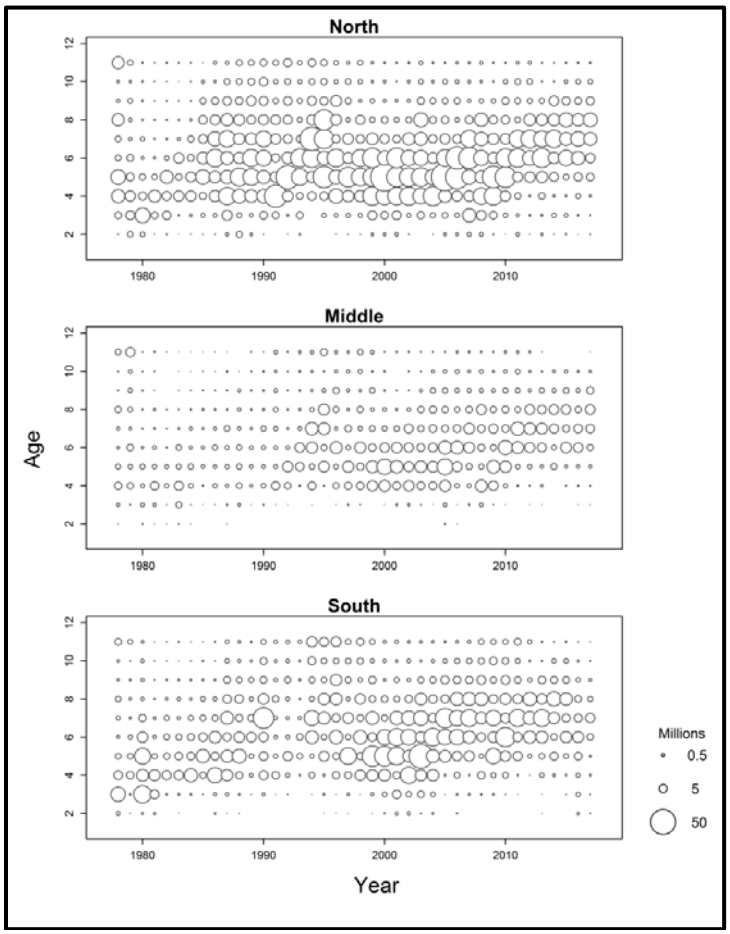


Figure 7. Bubble plots of fishery catch-at-age (number) of the fall spawner component of Atlantic Herring from the southern Gulf of St. Lawrence by region for mobile and fixed gears combined, 1978 to 2017. The size of the bubble is proportional to the number of fish in the catch by age and year. The values indicated at age 11 represent catches for ages 11 years and older.

Mean weights-at-age of FS herring from fixed and mobile gears have declined almost continuously over the period 1978 to 2011 and remain at low levels (Fig. 8). Lower mean weights have a consequence on the estimation of stock biomass when numbers are converted to weight.

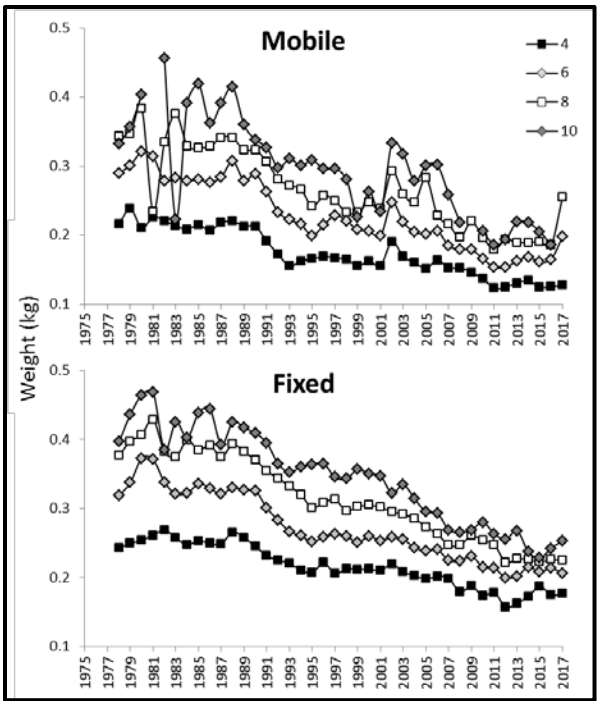


Figure 8. Mean weight (kg) for ages 4, 6, 8 and 10 years of the fall spawner component of Atlantic Herring from the southern Gulf of St. Lawrence sampled from catches in the fall season by the mobile (upper panel) and fixed (lower panel) gear fleets, 1978 to 2017.

ASSESSMENT

The SS herring and FS herring of NAFO Div. 4T are considered distinct stocks and are assessed separately. The assessments of abundance are made using Virtual Population Analysis (VPA) models based on catch-at-age, fishery dependent and fishery independent indices at age. The fishery TAC, and the analysis of catch options presented in this document, are for the spring spawner component and the fall spawner component separately and at the scale of the entire southern Gulf of St. Lawrence.

Indices of Abundance

Telephone survey

A telephone survey has been conducted annually since 1986 to collect information on the fixed gear fishery and opinions on abundance trends. The telephone survey responses include information on fishing effort, in terms of the number of nets, number of hauls, and mesh sizes used, which is used in the derivation of the commercial catch-per-unit-effort (CPUE) indices and in modelling relative fixed gear fishery selectivity in the fall spawner assessment model. The opinion of relative abundance is not used as an index in the population model. Overall, spring fishermen felt that abundances had remained consistent with the previous assessment, however for the fall fishery there was an overall sense of decreased abundance in all regions.

Fishery Independent Acoustic survey (SS and FS herring)

An annual fishery-independent acoustic survey of early fall (September-October) concentrations of herring in the sGSL has been conducted since 1991. The standard annual survey area occurs in the NAFO Div. 4Tmno areas (16B Fig. 1) where sGSL herring aggregate in the fall.

The 2015, 2016, and 2017 acoustic biomass indices for spawning groups combined were 169,635 t, 73,977 t, and 69,023 t, respectively. Based on biological samples, the biomasses in 2015 to 2017 were estimated to have been comprised of 19% SS and 81% FS herring.

Age-disaggregated acoustic indices for ages 4 to 8 are developed for the SS herring component. For the FS herring, the acoustic survey provides an abundance index of recruiting herring at ages 2 and 3 only.

Fishery Dependent Commercial Catch per Unit Effort (CPUE) (SS and FS herring)

Fixed gear catch and effort data were used to construct age-disaggregated abundance indices for SS herring and FS herring, expressed as catch per unit effort (CPUE) with values in kg/net-haul/trip. Age-specific CPUE indices for ages 4 to 10 are used in the assessments of the SS herring and FS herring stock. For the SS herring, an index is estimated for the whole stock area. For the FS herring, indices are calculated for each of the North, Middle, and South regions.

Fishery Independent Experimental Gillnet Indices (FS herring)

Catches from experimental nets are used to estimate the relative size-selectivity of gillnets of different mesh sizes and to produce age-disaggregated abundance indices, by region, as inputs to the fall spawner component assessment model.

Experimental gillnets, consisting of multiple panels of varying mesh size, were fished approximately weekly by fishermen during the fall fishing season. Each experimental gillnet had five panels of different mesh size, from a set of seven possible mesh sizes, ranging from 2” to 2¾” in ⅛” increments. All gillnets had panels with mesh sizes of 2½”, 2⅝”, and 2¾”, plus two smaller mesh sizes that varied among fishermen. The nets were set during the commercial fishery on the fishing grounds. The index is standardized to a one-hour soak time corresponding to the target fishing duration.

Fishery Independent September Bottom Trawl Survey (FS herring)

This sGSL index is used for the fall spawner population model. The annual multi-species bottom trawl survey, conducted each September since 1971, provides information on the relative abundance and distribution of NAFO Div. 4T herring throughout the sGSL. Since 1994, sampling of herring catches has been undertaken to disaggregate catches by spawner group and age. Spawning group assignment and age data were available for 1994 to 2017 for this assessment.

Spring Spawner Component (SS)

Indices of abundance

Acoustic survey

The acoustic survey provides catch rates (in numbers) of SS herring for ages 4 to 8 for 1994 to 2017 (Fig. 9). The combined index was highest in the mid-1990s and subsequently declined and remained at low levels in the 2000s.

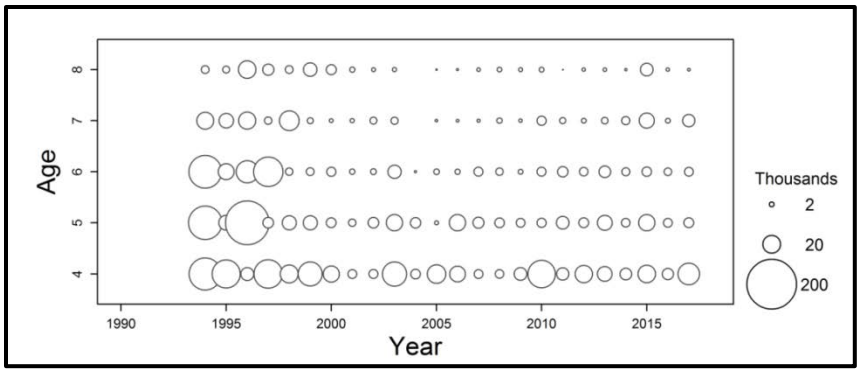


Figure 9. Bubble plot of abundance-at-age (number) from the fisheries-independent acoustic survey for herring spring spawners (SS; ages 4 to 8) in the southern Gulf of St. Lawrence, 1994 to 2017.

Commercial fixed gear catch per unit effort

The CPUE index for SS herring shows internal consistency as the abundance of cohorts is correlated between years, as shown for example for the sequence of catches of the 1988 year class (e.g., age 4 in 1992, age 5 in 1993, Fig. 10). Decreases in the CPUE of younger fish and increases in the CPUE of older fish are noted since 2011 (Fig. 10).

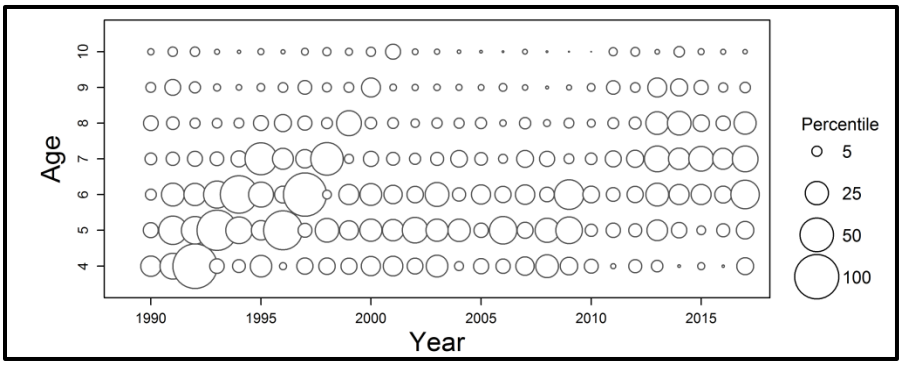


Figure 10. Bubble plot of spring spawner Atlantic Herring fixed gear catch per unit effort values (number per net-haul per trip) at age in the southern Gulf of St. Lawrence, 1990 to 2017. The size of the bubble is proportional to the maximum CPUE index value.

Population model

In the previous assessment (Swain, 2016), time-varying catchability was incorporated in the virtual population analysis (VPA) to improve the residual and retrospective patterns. Fishery dependent indices are an important component of the assessment. Indices such as the commercial gillnet CPUE, may not be proportional to abundance due to changes in catchability over time. Catchability to the fishery is defined as the proportion of the stock removed by one unit of fishing effort. If catchability doubles while abundance remains the same, CPUE will increase even though abundance did not. In the absence of correcting for changes in catchability, CPUE may bias the estimate of abundance.

The VPA model inputs include a natural mortality at all ages set at 0.2, a fishery catch-at-age 2 to 11+ (in numbers), fishery CPUE in numbers at ages 4 to 10 years from 1990 to 2017, and abundance indices at ages 4 and 8 from the fall acoustic survey (1994-2017). Catchability to the fishery, defined as the proportion of the stock removed by a unit of fishing effort, averaged about 0.006 in the 1990s, increasing to a peak of 0.032 from 2007 to 2017 (Fig. 11). Estimated catchability increased as the stock declined below 60,000 t of spawner biomass (Fig. 11).

Fishery catchability has been shown to increase as population size decreases for a number of stocks including herring (Winters and Wheeler, 1985). Reasons for this include:

- The area occupied by a stock usually decreases as stock size decreases, and because fish harvesters target fish aggregations (e.g., spawning aggregations), the proportion of the stock removed by a unit of fishing effort is expected to increase.
- In a gillnet fishery, net saturation at high abundance may also contribute to reduced catchability at high population size.

Independent of changes in SSB, catchability by fisheries may increase over time due to technological improvements and changes in fishing tactics. Other factors might result in declines in catchability, for example the changes in management measures that have occurred in the spring fishery since 2010. These measures included closures of some spawning areas and a requirement that gear be in the water by 6:00 PM and not retrieved before 4:00 AM the next day (preventing the targeting of aggregations overnight).

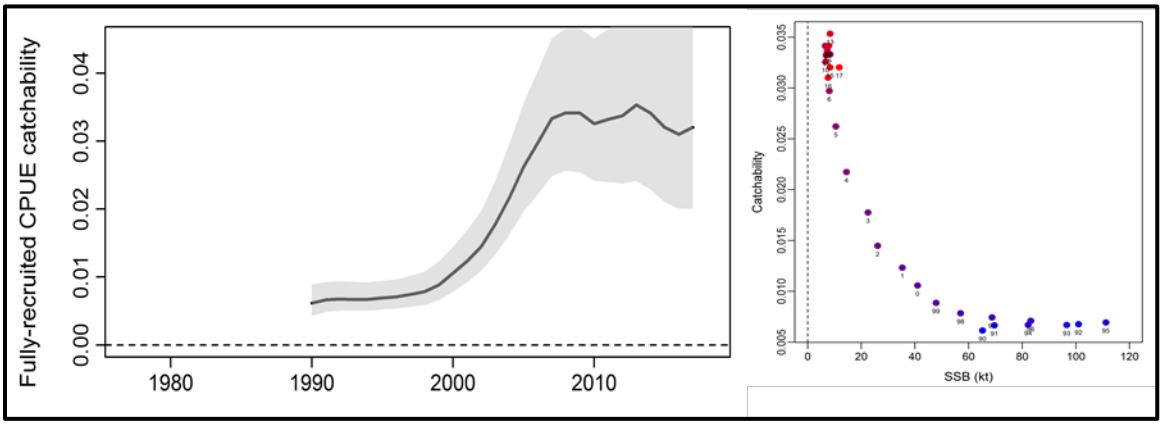


Figure 11. Estimated fully-recruited catchability to the CPUE index of the spring spawner component of Atlantic Herring (left panel) and fully-recruited catchability to the spring spawner gillnet fishery in relation to spring spawner SSB (right panel) for the southern Gulf of St. Lawrence. In the left panel, the line shows the median estimates and shading the 95% confidence intervals.

Recalculating the Limit Reference Point

The limit reference point (LRP) for NAFO Div. 4T herring is based on $B_{recover}$, the lowest biomass from which the stock has been observed to readily recover, calculated as the average of the four lowest spawning stock biomass (SSB) estimates in the early 1980s (i.e., 1980-1983). Consequently, this value is model dependent. If the model changes, stock biomass may be re-scaled upwards or downwards. With the model change initiated in 2016 (DFO 2016) and retained in this assessment, there was a revised value for the biomass in the 1980s. Thus the LRP was re-calculated. The revised LRP is 19,250 t, slightly lower than the former value of 22,000 t.

Spawning Stock Biomass and Exploitation Rate

The estimates of Spawning Stock Biomass (SSB; age 4+) at the beginning of 2017 and 2018 were 11,744 t (95% confidence interval: 6,463 – 28,171 t) and 12,446 t (95% CI: 6,418 – 30,365 t), respectively. These biomasses are higher than the SSBs in 2015 and 2016, however, the stock remains in the critical zone of the Precautionary Approach (Fig. 12). The SSB estimate for 2018 is 65% of the LRP. The probabilities that the projected SSBs were above the LRP at the start of 2017 and 2018 were <11% and 15%, respectively (Fig. 12).

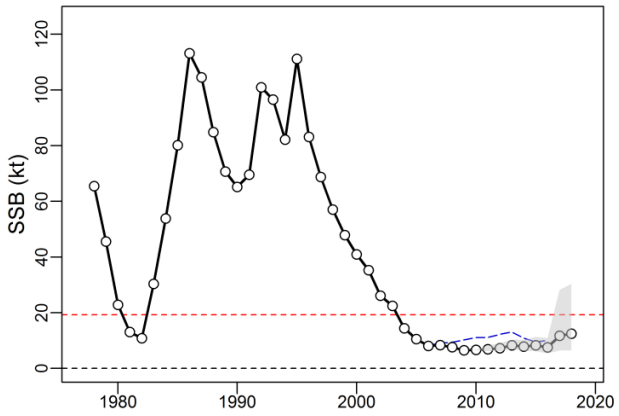


Figure 12. Estimated beginning of the year spawning stock biomass (SSB) of the spring spawner component of Atlantic Herring in the southern Gulf of St. Lawrence, 1978 to 2018. Circles show the maximum likelihood estimates, the solid line is the median of the Monte Carlo Markov Chain (MCMC) values and shading encompasses the 95% confidence interval. The red horizontal dashed line is the Limit Reference Point (19,250 t of SSB). The blue dashed line shows the SSB estimates from the 2016 assessment (DFO 2016).

Estimated fishing mortality rates were high in 1980 and in most years from 2000 to 2011 (Fig. 13), declined to a low value of 0.19 (annual exploitation rate of 0.16) and below the reference removal rate ($F_{0.1}$; F = 0.35 corresponding to exploitation rate of 0.30) in 2012, and has remained below $F_{0.1}$ in subsequent years, with the exception of 2013. Fishing mortality rates in 2015 to 2017 averaged 0.24 (annual exploitation rate of 0.21).

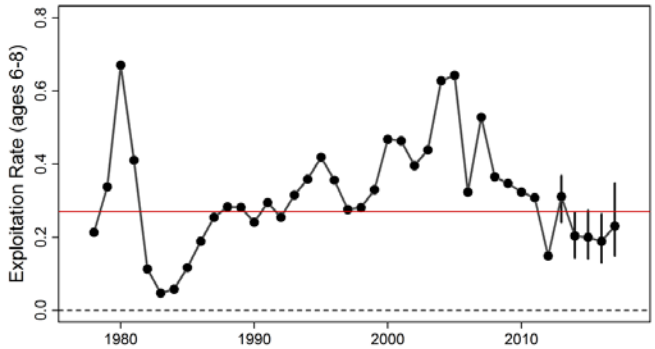


Figure 13. Estimated annual exploitation rates of spring spawning Atlantic Herring aged 6 to 8 years in the southern Gulf of St. Lawrence, 1978 to 2017. Circles are the median estimates and vertical lines their 95% confidence intervals. The red horizontal line shows the reference level annual exploitation rate (0.295 equivalent to F = 0.35) corresponding to $F_{0.1}$.

Recruitment and Recruitment Rates

Recruitment rates (the number of recruits divided by the SSB that produced them) were unusually high in the early 1980s (Fig. 14). Recruitment rates have been much lower since then, though periods of moderately high recruitment rates occurred in the late 1980s and early 1990s as well as during 2005 to 2011. Recruitment rates were lower in 2012 but appear high in 2013 though the uncertainties are very high (wide confidence intervals) for that year. Estimated abundances of age 4 herring at the start of 2017 and 2018 were higher than those since 2005 (Fig. 14). The age 4 abundance in 2018 depends on the assumption that recruitment rate for

this cohort equals the average rate for the preceding five cohorts. Recruitment rates and uncertainty vary among these five cohorts resulting in very high uncertainty in age 4 abundance in 2018. If the recruitment rate of the 2013 cohort was instead low, like that of the previous cohort, age 4 abundance in 2018 would be similar to the low 2016 value.

The estimate of spring spawner (4+) abundance for 2017 is 82.9 million fish (Fig.14; median value of 80.2 million with 95% CI: 42.3 – 206.5 million), about 20% of the average spawner abundance during 1985 to 1995.



Figure 14. Recruitment rates and beginning of year abundances of the spring spawner component of Atlantic Herring from the southern Gulf of St. Lawrence. The left panel shows recruitment rates at age 2 (circles) and at age 4 (bars) for the 1978 to 2013 cohorts with vertical lines indicating the 95% confidence intervals. The right panel shows the estimated beginning-of-year abundances of 4 year old herring (blue bars) and herring 4 years and older (line) for the spring spawner component of the southern Gulf of St. Lawrence. Bars and the line show the median estimate and vertical lines or shading the corresponding 95% confidence intervals. Age 4 abundance in 2018 (the red bar) was estimated assuming the recruitment rate for this cohort was the average of the rates of the preceding five cohorts.

Projections

The population model was projected forward for two years to the start of 2020 and 10 years to the start of 2027. These projections incorporated uncertainty in the estimates of abundance at age at the beginning of 2018, in the weights-at-age, partial recruitments to the fishery, and recruitment rates (to estimate ages 2 to 4). Projections were conducted at seven levels of annual catch (0 to 3,000 t in increments of 500 t) with the same catch level for the 2018 and 2019 fishing seasons. Projection results depend strongly on recruitment rates. Due to variable recruitment in recent years, projections were conducted for three recruitment scenarios during the projection period: (1) high recruitment rate scenario (2007 to 2012 cohorts), (2) low recruitment rate scenario (1999 to 2005 cohorts), and (3) mixed recruitment rate scenario (1999 to 2012 cohorts).

SSB was projected to increase slightly at annual catches of 0 and 500 t, remain roughly stable at a catch of 1,000 t, and decline at catches of 1,500 t or more (Fig. 15). However, uncertainty was high. The probability of an increase in SSB between the beginning of 2018 and the beginning of 2020 decreased from 80% at 0 t of catch to 49% at 1,000 t of catch and 11% at 2,500 t of catch under the high recruitment scenario. At the mixed and low recruitment scenarios, the probability of the SSB increasing in the absence of fishery removals (0 t) was 58% and 39%, respectively (Fig. 15; Table 1).

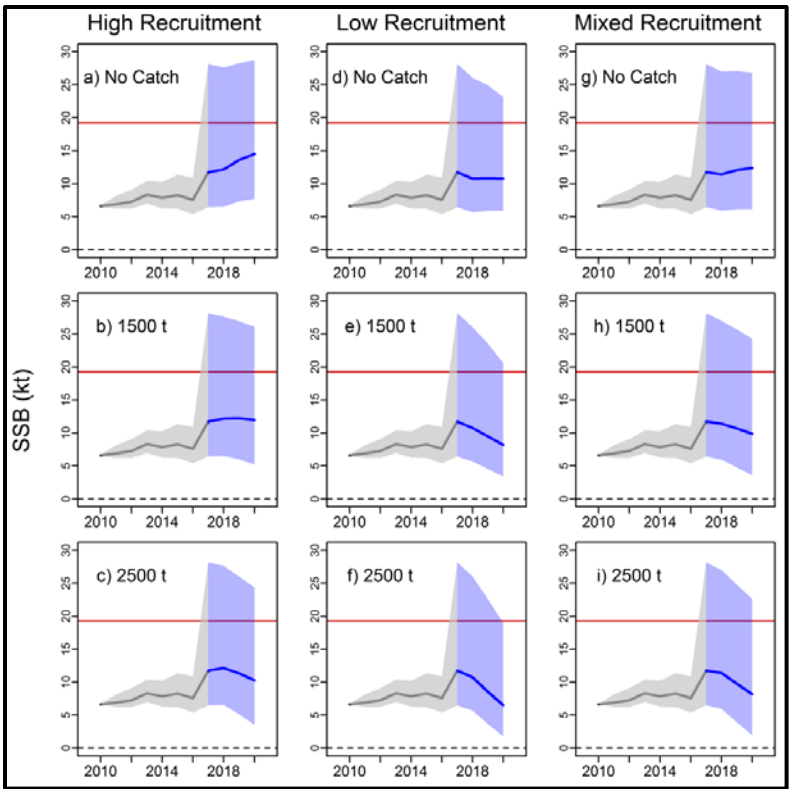


Figure 15. Projected spawning stock biomass (SSB in kt) of spring spawning Atlantic Herring from the southern Gulf of St. Lawrence for three recruitment scenarios (columns) and at various catch levels (rows) in 2018 and 2019. Lines show the median estimates of the beginning-of-year SSB and shading the 95% confidence intervals of these estimates (based on MCMC sampling). Grey shading indicates the historical period and blue shading indicates the projection period. The red horizontal line in each panel is the limit reference point (LRP) value of 19,200 t.

Risk analysis of catch options

All catch levels in 2018 and 2019 (including no catch) and recruitment rate scenarios indicate little probability that SSB would exceed the LRP at the start of 2020 (for high recruitment 20% at 0 t of catch, 8% at 2,500 t of catch; at low recruitment 6% at 0 t of catch, 2% at 2,500 t of catch) (Table 1). By 2027, the probability of exceeding the LRP was most favorable (>= 50%) under the high recruitment scenarios and low catches (<1,500 t), however at the low recruitment scenarios even with no catch there was only a 13% probability of SSB exceeding the LRP (Table 1).

There is no chance that the population would be at or above the Upper Stock Reference (USR) in 2020 even with no catch regardless of the recruitment rate scenario. At the high recruitment rate scenario, there is an 11% probability of SSB exceeding the USR by 2027 with no catch whereas at the low recruitment rate there is 0% chance (Table 1).

For the low recruitment rate scenario, the probability that age 6 to 8 fully recruited *F* in 2019 would be greater than the removal rate reference level of $F_{0.1}$ (0.35) was essentially zero at 1,000 t or less of catch, increasing to 9% at 1,500 t of catch, and rising to 57% at 2,500 t of catch.

Since 2009, the TAC has been set to 2,000 t annually. At a catch of 2,000 t, the probability of an increase in SSB after 2019 ranges from 0% (low recruitment rate) to a high of 19% (high recruitment rate) depending on the recruitment rate scenario. At 2,000 t of annual catch, there is

at most a 10% chance of exceeding the LRP and the probability of SSB exceeding the LRP by 2027 ranges from 2% (low recruitment) to 38% (high recruitment). Furthermore at 2,000 t there is at best a 4% chance of reaching the USR by 2027 (Table 1).

Table 1. Risk analysis table of probabilities (%) of increases in SSB, of SSB being greater than the LRP (i.e., the SSB not in the critical zone), of SSB being greater than the USR (i.e., the SSB in the healthy zone), and of fully-recruited fishing mortality rate (F_{6-8}) being above $F_{0.1}$ for differing fixed catch options in 2018, 2019, and 2027 for the spring spawner component of Atlantic Herring from the southern Gulf of St. Lawrence according to three recruitment rate scenarios. The recruitment rate scenarios are: A) High recruitment rate scenario (2007-2012 cohorts), B) low recruitment rate scenario (1999-2005 cohorts), and C) mixed recruitment rate scenario (1999-2012 cohorts). nd means not considered.

			Catch option (t)						
Scenario	State of stock	Year	0	500	1,000	1,500	2,000	2,500	3,000
A	SSB increasing	2018	91%	80%	63%	44%	28%	16%	nd
		2019	80%	66%	49%	32%	19%	11%	nd
	SSB > LRP	2019	16%	15%	13%	12%	11%	10%	nd
		2020	20%	17%	14%	11%	10%	8%	nd
		2027	87%	76%	63%	50%	38%	29%	21%
	SSB > USR	2019	0%	0%	0%	0%	0%	0%	nd
		2020	0%	0%	0%	0%	0%	0%	nd
		2027	11%	9%	6%	5%	4%	3%	2%
	F_{6-8} > 0.35	2018	0%	0%	0%	4%	22%	48%	71%
		2019	0%	0%	0%	3%	18%	39%	60%
		2027	0%	0%	1%	10%	30%	51%	69%
B	SSB increasing	2018	53%	25%	8%	1%	0%	0%	nd
		2019	39%	18%	5%	1%	0%	0%	nd
	SSB > LRP	2019	7%	6%	6%	5%	5%	5%	nd
		2020	6%	5%	4%	3%	3%	2%	nd
		2027	13%	7%	4%	3%	2%	1%	1%
	SSB > USR	2019	0%	0%	0%	0%	0%	0%	nd
		2020	0%	0%	0%	0%	0%	0%	nd
		2027	0%	0%	0%	0%	0%	0%	0%
	F_{6-8} > 0.35	2018	0%	0%	0%	6%	31%	58%	78%
		2019	0%	0%	0%	9%	33%	57%	74%
		2027	0%	0%	29%	73%	91%	96%	98%
C	SSB increasing	2018	68%	52%	37%	23%	13%	7%	nd
		2019	58%	43%	28%	17%	10%	5%	nd
	SSB > LRP	2019	11%	10%	9%	8%	7%	7%	nd
		2020	12%	10%	8%	7%	6%	5%	nd
		2027	54%	40%	28%	19%	12%	9%	6%
	SSB > USR	2019	0%	0%	0%	0%	0%	0%	nd
		2020	0%	0%	0%	0%	0%	0%	nd
		2027	2%	1%	1%	1%	1%	0%	0%
	F_{6-8} > 0.35	2018	0%	0%	0%	5%	26%	53%	75%
		2019	0%	0%	0%	6%	26%	49%	68%
		2027	0%	0%	7%	35%	62%	79%	90%

Fall Spawner Component (FS)

The FS herring assessment considers three regions (North, Middle, South) which cover the entire NAFO Div. 4T area as three independent populations. The regions are defined on the basis of traditional herring spawning beds and fishing areas: North (Gaspe and Miscou; 4Tmnopq), Middle (Escuminac-Richibucto and west Prince Edward Island; 4Tkl) and South (east Prince Edward Island and Pictou; 4Tfghj) (Fig. 16). The choice of three regions was dictated by geographic proximity of spawning beds and is the finest level of disaggregation that can presently be supported by the available data.

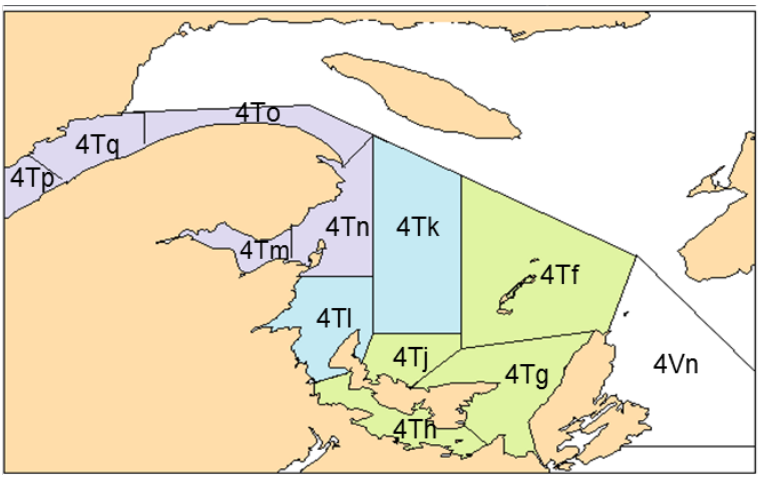


Figure 16. Correspondence between the herring fishing areas and the three regional groups (by colour shading) used in the assessment of the fall spawner component of Atlantic herring from the southern Gulf of St. Lawrence. Fishing areas in each region are described in the text above.

Indices of abundance

Acoustic survey

For the FS assessment model, the acoustic survey provides a useful abundance index of recruiting herring (ages 2 and 3) for the entire NAFO Div. 4T stock unit (LeBlanc et al. 2015). It is not considered a useful abundance index for older ages given that the survey is limited to a restricted portion of the sGSL at a time when older herring are distributed and spawning in areas throughout the sGSL. The index of three year olds was relatively high in 2015, with relatively smaller abundances for both age classes in 2016 and 2017 (Fig. 17).

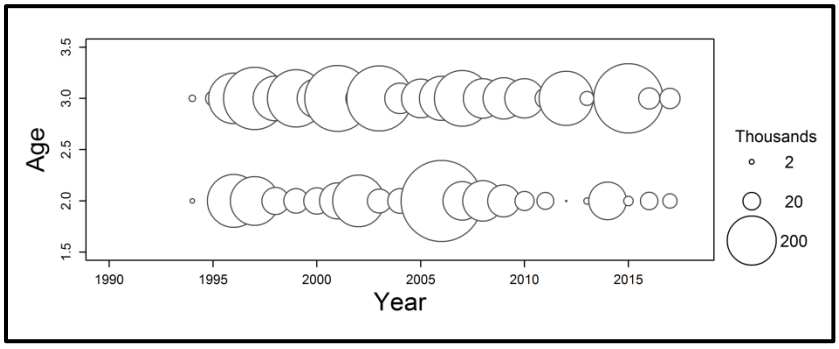


Figure 17. Bubble plot of the index of abundance (number of fish) of fall spawning herring at age 2 and 3, from the fisheries-independent acoustic survey for fall spawners, 1994 to 2017.

Commercial fixed gear catch per unit effort

Decreases in the CPUE of younger fish and increases in the CPUE of older fish were noted for the FS herring (Fig. 18). In the North region, CPUE indices for ages 6 to 8 in 2016 and 2017 were lower than in previous recent years. CPUE values in the Middle region were higher in 2016 than in the previous recent years but declined in 2017. CPUE values in the South region were higher in 2017 than in 2016 but both years were lower than most of the previous years.

In the North and Middle regions, catches of FS in 2016 were dominated by age 6 and 7 and in 2017 by ages 7 and 8 (2009 and 2010 year-classes). In the South region, catches of FS in 2016 and 2017 were dominated by age 7 and 8 respectively (2009 year-class).

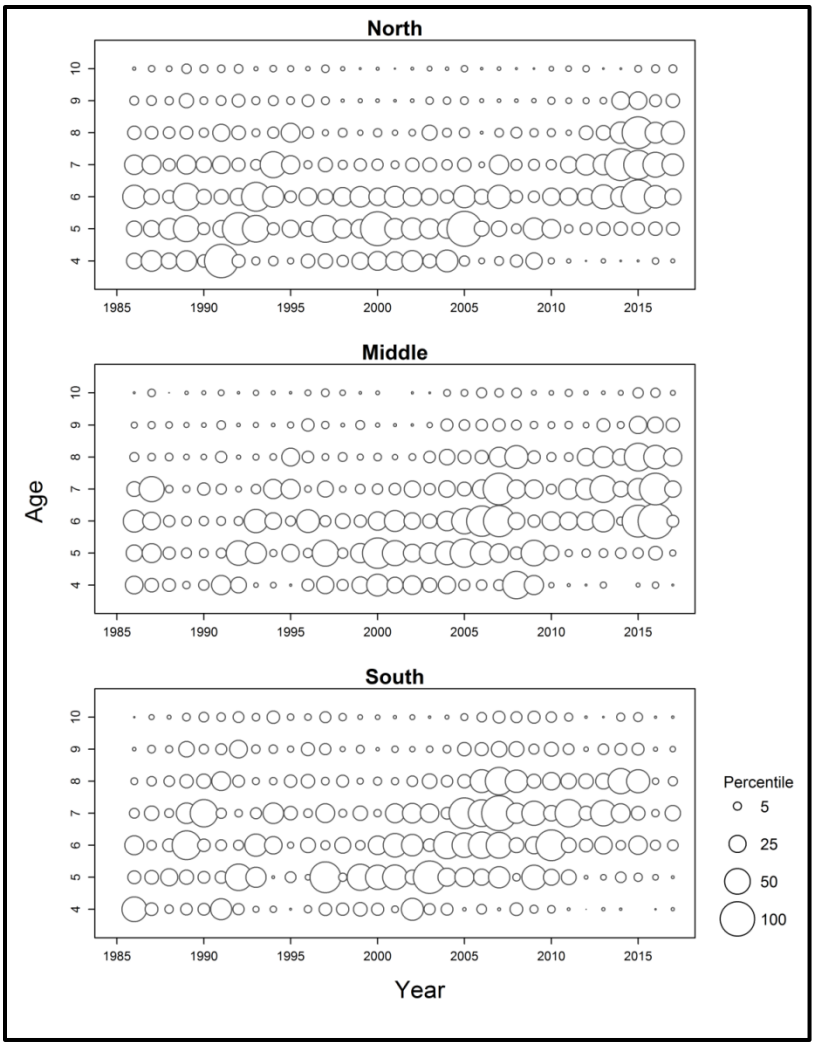


Figure 18. Fall spawner (FS) herring fixed gear age-disaggregated catch per unit effort values (number per net-haul per trip) by region (upper panel North, middle panel Middle, and lower panel South) in the southern Gulf of St. Lawrence, 1986 to 2017. The size of the bubble is proportional to the CPUE index value.

Experimental gillnet indices

The experimental gillnet indices suggest an increase in young herring (ages 2 to 4) until 2009, after which the numbers declined, with proportional catches of herring 5 to 9 generally increasing from 2010 to 2017, in all regions (Fig. 19).

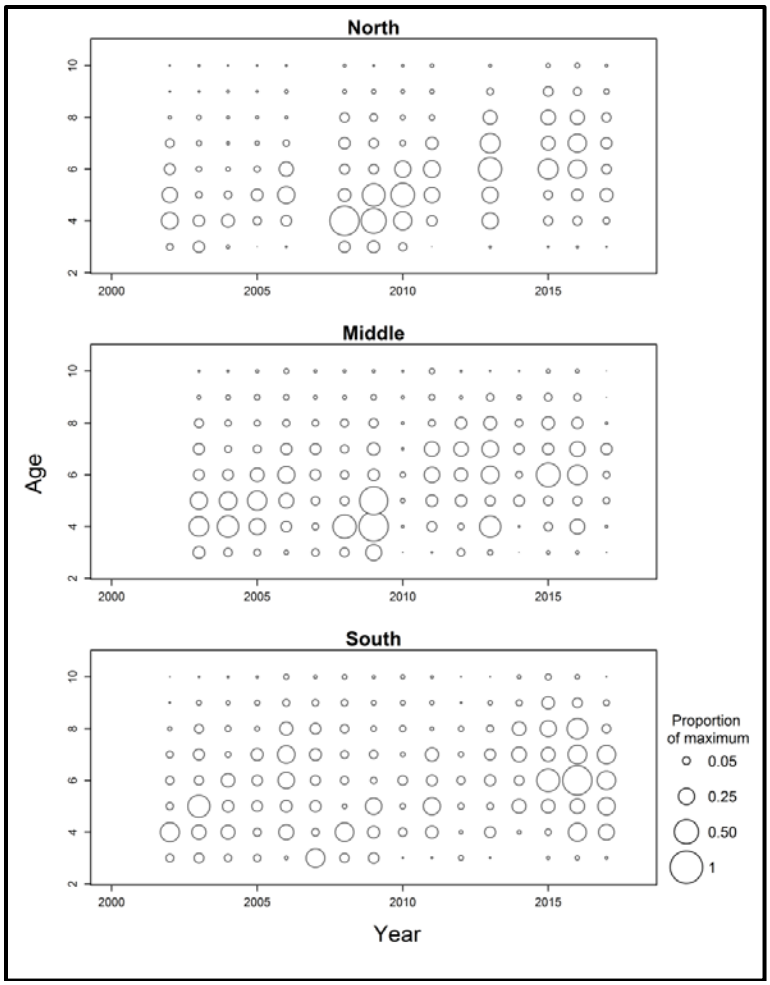


Figure 19. Bubble plots of catch-at-age indices (number) of fall spawner herring from the experimental gillnets by region (upper panel North, middle panel Middle, and lower panel South) in the southern Gulf of St. Lawrence, 2002 to 2017. The size of the bubble is proportional to the index value.

Fishery Independent September Bottom Trawl Survey

The index suggests an increasing trend in four year old FS herring from the mid-1990s to 2011, and generally higher abundance of six year old FS herring in the 2000s compared to the 1990s (Fig. 20).

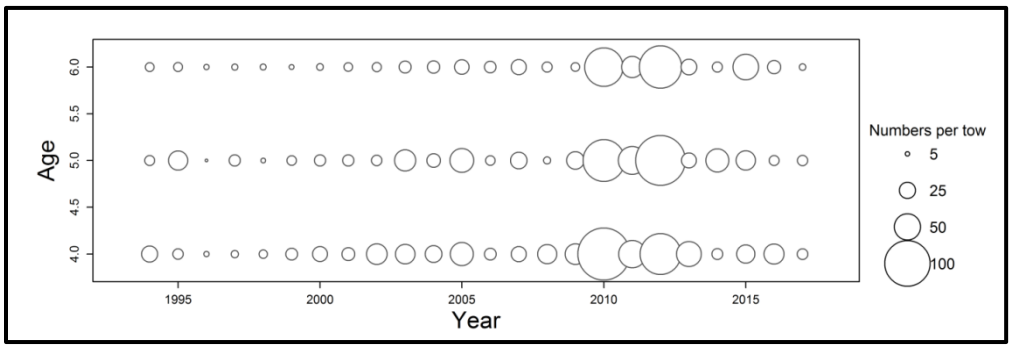


Figure 20. Multispecies bottom trawl survey abundance index (number of fish per standardized tow) for fall spawning herring ages 4 to 6 years in the southern Gulf of St. Lawrence, 1994 to 2017.

Population model

A virtual population analysis (VPA) as described in DFO (2015) was conducted for three regions and then combined to estimate the overall FS herring abundance in NAFO Div. 4T. Natural mortality at all ages and in all regions was set at 0.2. Data inputs were fishery catches at ages 2 to 11+ (in numbers), fishery CPUE in numbers at ages 4 to 10 years from 1986 to 2017, catch rates at age in experimental nets (ages 3 to 9 or 10, 2002 or 2003 to 2017, with indices missing in some years in some regions), abundance indices at ages 2 and 3 from the fall acoustic survey (1994 to 2017), and catch rates at ages 4 to 6 in the September bottom trawl survey. Separate fishery catch-at-age, CPUE indices from the gillnet fishery, and indices from the experimental nets were derived for each of the three regions. The acoustic and bottom trawl survey indices were considered abundance indices for the sum of the three regions.

Additional inputs included the proportion of gillnets with 2 $^{5}/_{8}$ inch mesh in each region in each year (Fig. 21) and relative selectivity to the gillnet fishery by age, year, and mesh size (Fig. 22). As a result of the changes in size at age over time, the relative selectivities in the two main gillnet mesh sizes used in the fixed gear fishery have also changed over time, generally declining over the time series for ages 4 to 6 and declining since the late 1990s for ages 8 and 10 in the 2 ¾ inch mesh gear (Fig. 22).

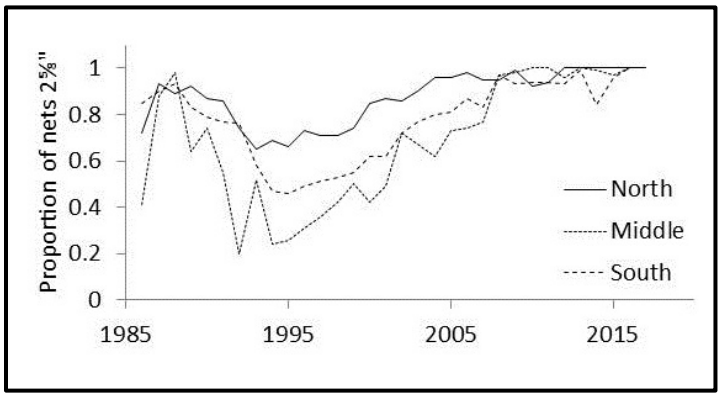


Figure 21. Variations by region in the proportions of gillnets with mesh sizes 2 $^{5}/_{8}$ inches used in the fall herring fishery season in the southern Gulf of St. Lawrence, 1986 to 2017. It is assumed that all other nets used were of mesh size 2 ¾.

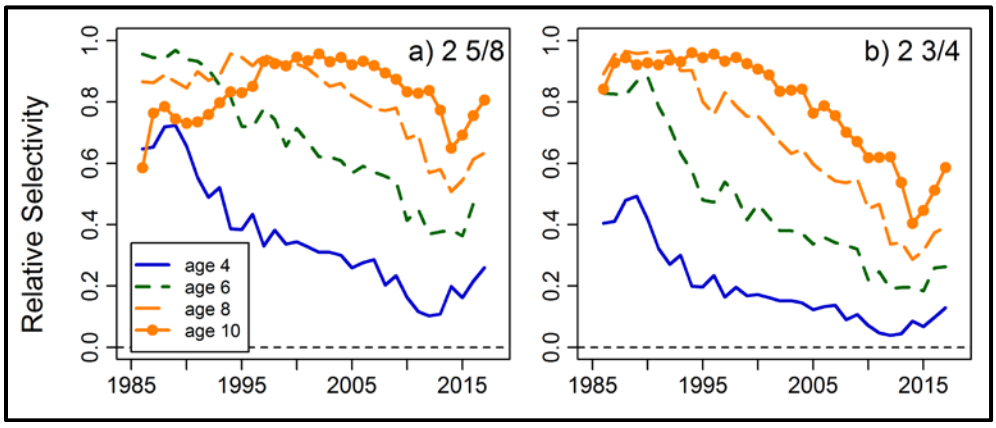


Figure 22. Changes in relative selectivity of fall spawning herring aged 4, 6, 8 and 10 years to gillnets with mesh sizes of 2 $^{5}/_{8}$ inches (left panel) or 2 ¾ inches (right panel) in the fall herring fishery of the southern Gulf of St. Lawrence, 1986 to 2017.

Similar to the results for 2016 (DFO 2016), the model diagnostics indicated an adequate fit to the observations. There was no severe blocking of residuals for the commercial CPUE indices. Fits to the CPUE indices were reasonably good, with predicted values consistent with the general trends in the indices. Retrospective patterns were present but negligible for the Middle region and greatest for the North region, though not in a consistent direction.

Estimated changes in catchability (*q*) to the gillnet fishery differed between regions (Fig. 23). Catchability was lowest and varied little over time in the North region. Catchability in the South region increased over time, primarily between 1995 and 2010 but has decreased recently. Estimated catchability was greatest in the Middle region except for a brief period in the mid-2000s.

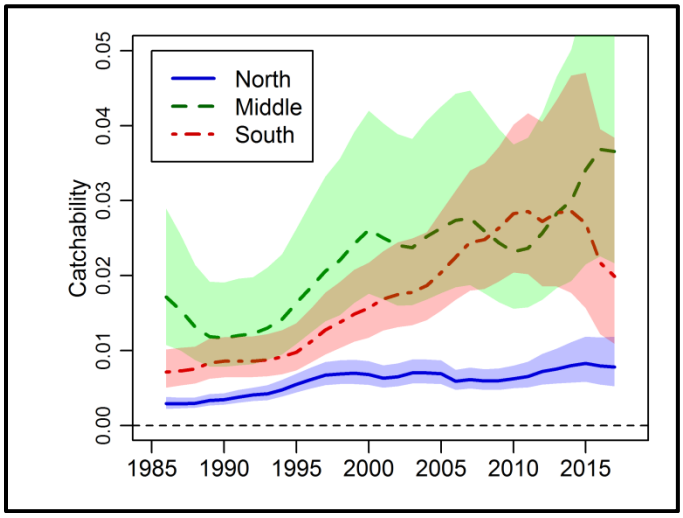


Figure 23. Estimated fully-recruited catchability (q) of fall spawner herring to the fall gillnet fishery in three regions (North, Middle and South) of the southern Gulf of St. Lawrence, 1986 to 2017.

Catchability to fisheries is expected to change over time for a number of reasons including a common inverse relationship between catchability and population size, and improvements in fishing technology and tactics. Variation in *q* within the Middle and South regions was independent of variations in stock biomass suggesting that much of the increase in *q* in these two regions is related to technological improvements and changes in fishing tactics.

Recalculating the Limit Reference Point

The limit reference point (LRP) in 4T herring is $B_{recover}$, the lowest biomass from which the stock has been observed to readily recover, and it is calculated as the average of the four lowest spawning stock biomass (SSB) estimates during the early 1980s (i.e., 1980-1983). Consequently, this value is model dependent. If the model changes, stock biomass may be re-scaled upwards or downwards. With the model change initiated in 2015 (DFO 2015) and retained in this assessment, there was a revised value for the biomass in the 1980s. Thus the LRP was re-calculated and the revised LRP is 58,000 t, slightly greater than the former value of 51,000 t.

Spawning Stock Biomass and Exploitation Rate

Estimated SSB in the North region was at a high level from the mid-1980s to the early 1990s and declined to a moderate level from the mid-1990s to the late 2000s (Fig. 24). Estimated SSB in this region declined continuously during 2012 to 2018, with the median estimate reaching low levels not observed since the early-1980s. In the Middle region, estimated SSB increased gradually from 1980 to the late 2000s, but declined by about 60% during 2009 to 2018. SSB in

the South region was at a relatively high level from about the mid-1980s to the late 2000s, however, estimated SSB declined during 2009 to 2015. In 2016, SSB began to increase in the South region, however, the estimate has very high uncertainty in this region. Summed over the three regions, the median estimate of total SSB at the start of 2018 is 112,000 t. The estimated probabilities that total SSB was below the USR of 172,000 t at the beginning of 2017 and 2018 are 98% and 97%, respectively.

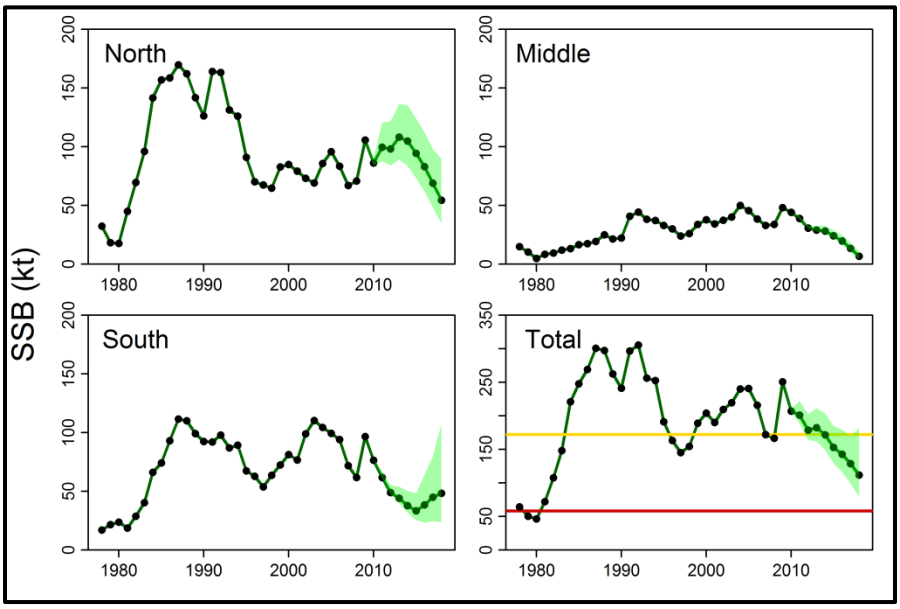


Figure 24. Estimated spawning stock biomass (SSB) of fall spawning herring by region and overall (Total) for the southern Gulf of St. Lawrence, at the beginning of the year 1978 to 2018. The line and circles show the median estimates and the shading their 95% confidence intervals. In the bottom right panel for Total, the yellow horizontal line is the upper stock reference level (USR) and the lower red horizontal line is the limit reference point (LRP).

Estimated fishing mortality rates (*F*; ages 5 to 10) declined to a relatively low level in the North (0.22 in 2017) region but in the Middle and South regions they remained relatively high and consistent until 2017 (Fig. 25). In the Middle region, *F* increased sharply to 0.95 in 2017, whereas in the South region it decreased to 0.10 in 2017 (Fig. 25). The average fishing mortality rate on ages 5 to 10 over all three regions (weighted by region-specific abundances of 5 to 10 year olds) exceeded $F_{0.1}$ (F = 0.32; the reference level in the healthy zone) during 1994 to 2011, except in 2004, but declined after 2011 to attain its lowest levels in 2016 (F = 0.18; Fig. 25). The probability that the overall *F* for ages 5 to 10 exceeded the $F_{0.1}$ value in 2017 was 20%.

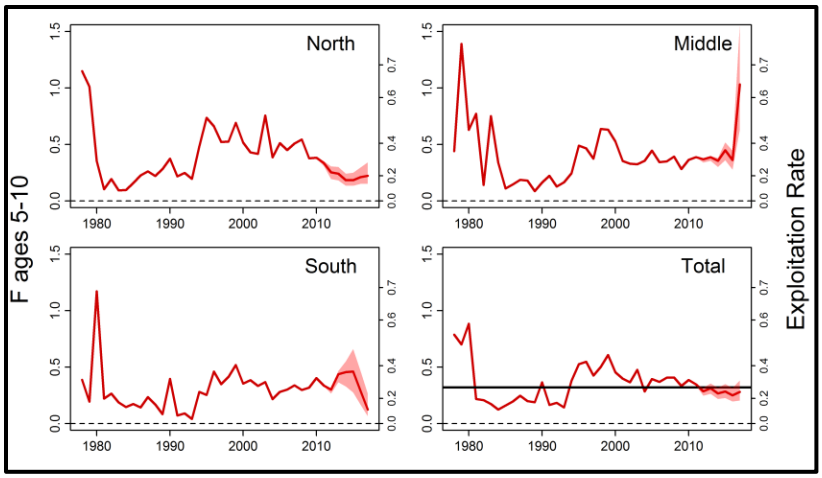


Figure 25. Estimated age 5 to 10 fishing mortality rates (instantaneous rate F in left axes and as annual exploitation rate in right axes) of fall spawning herring by region and averaged over regions (weighted by region-specific abundance at ages 5 to 10 years) in the southern Gulf of St Lawrence, 1978 to 2017. Lines show the median estimates and shading their 95% confidence intervals. The horizontal line in the bottom right panel (Total) shows the reference removal rate level of $F_{0.1}$ (F = 0.32, an exploitation rate of 27% annually) applicable in the healthy zone.

Recruitment and Recruitment Rates

The three most recent estimates of recruitment rate (2012 to 2014 cohorts; recruit abundance divided by the SSB producing them) were among the lowest observed in the North and Middle regions. The estimates for these three cohorts were average in the South region, though the estimates were extremely uncertain (Fig. 26). Summed over all three regions, total recruitment rates for the 2012 to 2014 cohorts were among the lowest observed.

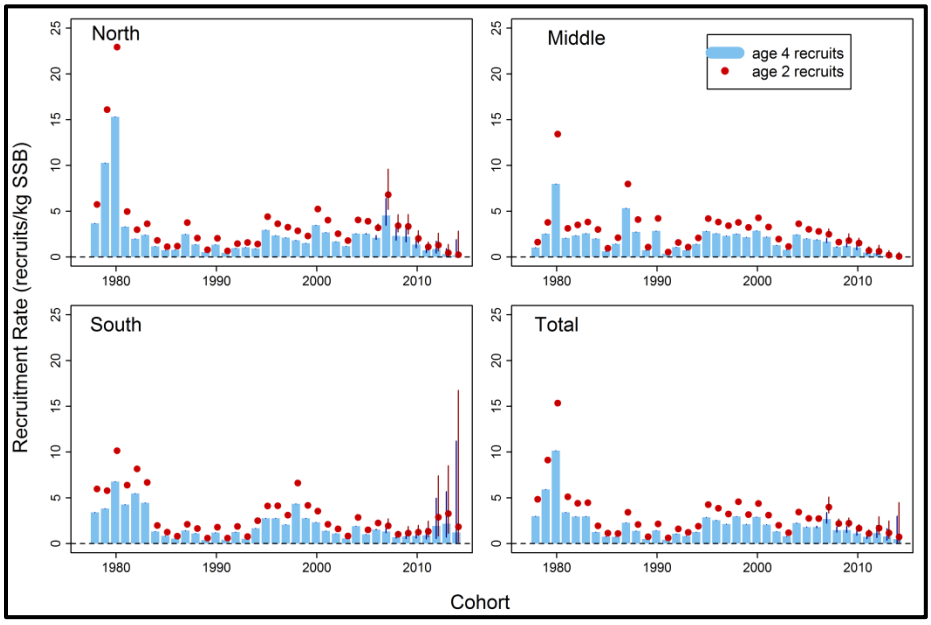


Figure 26. Estimated recruitment rates to age 2 (circles) and age 4 (bars) for fall spawning herring by region and summed (Total) over regions in the southern Gulf of St. Lawrence, for the 1978 to 2014 cohorts. Vertical lines are the 95% confidence intervals.

Estimated abundances of FS age 4 and older have declined in the North and Middle regions since 2013 and 2009, respectively (Fig. 27). In the South region, the abundances declined during 2004 to 2015 but increased recently, however, the estimates have very high uncertainty in this region since 2015 (Fig. 27).To a large extent, this reflects reductions in the recruitment of 4-year-old herring. In all three regions, estimated abundances of age 4 herring for the last three years (2016 to 2018) are among the lowest observed and comparable to the low levels estimated for the late 1970s.

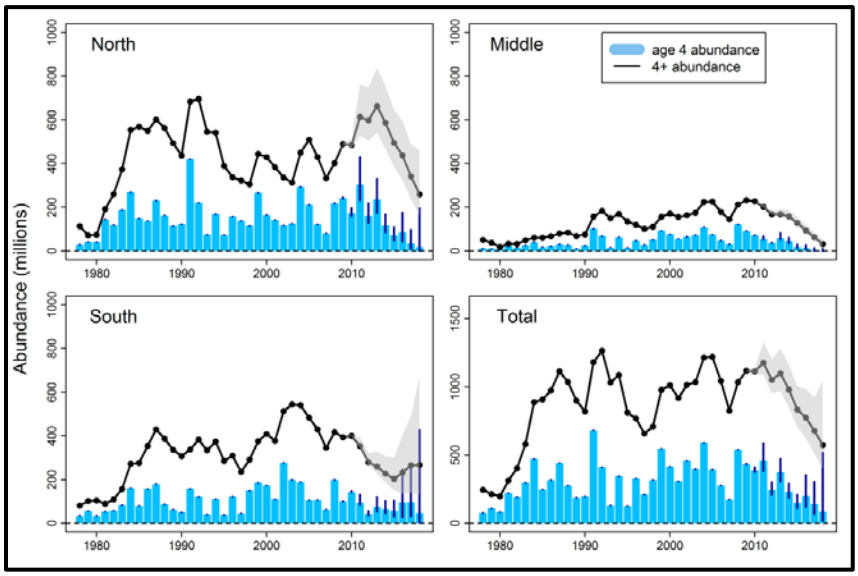


Figure 27. Estimated abundances of fall spawning herring at ages 4 and for ages 4+ by region and for the entire (Total) southern Gulf of St. Lawrence at the beginning of the year, 1978 to 2018. Line and circles (age 4+) and bars (age 4) show the median estimates and shading or vertical lines show the 95% confidence intervals.

Projections

The fishery TAC for the fall spawner component is set at the level of the entire NAFO Div. 4T stock unit. The three region-specific models were projected forward to the start of 2020. Uncertainties incorporated in projections included estimates of abundance at age at the beginning of 2018, weights-at-age, partial recruitment to the fishery, and recruitment rates (to estimate age 2 abundance). Summed over all three regions, the median estimate of SSB at the start of 2020 was projected to be below the USR at all catch levels between 10,000 and 50,000 t (Fig. 28).

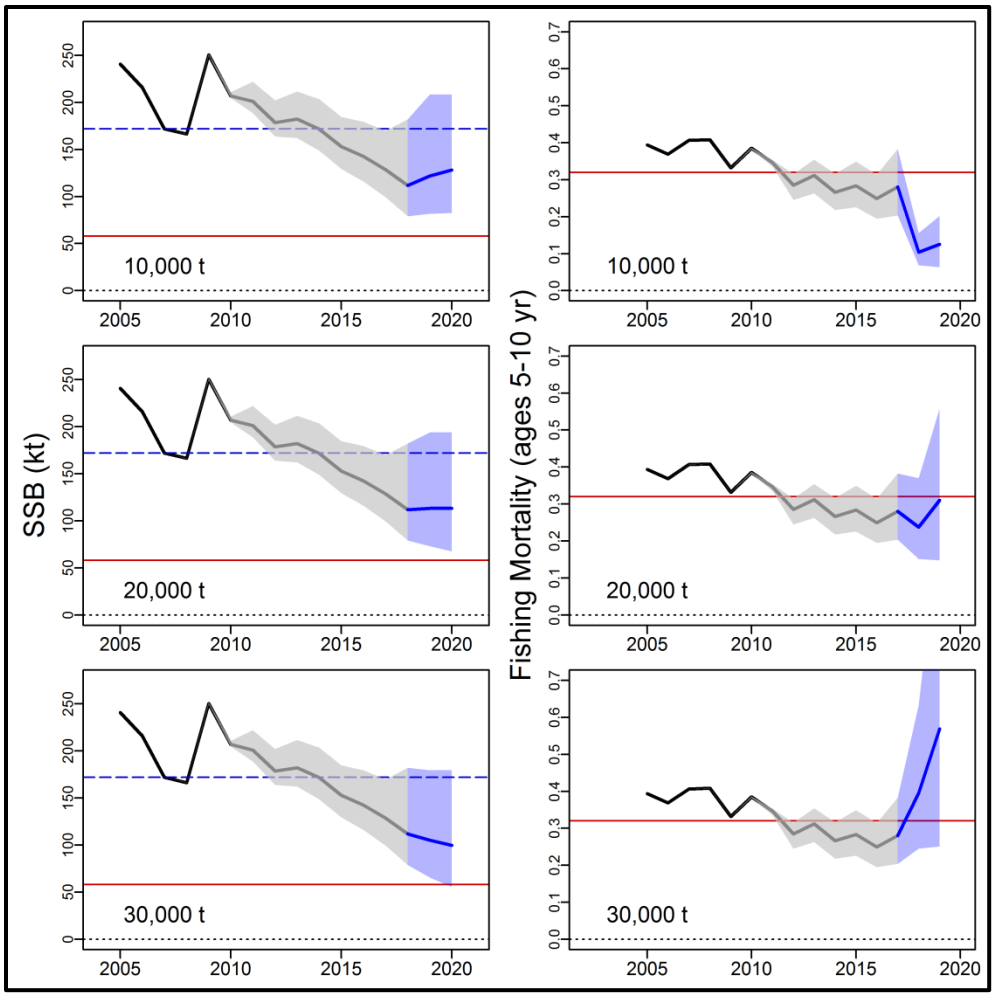


Figure 28. Spawning stock biomass (SSB in kt; left panels) and ages 5 to 10 fishing mortality rates (F; right panels) of fall spawner Atlantic herring from the southern Gulf of St. Lawrence for three catch levels in 2018 and in 2019. In all panels, lines show the median estimates and shading the 95% confidence intervals of these estimates (based on MCMC sampling). Black lines and grey shading indicate the historical period whereas blue lines and shading show the projection period, respectively. In the left panels, the blue dashed line is the upper stock reference (USR) and the red horizontal line is the limit reference point (LRP). In the right panels, the red horizontal line is the removal rate reference level ($F_{0.1}$; F = 0.32).

Risk analysis of catch options

The probability that SSB would be below the USR at the start of 2020 increases from 90% at 10,000 t of catch to 99% at 50,000 t of catch. At a catch of 20,000 t (the catch in 2017) in 2018 and 2019, this probability would be 94% (Fig. 29). At catch levels from 10,000 to 20,000 t in 2018 and 2019, the median value of weighted average *F* for ages 5 to 10 over all regions in 2019 was less than 0.32, i.e. the probability that F would exceed $F_{0.1}$ < 50%.

The probability that SSB would be below the LRP in 2020 ranged from 0% at 10,000 t to 17% at 50,000 t. A 5% increase in SSB by 2020 would only be likely at catches below 16,000 t whereas a decrease in SSB is probable at catches of 24,000 t and above.

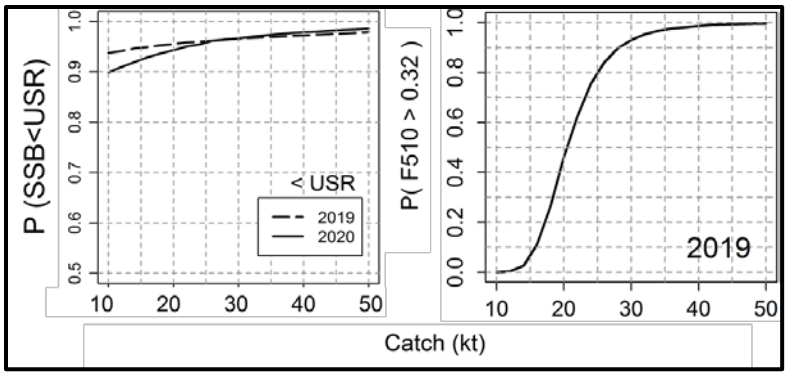


Figure 29. Risk analysis of annual fixed catch options for 2018 and 2019 for the FS herring component of the southern Gulf of St. Lawrence. The left panel shows probabilities that total SSB at the start of 2019 and 2020 will be below the USR. The right panel shows probability profile of average F for ages 5 to 10 in 2019 being greater than the reference level F = 0.32 ($F_{0.1}$).

Sources of Uncertainty

Fishery dependent indices, such as the commercial gillnet CPUE indices, may not be proportional to abundance due to changes in catchability over time. On one hand, catch rates can remain elevated despite decreases in abundance (increased catchability) due to contractions in stock distribution and targeting of aggregations by fishing fleets, as well as due to improved fishing technology and fishing practices. On the other hand, catch rates can be negatively affected by boat limits, saturation of nets at high abundance, and closure of prime fishing areas that redirect fishing effort to other locations. Catch rates calculated on the basis of realized landings and available fishing effort information would be subject to such effects. The estimation of time-varying catchabilities in the SS and FS assessments accounts for some of the effects listed above.

The commercial CPUE calculations are subject to uncertainty. The estimates are based on regional average seasonal values of fishing effort data (number of nets, number of hauls, and net length of gillnets) from the telephone survey rather than trip specific information. Trips with no catch were not documented prior to 2006 and therefore are not incorporated in the effort data. No information is collected on the soak time of nets. There are also potential inconsistencies in the reporting of effort data within and among regions and seasons.

The new modelling approach considers the dynamics of fall spawning herring in three regions. The dynamics are modelled independently among regions and assume closed populations after recruitment at age 2. This is a strong assumption that can have consequences on region-specific estimates of abundance and dynamics. Empirical evidence for spawning bed fidelity has been documented in fall spawning herring based on tagging studies. Nevertheless, elemental analyses of otolith structures did not detect region-specific differences among fall spawners despite showing distinct differences between spring spawners and fall spawners in the sGSL. Genetic research has been unable to identify population-level differences between regions for fall spawners.

The weight-at-age of herring has declined and remains at near record low levels. The causes of these declines in weight-at-age and the consequences to recruitment rate are unknown.

Catches of herring in bait fisheries are presently not accounted for in the assessments of either spring or fall spawner components. Catches in these fisheries are meant to be recorded in harvester logbooks but compliance with the requirement to complete and return logbooks is low. Catches of herring in the bait fishery are expected to be much lower than landings in the

commercial fishery, nonetheless this unaccounted fishing mortality constitutes a source of uncertainty in the total fishing mortality.

Uncertainty in recruitment rate in both the SS and FS leads to uncertainty in projections as these are heavily reliant on the recruitment rate selected. In this assessment, three recruitment scenarios were used for the SS assessment to account for variation in recruitment rates among years. In the FS assessment, an intermediate recruitment rate value was used as it appears that the most recent estimates of recruitment rate were biased low and would result in overly pessimistic projections.

The model assumes that natural mortality was constant over time. Retrospective patterns from previous assessments indicated a change in dynamics over time which could be associated with changes in catchability of the commercial cpue index (q) or natural mortality (M). A model that incorporated time varying change in q rather than M resolved the non-stationarity problem. This does not mean that M did not change but the current data and information used in the model only resolve one or the other. Future research should also consider whether M has changed in this ecosystem and what information could be used to incorporate this dynamic in the population model.

In the previous assessment, the fall spawner abundances were declining with the estimate at the end of 2015 just below the USR. In this assessment, the median of the 2014 and 2015 estimates are below the USR. The declining trend in status has continued into 2018. Given this decline in absolute level of abundance from the previous assessment, it is possible that the current biomass values from the model are overestimated. This overestimation of the biomass will result in an underestimate of the risk of failing to achieve defined management objectives for different catch options for 2018 and 2019 although the extent of the bias is not known.

CONCLUSIONS AND ADVICE

Spring Spawner Component (SS)

The spring spawner component trajectory with respect to spawning stock biomass and fishing mortality levels is shown in Figure 30. The stock has been in the critical zone (SSB < LRP = 19,250 t) since 2004 with fishing mortalities above the $F_{0.1}$ level until 2010. Since 2010 *F* has decreased and remained at levels below $F_{0.1}$.

SSB at the start of 2019 and 2020 was projected to increase slightly at annual catches less than 500 t, remain roughly stable at annual catches of 1,000 t, but decline at catches of 1,500 t or more. However, uncertainty in projected SSB is high. Even in the absence of any removals of SS herring in 2018 and 2019, the SSB is expected to only increase slightly with a very high probability (90%) that the stock will remain in the critical zone.

Fishing mortality on the SS herring in recent years was estimated at 0.24, low relative to the history of the fishery but still high for a stock in the critical zone. Elevated fishing mortality and declines in weight-at-age are also exacerbating the reductions in SSB.

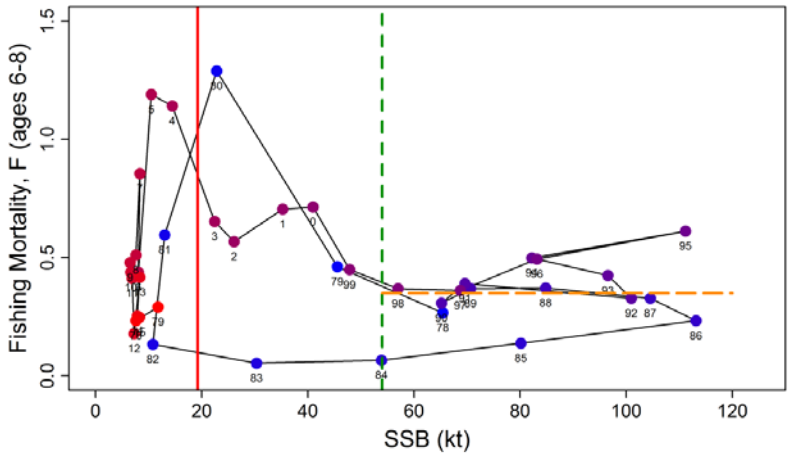


Figure 30. The southern Gulf of St. Lawrence Atlantic Herring spring spawner component trajectory in relation to spawning stock biomass (SSB, kt = thousand t) and fishing mortality rates for ages 6 to 8 years. The solid red vertical line is the LRP (19,250 t), the green dashed vertical line is the Upper Stock Reference (USR = 54,000 t), and the dashed horizontal line is the removal rate reference value ($F_{0.1}$ = 0.35). Point labels are years (83 = 1983, 0 = 2000). Colour coding is from blue in the 1970s and early 1980s to red in the 2000s.

Fall Spawner Component (FS)

The fall spawner component trajectory with respect to spawning stock biomass and fishing mortality levels is shown in Figure 31. The median estimate of the SSB has generally been in the healthy zone (SSB > 172,000 t) over its history with few exceptions but the median estimate of SSB has been in the cautious zone since 2015. Fishing mortality rates generally exceeded the removal rate reference from the mid-1990s to 2011 but were below the reference level from the early 1980s to the mid-1990s and since 2011.

The median SSB estimate at the start of 2019 and 2020 was projected to remain in the cautions zone (below the USR) even at catch levels of 10,000 t. At a catch of 20,000 t (the catch in 2017) in 2018 and 2019, the probability of the SSB being in the cautious zone in 2020 was estimated at 94%, and the probability of the fishing mortality rate being above the removal rate reference was estimated at 46%.

Fishing mortality on the FS herring averaged 0.20 since 2012, just over half of the $F_{0.1}$ removal reference level.

Declining abundance at age 4 in recent years, resulting from declining recruitment rates, has contributed to the decline in SSB for this stock. The causes of the low recruitment rates for the FS herring component are unknown. Declines in weight-at-age are also exacerbating the reductions in SSB. Fishing mortality rates in excess of $F_{0.1}$ from the mid 1990's to 2010 have also contributed to reductions in SSB.

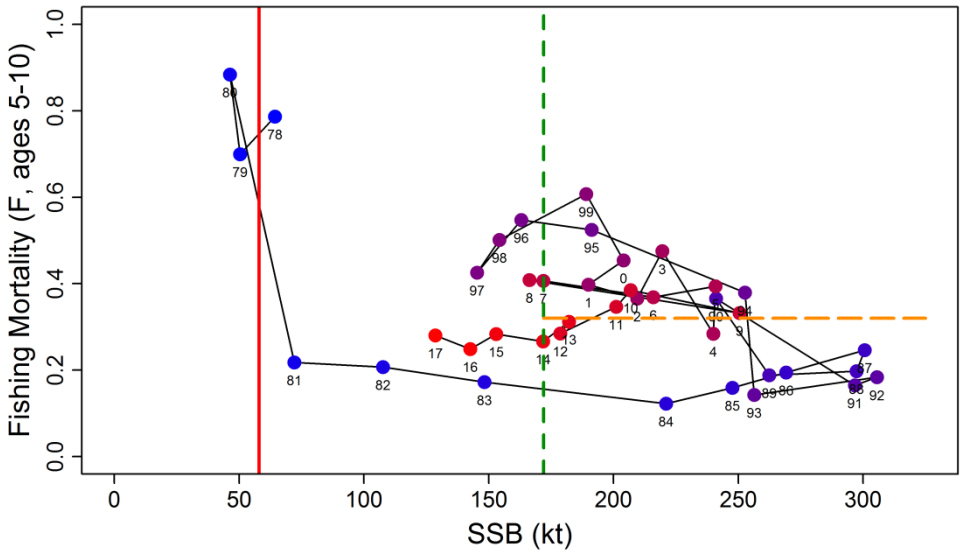


Figure 31. The southern Gulf of St. Lawrence Atlantic Herring fall spawner component trajectory in relation to spawning stock biomass (SSB, kt = thousand t) and fishing mortality reference levels. The solid red vertical line is the LRP (58,000 t), the green dashed vertical line is the Upper Stock Reference (USR = 172,000 t), and the dashed horizontal line is the removal rate reference value ($F_{0.1}$ = 0.32). Point labels are years (83 = 1983, 0 = 2000). Colour coding is from blue in the 1970s and early 1980s to red in the 2000s.

SOURCES OF INFORMATION

This Science Advisory Report is from the March 15, 2018 regional science peer review meeting on the Assessment of stock status of Atlantic herring (*Clupea harengus*) from the southern Gulf of St. Lawrence (NAFO Div. 4T-4Vn) to 2017 and advice for the 2018 and 2019 fisheries. Additional publications from this meeting will be posted on the Fisheries and Oceans Canada (DFO) Science Advisory Schedule as they become available.

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Aussi disponible en français :

MPO. 2018. Évaluation du hareng de l'Atlantique (Clupea harengus), composantes des reproducteurs de printemps et d'automne, du sud du golfe du Saint-Laurent (division 4T de l'OPANO) et avis pour les pêches de 2018 et de 2019. Secr. can. de consult. sci. du MPO, Avis. Sci. 2018/029.

APPENDIX D-2

Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Canadian Science Advisory Secretariat (CSAS)

Research Document 2016/097

Gulf Region

Estimation of local spawning biomass of Atlantic Herring from acoustic data collected during fall commercial gillnet fishing activities in the southern Gulf of St. Lawrence (NAFO Div. 4T)

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Gulf Fisheries Centre
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November 2016

Canada

Foreword

This series documents the scientific basis for the evaluation of aquatic resources and ecosystems in Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

Research documents are produced in the official language in which they are provided to the Secretariat.

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ABSTRACT

In partnership with Fisheries and Oceans Canada (DFO), fish harvesters participating in the Atlantic herring (*Clupea harengus*) fall fishery in NAFO Div. 4T surveyed five spawning grounds in the southern Gulf of St. Lawrence using acoustic sounders over the course of their regular fishing activities from 2002 to 2012. Using a statistical method developed for Fisherman's Bank, seasonal biomass was estimated for all five spawning grounds. Acoustic data from each area was processed and analyzed to produce nightly biomass estimates for a subset of days over the season. Missing biomass values were simulated using a Bayesian time-series model, then grouped by spawning aggregation using a spatial-temporal clustering model. Seasonal biomass estimates were then produced by year and region. While this approach showed some promise, the model did not provide realistic results for two of the five regions. Furthermore, there are also underlying methodological and biological issues which raise significant doubts as to the comparability of results among regions. Given the inconsistencies in model performance and the underlying issues with the data it was decided that these data could not be used to develop a time series of local abundance indices for herring as part of the fall herring stock assessment. Recommendations are made to aid in future spawning bed specific acoustic surveys.

Estimation de la biomasse du stock de reproducteurs de harengs de l'Atlantique à l'échelle locale à partir des données acoustiques recueillies au cours des activités de pêche commerciale au filet maillant d'automne dans le sud du golfe du Saint-Laurent (division 4T de l'Organisation des pêches de l'Atlantique Nord-Ouest (OPANO))

RÉSUMÉ

En partenariat avec Pêches et Océans Canada (MPO), les pêcheurs participant à la pêche d'automne du hareng de l'Atlantique (*Clupea harengus*) dans la division 4T de l'OPANO ont effectué des relevés dans cinq frayères du sud du golfe du Saint-Laurent en utilisant des sondeurs acoustiques pendant leurs activités de pêche courantes entre 2002 et 2012. À l'aide d'une méthode statistique conçue pour le Fisherman's Bank, on a estimé la biomasse saisonnière pour les cinq lieux de frai. Des données acoustiques de chaque zone ont été traitées et analysées afin de produire des estimations de la biomasse chaque nuit pour un sous-ensemble de jours au cours de la saison. Les valeurs de la biomasse manquantes ont été simulées à l'aide d'un modèle bayésien d'ajustement des séries chronologiques puis classées par groupement de poissons en frai à l'aide d'un modèle de regroupement spatiotemporel. Les estimations de la biomasse saisonnière ont ensuite été produites par année et par région. Bien que cette méthode se soit révélée assez prometteuse, le modèle n'a pas fourni des résultats réalistes pour deux des cinq régions. De plus, il y a aussi des problèmes méthodologiques et biologiques sous-jacents qui soulèvent de sérieux doutes quant à la comparabilité des résultats entre les régions. Compte tenu des irrégularités dans le rendement du modèle et des problèmes sous-jacents liés aux données, il a été décidé que ces données ne pouvaient pas être utilisées pour élaborer une série chronologique d'indices de l'abondance locale du hareng dans le cadre de l'évaluation du stock de reproducteurs d'automne de hareng. Des recommandations sont formulées pour faciliter les relevés acoustiques propres aux frayères à venir.

INTRODUCTION

Population biomass and fishing mortality estimates are key components of fishery management decision frameworks, and are necessary for developing harvest control rules based on defined reference points (DFO 2006). The risk of not achieving sustainability objectives when fisheries occur on discrete spawning grounds increases when information is only obtained for large scale processes. Managing diverse herring spawning grounds for sustainability is important for conserving intraspecific biodiversity and adaptive potential (Sinclair 1988; Stephenson et al. 2001).

Until 2014, the stock assessment for the southern Gulf of St. Lawrence (sGSL) fall Atlantic herring (*Clupea harengus*) stock used a population model adjusted to annual gillnet catch-per-unit-effort (CPUE) from all spawning grounds combined and management provides Total Allowable Catch (TAC) advice based on the overall sGSL biomass (LeBlanc et al. 2015). There are concerns that gillnet CPUE does not track population biomass well, because fisheries that target spawning aggregations often exhibit hyperstability, where CPUEs remain elevated even as stock abundance declines (Erisman et al. 2011; Swain 2016).

Acoustic data from fishing vessels have been used to analyze school morphology characteristics, spatial patterns, relative changes in school density (Shen et al. 2008) and to develop estimates of abundance (Melvin et al. 2002; Honkalehto et al. 2011). Derivation of an annual seasonal index of biomass of herring from fishery acoustic data have been problematic for two reasons (Claytor and Clay 2001). First, the behaviour of herring gradually accumulating on spawning grounds prior to spawning, if not accounted for, can lead to multiple counts of the same fish which leads to over-estimation of biomass. Second, missing data created by weather, equipment malfunction, fishery closures, and other reasons create a source of uncertainty and potential biases in biomass and exploitation rate estimates.

From 2002 to 2012, acoustic data were collected from commercial gill netting vessels while fishing on the five major Atlantic herring fall spawning areas located within the coastal waters of the sGSL. The fall spawning areas were Miscou (NB), Escuminac and Richibucto (NB), Fisherman's Bank (PEI), West PEI, and Pictou (NS) (Fig. 1). Acoustic data were to be collected according to a protocol described in Claytor and Allard (2001) for the purpose of developing a time series of local abundance indices for herring as part of the fall herring stock assessment. The objectives of this research document were to analyze the collected acoustic data and determine whether they could be used to derive an index of local abundance. Nightly biomass estimates were derived following a defined protocol (Claytor and Clay 2001) and an analytical method (Surette et al. 2015) was applied to estimate spawning bed specific estimates of annual abundance and area-specific estimates of exploitation rates for five sGSL fall spawning grounds. This novel method was developed to account for some aspects of herring spawning behaviour and includes many sources of uncertainty in its final inferences.

METHODS

Atlantic herring from the sGSL are comprised of two spawning components, a spring spawning component and a fall spawning component (Scott and Scott 1988; Messieh 1988). Both spawning components have preferred spawning seasons and specific grounds. Herring show a high degree of fidelity to a specific spawning season and spawning ground once they have spawned (Wheeler and Winters 1984; McQuinn 1997; Brophy et al. 2006). Herring spawn in temporally discrete groups, separated by several days to weeks in a single spawning season (Ware and Tanasichuk 1989). Genetic and morphometric differences found in spawning herring were consistent with a replacement period of 6 days or less (McPherson et al. 2003). Fall

spawning occurs from mid-August to mid-October, at depths of 5 to 25 m (Messieh and MacDougall 1984). The fall spawning component is the focus of this study.

Fisherman's Bank has been the focus of numerous prior studies on herring spawning behaviour. In situ observations showed that a spawning event and the creation of the associated spawning bed took place over the course of a single day (Messieh 1988). Between 1985 and 1995 the number of spawning beds surveyed on Fisherman's Bank per season varied from a minimum of 1 to a maximum of 7, with few cases of simultaneous spawning events (Table 1). Spawning season length (i.e., between the first and last spawning event) varied from 6 to 29 days (Cairns et al. 1996).

Herring spawn in multiple waves during the course of the season. Incoming schools of herring create spawning aggregations over spawning beds, and may be joined by further schools accumulating over several days. Herring subsequently dissipate after spawning, as evidenced by the low frequency of spawned herring in fishery catches. To avoid double-counting of fish during the accumulation phase, observations need to be partitioned by spawning waves. The method previously applied to Fisherman's Bank (Surette et al. 2015) is applied in this study to the other four spawning areas surveyed.

OVERVIEW OF ANALYSIS

The goal of the analysis is to estimate the total fall spawning biomass from a set of nightly acoustic observations. Seasonal biomass requires a daily tally of all incoming or outgoing fish over spawning grounds for each region. The data presents two difficulties. Firstly, biomass estimates are only available for nights where the participating fish harvester was active. Secondly, spawning aggregations contain a mixture of fish which entered the grounds during the previous 24 hours and those from days prior.

The analysis proceeds in three steps. The first is to process and analyze the nightly acoustic data for each region in order to obtain a nightly biomass estimate. The method is described in Claytor and Clay (2001). The second step is to use a model to simulate values for nights with missing observations. The third step is to partition nightly biomass into distinct spawning waves using a spatial-temporal model. This step provides estimates of recruitment and escape biomasses which are then summed into a seasonal estimate. Uncertainty due to missing observations and clustering were incorporated in each step of the analysis.

ACOUSTIC DATA ANALYSIS

Two data sources were used in the following model: region-specific landings from the sGSL fall gillnet fishery and region-specific acoustic data from participating fishing vessels. Nightly landings were obtained from dockside monitoring data compiled and archived by the Department of Fisheries and Oceans Statistics Branch. The acoustic data was obtained from one or two fishing vessels per night from each spawning ground (Fig. 2). Acoustic calibration, data collection and processing, as well as the method for calculating nightly biomass, are described in Claytor and Clay (2001).

Nightly biomass model

Observations from each day of the spawning season are required for calculating the seasonal biomass. Missing observations occurred due to logistical problems (e.g., equipment failure, vessel electrical problems), weekend fishery closures, inclement weather or the fishery attaining its quota before the end of the spawning season. Missing nightly biomass values were inferred using a time-series model.

Let b_{ijk} be the nightly biomass estimate for day *i*, year *j* and region *k*. Zero values and positive values of b_{ijk} were modeled separately. Let $z_{ijk} \sim Bern(\pi_{jk})$ be a binary random variable indicating whether b_{ijk} is zero ($z_{ijk} = 1$) or one ($z_{ijk} = 0$). For each year and region, positive values of b_{ijk} are assumed to be log-normally distributed realisations from a first order autoregressive process (AR(1)):

$$\varepsilon_{ijk} \sim N(\phi_k \varepsilon_{i-1,jk},\ \sigma_\varepsilon^2)$$

$$\mu_{ijk} = \alpha_{jk} + \varepsilon_{ijk}$$

$$b_{ijk} \mid z_{ijk} = 0 \sim LN(\mu_{ijk}, \sigma^2)$$

where the log-linear annual means $\alpha_{jk} \sim N(\mu_{\alpha,}\sigma_\alpha^2)$ were given a hierarchical prior, with $\mu_\alpha \sim N(0, 10^4)$ and $\sigma_\alpha^2 \sim InvGam(10^{-4}, 10^{-4})$, the AR(1) process error was given a prior of $\sigma_\varepsilon^2 \sim InvGam(10^{-4}, 10^{-4})$, the AR(1) autocorrelation parameter a prior of $\phi_k \sim U(0, 1)$, the nightly observation error parameter was given a prior of $\sigma^2 \sim InvGam(10^{-4}, 10^{-4})$ and the prior probability of observing a zero was given a hierarchical prior of $\pi_{jk} \sim Beta(a, b)$ with $a \sim Exp(1)$ and $b \sim Exp(1)$. An error (CV = 0.15), based on empirical considerations (Claytor and Allard 2001) was added to each nightly biomass as a proxy for estimation error. If landings were reported for a given night, missing observations were assumed to be drawn from a truncated distribution and these were used to inform missing observations by serving as lower bound in a censored log-normal distribution. When landings exceeded nightly biomass estimates, the latter were treated as missing values. The above model differed slightly from the one presented in Surette et al. (2015) which made no provision for autocorrelation between observations and had no inter-regional hierarchical priors as it was applied to Fisherman's Bank region only. The OpenBUGS code for this model is found in Appendix A.

For the purposes of this study, the fishing season was defined as a period of 28 days starting at the opening date of the fishery. The sampling period by participating vessels covers the potential spawning period of herring for each spawning area. The seasonal distribution of acoustic data samples for each region is shown in Figure 2.

Spatial-temporal clustering model

The locations of nightly aggregations were calculated directly from acoustic density data, as a density-weighted average of GPS coordinates. These coordinates were used as inputs in a spatial-temporal clustering model, used for partitioning observed spawning aggregations by spawning wave. Under this model, a temporal sequence of spatially proximate aggregations would likely be grouped together as a single spawning wave, while those which are spatially distant would not. Such structural features in the data aid in probabilistically inferring the spawning wave with which missing observations are associated. The model formulation is as follows.

Let x_{ijk} and y_{ijk} represent the horizontal and vertical coordinates (in UTM projection, NAD83, zone 20, scaled to kilometers) of the aggregation locations for day *i* of the fishing season at year *j* within spawning region *k*. The coordinates were modeled as random walks with heterogeneous variances:

$$x_{ijk} = x_{i-1,jk} + \varepsilon_{ijk}^x, \text{ with } \varepsilon_{ijk}^x \sim \mathrm{N}(0, \sigma_{s_{ijk}}^2)$$

$$y_{ijk} = y_{i-1,jk} + \varepsilon_{ijk}^y, \text{ with } \varepsilon_{ijk}^y \sim \mathrm{N}(0, \sigma_{s_{ijk}}^2)$$

where ε_{ijk}^{x} and ε_{ijk}^{y} are independent normal random variables, each with two variance parameters $\sigma_0^2 < \sigma_1^2$ which were given uninformative priors of $\mathrm{InvGam}(10^{-4}, 10^{-4})$. The choice of variance parameter used is controlled by a binary random variable s_{ijk}, modeled as a 2-state Markov chain s_{ijk}. Formally,

$$s_{ijk}|s_{i-1,jk} = 0 \sim \mathrm{Bern}(\pi_{0\mathrm{k}})$$

$$s_{ijk}|s_{i-1,jk} = 1 \sim \mathrm{Bern}(\pi_{1\mathrm{k}})$$

where state 0 indicates that the aggregation location from day *i* belongs to the same spawning wave as that of previous day and state 1 indicates that it belongs to a new spawning wave. The transition probabilities were given hierarchical priors of $\pi_{0k} \sim \mathrm{Beta}(a_0, b_0)$ and $\pi_{1k} \sim \mathrm{Beta}(a_1, b_1)$ with $a_0 \sim \mathrm{Exp}(1)$, $a_1 \sim \mathrm{Exp}(1)$, $b_0 \sim \mathrm{Exp}(1)$ and $b_1 \sim \mathrm{Exp}(1)$. The probability parameter $\pi_{0\mathrm{k}}$ controls the residence time of sequences within spawning events while $\pi_{1\mathrm{k}}$ controls how often an aggregation will be remain within the current spawning event, given that a new spawning event has just occurred. The spawning event to which an observation from day *i*, year *j* and region *k* belongs, labelled c_{ijk}, is the cumulative sum of the corresponding elements of s_{ijk} over the season:

$$c_{ijk} = \sum_{m=1}^{i} s_{mjk} \; + \; 1$$

This model was nearly identical to that presented in Surette et al. (2015), except for the hyperpriors placed on the transition probabilities and variance parameters, to allow for some pooling of information across regions.

For both the nightly biomass and spatial clustering model, posterior samples were drawn via Monte Carlo Markov Chain (MCMC), with a burn-in sample of 5,000 iterations, plus a further draw of 100,000 samples which were thinned to one out of every twenty samples, for a total of 5,000 posterior samples. The OpenBUGS code (Lunn et al. 2000) for this model is found in Appendix B.

Seasonal biomass calculation

Simulations of nightly biomasses for each night of the season and their corresponding spawning wave identifications provided the input for calculating a seasonal spawning biomass. Each day of an event was assumed to be either a recruitment day, whereby a quantity of fish enter the aggregation, or an escape day, where fish exit the aggregation. For the first day of the event, biomass was considered to be recruitment. For subsequent days, recruitment and escape days were determined by comparing the biomass from day *i+1* (b_{i+1}) with the residual biomass of the day *i*, expressed as the difference of the biomass from day *i* (b_i) and the landings (l_i). If b_{i+1} was larger, it was interpreted as a recruitment day, otherwise it was an escape day. This recruitment was calculated as the difference between the biomass b_{i+1} and the residual biomass r_i. The seasonal biomass is defined as the sum of the recruitment biomasses.

A minimum sequence of three days was imposed for a simulated spawning event to be considered valid in the summation of seasonal spawning biomass. Sequences less than three days were ignored in the summation, and were considered as roaming fish not actively participating in a spawning event.

RESULTS

A log-scale scatterplot of landings versus estimated nightly biomass is shown in Figure 3. The correlation between the two values is weak; high biomass estimates do not imply high landings. Despite efforts to have good coverage of the spawning aggregation by the participating fish harvesters, 22% of nightly biomass estimates were less than the reported nightly landings. In the most severe cases, the biomass estimates were 10 to 50 times less than the landings. Estimates of biomass from the Miscou spawning area showed the largest discrepancies between biomass and landings.

The spatial distributions of spawning aggregations used in the spatial-temporal clustering model are shown in Figure 4 for each spawning region. Each region has its particular characteristics. Where Fisherman's Bank has clusters of locations strongly associated with a submerged ridge, Miscou has a more diffuse distribution across a large area. The distribution in Pictou is stretched out along the coast, and the fleet tends to move as schools of herring migrate through the region during the season. The distribution in the Escuminac region is composed of a northern and southern component. West PEI shows a more complex distribution of scattered locations and a small patch to the Northwest.

Summary statistics for the main model parameters are shown in Table 2.

For the nightly biomass model, credibility intervals showed that the auto-correlation parameter ϕ was not significant for Escuminac, Fisherman's Bank and West PEI, while it was marginally significant for Pictou and significant for Miscou. Variation in the biomass estimates was high and this was reflected in the posterior credibility intervals of missing observations. As an example, boxplots of posterior estimates for Miscou in 2006 are shown in Figure 5. The auto-correlation in the posterior simulations aided in the interpolation of missing values for Miscou. For other regions, the simulations for missing observations are nearly independent (i.e., their posterior means and variances are similar). Actual observations, shaded in grey, had the assumed baseline CV of 0.15.

For the spatial-temporal model, the error parameters σ_0 and σ_1 indicate the amount of distance change (in kilometers) between adjacent pairs of nightly spawning aggregations. Since the coordinates are modelled as a Gaussian random walk, the values of σ_0 and σ_1 are estimates which indicate that points along the walk will occur within σ_0 (intra-aggregation) and σ_1 (new aggregation) kilometers of the previous coordinate in 68% of cases. The intra-event distance parameter σ_0 was 0.53 km in Fisherman's Bank. In terms of surface area, this corresponds roughly to 0.88 km² at 68% areal coverage or 3.52 km² at 95% coverage, assuming a circular distribution of points. These values correspond well with spawning bed surface area estimates from previous studies (Table 1), which ranged from 0.36 km² to 1.44 km². We expect the spatial distribution of aggregations over and around spawning beds to be larger in extent than that of the spawning beds themselves. The σ_0 values for other regions were somewhat larger, from 0.68 km in West PEI to 1.46 km in Pictou. The extra-event distance parameter σ_1 showed more variability, going from 4.39 km in Fisherman's Bank to 24.0 km in Pictou. This parameter reflects the regional extent of coverage, with fish harvesters travelling significantly more during the season in some regions than in others.

The intra-event transition probability π_0 controls the residence time of aggregations within spawning events while the transition probability π_1 controls how often sequences of new spawning aggregations occur. Mean intra-event transition probabilities π_0 were generally high, from 0.81 for Fisherman's Bank, 0.87 for Escuminac and 0.88 for West PEI. The probability value for Miscou was exceptionally high at 0.97, while Pictou was very low with 0.55. The transition probabilities π_1 were more consistent between regions, ranging from 0.41 for Pictou to 0.65 in West PEI (Table 2).

The estimated number of spawning events for each spawning region by year is shown in Table 3. In general, the number of events was 3 or 4 events per 28-day period, the exception being Miscou, with generally one or two spawning events per period, owing to its high intra-event transition probability of 0.97.

Combining the nightly biomass and the spawning event inferences, seasonal biomass estimates for each region and year were obtained. Boxplots of seasonal estimates by spawning region by year are shown in Figure 6. Escuminac shows a downward trend in abundance during 2002 to 2010, with a slight increase in the last years. The estimates for Pictou fluctuate during the first half of the series and have increased in the past four years. Fisherman's Bank shows no overall trend but the last two years show low values with respect to the rest of the series. Estimates for West PEI are fairly stable, but show a slight decreasing trend across the series. Estimates for Miscou varied in the first half of the series, were low in 2008 and 2009, rose in 2010 and 2011, and then was reached a minimum in 2012. Given the variability in the inferred missing nightly biomasses (Fig. 5), the variability of the seasonal biomasses is correspondingly high. For comparison, the means of observed nightly biomass estimates, unadjusted for spawning events are shown in Figure 7. These trends are broadly similar to those of estimated seasonal biomasses.

The exploitation rate was calculated by dividing the total seasonal landings (for the same 28 day period as used in the model) by the seasonal biomass estimate. Boxplots of the exploitation rates by spawning area are presented in Figure 8. The scale of exploitation rates estimates varies among regions, with Escuminac and West PEI being somewhat lower than in other regions. Exploitation rate estimates in West PEI show an increasing trend. Escuminac, Fisherman's Bank, and Pictou show low rates for the last two years.

There are a number of caveats to consider in the interpretation of these results (both seasonal biomass and exploitation rates).

DISCUSSION

Science advice should be tailored to the management strategy. Currently, a reference removal rate is applied to a NAFO 4T Atlantic herring biomass estimate and a historical sharing formula is used to partition the TAC among the fleets from different regions. In this study, we evaluated the possibility of including spawning ground acoustic biomass indices as an additional element to the fall herring stock assessment and the subsequent science advice that could aid in partitioning the TAC. For the presented method to play such a role, seasonal biomass estimates must be comparable and be on the same scale among regions. How these estimates would actually be used to partition the TAC is beyond the scope of this review. We have thus restricted our discussion to the robustness of the science advice that could be provided using this model.

For seasonal biomass estimates to be valid and comparable across spawning areas, underlying assumptions of the model must be respected. The main assumptions are:

- nightly landings are accurate,
- nightly biomass estimates are unbiased estimators of true biomass in each spawning area,
- the models used are an adequate representation of the processes (e.g., spawning behaviour, fishing fleet dynamics, etc.) generating the observations and adequately account for double-counting, missing observations, and other potential sources of error,
- the study period captures the majority of spawning activity, and

- sampling methods and biological processes are sufficiently similar across regions that meaningful comparisons can be made.

For the fall herring fishery, there is little concern of bias in landings as there is 100% dockside monitoring, documented conversion factors, and controls on catch recording because nightly or weekly quotas are used to manage the fishery.

A working hypothesis for calculating the seasonal biomass is that nightly biomass estimates are on the same scale as landings. However, comparison of nightly biomass values with landings showed that these were underestimated in at least 22% of cases. These discrepancies were more prevalent in Miscou than in other regions. This percentage is probably higher given that nightly exploitation rates of 80% or larger are probably unreasonable in most regions.

Participating fish harvesters were to follow to a protocol for a complete fishery survey over each night of scanning, as defined in Claytor and Allard (2001). This protocol called for sampling vessels to collect acoustic data before and after a management-imposed nightly boat limit was caught. An incomplete survey was said to occur if the data collection was terminated when the boat limit was caught. If this protocol was properly adhered to, nightly biomass could be estimated from acoustic data before any fishing has occurred followed by a removal estimate after fishing activity has ceased. However, timing of data collection and discussions with fish harvesters indicated that acoustic scanning of spawning aggregations was generally performed during fishing activities, rather than before and after as the original protocol stated. Thus the data collection occurs as fish are actively being exploited, rather than in the pre- and post-fishing condition. Nightly biomass estimates were calculated using all validated acoustic data, irrespective of the time it was gathered or with reference to fleet fishing activities. Also, scanning during peak fishing activities is problematic because placement of gillnets over concentrations inhibits the ability of the sampling vessel to scan over the whole concentration. Thus the exploited spawning aggregation may be inadequately covered by the acoustic vessel, which may result in an underestimation of nightly biomass. In addition to possible bias in observed spawning aggregations, the presence of unobserved aggregations would also lead to underestimates of nightly biomass. This would be an issue where herring schools are more fragmented and spread out over spawning grounds. This would also have implications for fishing fleets which exploit them, in that these would also tend be more fragmented and widely distributed over spawning grounds. The sampling vessel in such cases would have had limited ability to cover the entire fleet activities. It is also possible that some spawning aggregations remain undetected by any portion of the fleet during a night of fishing in each region.

Biases could arise from the acoustic data itself, such as variability in backscattering in high target concentrations, the relationship between target strength and fish size, and acoustic extinction from near surface reverberation (Fréon and Misund 1999; Simmonds and MacLennan 2005; Brehmer et al. 2006; Boswell et al. 2008). Variability arising from these factors are minimized because the 28-day study period is relatively short, we are dealing with a single species in a well-defined phase of its life history (spawning) with a relatively restricted size-distribution, and the equipment is calibrated against objects of known target strength.

BIOMASS MODEL

The biomass model was developed as a way of inferring nightly biomass over the study period. However, there are two issues with the approach. The first is a potential sampling bias and the second is a lack of structure in the observations by which to make strong inferences.

The variability in nightly biomass estimates is very high with estimates ranging from 0 to over 33,000 tons. There was little evidence of temporal trends or autocorrelation in nightly biomass estimates making it difficult to infer missing biomass values. This may have some implications

with respect to the assumed process of accumulating waves of herring into spawning aggregations, in that residence times of herring within an aggregation may be relatively short, though uncertainties in the nightly biomass estimates as discussed above prohibit a strong conclusion.

Given that fishing is not independent of the quantity of fish, biases may arise through temporal sampling biases, given that sampling is not randomly distributed throughout the season. Such biases may be minimized by high sampling rates (i.e., most every weekday throughout the season) but the temporal pattern of coverage varies from year to year and by region. There is little indication that the survey season was cut short by attainment of the quota. Only West PEI showed a lower sampling density during the last week of the study period. Ideally, surveys would have been conducted daily or randomly within the potential spawning period of herring.

The length of the 28-day period is supported by the spawning event study on Fisherman's Bank (Cairns et al. 1996) and average length of recent fishing seasons. Biases may occur if the start date of the fishery is offset from major waves of spawning activity or if major spawning waves occur after the study period. Given the general absence of trends in the nightly biomass values, we are unable to comment on whether the study period encompasses the majority of spawning activity within each region. A strong economic argument could be made that the fishery depends on a fishing season that is timed with spawning activity, and after 28 days fishing activity has generally tapered to low levels.

SPATIAL-TEMPORAL MODEL

The spatial-temporal model was developed to identify local spawning aggregations as a precursor to assessing fish which are present in aggregations over multiple days (i.e., double-counting). The spawning behaviour assumptions in the model are justified in Fisherman's Bank (Cairns et al. 1993, 1996), however these biological assumptions have not been independently confirmed.

For a modelling perspective, spawning events in Escuminac, West PEI and Fisherman's Bank have similar spatial extents and residence times (Table 2). As a consequence, the relative scaling between the observations and the estimated seasonal biomass is expected to be similar. The spatial extent between spawning event aggregations in Fisherman's Bank of 0.53 km (or 1.06 km at two standard deviations) are consistent with previous estimates of spawning bed size, 0.92 (+/- 0.65) km² (Cairns et al. 1996). Cairns et al. (1993, 1996) also found that the observed number of spawning beds per season was between 1 and 7 from 1985 to 1995 on Fisherman's Bank. These values are consistent with our annual average of 3.7 spawning events over the 28 day estimation period. West PEI and Escuminac produced results that were within the expectations from model assumptions.

In Miscou, the model was deemed inconsistent with biological knowledge as the fitted parameters implied long, protracted spawning events spanning large spatial areas. As a consequence, seasonal estimates were essentially the sum of recruitment days over each 28 day sampling season. The distribution of sampling and fishing effort at Miscou shows little clustering of fishing aggregations, which are otherwise present in other regions (Fig. 4). The presence of such spatial features is assumed by the model. This suggests that spawning aggregations in Miscou may follow different spatial dynamics than in other regions. Miscou also had a lower sampling density than other regions (Fig. 2), so that the seasonal estimates for certain years (e.g., 2007 with no observations, 2010 and 2011 with three observations each) are more a reflection of the hierarchical prior for the mean nightly biomass values rather than actual observations. Furthermore, Miscou landings surpassed nightly biomass estimates more frequently than in other regions. Consequently, the data collected from Miscou do not satisfy the model assumptions.

Pictou fishing locations were spread out along the coast and around Pictou Island (Fig. 4). While this data set is richer, spatial clusters and therefore spawning aggregations, were found to be of short duration resulting in approximately half of the schools being classified as roaming, non-spawning fish. These in turn were not considered in the biomass summation, implying that the downward scaling between observed nightly biomass and seasonal biomass was more severe in Pictou than in other areas. Whether this is due to true differences in herring reproductive behaviour, or that the sampling fish harvester is simply more apt to change locations over such a wide area, remains unclear.

These results suggest that seasonal biomass estimates for Miscou and Pictou are not on the same scale as other regions. The model does not appear to produce valid results in these regions.

Given the inconsistencies in model performance and the underlying issues with the data, this project could not be used to develop a time series of local abundance indices for herring as part of the fall herring stock assessment.

SUMMARY AND RECOMMENDATIONS

Summary of results

- Results for Fisherman's Bank, Escuminac, and West PEI are comparable. Seasonal biomass estimates are comparable if sampling methods and biological processes are also comparable.
- Results for Miscou and Pictou spawning components indicate a mismatch between model output and known spawning biology and behaviour.

Recommendations for future analyses

- Possible biases in nightly biomass estimates need to be assessed.
- Observed aggregations need to be well covered by the sampling vessel to ensure edges of observed schools are well defined in the available acoustic data sets, and determine if spatial structure of available data shows evidence of partial coverage or differences between years or regions.
- Some effort must be made to verify that there are no other spawning aggregations in the area which are unaccounted for. The existence of such unobserved aggregations might be inferred from local fleet dynamics, i.e., logbooks or VMS data.
- Uncertainty in the seasonal biomass is in large part driven by variability in observations. An experiment could be conducted where the sampling vessel is active over as many nights as possible over the season. This data set could then be used to test the robustness of the model at varying proportions of missing observations.
- Nightly spawning aggregations may be better characterized by multiple rather than a single coordinate point, to account for more complex local spatial distributions such as when multiple schools are present in an area.

Recommendations for improving the data collection protocols

- Develop clear protocols for ensuring that fishing surveys are complete and that a method for evaluating this completeness is identified.
- Two possibilities for obtaining these data are noting fishing location in logbooks and by VMS recording.

- This protocol will include comments on the number of vessels required and fishery reporting that includes location of catch.
- Strict adherence to protocols in particular that acoustic surveys should be completed prior to conducting the nightly fishing activity.
- Periodic structured surveys might be undertaken over the entire potential spawning area during the spawning season. It is recommended that it be performed once a week on each spawning bed during weekend fishery closures, and also one week prior and two weeks after end of fishing season, assuming a seven day turnover rate.

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TABLES

Table 1. The number and mean surface area of spawning beds detected from Fisherman's Bank spawning bed surveys (Cairns et al. 1996).

Year	Number	Area (km²)
1985	5	0.36
1986	1	1.10
1987	4	0.52
1988	4	0.84
1989	5	0.81
1990	7	0.70
1991	5	1.08
1992	4	1.44
1993	5	1.22
1994	6	1.26
1995	2	0.64

Table 2. Posterior means (95% credibility intervals in parentheses) for selected nightly biomass and spatial-temporal model parameters.

Region	ϕ	σ_0	σ_1	π_0	π_1
Escuminac	0.24 (-0.16 ,0.66)	0.98 (0.85 ,1.12)	16.08 (12.93 ,20.06)	0.87 (0.81 ,0.93)	0.45 (0.27 ,0.65)
Fisherman's Bank	0.01 (-0.44 ,0.49)	0.53 (0.41 ,0.68)	4.39 (3.6 ,5.45)	0.81 (0.71 ,0.9)	0.52 (0.31 ,0.74)
Miscou	0.61 (0.25 ,0.85)	1.46 (1.29 ,1.65)	24.0 (16.45 ,36.27)	0.97 (0.94 ,0.99)	0.48 (0.16 ,0.86)
Pictou	0.48 (0.1 ,0.76)	0.86 (0.66 ,1.12)	8.32 (7.28 ,9.53)	0.55 (0.39 ,0.7)	0.41 (0.26 ,0.58)
West PEI	0.45 (-0.07 ,0.79)	0.68 (0.56 ,0.83)	13.67 (10.59 ,18.2)	0.88 (0.82 ,0.93)	0.65 (0.45 ,0.85)

Table 3. Estimated number (standard error in parentheses) of spawning events for each spawning region by year.

Year	Miscou	Escuminac	West PEI	Fisherman's Bank	Pictou
2002	2.5 (0.7)	3.0 (1.0)	3.2 (1.1)	2.6 (0.8)	3.8 (1.1)
2003	1.1 (0.2)	3.9 (0.5)	2.7 (0.8)	3.7 (1.0)	3.9 (1.0)
2004	1.6 (0.7)	1.6 (0.7)	4.3 (0.5)	3.5 (0.9)	4.2 (1.1)
2005	1.1 (0.3)	3.7 (0.7)	2.5 (1.0)	3.1 (1.1)	3.2 (0.9)
2006	1.0 (0.1)	3.2 (0.8)	3.0 (0.2)	4.1 (1.0)	3.7 (1.0)
2007	1.1 (0.3)	1.4 (0.6)	2.9 (1.0)	4.3 (0.9)	3.3 (1.0)
2008	2.0 (0.3)	3.7 (0.7)	4.1 (0.9)	3.8 (0.8)	4.2 (1.0)
2009	1.0 (0.2)	3.5 (0.6)	3.8 (0.5)	4.1 (1.0)	4.4 (1.0)
2010	1.3 (0.5)	3.5 (0.8)	2.4 (0.6)	3.4 (1.0)	3.9 (1.2)
2011	2.0 (0.3)	4.0 (0.7)	3.0 (0.9)	4.0 (0.9)	3.4 (0.7)
2012	2.3 (0.6)	2.7 (0.7)	3.2 (0.8)	4.0 (1.0)	4.2 (1.1)

FIGURES

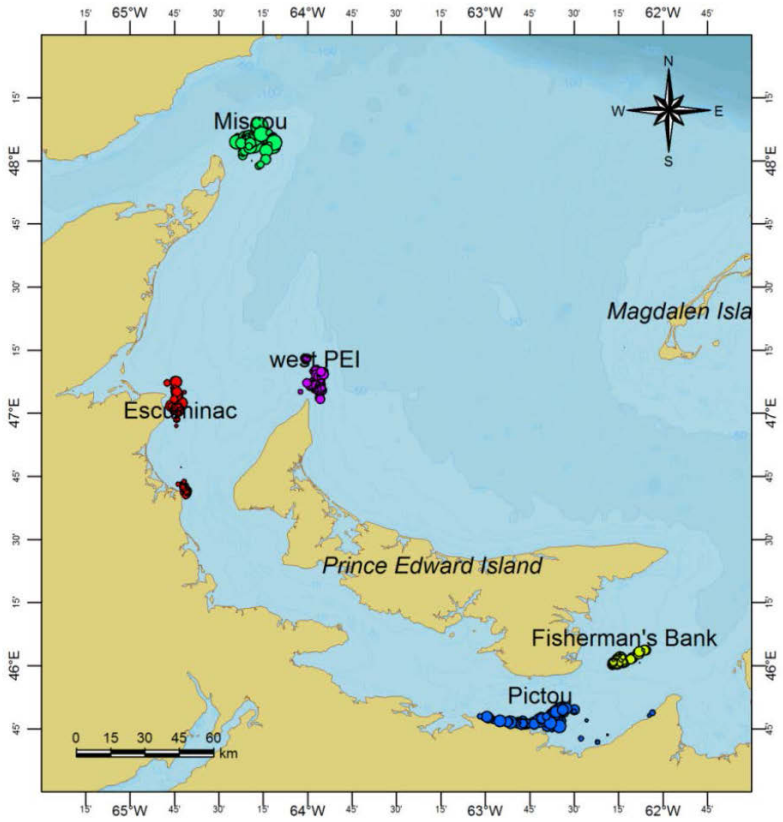


Figure 1. Herring fall spawning locations in NAFO 4T.

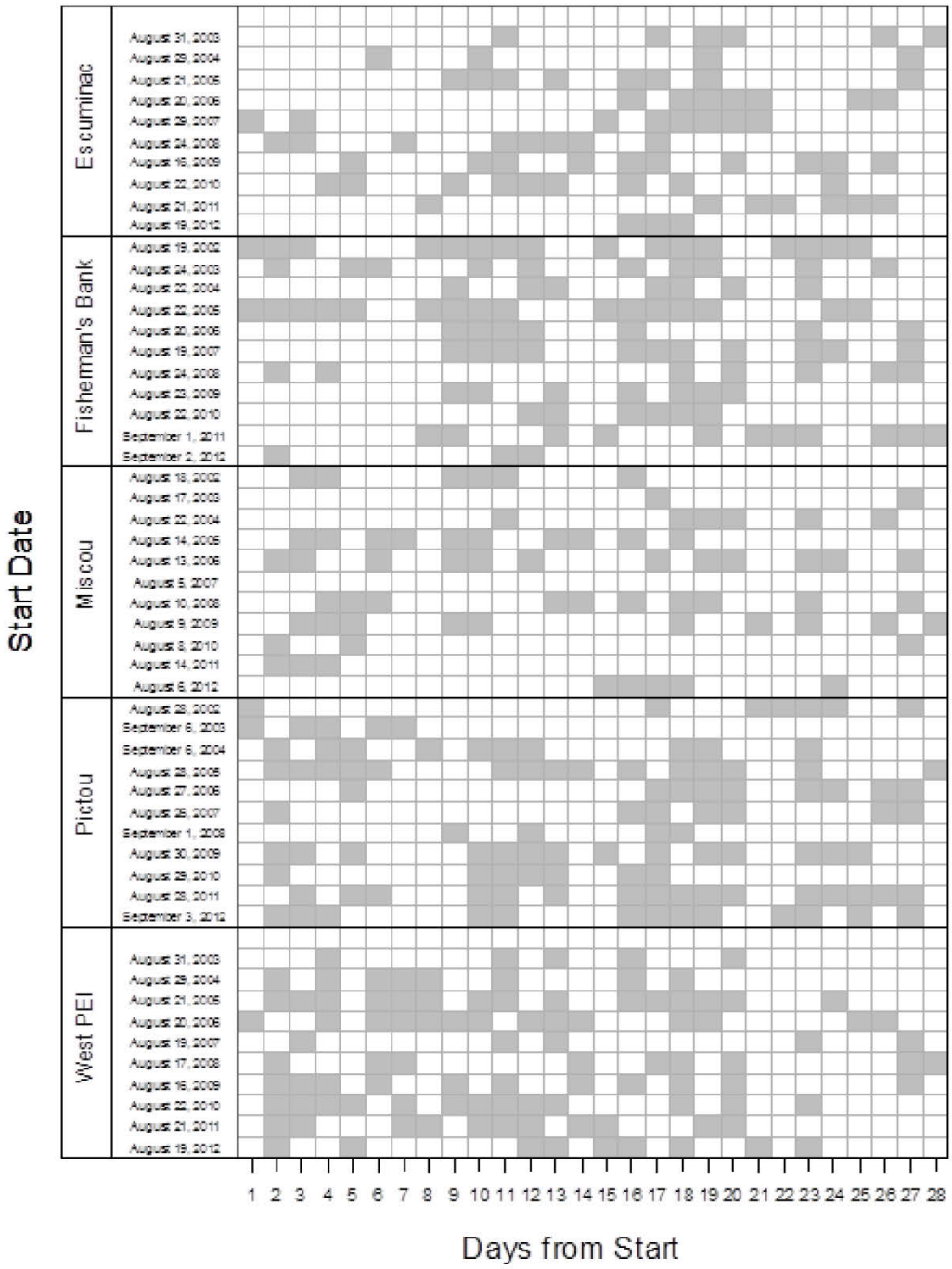


Figure 2. Seasonal pattern of nightly observations (grey squares) used for the analysis for each 28-day period by year and spawning region.

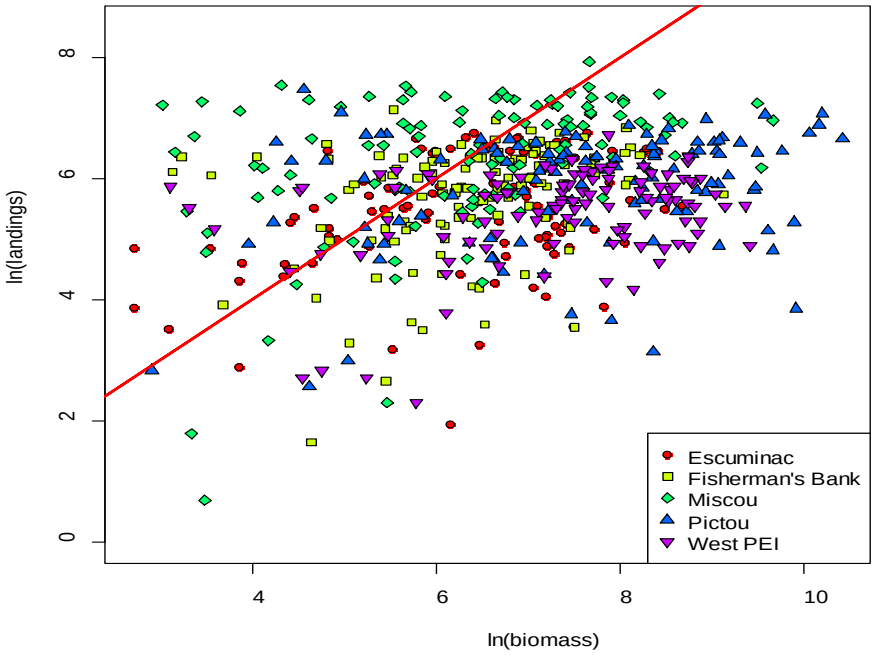


Figure 3. Nightly landings versus nightly biomass estimates for each spawning region for all years combined on the log-scale. The red line is the boundary where nightly landings equal nightly biomass estimates. For points above the line, the nighty landings are greater than the nightly biomass estimates and for points below the line the nightly landings are less than the nightly biomass estimates.

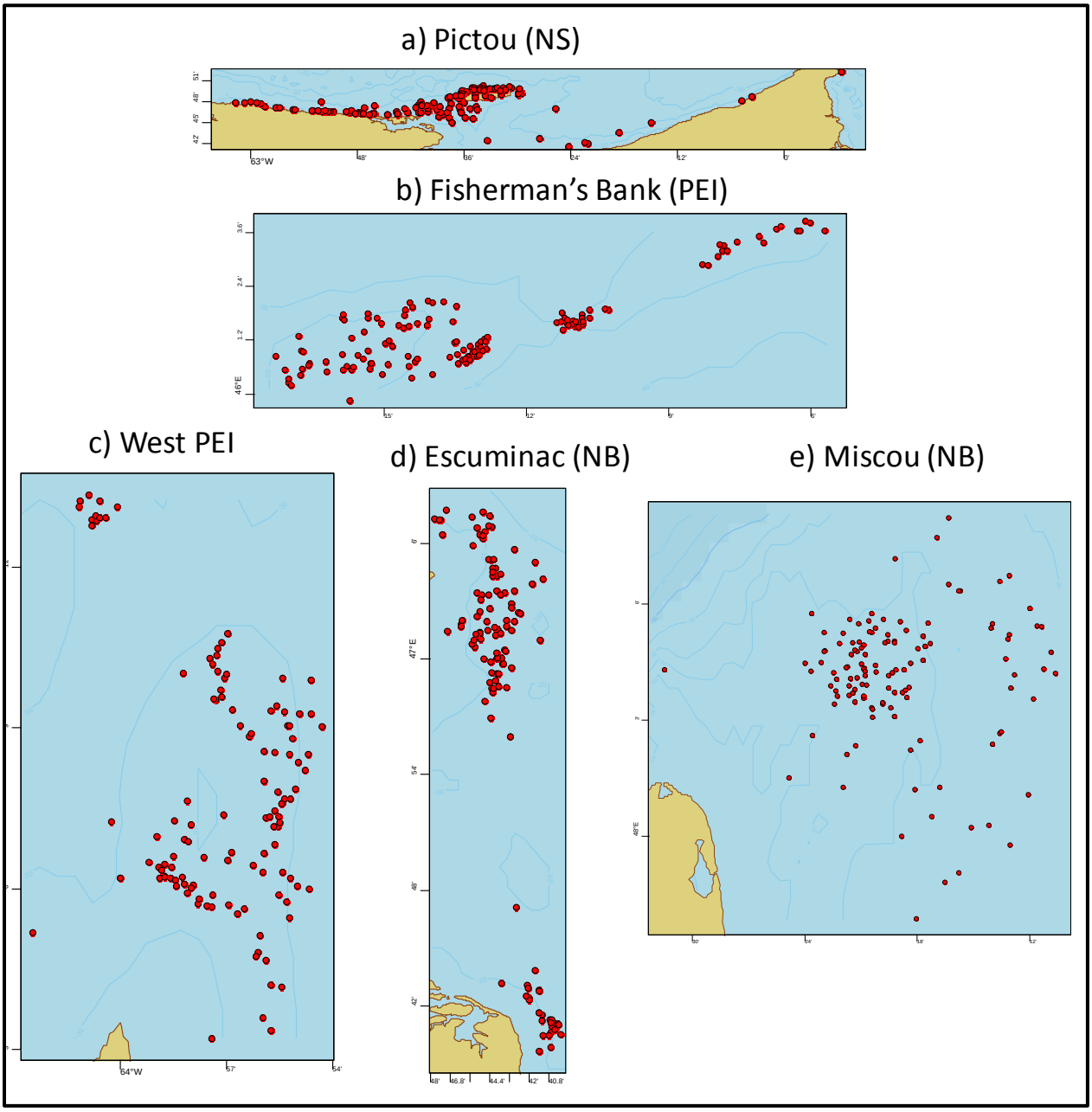


Figure 4. Distribution maps of estimated nightly school locations for each spawning area for all years combined.

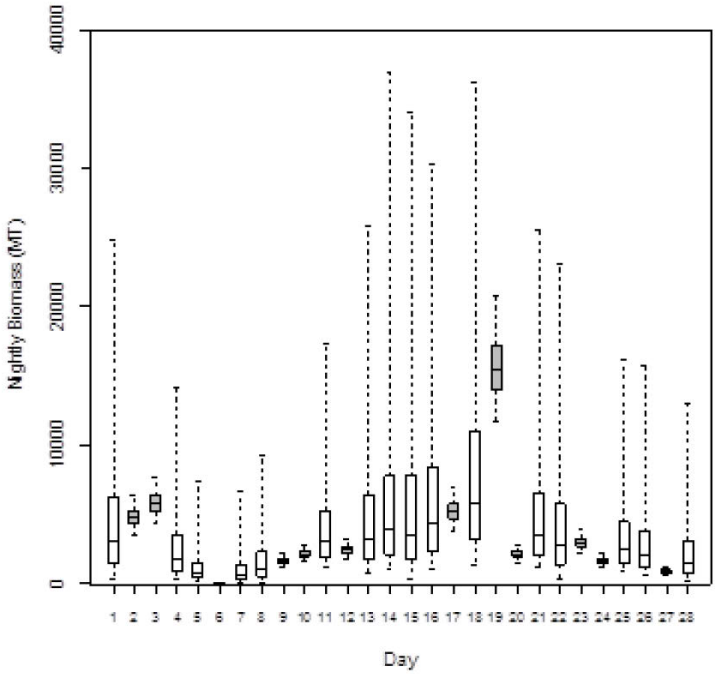


Figure 5. Boxplot of posterior MCMC simulated nightly biomass observations (in grey) and missing values (in white) for Miscou in 2006. Boxplots indicate the median, interquartile range (box) and 95% credibility intervals (whiskers).

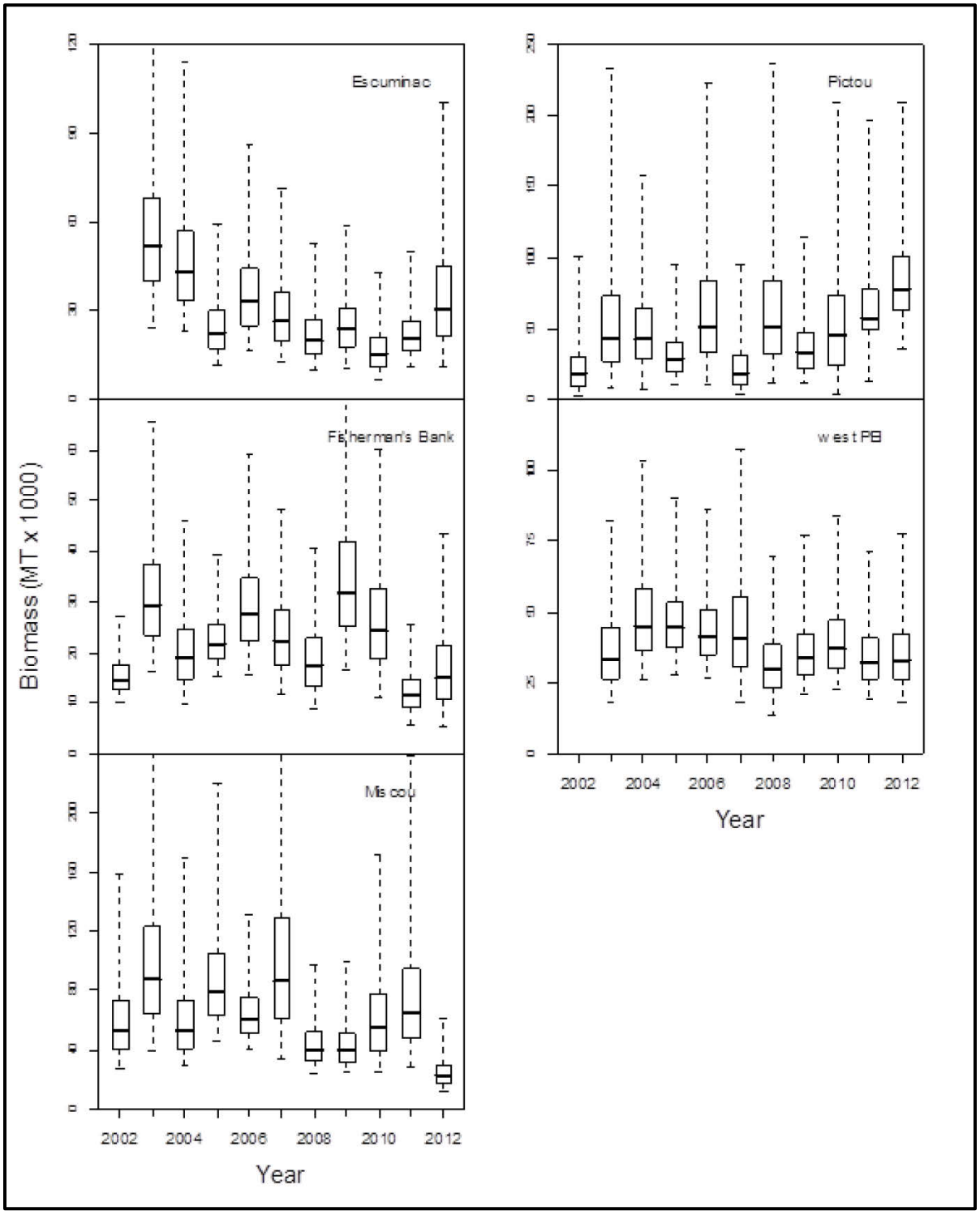


Figure 6. Seasonal biomass estimates by year obtained from MCMC posterior simulations (n = 5,000) for the five spawning areas. Boxplots indicate the median, interquartile range (box) and 95% credibility intervals (whiskers).

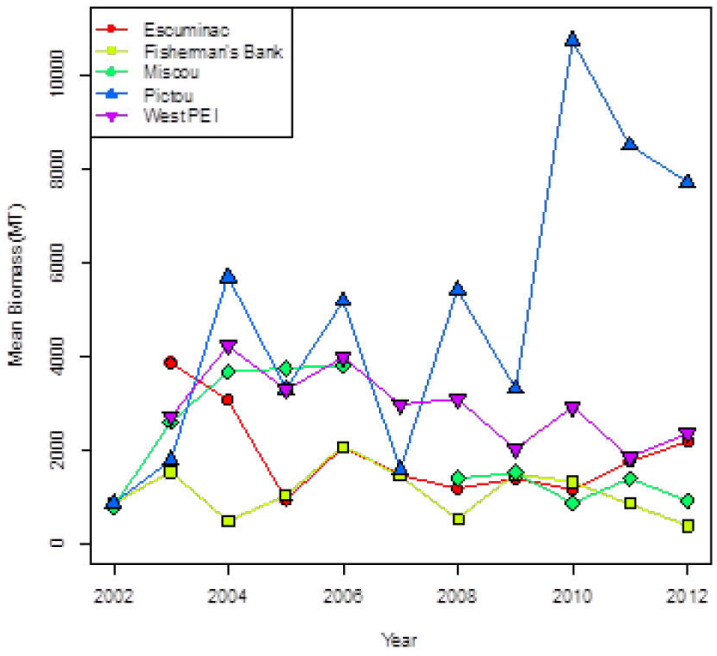


Figure 7. Mean observed nightly biomass for each spawning area by year.

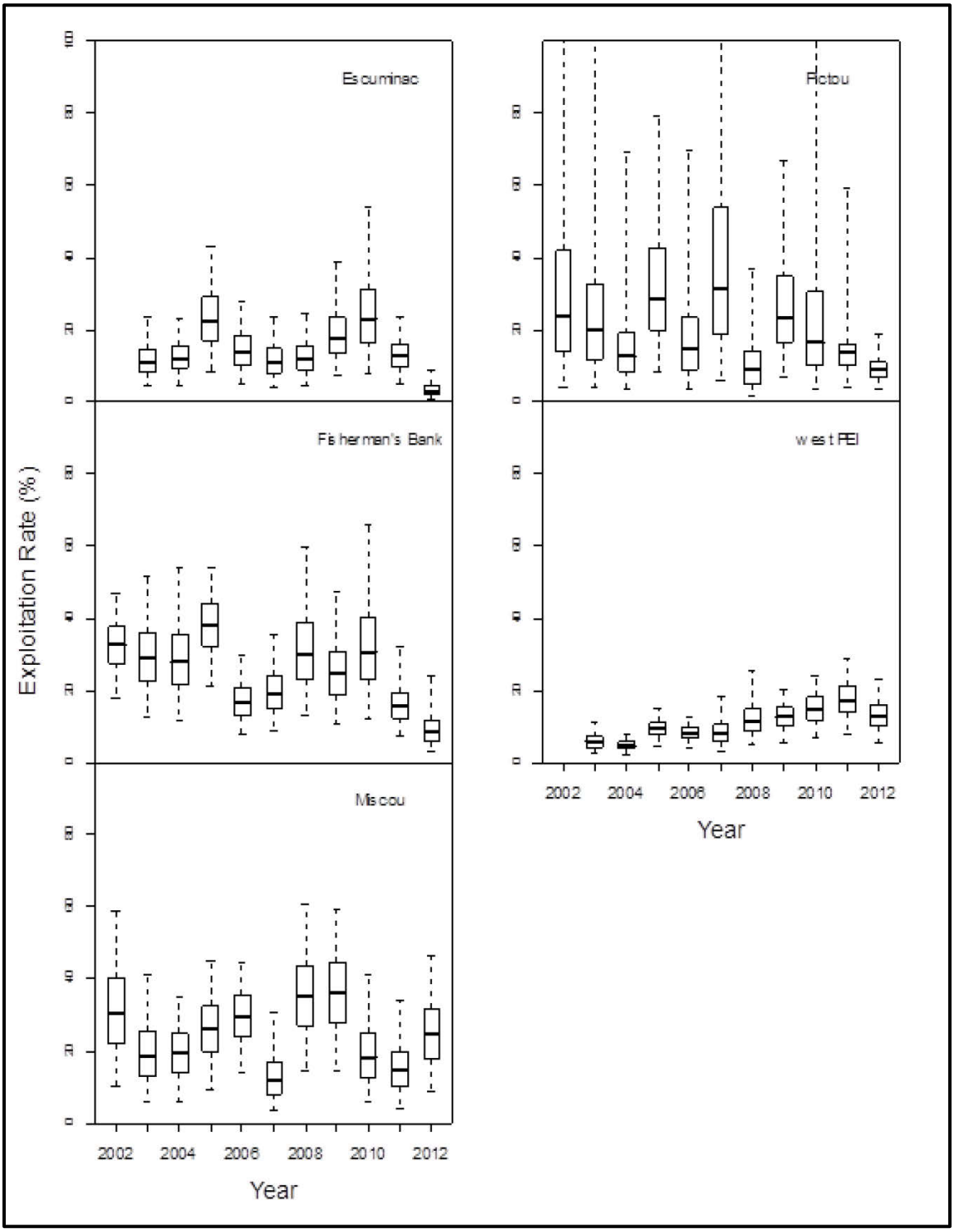


Figure 8. Exploitation rates by year obtained from MCMC posterior simulations (n = 5,000) for the five spawning areas. Boxplots indicate the median, interquartile range (box) and 95% credibility intervals (whiskers).

APPENDICES

APPENDIX A. OPENBUGS CODE FOR THE NIGHTLY BIOMASS MODEL.

```
# Prior over zero proportions:
alpha.pi ~ dexp(1)
beta.pi ~ dexp(1)
for (i in 1:n.region){
      for (j in 1:n.year){
            pi[i,j] ~ dbeta(alpha.pi, beta.pi) } }
# Hierarchical mean prior
mu.mu ~ dnorm(0, 0.01)
tau.mu ~ dgamma(0.1, 0.1)
sigma.mu <- pow(tau.mu, -2)
for (i in 1:n.region){
            phi[i] ~ dunif(-1,1)
            tau.eps[i] ~ dgamma(1,1)
            tau.eps.global[i] <- (1-pow(phi[i], 2)) * tau.eps[i] }
for (i in 1:n.region){
      for (j in 1:n.year){
            mu.year[i,j] ~ dnorm(mu.mu, tau.mu)
            eps[i,j,1] ~ dnorm(0, tau.eps.global[i])
            for (k in 2:n.day){
            mu.eps[i,j,k] <- phi[i] * eps[i,j,k-1]
            eps[i,j,k] ~ dnorm(mu.eps[i,j,k], tau.eps[i]) }
            for (k in 1:n.day){
            mu[i,j,k] <- mu.year[i,j] + eps[i,j,k] } } }
# Prior observation error
tau.b ~ dgamma(0.1, 0.1)
var.b <- 1 / tau.b
sigma.b <- sqrt(var.b)
# Additional observation error parameters
cv.mu <- -log(pow(0.15,2) + 1) / 2
cv.tau <- 1 / log(pow(0.15,2) + 1)
# Observation error model
for (i in 1:n){
            b[i]  ~ dlnorm(mu[region[i], year[i], day[i]], tau.b) I(L[i], )
            z[i]  ~ dbern(pi[region[i], year[i]])
            cv[i] ~ dlnorm(cv.mu, cv.tau)
            biomass[day[i], year[i], region[i]] <- (1-z[i]) * b[i] * cv[i] }
```

APPENDIX B. OPENBUGS CODE FOR THE SPATIAL-TEMPORAL CLUSTERING MODEL.

```
# Prior over transition probabilities
for (i in 1:2){
        alpha.p[i] ~ dexp(1)
        beta.p[i] ~ dexp(1)
    for (k in 1:n.region){
        P[k,i] ~ dbeta(alpha.p[i], beta.p[i]) } }
# Define Markov probability transition matrix
for (k in 1:n.region){
        T[k,1,1] <- P[k,1]
        T[k,1,2] <- 1 - P[k,1]
        T[k,2,1] <- P[k,2]
        T[k,2,2] <- 1 - P[k,2]}
# Define state of initial distance observation
for (j in 1:n.year){
    for (k in 1:n.region){
        S[1,j,k] <- 1
        C[1,j,k] <- 1 } }
# Define the Markovian state vector of observations
for (i in 2:n.day){
    for (j in 1:n.year){
        for (k in 1:n.region){
        S[i,j,k] ~ dcat(T[k, S[i-1,j,k],1:2])
        C[i,j,k] <- C[i-1,j,k] + (S[i,j,k]-1) } } }
# Spatial extent of spawning event
for (m in 1:2){
        alpha.tau[m] ~ dexp(1)
        beta.tau[m] ~ dexp(1)
    for (k in 1:n.region){
        tau[k,m] ~ dgamma(alpha.tau[m], beta.tau[m])
        sigma[k,m] <- pow(tau[k,m], -0.5) } }
# Coordinate random walk
for (j in 1:n.year){
    for (k in 1:n.region){
        x[(j-1)*n.day*n.region + (k-1)*n.day + 1] ~ dnorm(0, 0.001)
        y[(j-1)*n.day*n.region + (k-1)*n.day + 1] ~ dnorm(0, 0.001) } }
for (i in 2:n.day){
    for (j in 1:n.year){
        for (k in 1:n.region){
        x[(j-1)*n.day*n.region + (k-1)*n.day + i] ~
        dnorm(x[(j-1)*n.day*n.region + (k-1)*n.day + i - 1], tau[k,S[i,j,k]])
        y[(j-1)*n.day*n.region + (k-1)*n.day + i] ~
        dnorm(y[(j-1)*n.day*n.region + (k-1)*n.day + i - 1], tau[k,S[i,j,k]]) } } }
```

APPENDIX D-3



DIOXINS AND FURANS

The Issue

Dioxins and furans are common names for toxic chemicals that are found in very small amounts in the environment, including air, water and soil. As a result of their presence in the environment, they are also present in some foods.

Exposure to dioxins and furans has been associated with a wide range of adverse health effects in laboratory animals and humans. The type and occurrence of these effects typically depend on the level and duration of exposure.

Background

There are 210 different dioxins and furans. All dioxins have the same basic chemical "skeleton," and they all have chlorine atoms as part of their make-up. Furans are similar, but have a different "skeleton". These substances vary widely in toxicity. The one considered most toxic is referred to as 2,3,7,8-tetra-chlorodibenzo-p-dioxin, or simply TCDD.

The biggest source of dioxins and furans in Canada is the large-scale burning of municipal and medical waste. Other major sources include:

- the production of iron and steel
- backyard burning of household waste, especially plastics
- fuel burning, including diesel fuel and fuel for agricultural purposes and home heating
- wood burning, especially if the wood has been chemically treated
- electrical power generation
- tobacco smoke

Dioxins can also be produced from natural processes, such as forest fires and volcanic eruptions. Most dioxins are introduced to the environment through the air. The airborne chemical can attach to small particles that can travel long distances in the atmosphere, which means that Canadians may also be exposed to dioxins and furans created in other countries.

These substances work their way up the food chain by moving into and remaining stored in body fat. Because of this, people actually take more dioxins and furans into their bodies through food than through air, water or soil. Ninety per cent of people's overall exposure to dioxins is estimated to be from the diet. Meat, milk products and fish have higher levels of dioxins and furans than fruit, vegetables and grains.

The Health Effects of Dioxins and Furans

Scientists have studied the effects of dioxins and furans on laboratory animals. They have also researched the health effects on people exposed to dioxins through industrial accidents, contaminated food, and occupational exposure to certain herbicides prior to improved manufacturing processes that have reduced these contaminants.

The studies show that dioxins and furans have the potential to produce a range of effects on animals and humans. Health

effects associated with human exposure to dioxins include:

- skin disorders, such as chloracne
- liver problems
- impairment of the immune system, the endocrine system and reproductive functions
- effects on the developing nervous system and other developmental events
- certain types of cancers

It is important to remember that with all toxic substances, including dioxins, the risk of health effects depends on many factors, including:

- the way a person is exposed (e.g., through food, air, water, etc.)
- how much a person is exposed to, and when (e.g., whether it is a large amount on one occasion, or daily exposure to small amounts, etc.)
- individual susceptibility, including general state of health
- whether the person is also exposed to other substances that may be associated with health effects

These issues are very complex. Scientists do not have all of the answers, but they agree that exposures to dioxins and furans should be kept as low as possible.

Dietary Exposure to Dioxins and Furans

For most people, about 90% of overall exposure to dioxins comes through diet. The Joint Expert Committee on Food Additives, an expert group of the World Health Organization and the Food and Agriculture Organization of the United Nations, has set a "tolerable monthly intake" level for dioxins, furans and similar substances.

The "tolerable" level (meaning no serious health effects are expected) is 70 picograms per kilogram of body weight / month. This is roughly 2.3 picograms per kilogram of body weight / day. A picogram is one-trillionth of a gram.

Studies done between 1998 and 1999 in two Canadian cities showed that the average dietary intake of dioxins, furans and similar substances was 0.62 picograms per kilogram of body weight /day. This is well within the level considered tolerable by Joint Expert Committee on Food Additives.

Minimizing Your Risk

If you are concerned about exposure to dioxins and furans, consider taking the following steps:

- Prepare meat and fish in a way that minimizes your exposure by trimming visible fat from food. Bake, broil, roast, barbecue or microwave instead of frying, and drain off extra fat after cooking.
- Follow the advice in Canada's Food Guide to Healthy Eating, and enjoy a variety of foods. Vegetables, fruit and grains contain fewer dioxins and furans than meat, milk products and fish.
- Follow provincial/territorial government advisories about eating certain types of fish.
- Do not burn garbage, especially construction materials that might contain wood preservatives or plastic.
- Limit the amount of wood you burn in your fireplace or stove, and learn about wood-burning techniques that release fewer dioxins. For more information about safer wood burning techniques go to the Need More Info section below.
- Do not smoke, and keep your family away from second-hand smoke as much as possible.

By taking these steps, you can reduce your family's exposure to dioxins and furans, and help to limit the overall release of these substances into the environment.

The Government of Canada's Role

The Government of Canada is working to control, and if possible eliminate, releases of these substances into the environment to help protect Canadians against harm from dioxins and furans. Actions to date include:

- Guidelines to minimize the release of dioxins and furans from municipal solid waste

and hazardous waste incinerators.

- Regulations requiring the virtual elimination of dioxin and furan releases from pulp mills.
- Virtual elimination of dioxins and furans from pest control products used in Canada.
- Active support for international agreements to reduce releases of these substances on a global basis.

These efforts are working. The latest inventory shows a 60 percent decrease since 1990 in the overall release of dioxins and furans from sources within Canada. Also, the levels of dioxins and furans in Canadian human milk, which were already low, went down by roughly 50 percent between the 1980s and the 1990s. It is expected that levels of dioxins in various sources in Canada will continue to decline in conjunction with ongoing pollution prevention and control activities.

The Government's work to control sources of dioxins and furans in Canada continues. A federal-provincial task force has updated the inventory of sources for these substances, and Canada-wide standards are being established to address releases from remaining manufactured sources. In addition, the Government is continuing to carry out food monitoring activities to identify, control and if possible, eliminate previously unknown sources of dioxin contamination.

Also, Health Canada is doing a comprehensive reassessment of the risks posed by dioxins. In the meantime, Health Canada has adopted the Joint Expert Committee on Food Additives' tolerable monthly intake for dioxins as a guideline for Canadians.

Need More Info?

For more information, contact:
Health Canada's Management of Toxic Substances Division
Room A724,
Jeanne Mance Building #19
Tunney's Pasture Ottawa, ON
K1A 0K9 (613) 957-3127

Health Canada's Food Program Web site at:
http://www.hc-sc.gc.ca/fn-an/index_e.html

Canada's Food Guide to Healthy Eating at:
http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index_e.html

Environment Canada, Persistent Organic Pollutants - POPs at:
http://www.ec.gc.ca/pops/index_e.htm

For tips on safer ways to burn wood, visit Natural Resources Canada, Burn it Smart at:
http://www.burnitsmart.org/

For more on the health effects associated with exposure to dioxins, see the following:

The World Health Organization's "Safety Evaluation of Certain Food Additives and Contaminants" at
http://www.inchem.org/documents/jecfa/jecmono/v48je20.htm

The World Health Organization's " Dioxins and their effects on human health"
http://www.who.int/mediacentre/factsheets/fs225/en/index.html

The U.S. Environmental Protection Agency's "Draft Dioxin Reassessment"at:
http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=55265

United States National Academy of Sciences Report, Dioxins and Dioxin-like Compounds in the Food Supply: Strategies to Decrease Exposure at:
http://www.iom.edu/report.asp?id=13097

For information on herbicide use at National Defence, see the National Defence Web site at:
http://www.forces.gc.ca/site/Reports/defoliant/index_e.asp

For additional articles on health and safety issues go to the It's Your Health Web site at:
www.healthcanada.ca/iyh
You can also call toll free at
1-866-225-0709
or TTY at 1-800-267-1245*

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Canada

APPENDIX D-4

Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Canadian Science Advisory Secretariat (CSAS)

Research Document 2016/044

Gulf Region

Identification and Characterization of Important Areas based on Fish and Invertebrate Species in the Coastal Waters of the Southern Gulf of St. Lawrence

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May 2016

Canada

Foreword

This series documents the scientific basis for the evaluation of aquatic resources and ecosystems in Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

Research documents are produced in the official language in which they are provided to the Secretariat.

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ABSTRACT

Identification and designation of Ecologically and Biologically Significant Areas (EBSA) is recognized both nationally and internationally as a useful tool for aquatic resource conservation, management, and planning. In eastern Canada, previous work focused on offshore waters with the highly productive coastal areas intentionally excluded. The aim of this study was to apply the EBSA criteria of uniqueness, aggregation, and fitness consequences to the coastal area of the southern Gulf of St. Lawrence. The criteria were applied to 32 fish and 23 benthic invertebrate taxa to identify important areas (IA). Based on data from multi-species surveys and literature reviews, three IA were identified in order of precedence: Northumberland Strait, St. George's Bay, and water at the eastern end of Prince Edward Island. These IA stood out primarily due to the presence of likely-endemic species (i.e. lady crab and winter skate), and all three IA had previously been identified as EBSA. Although not identified as IA, special consideration could be assigned to Chaleur Bay and the Shediac Valley for their importance in the migration of several anadromous species.

Identification et caractérisation de zones d'intérêt basées sur les espèces de poissons et d'invertébrés dans les eaux côtières du sud du golfe du Saint-Laurent

RÉSUMÉ

L'identification et la désignation des zones d'importance écologiques et biologiques (ZIEB) est reconnu nationalement et internationalement comme étant un outil efficace pour la conservation des ressources aquatiques de même que pour la gestion et la planification. Dans l'est du Canada, les travaux antérieurs portaient principalement sur le milieu hauturier alors que le milieu côtier hautement productif avait été intentionnellement mis de côté. L'objectif de cette étude visait à appliquer les critères d'unicité, d'agrégation et de conséquences sur la valeur adaptative des ZIEB dans la zone côtière du sud du golfe du Saint-Laurent. Ces critères ont été considérés en lien avec 32 espèces de poissons et 23 espèces d'invertébrés benthiques afin d'identifier les aires d'importance (AI). Selon les données des relevés de recherche plurispécifique et d'une revue de la littérature, trois AI ont été identifiées en ordre de précédence : le détroit de Northumberland, la baie St. George et les eaux de l'extrémité est de l'Île-du-Prince-Édouard. Ces trois AI se démarquent principalement par la présence d'espèces présumées endémiques (c.-à.-d. le crabe calicot et la raie tachetée) et toutes les trois ont précédemment été identifiées à titre de ZIEB. Bien qu'elles ne sont pas identifiées comme AI, la baie des Chaleurs de même que la vallée de Shédiac pourraient bénéficier d'une considération particulière pour leur importance lors de la migration de plusieurs espèces anadromes.

INTRODUCTION

Canada's Oceans Act (1997) authorizes the Department of Fisheries and Oceans (DFO) to provide enhanced protection to areas of the oceans and coasts that are ecologically or biologically significant through mechanisms such as Marine Protected Areas. Ocean areas can be ecologically or biologically "significant" because of the functions that they serve in the ecosystem and/or because of structural properties (DFO 2004). Identifying Ecologically and Biologically Significant Areas (EBSA) is not a general strategy for protecting all habitats and marine communities that have some ecological significance. Rather, it is a tool for calling attention to an area that has particularly high ecological or biological significance, to facilitate provision of a greater-than-usual degree of risk aversion in management of activities in these areas (DFO 2004).

DFO established criteria to identify EBSA (DFO 2004) and applied these to features in the Gulf of St. Lawrence (DFO 2006). Ten EBSA were identified, all offshore (DFO 2007, Savenkoff et al. 2007). There were many discussions during the 2006 meeting regarding the inclusion of coastal areas in the EBSA evaluation for the Gulf but no consensus was reached on how to consider the ecological and biological significance of coastal and estuarine areas within a classification system that is based primarily upon the relationship with large scale oceanographic features or processes (DFO 2006). The review at that time excluded coastal features such as barachois, salt marshes, and eel grass beds on the premise that they may have a high local significance but they likely do not have a substantive effect on the functioning of the much larger oceanic ecosystem (DFO 2006).

Following several EBSA exercises within Canadian waters, a reflection was made on the overall efficiency of the EBSA process and to provide guidance in future application its criteria (DFO 2011). It was recognized that the three primary criteria (aggregation, uniqueness, and fitness consequences) were applicable to coastal habitat with the acknowledgment that some ecological functions and processes in these systems differ from comparable ones in marine systems (DFO 2011). It was also proposed to use heat maps to illustrate the different criteria when possible.

The identification of EBSAs in the coastal zone is necessary to complete the ecological profile of the estuary and the Gulf of St. Lawrence and for the planning of the network of marine protected areas. In order to determine if the coastal zone meets the EBSA criteria, a zonal peer review meeting was held in Mont-Joli, Quebec in December 2014 (DFO 2015). A two-step approach was considered during the meeting. The first step was to agree on a definition of the coastal zone and to identify and describe the data sets that could be used to apply the EBSA criteria to the coastal zone. The second step was a formal review process of the data and information applied to the EBSA criteria to yield a number of important areas (IA). This study presents the information, data, and analyses considered for the identification of IA in the southern Gulf of St. Lawrence (sGSL) based upon invertebrates and fishes.

MATERIALS AND METHODS

STUDY AREA

Standardized data from three surveys were used for modeling to predict the probability of detecting the presence of a taxon in a standardized tow. Survey data and environmental variables were defined for the same 2.5 x 2.5 km (6.25 km2) grid derived by Dutil et al. (2012) for the entire sGSL. The study area was defined as waters between 0 and 40 m deep (mean value of the cell) within the sGSL but excluded estuaries and semi-enclosed embayments. The

estuary/coastal area boundaries were determined by the presence of barrier islands or peninsulas, and cells with centroids inside of those features were removed. Also, cells east of New Carlisle along the Gaspé Peninsula and east of Cape North in Cape Breton (i.e., outside the sGSL) were removed. The final grid for the sGSL coastal study area was comprised of 4,486 cells (Fig. 1).

DATA SOURCES

Quantitative data were retrieved from three surveys:

- the annual September bottom trawl survey in the sGSL (RV survey);
- the annual Northumberland Strait bottom trawl survey (NS survey); and
- two recent scallop-dredge surveys.

These surveys record data on most of the animal species captured and have substantial sampling effort within the coastal waters of the sGSL. The shallow-water depth threshold (roughly 4 m chart datum) for the small-boat surveys (NS, scallop-dredge) was determined by the draft of the survey ships. The RV survey was designed to survey waters deeper than ~20 m. The survey catch data were transformed to presence-absence for modeling purposes. The annual snow crab survey was not considered for this study because nearly all stations are in water >40 m deep.

Annual September bottom trawl survey in the sGSL (RV survey)

A bottom-trawl survey of the sGSL has been conducted in September since 1971 and provides the longest time-series of distributions and relative abundances for fishes and invertebrates in the sGSL. The RV survey follows a stratified random design, with stratification based on depth and geographic area. Twenty-four strata have been fished since 1971 and three inshore strata were added in 1984.

The RV survey uses the same standardized fishing procedures each year: a 30-minute tow at a speed of 6.5 km/h. Five ships using two types of trawls (“Yankee-36” and “Western IIA”) have been used during the time series. Corrections and adjustments for net efficiency, net swept area, and vessel effects are described by Hurlbut and Clay (1990), Benoît and Swain (2003a), and Benoît (2006). The difference in catchability of certain species based on the time of day was assessed by Benoît and Swain (2003b).

Between 100 and 200 tows were attempted during the RV survey each year (Fig. 2). Because of issues with data quality and accuracy in the identification of some species, only data collected between 1976 and 2013 were used in this study.

Northumberland Strait bottom trawl survey (NS survey)

Between July and August, the demersal community of the Northumberland Strait was sampled annually since 2000. Two bottom trawls were used, depending upon the survey’s goals. For all years except 2010 and 2011, when a Nephrops trawl was used, the survey gear was a number 286 bottom trawl equipped with rockhopper footgear (rockhopper trawl). The NS survey area (Fig. 3) was overlain with a 3.7 x 3.7 km grid (starting point 46°30’ N; 64°00’ W), establishing over 1,100 possible sampling stations (Voutier and Hanson 2008; Bosman et al. 2011; Kelly and Hanson 2013a, b). The study area was originally divided into nine strata, based on bottom composition and water mass characteristics, and surveys followed a random block sampling design. Starting in 2010, some strata were dropped and stations were randomly selected (at a reduced sampling intensity) from within the original grid (see Rondeau et al. 2014 for details).

During the NS survey, the rockhopper trawl was towed for 15 minutes at a speed of 4.6 km/h. However, because of the gap under the rollers, the net was inefficient at catching Atlantic rock crab (*Cancer irroratus*), a species that plays an important role in the coastal ecosystem in terms of energy cycling (Hanson et al. 2014; Rondeau et al. 2014). To address this shortcoming, a Nephrops trawl that digs into the bottom (Conan et al. 1994), and is more efficient at capturing crabs, lobster, and many other benthic organisms, was used in 2010 and 2011 (Hanson *et al.* 2014; Hanson and Wilson 2014). The Nephrops trawl was towed at a speed of 3.7 km/h for only 5 minutes because large amounts of sediment and debris were retained. Between 101 and 255 valid tows were done per survey from 2000 to 2013 (Fig. 3).

Scallop-dredge survey

A scallop-dredge survey was conducted in 2012 and 2013 to gather information on the distribution and abundance of adult and juvenile sea scallop (*Placopecten magellanicus*) within the sGSL. The survey gear was an 8 bucket Digby-type dredge (total length of 3.3 m) fitted with a Vexar® mesh liner (mesh size of 12-14 mm) to retain scallop recruits and small benthic species. The dredge was towed for 2 minutes at a speed of 3.7 to 4.6 km/h at 67 randomly selected stations in Northumberland Strait (2012) and at 87 stations in Chaleur Bay (2013) (Fig. 4).

SPECIES SELECTION

Sampling protocols for multi-species surveys specified that all organisms encountered be identified to the lowest practical taxon (typically species). Unfortunately, identification effort and taxonomic expertise has not been constant throughout the RV survey time series. Nevertheless, with a few exceptions, most fish species encountered are thought to have been accurately identified to species level over the years and as such were considered as the primary source of information. One exception is the combination of blueback herring and alewife to match commercial catch recordings (where they are called “gaspereau”). Some deep-water species were eliminated from the analysis even if they were caught at the margin of the study area to minimize their influence on the modelling predictions. Hereafter, fish and invertebrate species or taxa were identified by their common names. Based on the three benthic surveys, there were usable data for 32 fish taxa (Table 1). The final species selection was done after consultation with peers following a CSAS meeting on the application of EBSA criteria to the coastal area (DFO 2015).

The list of invertebrates was more difficult to establish. For the RV survey, a consistent effort to identify and record catch information on invertebrate taxa only started in 1989. Hence, invertebrate data prior to 1989 were not considered. In the NS survey, most of the sampling in the early years was focusing at large decapod crustaceans and fishes. Data from American lobster, Atlantic rock crab, snow crab, lady crab, and toad crab sampled in 2003, and between 2005 and 2013, were used. For small-bodied taxa, only data starting in 2010 were considered reliable. Invertebrate data from both years of the scallop-dredge survey were retained. Furthermore, some species or taxa still needed to be removed from the potential data set because of uncertainties in their identification. In some instances, species were only identified to a higher taxonomic level (e.g., sponges, sea anemones) which most likely includes both coastal and deep water taxa. Since the latter was not considered in our analysis, species identified at high taxonomic levels (i.e., above genus level, excepting mussels) were not selected. As for fish species, recognized deep water invertebrate species were excluded from the analysis (e.g., sea potato *Boltenia ovifera*, Iceland scallop *Chlamys islandica*) and the final list of species retained was vetted by peers. For this study, 23 invertebrate species and/or taxa (Table 2) were included. Over 18 shrimp species can be found in the sGSL, and some (especially *Crangon*

septemspinosa) are known to play an important role in the coastal-ecosystem food web (Hanson 2011; Kelly and Hanson 2013a; Hanson and Wilson 2014; Hanson et al. 2014;). Unfortunately, because of data availability issues, it was not possible to incorporate the information on shrimp in the analysis.

Information on the selected species of fish and invertebrate from the three surveys was transformed into presence-absence data and a minimum of ten occurrences was arbitrarily selected as the threshold for a taxon to be retained for modeling.

DATA PROCESSING AND MODELING

The presence-absence data were modeled to predict the probability (0 to 1) of detecting a taxon in a standardized tow within a grid location. In addition to environmental variables, spatial and gear effects were included as predictors. Five environmental variables from Dutil et al. (2012) known to or are presumed to affect species distributions were included in the model testing:

- mean water depth in the grid cell,
- mean bottom temperature at the mean water depth within the grid cell,
- mean bottom salinity at the mean water depth within the grid cell,
- mean tidal current (cm/sec) associated with the “principal lunar semi-diurnal” component of the tide (M2), and
- mean annual wind speed (m/sec).

Generalized Additive Models (GAM) were used to model binary presence-absence data. Using a forward stepwise approach, the model having the lowest total Akaike information criterion (AIC, Burnham and Anderson 2002) value over the 14 selected taxa (Table 3) was selected and used for spatial predictions.

Smoothing terms over space (i.e. latitude and longitude coordinates converted into UTM), water depth, bottom temperature, bottom salinity, tidal current and annual wind speed were included were added one by one, choosing the smoothing term which contributed to the largest decrease in AIC value at each step or until the total AIC increased. The selected model was:

Presence ~ s(T_BOT_MEAN) + s(DEPTHMEAN) + s(x, y) + gear

where s(T_BOT_MEAN) is an additive smoothing term for mean bottom water temperature, s(DEPTHMEAN) is a smoothing term over water depth, s(x,y) is a spatial smoothing term and gear is an additive term denoting the type of gear used. The data from each survey is not on the same scale, the gear effects correct for (logit) linear differences in scale, such that any linear transform of data observations applied to surveys other than the reference survey leave the end result unaffected, as the gear effect parameters will scale accordingly in the estimation.

The selected model was applied to all data available from the coastline up to the 60 m isobaths, the data between 40 m and 60 m were included so as to obtain a better adjustment at the margins of the study area (i.e. near 40 m). Contour maps of the restricted study area (0-40 m) were then produced using the predicted probability of capturing a given taxon for a standard tow of 1.75 nautical miles (nm) with a Western IIA trawl (as used in the RV survey) for each grid cell. Since lady crab and mud crab were not caught in the RV survey, their predictions were based on Nephrops trawl of standard tow length 0.125 nm from the NS survey rather than the Western IIA trawl.

The predicted species distribution from the model depended on the spatial and temporal occurrence of the survey sampling stations; therefore, the predicted species distribution could

be misleading if sampling was limited or absent (i.e., upper Chaleur Bay, western Cape Breton and a caution for the northern part of Magdalen Islands). Sampling gear can also affect the catchability, therefore, the observed species occurrences can be affected by the spatial distributions of the gear used. Contour maps for all species and taxa were either presented in the analysis section of this document or in Appendix 1.

Biodiversity contour maps were produced separately for fish and invertebrate taxa by summing single-taxon predictions by grid cell, which yielded the number of taxa expected to be captured in a grid cell. For invertebrates, since many different species were encompassed within a single taxon (e.g., toad crab includes *Hyas araneus* and *H. coarctatus*; Table 2), and many groups were not included (e.g., shrimps, polychaetes), the biodiversity indicator displayed on the map is severely underestimated and should be interpreted as a "pseudo-diversity" map. This is also true to a lesser extent for the fish "pseudo-diversity" map because only a few fish taxa were comprised of more than one species (Table 1).

When considering 55 species or taxa for the identification and characterization of potential IA in the coastal zone of the sGSL, special considerations must be made for the species-at-risk. However, the EBSA process is separated from the one dealing with critical habitat designation under the Species at Risk Act (SARA). The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has already evaluated twelve fish species identified in this IA process and are suspected of being at risk of extinction or extirpation (Table 4). However, at the moment only three species are assigned a status under SARA, one has been rejected (winter skate; Canada Gazette 2010), and the others are still under consideration. Data on five of the twelve species evaluated by COSEWIC were available from our trawl surveys; for the remaining seven, capturability was very low or nil (e.g., bluefin tuna *Thunnus thynnus* and white shark *Carcharodon carcharias* are fast-swimming pelagic species that have never been captured in our survey trawls).

EVALUATION CRITERIA

To identify important areas (IA), the evaluation of the coastal waters in the sGSL was based on the same three criteria or dimensions proposed for EBSA (DFO, 2004): uniqueness, aggregation, and fitness consequences. These criteria have already been used for the identification of mid-shore and offshore EBSAs, and they could be equally applied to coastal waters (DFO, 2011). It must be recognized that to identify IA, the ecological consequences of a severe perturbation in that area would be greater than an equal perturbation of most other areas in the region. An IA should be different from unexceptional areas; in the latter case, this does not make the area an unimportant area.

Based on the uniqueness criterion, an area would be deemed important if it contains unique, rare, or distinct characteristics when compared to other areas in the region. Either the biological processes that are taking place in such an area, or the species that are present, should reveal some uniqueness. Special considerations at the species level were given to rare and/or potential endemic species as well as species evaluated under COSEWIC or SARA.

For the aggregation criterion, the species as well as the pseudo-diversity contour maps were used to identify areas of high abundance (concentrations), and where the greatest number of species occurred. These observations, however, only reflect the period when the data were collected, i.e., during the summer months. Additional information from the literature (Appendix 2), commercial landings, traditional ecological knowledge and expert opinion were considered to fill the gaps and increase the reliability of the overall evaluation.

The fitness consequences criterion was used to identify key or important areas where crucial life history activities are undertaken. The criterion was divided into five ecological functions:

- feeding,
- reproduction,
- nursery area,
- migration, and
- seasonal refugia.

Based on the available literature, the connectivity among the areas where these ecological functions were observed was also discussed. Fishes are mobile and several areas can serve as locations for different ecological functions. In contrast, the majority of the invertebrate species are either sessile or are benthic with minimal seasonal movements (i.e., can be considered sedentary), and a single site serves for most fitness functions. Information on invertebrates was mainly considered for the aggregation criterion (the pseudo-diversity contour maps); however, uniqueness was applicable for the lady crab, a likely undescribed endemic whose entire distribution is within Northumberland Strait (Voutier and Hanson 2008).

ANALYSIS

GENERAL CHARACTERISTICS OF THE STUDY AREA

The coastal zone was defined as the area with waters ≤40 m deep (DFO 2015). Consequently, this coastal zone actually comprises areas where the warm surface waters contact the bottom (typically ≤30 m) and includes much of the transition zone between the surface layer and the cold intermediate layer (CIL; Gilbert and Pettigrew 1997). Hence, fish species that prefer cold and tolerate low temperatures occur at the shallow edge of their distributions in the coastal zone but most of the population is located in or below the CIL. In contrast, the species that prefer warm waters have the deep-water boundary of their distribution within the transition zone. Finally, diadromous species are a major component of the warm-water fish community, and are all but absent from the cold-water community. The study area, except for the Magdalen Islands (Fig. 5), includes rivers large enough for spawning by anadromous fishes and there is relatively little difference in species diversity of anadromous species. A major exception is the Miramichi River, which is the only known spawning area for striped bass and American shad.

The shallow coastal zone is characterized by seasonal extremes in environmental conditions. During summer months, bottom-water temperatures can exceed 21°C in many areas (often >25°C in embayments and estuaries) while there is an extended period of land-fast and sea ice during winter with bottom water temperatures as low as ca. -1.7°C. The areas exposed to sea ice are subjected to moving ice and ice ridges that can cause bottom scouring down to 20 m depths (Brown et al. 2001; Forbes et al. 2004; Prisenberg et al. 2006). In addition, there is extensive down-welling of ice crystals during storms. Contact with ice or exposure to water below the freezing point of fish tissue can be fatal and consequently most fishes migrate out of the danger zone for the winter months (Clay 1991) often following well-defined migration corridors.

The sGSL is characterized by an array of different environments and habitats but some features of its coastal zone need to be emphasized. Within the study area, Northumberland Strait (Fig. 5) is the only area bounded by land on two sides and it is characterized by almost 100% warm and shallow (<30 m) habitat. There is a prominent cool-water (10-12°C during summer) upwelling area near Wood Island that corresponds to the end of a narrow channel running along the southeastern shore of Prince Edward Island (PEI). Part of that trench is deeper than 40m and has been excluded from the study area (Fig. 1). The blocking in 1954 of the Canso Strait by a

causeway created a major disruption in St. George's Bay (Fig. 5) as it closed an important migration route for many long-distance migrants (e.g., the three *Alosa* species, Atlantic saury, butterfish, and perhaps bluefin tuna). The coastal area west of Cape Breton is limited to a narrow band with limited presence of shallow water (Fig. 1). One distinctive feature of the Magdalen Islands is the near-absence of freshwater input in the coastal habitat resulting in the near absence of anadromous species.

ECOLOGICAL PROPERTIES

Uniqueness

White hake (Fig. 6) and winter skate (Fig. 7), two suspected undescribed endemics, now occur at very low abundance, and there has been severe range compression to small areas where the population remnants are concentrated (COSEWIC 2005, 2013; Kelly and Hanson 2013a, 2013b). The areas occupied by those two species are therefore unique as they represent their last stronghold.

St. George's Bay and the eastern end of Northumberland Strait constitute the only remaining spawning area for white hake (Fig. 6) as well as a critical summer feeding area (COSEWIC 2013). When migrating out to the Laurentian Channel and Cabot Strait for the winter, adults go through the Northumberland Strait and then follow the west coast of Cape Breton.

While formerly widespread, winter skate is now mainly restricted to the western half of Northumberland Strait (Fig. 7) where they feed and release most of their eggs. In late autumn, they spread from the shallow waters of Northumberland Strait out into the deeper waters of the sGSL; however, some remain in waters ≤ 40 m deep.

The sGSL also shelters a lady crab that is likely an undescribed endemic species (Voutier and Hanson 2008; J.-M. Gagnon, Canadian Museum of Nature, Ottawa) (Fig. 8). Should there be a negative effect that eliminates the lady crab population in the Strait, this would represent a species extinction. The lady crab population from the Northumberland Strait has not been assessed by COSEWIC.

Aggregation

Given the endangered status of white hake population (COSEWIC 2013), concentrations of this species, especially the juveniles, in Northumberland Strait, St. George's Bay and east of PEI (Fig. 6) increase the importance of these areas. The species also formerly occupied the Shediac Valley (Fig. 5), which is no longer the case (Benoit et al. 2003; Swain et al. 2012).

Juvenile Atlantic cod occur at the shallow edge of the CIL and well into the transition zone waters (Fig. 9), and large numbers of age-0 (semi-pelagic) individuals occur in warm waters such as Northumberland Strait. Aggregations of juvenile Atlantic cod occur east of PEI but that is only one of many areas of aggregation (Hanson 1996; Benoit et al. 2003; Darbyson and Benoit 2003). In autumn, juvenile Atlantic cod follow after the adults and they appear to concentrate north of the Magdalen Islands and along the edge of the Laurentian Channel for the winter. Mixed groups of adult and juvenile Atlantic cod return to the sGSL in spring, shortly after the ice melts.

Atlantic halibut is not a coastal species per se; however, part of the population occurs closer to shore in the Gaspe and Cheticamp troughs during summer and early autumn (Benoit et al. 2003; Darbyson and Benoit 2003). Based on our data, the Atlantic halibut was mostly observed in the waters from northeastern New Brunswick (NB), on the north side of PEI, and east of the Magdalen Islands (Fig. 10).

Most individuals from the Atlantic salmon, alewife, and American eel populations that migrate into the Restigouche River, to either spawn (anadromous) or feed (catadromous), must congregate, even temporarily, in Chaleur Bay and this area would be important for their fitness. Unfortunately, the map generated from our alewife data (Fig. 11) does not reflect this expectation because data were collected mostly in the summer months. The aggregation of alewife occurs in a brief period during spring and is limited geographically; hence, it is unlikely that it could be observed in the traditional bottom trawl surveys, i.e., illustrating data limitation. Similarly, the entire breeding population of American shad and striped bass must cross the eastern NB area to access their single spawning site in the Miramichi River (Chaput and Bradford 2003; Douglas et al. 2009; COSEWIC 2012b; DFO 2014a), so this transition area is important in terms of the aggregation of those species.

Although our contour map for butterfish (Fig. 12) suggests a single aggregation within Northumberland Strait, they also occupied several other areas in the summer and the fall. However, other than occasional captures in the Miramichi Estuary (Hanson and Courtenay 1995), they have not been captured in areas west of North Point, PEI (Benoit et al. 2003; Darbyson and Benoit 2003).

The pseudo-diversity contour map for fish (Fig. 13) indicated the greatest numbers of species were captured in the Northumberland Strait, St. George's Bay, and Chaleur Bay. Based on the available data, numerous species found in these areas were indeed very abundant (e.g. Atlantic herring, longhorn sculpin, rainbow smelt, alewife, winter flounder) and therefore had a very high predicted probability of capture. Aggregation of fish species was less important around the Magdalen Islands mostly because of the absence of anadromous species. Coastal waters west of Cape Breton are restricted to a very narrow band and limited data were available from our surveys to generate the model's predictions which could explain why fewer species seemed to be present in that area.

The pseudo-diversity contour map for invertebrates suggests that relatively high numbers of species occur in the Shediac Valley, Chaleur Bay, and just south of the Magdalen Islands; and that lower numbers of species are present in the Northumberland Strait, St. George's Bay, and eastern PEI (Fig. 14). This is quite the opposite of the results based on fish species (Fig. 13). The invertebrate pseudo-diversity contour map seems to be driven by the high number of echinoderm species in our database, and transient invertebrate species (i.e., at the upper limit of the CIL). Sea stars, sea cucumbers, and sea urchins are easy to identify compared to many other taxa that were not included in this evaluation, such as shrimps, polychaetes, small crustaceans (i.e., mysids, cumaceans, and amphipods), sponges, sea anemones, tunicates, and small mollusks. Thus, the pseudo-diversity contour map for invertebrates based on the available information is a biased representation of the coastal invertebrate community and is a severely biased indicator of the aggregation criterion. Consequently, it should not be considered in the identification and characterization of coastal IA.

Fitness consequences

Feeding

The majority of the research trawl surveys occur between early July and late September. Thus, summer species' distributions represent areas where fishes are observed actively feeding and growing. With a few exceptions, fishes that remain in the sGSL during winter do not feed or feed at greatly reduced levels.

Adult white hake currently only feed in St. George's Bay and the eastern end of Northumberland Strait (Fig. 6) so key food source for that species might only be available there; however, their main prey are Atlantic herring and Atlantic mackerel, two widespread species (Hanson 2011). It

is recognized that there are high concentrations of forage fish in St. George's Bay such as juvenile and adult Atlantic herring, Atlantic saury, and juvenile alosids in autumn and spring. This area along with the eastern end of Northumberland Strait is critical to the fitness of the white hake population since the remnant of the adult population feeds there and it is two of the three locations, along with Shediac Valley, where juveniles feed. There is an October feeding migration of juvenile white hake into estuaries of Northumberland Strait and up to at least the Miramichi Estuary (Hanson and Courtenay 1995; Bardford et al. 1997; Swain et al. 2012) adjacent to the Shediac Valley (Fig. 5).

The western end of Northumberland Strait is the only feeding area for the lady crab (Voutier and Hanson 2008) and the summer feeding area for the remnant population of winter skate (Kelly and Hanson 2013a, 2013b), both species having a high likelihood to be undescribed endemics. The warm water (probably too warm for most of the transition water/CIL species), sand substrate, and currents result in Northumberland Strait being the only area suitable for lady crabs north of the United States eastern seaboard (with the exception of a small population in Minas Basin) (Voutier and Hanson 2008).

Large proportions of the alewife (Fig. 11), windowpane flounder (Fig. 15), rainbow smelt (Fig. 16), and American shad populations also feed within Northumberland Strait, where there also are high concentrations of forage fish such as juvenile Atlantic herring (McQuinn et al. 2012). The area is also used consistently for feeding by most anadromous species. Rainbow smelt are very common in the <35 m depths in bottom trawl surveys and occur along all the shoreline of the sGSL except the Magdalen Islands (Fig. 16) during the ice-free season. Typically, there are large concentrations of rainbow smelt feeding in waters <30 m deep in Chaleur Bay, eastern NB, and throughout Northumberland Strait (Benoit et al. 2003; Bosman et al. 2011; Savoie 2014a). Juvenile rainbow smelt have the same general distribution of adults once they enter full salt water, but the juveniles tend to be closer to shore.

There are at least four marine fish species (transient marine species) that enter the sGSL coastal waters to feed during summer months: bluefin tuna, butterfish, Atlantic saury, and spiny dogfish (Appendix 2). The bluefin tuna and Atlantic saury are pelagic species and not captured in DFO trawl surveys but based on commercial and reported commercial fisheries landings (DFO 2010; Vanderlaan et al. 2014) feeding aggregation information could be deduced. The largest numbers of bluefin tuna occur along the north coast of PEI and at the eastern end of the Strait where they feed actively. The Shediac Valley is the third high-density feeding areas for bluefin tuna (based on landings) within the sGSL making those areas rather important for the fitness of that species. Atlantic saury is noteworthy for its feeding concentrations during autumn in a small area of St. George's Bay (Chaput and Hurlbut 2010; DFO 2010) - they presumably enter and exit along the west coast of Cape Breton. Butterfish enter the sGSL sometime during summer with very small numbers caught in the NS survey, and from central Strait to St. George's Bay (Fig. 12) in September and October. Large incursions of spiny dogfish occur when its population in adjacent ecosystems is at high levels (COSEWIC 2010b). Spiny dogfish mainly occur during late summer and autumn in coastal waters from Miscou Island through Northumberland Strait and the north Shore of PEI to eastern PEI, with a concentration on the east side of the Magdalen Islands (Benoit et al. 2003; COSEWIC 2010b) (Fig. 17). During autumn, these aggregations of spiny dogfish likely are concentrating on spawning aggregations of Atlantic herring.

A group of anadromous species does not leave the sGSL and uses the coastal zone as their primary open-water feeding area. Some species tend to stay very close to shore (e.g., striped bass and brook trout) and others are simply poorly sampled (e.g., Atlantic tomcod and threespine stickleback), because much of the population occurs, again, close to shore or is

pelagic (not mutually exclusive mechanisms), resulting in the absence or quasi-absence of these species in our research trawl surveys.

Migration corridors

Of the fish species that show significant seasonal movements, most appear to undergo diffuse migration between summer feeding areas and overwinter refuges. There are notable exceptions. The entire near-shore area from Gaspé to roughly the Margaree Estuary in Cape Breton represents the seasonal migration corridor for striped bass (Robinson et al. 2004; Douglas et al. 2009; S. Douglas, Gulf Fisheries Centre, pers. comm.) (Fig. 18); however, this species does not move out of the sGSL. American eel, the three alosid species, butterfish, Atlantic saury, and spiny dogfish, all are thought to migrate along the coast, and especially in Northumberland Strait, to the west coast of Cape Breton and then out along the northern tip of Cape Breton. Atlantic cod shows a similar migration pattern in and out of the sGSL (Hanson 1996; Campana et al. 1999; Comeau et al. 2001). While Atlantic mackerel and bluefin tuna do not necessarily stay in coastal waters when feeding, they mostly pass along the north tip of Cape Breton as they enter and exit the sGSL. White hake also migrate along the west coast of Cape Breton (current low population pattern) and showed a similar migration along the coastal areas of both sides of PEI when population numbers were higher. Thus there clearly is a major migration corridor primarily through Northumberland Strait (and to a lesser degree along the north shore of PEI), along the west coast of Cape Breton, and then a highly significant choke point at the northern tip of Cape Breton Island (Fig. 18).

The three alosid species (alewife, blueback herring, and American shad) undergo long-distance migrations to overwinter well outside the sGSL (Chaput and Bradford 2003; Darbyson and Benoit 2003; McQuinn et al. 2012). The three species spawn in rivers during spring or early summer; the young-of-the-year move down the estuary as they grow; they join the large juveniles and adults in coastal waters (especially in Northumberland Strait) during late summer or early fall, and all sizes leave the sGSL before ice formation. The migration appears to run along the shoreline of the mainland (mainly Northumberland Strait) and, for a while, there can be large numbers concentrated at the eastern end of St. George's Bay. Eventually, all the migrants exit along the west coast of Cape Breton, leaving the sGSL completely during winter. All sizes of alosids return to the sGSL as the ice melts, adults enter freshwater to spawn, and the post-spawners move back down to coastal waters to feed for the summer – along with the immature fishes (Hanson and Courtenay 1995; Bosman et al. 2011; J.M. Hanson, unpublished data). A very large proportion of the populations of the three alosid species, butterfish, striped bass (in the Miramichi River and a few nearby rivers), and adult American eels migrate through the Northumberland Strait in autumn to overwinter or to breeding sites (reverse migrations in spring for diadromous species). For species entering rivers within the Strait, there is no other route so the area is an obligatory passage. Winter skate migrate into the Strait from overwinter areas to feed and breed. As an obligatory passage to local end points (either to breeding, feeding, or overwinter sites), this area is critical for the fitness of many anadromous species, such as striped bass and American shad, and for winter skate.

Atlantic mackerel is also a long distance migrant. They migrate to US coastal shelf region to overwinter, returning in spring to spawn, and both adults and juveniles feed pelagically in the coastal zone all summer (McQuinn et al. 2012; DFO 2014b). Like the three alosid species, the migrants must pass through the choke point at northern tip of Cape Breton (Fig. 18) during both migrations.

As a deep-water species, adult Atlantic cod mainly occur in the cold waters of the CIL although, when population numbers were high, some occurred in the transition waters. The migration path of Atlantic cod is well-known (Swain et al. 1998; Campana et al. 1999; Comeau et al. 2001); the

western group moves in waters offshore from the north shore of PEI in October, joins up with eastern group along west coast of Cape Breton, and move to the edge of the Cape Breton Trough up to the north tip Cape Breton in November. The adults migrate ahead of the ice-edge in Cabot Strait as winter progresses and ultimately out onto the Scotian Shelf.

As described earlier, bluefin tuna, butterfish, Atlantic saury, and spiny dogfish are known to enter the sGSL to feed. Presumably, all enter and exit via the passage at the tip of Cape Breton and pass along the west coast of Cape Breton, presumably between the shore and edge of the Laurentian Channel.

Anadromous species spawn in freshwater and have migrations of varying lengths. Corridors leading to those freshwater spawning locations are therefore important for the fitness of the anadromous species in the sGSL. Chaleur Bay is an obligatory passage for salmon, alewife, and American eels going into rivers like the Restigouche, and likely for striped bass during its feeding migrations. Similarly, eastern NB (coastal Shediac Valley) is also an obligatory passage for these species going into other rivers. Furthermore, the Miramichi River is the only known spawning site for striped bass and American shad so the entire population funnels through the area coming either from the northern and southern route (Fig. 18) before entering the river. Young-of-the-year striped bass and American shad move down the river and into the estuary as they grow and then disperse all along the coast in mid-summer (Chaput and Bradford 2003; Robinson et al. 2004). Finally, most of the juvenile and adult alewife and rainbow smelt go through the Miramichi Estuary to migrate into Northumberland Strait to feed during the summer months.

There is an October feeding migration of juveniles of white hake from the Shediac Valley into the Miramichi Estuary (eastern NB) where fish aggregate for a month or so before leaving to overwintering locations (Hanson and Courtenay 1995; Bradford et al. 1997; Swain et al. 2012; COSEWIC 2013). Eastern NB is therefore important for the fitness of this endangered species. Since there is also a feeding migration of juvenile white hake in rivers of Northumberland Strait, that area must also be of some importance.

Atlantic salmon undertakes a long feeding migration. Small juvenile Atlantic salmon (smolts) migrate down the estuaries of their natal rivers during spring. The pelagic smolts from several major rivers apparently congregate for a short time in the Miramichi “outer-bay” area and move as a group across the Magdalen Shallows, crossing to the Strait of Belle Isle, and ending up near Greenland (COSEWIC 2010c). The return migration is not synchronous with fish fresh from the ocean appearing in fresh waters from late June through October. Locations of the adults in transit are poorly understood, and they are all but immune to our survey gears because they are pelagic and fast-moving; hence, possible migration corridors (if any) cannot be inferred. The adults spawn during autumn and the surviving spent fish move back down the estuary during spring (feeding as they go) and out to sea. Some of the spent fish that migrate back to the ocean sea will return to spawn in subsequent years.

Longhorn sculpin, sea raven, yellowtail flounder, windowpane, and ocean pout are widely distributed and most individuals appear to leave the <30 m waters occupied during summer and move to the deeper waters within the sGSL to overwinter with no specific migration corridor (Bosman et al. 2011; Hanson and Wilson 2014). Similarly, the almost ubiquitous winter flounder shows two types of migration to overwinter refuges. Some individuals move to the edge of the Laurentian Channel while others enter estuaries during autumn and exit shortly after ice-melt (Hanson and Courtenay 1995, 1996; Darbyson and Benoit 2003).

Some warm-water coastal-zone species do not appear to migrate (see Appendix 2). Cunner hides under rocks or buries in sediment and enters a state of torpor as water temperatures drop below 5 to 8 °C (Johansen 1925; Dew et al. 1976; Green et al. 1984). Rock gunnel mainly lives

under rocks close to shore and inside estuaries (Scott and Scott 1988). Wrymouth live in deep burrows (Scott and Scott 1988). Presumably these species remain in their preferred habitat year-round. Grubby (almost exclusively close to shore and in estuaries) and northern sand lance are not well sampled and their seasonal movements cannot be discerned.

The Canso Strait was most likely an important passageway for many species (e.g., Atlantic herring, Atlantic saury, and *Alosa* spp.) but since its blockage, each side now acts as a retention area (depending on the season) where migratory fish species are caught up until they take an alternative route out and around Cape Breton, i.e., along the west coast of Cape Breton in the sGSL. A significant proportion of the migratory species populations pass along the west coast of Cape Breton. Atlantic salmon populations using the rivers in the area must migrate through St. George's Bay to access spawning endpoints. St. George's Bay formerly was very important for the fitness of species migrating through the Canso Strait but now marine fish are going around Cape Breton following the shore west of Cape Breton or a bit offshore.

Invertebrate species do not show much in the way of seasonal movements although some adult American lobsters do make short seasonal movements to slightly deeper water if cover is not available in the <30 m depths (Bowlby et al. 2007, 2008). Consequently, no area can be identified as being important for the fitness of invertebrate species based on migration.

Spawning locations

Fish populations in the sGSL can be classed in four guilds by spawning behavior; anadromous species, those that do not spawn in the sGSL, species with known spawning beds, and species where no spawning area has been located (the vast majority of species). Anadromous, catadromous, and transient species do not spawn in the sGSL marine coastal habitat and therefore their spawning grounds can be ignored for the purpose of this report. With few exceptions (e.g., Atlantic herring, white hake, winter skate), distinct spawning areas are unknown for most marine resident species.

The St. George's Bay is unique as it is the only remaining breeding location for coastal white hake (Swain et al. 2012; COSEWIC 2013); the entire breeding population is present and the loss of this location would most likely result in the extirpation or extinction of white hake. As the only breeding area for lady crab (Fig. 8) and most of the remnant winter skate population (Fig. 7), the western half of Northumberland Strait is critical for these species. The loss of this breeding area would most likely result in the extinction of lady crab and winter skate. Baie Verte located in central Northumberland Strait (Fig. 5) used to be one of the two known spawning location for white hake (with St. George's Bay) but this function is now lost (Swain et al. 2012).

Atlantic herring (spring and fall spawners) have many spawning beds (e.g., Miscou Island, both ends of Northumberland Strait, Chaleur Bay) (Messieh 1987) but usage is not consistent from year to year. Historically, there have been spring and fall herring spawning beds for the entire sGSL but some of them seem to have disappeared (McQuinn et al. 2012).

Capelin probably spawns on offshore banks and perhaps beaches from Miscou Island to roughly Gaspé Bay; however, actual locations have not been documented.

Winter sampling in the lower Miramichi Estuary has detected Greenland cod and shorthorn sculpin in spawning condition (ripe and running and newly spent; Hanson and Courtenay 1995) but whether winter spawning in the lower section of estuaries is the rule for sGSL populations is unknown.

Beside St. George's Bay and Northumberland Strait, no other areas can be identified as being important for the reproductive fitness of fish species. As for the invertebrate species, very little

information on breeding grounds is available. As said previously, most species are sessile or sedentary and will complete their whole life cycle within the same area.

Nursery areas

The possibility of distinct nursery areas has not been investigated for most marine species. Estuaries, for varying lengths of time, represent important nursery areas for all of the diadromous fishes except Atlantic salmon and sea lamprey (whose young pass quickly through the zone en route to marine feeding areas). There are very few juveniles of diadromous species in shallows of St. George's Bay and the Magdalen Islands because of the small number and the total absence of inflowing rivers, respectively. For most species, the juvenile fish essentially share the same locations as the adults although there is a moderate tendency for the juveniles to be in shallower waters.

Distinct nursery areas are known for Atlantic herring, and are located within Northumberland Strait and the end of Chaleur Bay (LeBlanc et al. 1998; Bosman et al. 2011). There are also some concentrations of juvenile herring in St. George's Bay (McQuinn et al. 2012).

For Atlantic cod, the major concentrations of juveniles occur around the north point of PEI, immediately west of the Magdalen Islands, and along the north and east coasts of PEI. Some concentrations of age-0 and small juveniles occur within Northumberland Strait during summer (Bosman et al. 2011).

Juvenile white hake are now only found in three locations: St. George's Bay, Northumberland Strait, and eastern PEI (Hanson and Courtenay 1995; Swain et al. 2012; COSEWIC 2013) with no area being more important than the others for the fitness of the remnant population. The western half and central Northumberland Strait is also the only nursery area for lady crab and remnant winter skate population; meaning it is critical for the fitness of both species. In addition to those two likely-endemic species, there are large concentrations of age-0 and juveniles of the three alosid species and striped bass. High concentrations of adult windowpane (Fig. 15) and winter flounder probably indicate that the area is used as a breeding and nursery area as well as for feeding.

Seasonal refuge

With one exception, there is no significant winter refuge in the coastal zone of the sGSL. Most strictly warm-water coastal fishes migrate to deeper waters outside the coastal area or enter estuaries for the winter, including all of the rare (COSEWIC ranked) or suspected endemic fishes (winter skate and white hake). A few widely-distributed warm-water fishes (e.g., wrymouth, cunner, and rock gunnel) remain in their burrows, hide under rocks, or bury in the sediments to overwinter. Furthermore, seasonal migrations by benthic invertebrate species, including the likely undescribed endemic population of lady crab, are minimal or non-existent. The whole population of lady crab is restricted to the western half of Northumberland Strait year-round so the area is its sole refuge. The fitness (i.e., continued survival) of this species depends on this area.

DISCUSSION

In contrast with the identification and characterization of important areas (IA) in the coastal waters, the workshop held in 2006 (DFO 2007) was not limited by depth, per se. The focus of the 2006 workshop was more "offshore" largely because the RV survey typically has very few sets in water <25 m deep. Nevertheless, two of the ten identified EBSAs (St. George's Bay and the western Northumberland Strait; DFO 2007) occur entirely in waters ≤40 m deep (Table 5). Furthermore, two other EBSA (Western Cape Breton and southwestern coast of the Gulf; DFO

2007) were very large areas that covered much deeper waters (>40 m) but included large portions of coastal waters (Table 5).

Based on the information available, the Northumberland Strait area is the highest ranked IA. Its importance is paramount considering the three evaluation criteria; uniqueness, aggregation and fitness consequences. The high importance in terms of these three criteria is mainly driven by the presence of two likely-endemic species (lady crab and winter skate) in the center and western half of the Strait, and by its being the only remaining spawning location for the coastal white hake (eastern half). Moreover, the only other known spawning location for these white hake was within the Strait in Baie Verte (Swain et al. 2012). In addition, the Northumberland Strait is a major migration corridor for fishes (butterfish, striped bass, *Alosa* spp. and adult American eels) with a bottleneck at both ends. The western part of the Strait was identified as an EBSA (see Table 5) in the 2006 workshop (DFO 2007) mainly because of the presence of the lady crab (Chabot et al. 2007) and remnant winter skate population (Swain and Benoît 2007), and more recently for its importance for small pelagic fishes in the eastern half (McQuinn et al. 2012). However, given the similarity of the oceanographic processes within Northumberland Strait (Chassé et al. 2014), the entire area could be characterized as a single unit.

St. George's Bay was previously identified as an EBSA (St. George's Bay EBSA 2; DFO 2007), and since the entire bay is <40 m, and the same dataset was used, we could also consider it as a coastal IA (Table 5), and de facto as a coastal EBSA. St. George's Bay ranked high because it is part of the only remaining breeding location for white hake, and losing this area would result in its extirpation or extinction (Swain and Benoît 2007). Additionally, concentrations of juvenile white hake are found there. St. George's Bay is an important feeding area for many fishes (e.g., juvenile and adult Atlantic herring, juvenile *Alosa* spp., white hake and Atlantic saury) and many fish species aggregate there during part of their migration in and out the sGSL. The area was designated as an EBSA in 2006 mostly for its major role for meroplankton (largest array and abundance in the sGSL) as well as for its usage by groundfish and pelagic fish (DFO 2007).

The coastal areas at the eastern end of PEI and along the western shore of Cape Breton are encompassed by a much larger area that was identified and characterized as an EBSA (DFO, 2007). At the 2006 EBSA meeting, western Cape Breton was designated as an EBSA (EBSA 1; DFO 2007) because of its major role for meroplankton (with a large array of species), high biomasses and large concentrations of small (<1 mm) and large (>1 mm) meso-zooplankton and its importance to groundfish (Swain and Benoît 2007). The Cape Breton Channel serves as a migration corridor (spring and fall) for many fishes but especially for Atlantic cod and white hake (Swain and Benoît 2007). However, the main ecological functions are more important in the offshore portion of the western Cape Breton EBSA. Indeed, the EBSA is mostly comprised of the deep waters (>40 m) that occur between PEI and Cape Breton rather than coastal waters. Within the context of the current study, the coastal zone (<40 m) along the western coast of Cape Breton is a narrow band, and does not appear to be of critical importance to any of the species considered in the present evaluation; therefore, it would not be designated as IA (Table 5). In contrast, the coastal zone at the eastern end of PEI is wider and is directly connected to the adjacent IAs (i.e., Northumberland Strait and St. George's Bay). Thus, it should be considered an IA (Table 5), mainly because of the presence of white hake, but also due to its importance to pelagic fishes (McQuinn et al. 2012).

Chaleur Bay and the coastal waters west of the Shediac Valley (i.e., eastern NB) should not be considered an IA; however, the deeper waters adjacent to these coastal areas have been identified as EBSA (Table 5) and might warrant special consideration. The relative importance of these areas refers mainly to migratory anadromous species (e.g., Atlantic salmon, alewife, and American eels) going into the Restigouche river and with American shad and striped bass

(their only spawning locations in the sGSL) going into the Miramichi River (which also supports much larger populations of salmon, alewife, and American eels than the Restigouche River). These two areas are comprised within the southwestern coast of the Gulf EBSA identified during the 2006 workshop and represent most of its coastal portion (<40 m). The discrepancy between the two evaluations seems to be the depth restriction and additional layers of information. First, the southwestern coast of the Gulf EBSA is influenced by the Gaspé current and both the Miramichi and Restigouche rivers empty into the area creating special physical processes including retention potential, resurgence, and important tidal mixing (DFO 2007). Consequently, with the influence of the Gaspé current carrying nutrients and phytoplankton cells, high phytoplankton concentrations can be observed in the area. That would explain the importance of that area for pelagic fishes (DFO 2007; McQuinn et al. 2012). Second, fishes and invertebrates are high in numbers but the species listed is indicative of species that prefer lower temperatures and thus more abundant, or present, at depth >40 m. Furthermore, Chaleur Bay represents one of the principal wintering areas for juvenile Atlantic herring (DFO 2007; McQuinn et al. 2012), but this occurs in waters >40 m and hence was not considered in our identification for coastal IA (Table 5). Also, the southwestern coast of the Gulf was identified as an EBSA because of a significant feeding area for several marine mammal species, but offshore from Gaspé (DFO 2007), not in the coastal area. Finally, Swain and Benoît (2007) indicated the importance of Chaleur Bay (their IA-7) as low and Shediac Valley (their IA-5) as moderate (Table 5) based on information for demersal fishes.

Finally, coastal areas north of PEI and around Magdalen Islands ranked the lowest as IA based on the three evaluation criteria and all the ecological functions. These locations have no distinctive features and do not seem to be essential for any of the fish or invertebrate species accounted for this evaluation of coastal IA. Similarly, they were not given any special consideration during the identification and characterization process to established EBSA in 2006 (Table 5).

DATA AND RESEARCH LIMITATIONS

The framework and concepts for the identification of IA rely on data availability and quality. Our evaluation had limitations due to gaps in survey coverage in shallow waters of the coastal habitat. For waters < 25 m deep, only Northumberland Strait was well-surveyed; with reasonably good coverage in the eastern half of the Strait only starting in 2005. Waters of Northumberland Strait < 4 m deep could not be sampled due to the draft of the survey trawlers; consequently, distributions of many species described within this study are truncated. Elsewhere in the sGSL (including St. Georges Bay), there is little information for depths < 25 m, and extrapolating the results from this study to the entire coastal zone should be done with caution.

Lack of sampling in the coastal habitat also reflects, among other things, heterogeneous rough bottoms in some areas which prevent sampling by bottom trawls during some surveys. Rocky hard bottoms (e.g., boulder, reefs) in the sGSL are largely located in ≤ 40 m depths. Also, some areas, specifically the western half of Northumberland Strait, could not be sampled during the annual RV survey due to ongoing fishing activities (i.e., the large numbers of lobster traps). Hence, the only information available for this area comes from the NS survey that began in 2000, reflecting inconsistencies in the sampling coverage and sampling gears for the data considered. Filling the data gap in these areas would be difficult for many species.

Trawl efficiency is also an issue for many fish and invertebrate species, especially small bodied species but also for epibenthic (including demersal fishes such as flatfishes) and endobenthic species which are not well-sampled with the trawls used in most multispecies surveys. This is

problematic for species such as the sevenspine bay shrimp (*Crangon septemspinosa*) and the Atlantic rock crab that play a critical role in the coastal zone food web (Hanson 2011; Kelly and Hanson 2013a; Hanson and Wilson 2014;Hanson et al. 2014). However, basic information such as abundance and distribution is lacking for these species for most of the sGSL. Information on buried invertebrates (e.g., small and large bivalves, polychaetes, some tunicates, some echinoderms) is also lacking or with very limited spatial coverage even if it is recognized that species of the endobenthos are an important link within ecosystem food webs.

Correct species identification in the different surveys continues to be an issue. Species diversity, even for fishes in our study, is affected by taxonomic shortcomings such as pooling two species for alewife and blueback herring (similar to commercial landings) or the separation of small stichaeids (daubed shanny, stout eel blenny; slender eel blenny, juvenile snakeblenny) that has not been done consistently in the surveys' time series. The issue with the invertebrate data availability bears repeating. Many groups, including higher taxa, are pooled to class or phylum level in the database. In some cases, species-level identification work has been done (e.g., shrimps since 2002) following surveys but their entry into the database has been slow and this information was not available for the present study. With only one shrimp species in the warm-water part of the coastal zone versus at least 14 species occurring in the transition waters and CIL, the difference in biodiversity between the two depth zones is greatly underestimated.

Data-rich areas are more likely to be considered as important, creating a bias compare to data-poor areas. Unique characteristics, evidence of aggregations of some species, and the functionality of an area are easier to identify with a wealth of data and information. Also, the large amount of data on commercial species could predispose the identification of IA to those species and not for whole ecosystem processes.

CONCLUSION

The process for identification and characterization of coastal important areas (IA) reveals three locations that rank high based on fish species and one crab species: Northumberland Strait, St George's Bay, and eastern coast of PEI. These areas stand out primarily because of the presence of likely-endemic species. Chaleur Bay and coastal Shediac Valley are important mainly for the migration of several anadromous species and may warrant some special consideration. The area along the west coast of Cape Breton has a major role as a migration corridor, but more so in the > 40 m deep portion of the area and especially at the "choke point" for many fish species. Finally, there is no evidence to consider northern PEI and Magdalen Islands as IA, as per the previous EBSA identification and characterization meeting in 2006 (DFO 2007).

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TABLES

Table 1. Fish species or group of species considered for modeling.

Common name	Scientific name
Gaspereau	*Alosa pseudoharengus, A. aestivalis*
American plaice	*Hippoglossoides platessoides*
American shad	*Alosa sapidissima*
Atlantic cod	*Gadus morhua*
Atlantic halibut	*Hippoglossus hippoglossus*
Atlantic herring	*Clupea harengus*
Atlantic mackerel	*Scomber scombrus*
Atlantic tomcod	*Microgadus tomcod*
Butterfish	*Peprilus triacanthus*
Capelin	*Mallotus villosus*
Cunner	*Tautoglabrus adspersus*
Daubed shanny	*Leptoclinus maculatus*
Fourbeard rockling	*Enchelyopus cimbrius*
Greenland cod	*Gadus ogac*
Grubby	*Myoxocephalus aenaeus*
Longhorn sculpin	*Myoxocephalus octodecemspinosus*
Lumpfish	*Cyclopterus lumpus*
Northern sandlance	*Ammodytes sp.*
Ocean pout	*Zoarces americanus*
Rainbow smelt	*Osmerus mordax*
Rock gunnel	*Pholis gunnelus*
Sea raven	*Hemitripterus americanus*
Shorthorn sculpin	*Myoxocephalus scorpius*
Snakeblenny	*Lumpenus lampretaeformis*
Spiny dogfish	*Squalus acanthias*
Threespine stickleback	*Gasterosteus aculeatus*
White hake	*Urophycis tenuis*
Windowpane	*Scophthalmus aquosus*
Winter flounder	*Pseudopleuronectes americanus*
Winter skate	*Leucoraja c.f. ocellata*
Wrymouth	*Cryptacanthodes maculatus*
Yellowtail flounder	*Limanda ferruginea*

Table 2. Invertebrate species and taxa considered for modeling.

Taxon or species	Scientific name	Phylum	RV data
American lobster	*Homarus americanus*	Arthropoda	1989-2013
Atlantic rock crab	*Cancer irroratus*	Arthropoda	1989-2013
Lady crab	*Ovalipes c.f. ocellatus*	Arthropoda	NA
Mud crab	*Dyspanopeus sayi*	Arthropoda	NA
Pagurus	*Pagurus sp.*	Arthropoda	1989-2013
Toad crab	*Hyas sp.*	Arthropoda	1989-2013
Sea strawberries	*Gersemia sp.*	Cnidaria	2003-2013
Asterias	*Asterias sp.*	Echinodermata	2004-2013
Blood star	*Henricia sp.*	Echinodermata	1989-2013
Brittle star	*Ophiuroidea*	Echinodermata	1989-2013
Leptasterias polaris	*Leptasterias polaris*	Echinodermata	2004-2013
Purple sunstar	*Solaster endeca*	Echinodermata	2005-2013
Sand dollars	*Echinarachnius parma*	Echinodermata	1989-2013
Scarlet psolus	*Psolus fabricii*	Echinodermata	1995-2013
Sea cucumber	*Cucumaria frondosa*	Echinodermata	1989-2013
Sea urchins	*Strongylocantrotus sp.*	Echinodermata	1989-2013
Spiny sunstar	*Crossaster papposus*	Echinodermata	2005-2013
Mussels	*Mytilus edulis*	Mollusca	1989-2013
Northern moonsnail	*Euspira eros*	Mollusca	1989-2013
Ocean quahaug	*Arctica islandica*	Mollusca	1989-2013
Sea scallop	*Placopecten magellanicus*	Mollusca	1989-2013
Sea slugs	*Nudibranchia*	Mollusca	2002-2013
Whelks	*Buccinum sp.*	Mollusca	1989-2013

Table 3. Test taxa included in the model selection process for selecting the most common best fitting model to be applied to the whole taxa list.

Fish species	Invertebrates species
Alewife	American lobster
American plaice	Atlantic rock crab
Atlantic cod	Lady crab
Atlantic herring	Sea scallop
Rainbow smelt	Snow crab
Winter flounder	Toad crab
Winter skate	
Yellowtail flounder	

Table 4. List of species that have been evaluated by the Committee on the Status of Endangered Wildlife in Canada with their status and year of assessment. Species and populations listed under the Species At Risk Act (SARA) are identified. Species for which trawl-survey data were available to this study are underlined.

Common name	Scientific name	Status	Year of assessment
American eel	*Anguilla rostrata*	Threatened	2012
American plaice	*Hippoglossoides platessoides*	Threatened	2009
Atlantic cod	*Gadus morhua*	Endangered	2010
Atlantic salmon	*Salmo salar*	Special concern	2010
Atlantic wolffish	*Anarhichas lupus*	SARA - Special concern	2003
Bluefin tuna	*Thunnus thynnus*	Endangered	2011
Spiny dogfish	*Squalus acanthias*	Special concern	2010
Striped bass	*Morone saxatilis*	Special concern	2012
Thorny skate	*Amblyraja radiata*	Special concern	2012
White hake	*Urophycis tenuis*	Endangered	2013
White shark	*Carcharodon carcharias*	SARA – Endangered Atlantic population	2006
Winter skate	*Leucoraja ocellata*	Endangered	2005

Table 5. Comparison of the Ecologically and Biologically Significant Areas (EBSA) and important areas (IA) within the southern Gulf of St. Lawrence (sGSL). EBSA locations (as indicated in Figure 5) are based on DFO (CSAS 2007/016), Swain and Benoît (CSAS 2007/012) and McQuinn et al. (CSAS 2012/087), and possible coastal IA based on fish and invertebrate species are from the present study. NB = New Brunswick; PEI = Prince Edward Island.

Locations	Coastal IA	CSAS 2007/016	status	CSAS 2007/012	status	CSAS 2012/087	status
Northumberland Strait	yes	part of EBSA 3	High	IA 3 (part)	High	IA 7, 9, 24	High
St. George's Bay	yes	EBSA 2	High	IA 2	High	IA 7, 9, 24	High
East PEI	yes	Part of EBSA 1	High	None	Low	IA 9, 24 (part)	High
West of Cape Breton	no	Part of EBSA 1	High	IA 1 (part)	High	None	Low
Coastal Shediac Valley	no	Part of EBSA 5	High	IA 5	Moderate	IA 8, 23 and 1 (part)	High
Chaleurs Bay	no	Part of EBSA 5	High	IA 7	Low	IA 3, 12, 1 (part)	High
North PEI	no	None	Low	None	Low	IA 13	Moderate
Magdalen Islands	no	None	Low	None	Low	None	Low

FIGURES

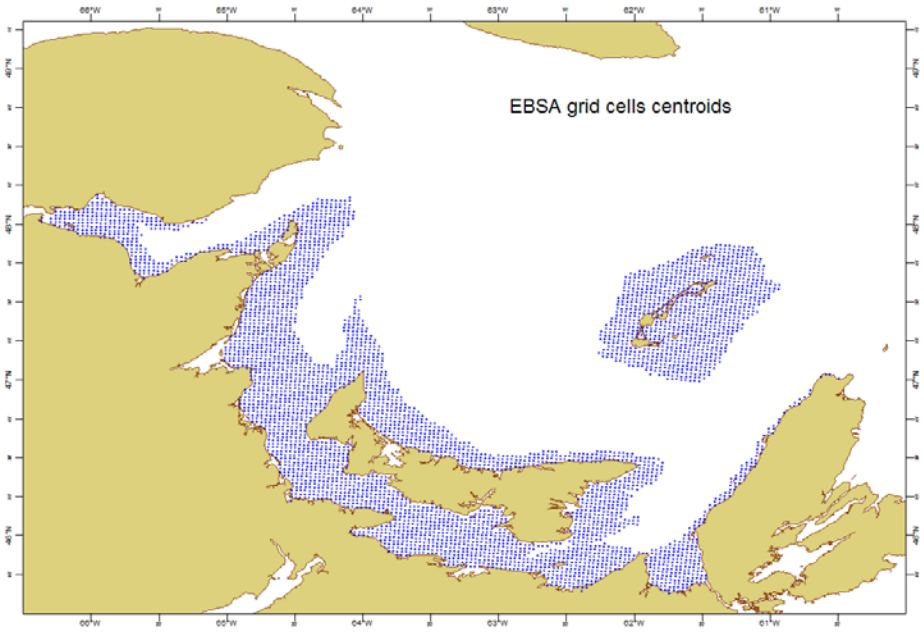


Figure 1. Map of the southern Gulf of St. Lawrence with the cell grid centroids between 0 and 40 m water depth, excluding cells within estuaries and semi-enclosed embayments.

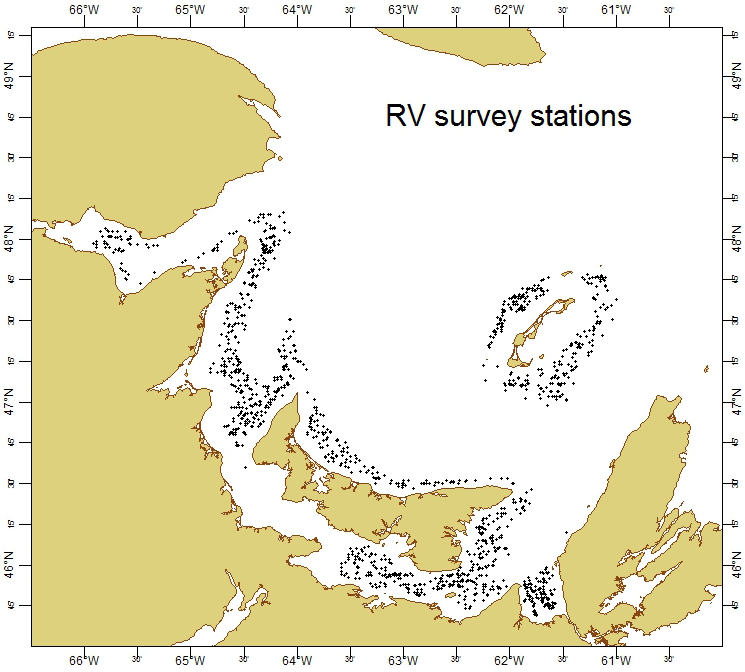


Figure 2. Map of the southern Gulf of St. Lawrence with the annual September bottom trawl survey (RV survey) sampling stations between 0 and 40 m deep, 1976 - 2013. Mid-tow locations were used for plotting the stations.

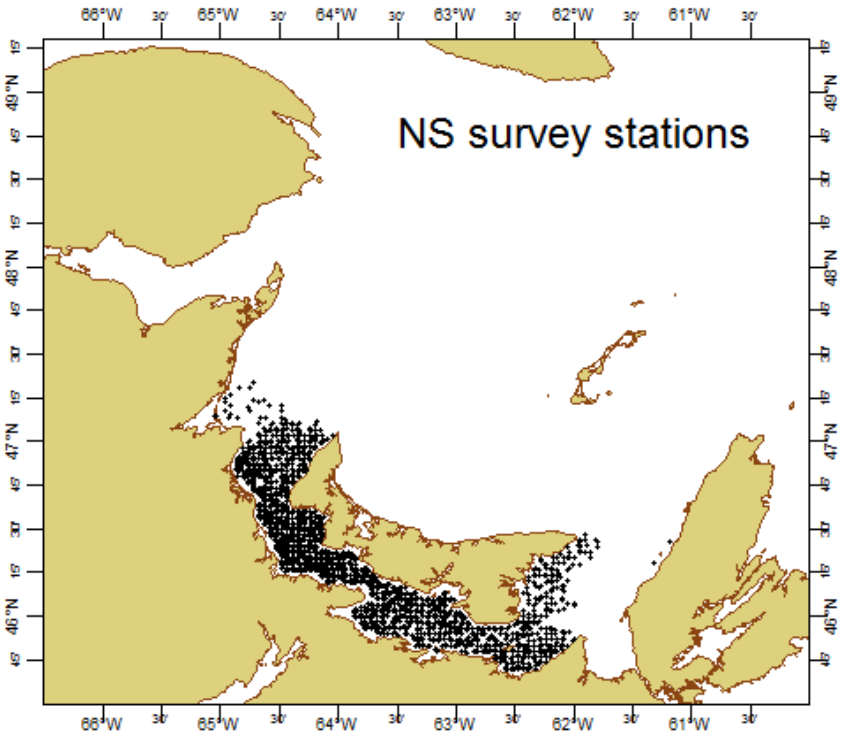


Figure 3. Map of the southern Gulf of St. Lawrence with the annual Northumberland Strait bottom trawl survey (NS survey) sampling stations between 0 and 40 m deep, 2000 - 2013. Mid-tow locations were used for plotting the stations.

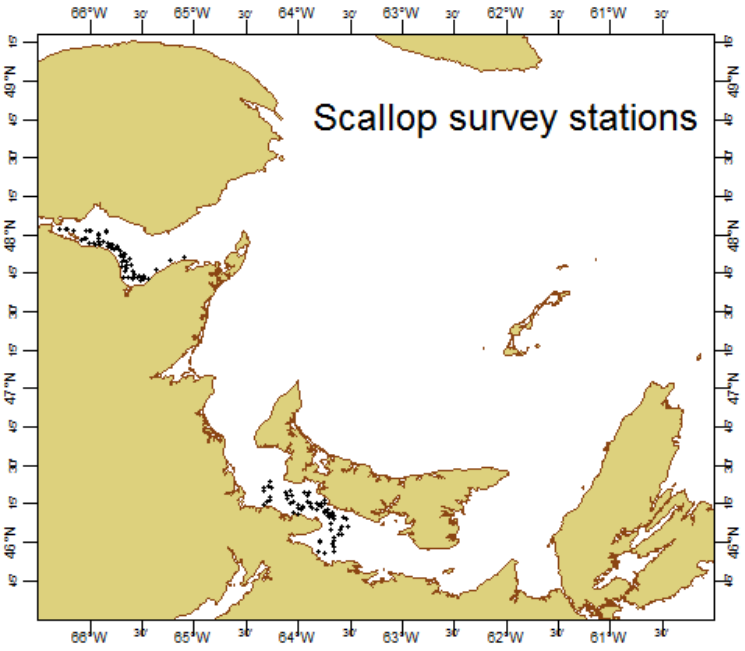


Figure 4. Map of the southern Gulf of St. Lawrence with the scallop survey sampling stations between 0 and 40 m deep in 2012 and 2013. Mid-tow locations were used for plotting the stations.

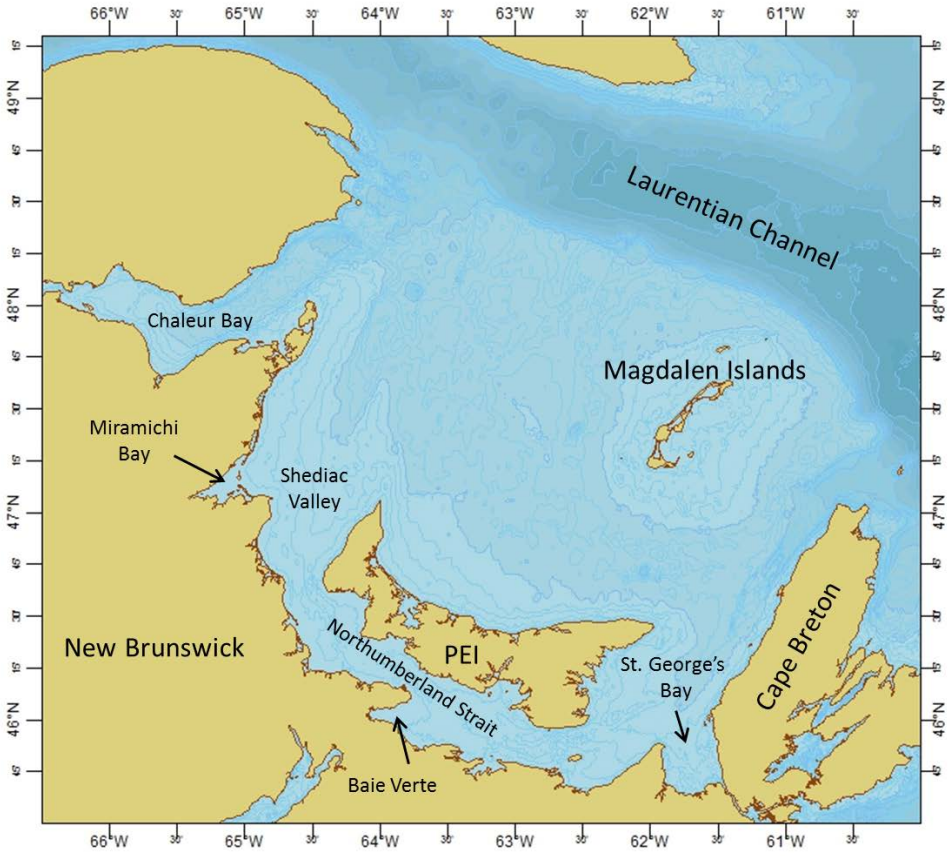


Figure 5. Map of the southern Gulf of St. Lawrence with place names identified. (Prince Edward Island = PEI).

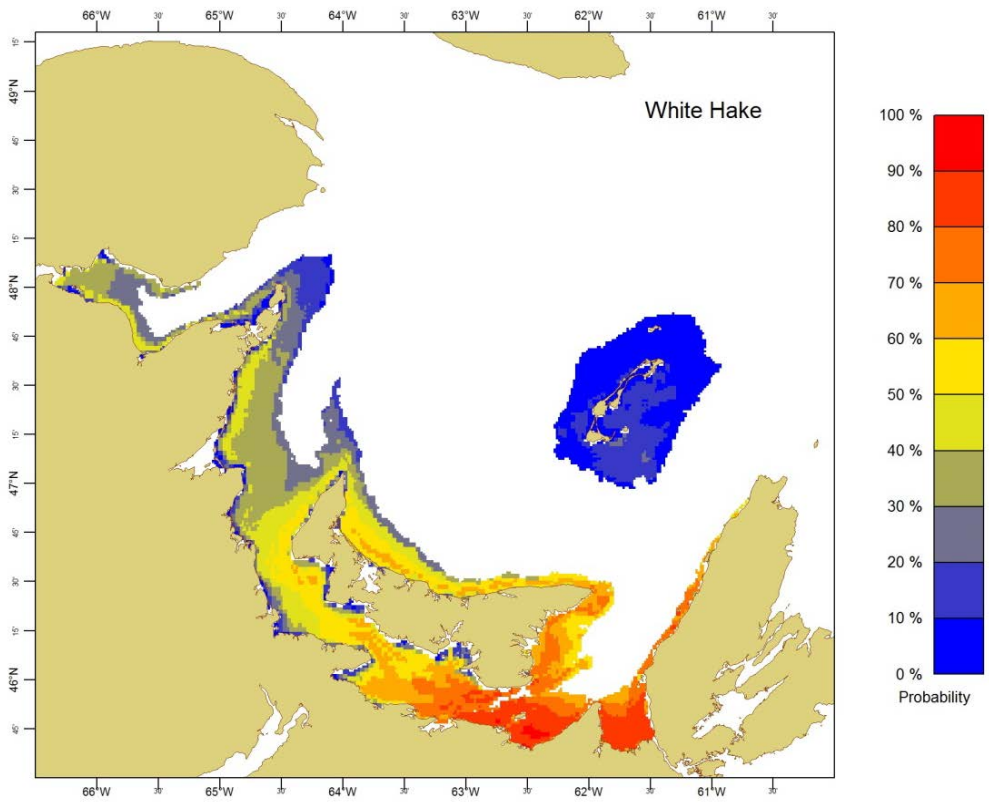


Figure 6. Contour map showing the predicted probabilities of capturing white hake (Urophycis tenuis) during a standard tow, using a Western IIA bottom trawl.

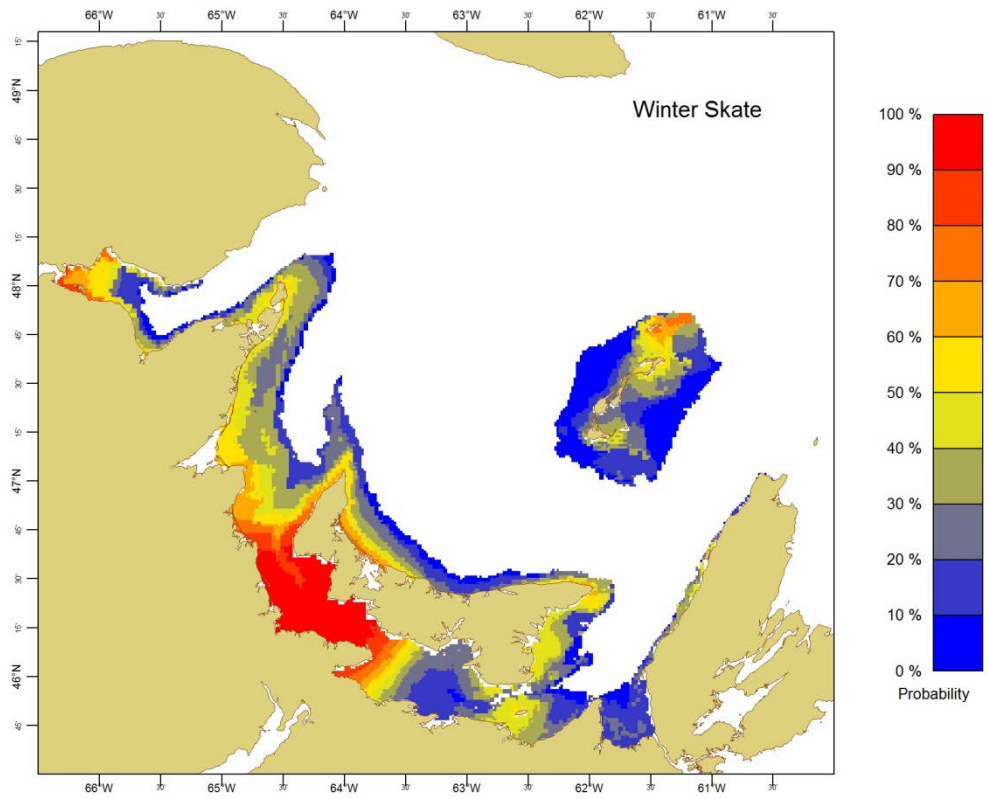


Figure 7. Contour map showing the predicted probabilities of capturing winter skate (Leucoraja ocellata) during a standard tow, using a Western IIA bottom trawl.

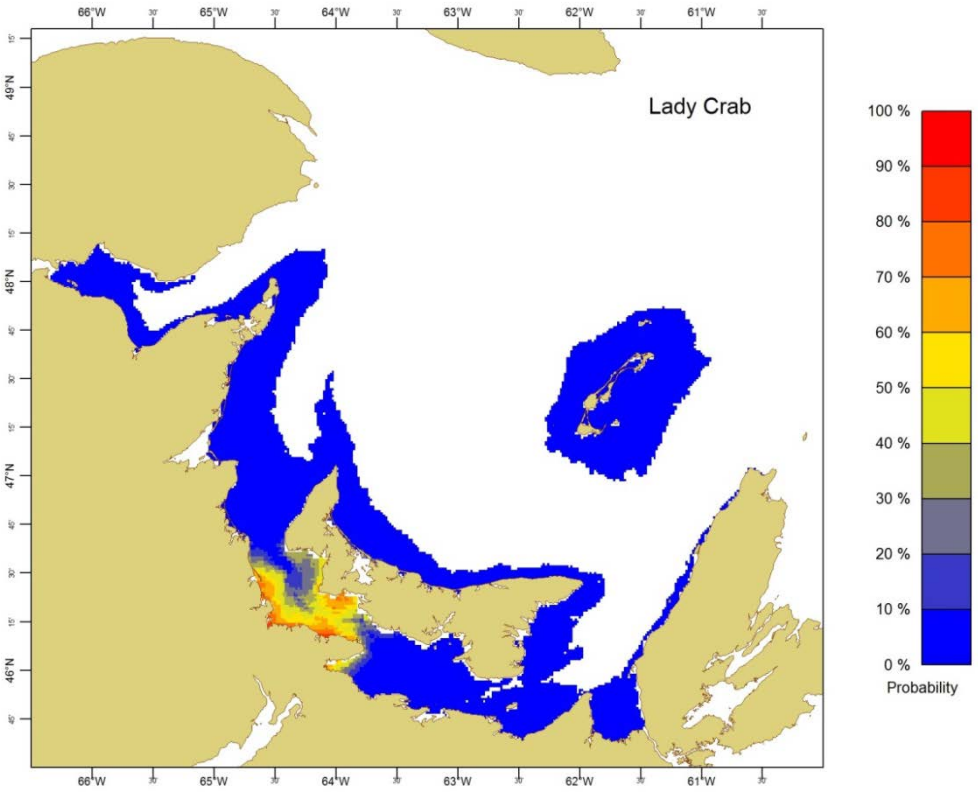


Figure 8. Contour map showing the predicted probabilities of capturing lady crab (Ovalipes ocellatus) during a standard tow, using a Nephrops trawl.

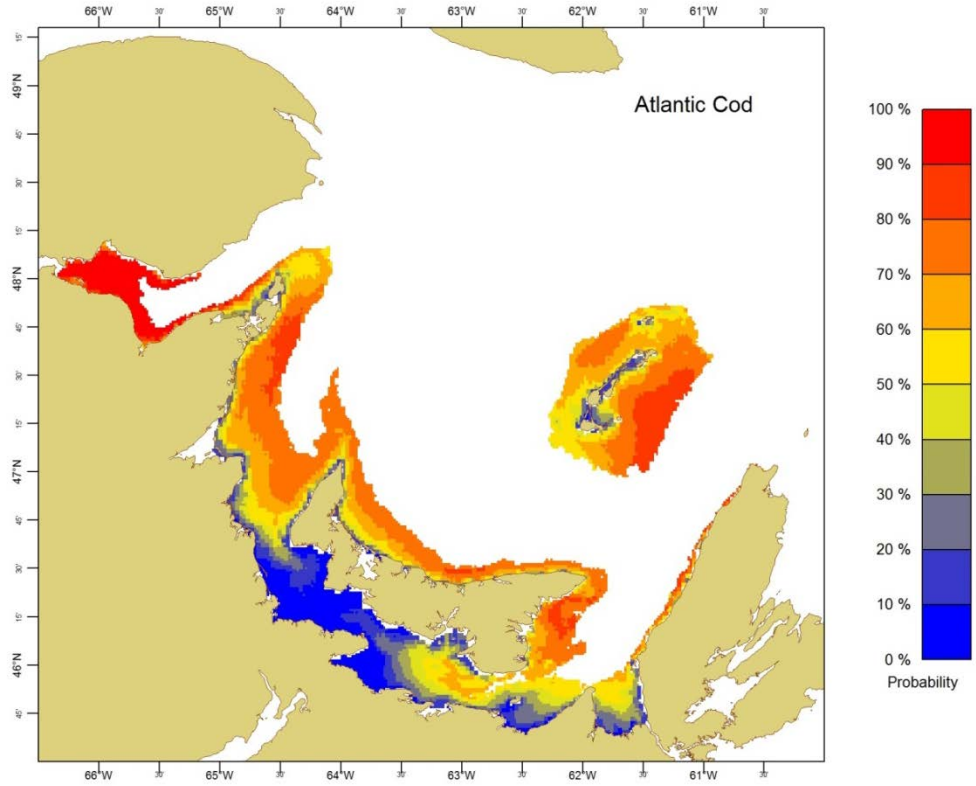


Figure 9. Contour map showing the predicted probabilities of capturing Atlantic cod (Gadus morhua) during a standard tow, using a Western IIA bottom trawl.

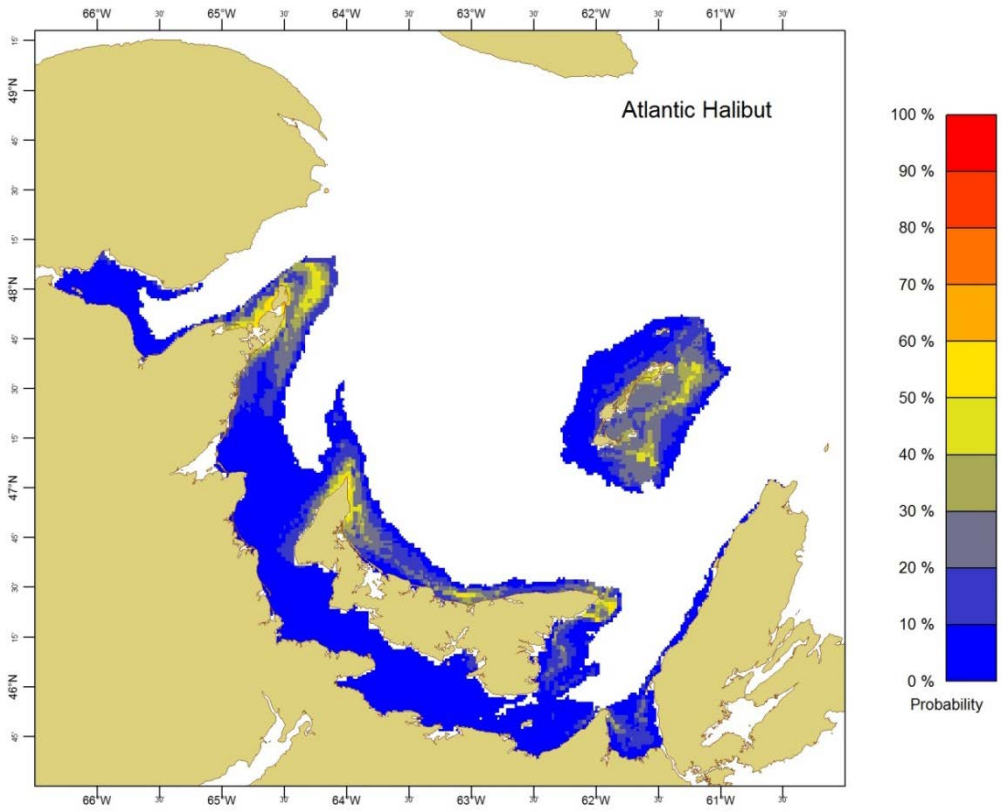


Figure 10. Contour map showing the predicted probabilities of capturing Atlantic halibut (Hippoglossus hippoglossus) during a standard tow, using a Western IIA bottom trawl.

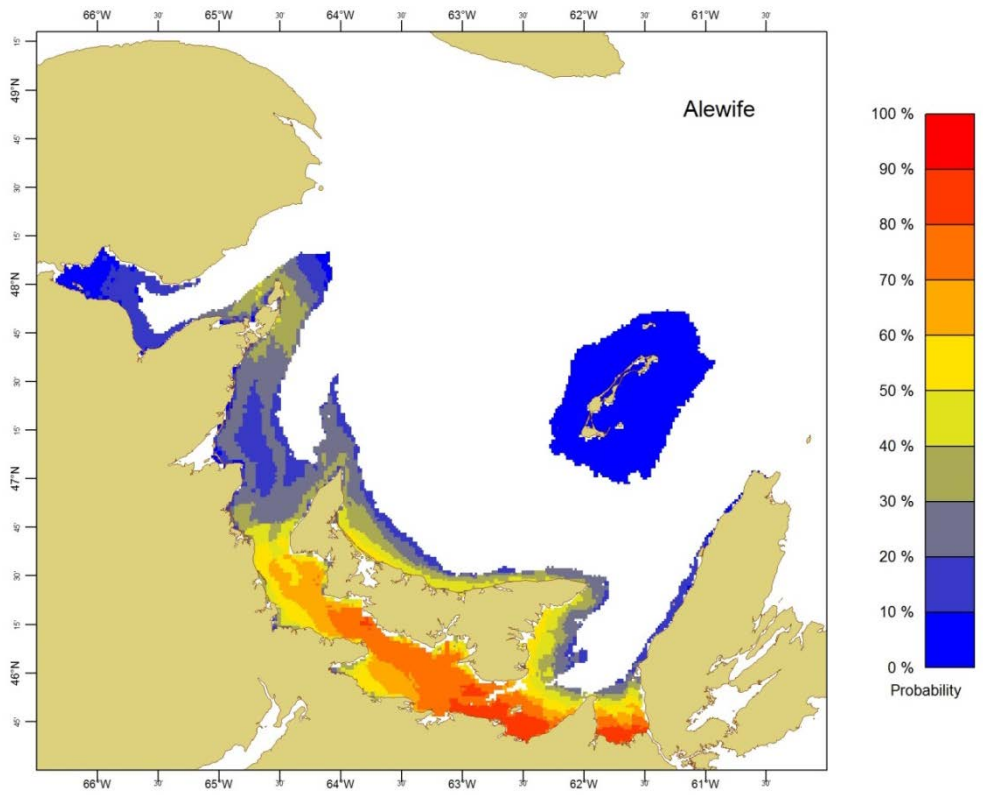


Figure 11. Contour map showing the predicted probabilities of capturing Alewife (Alosa pseudoharengus) during a standard tow, using a Western IIA bottom trawl.

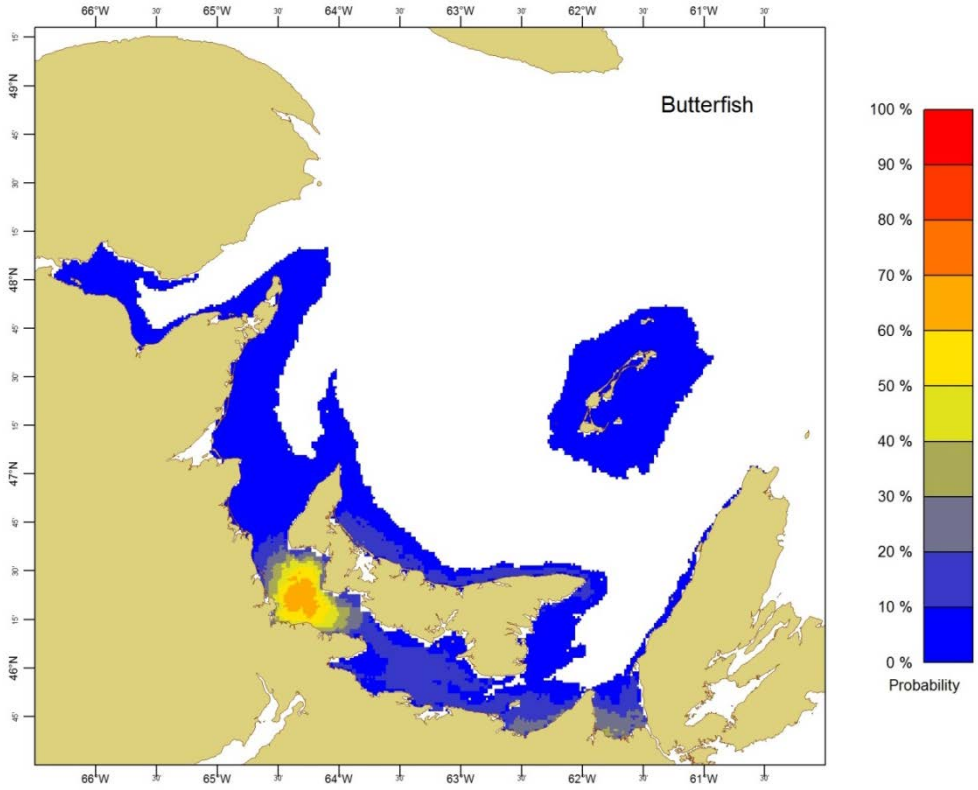


Figure 12. Contour map showing the predicted probabilities of capturing Butterfish (Peprilus triacanthus) during a standard tow, using a Western IIA bottom trawl.

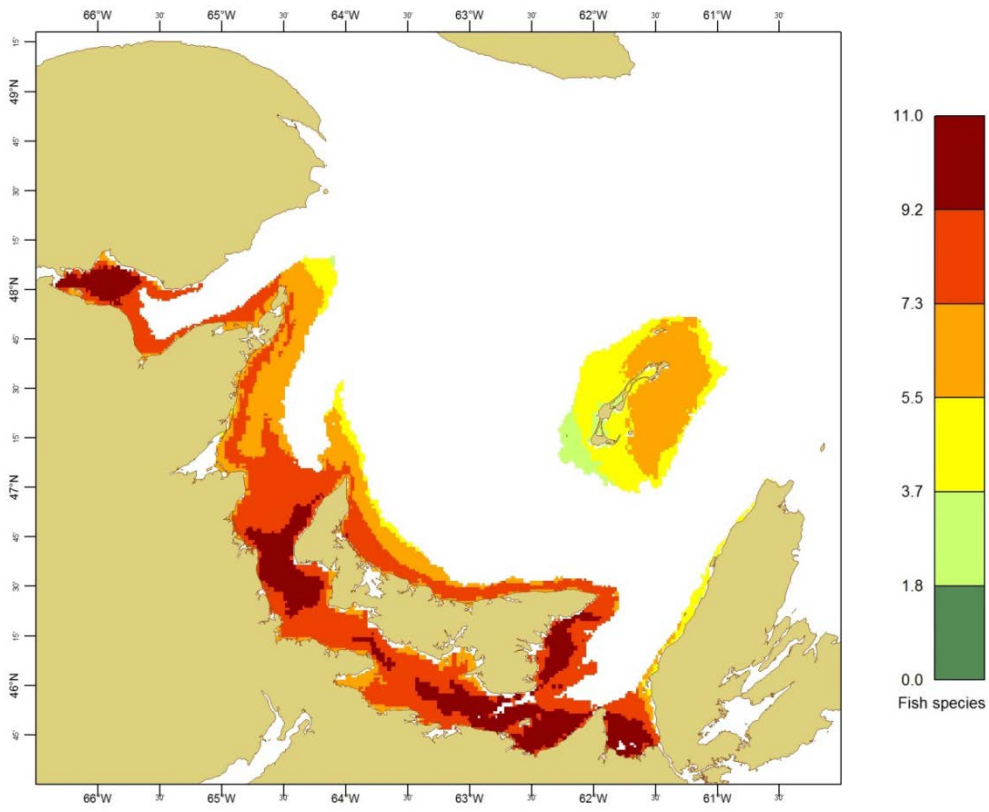


Figure 13. Pseudo-diversity contour map based on the 32 fish species examined.

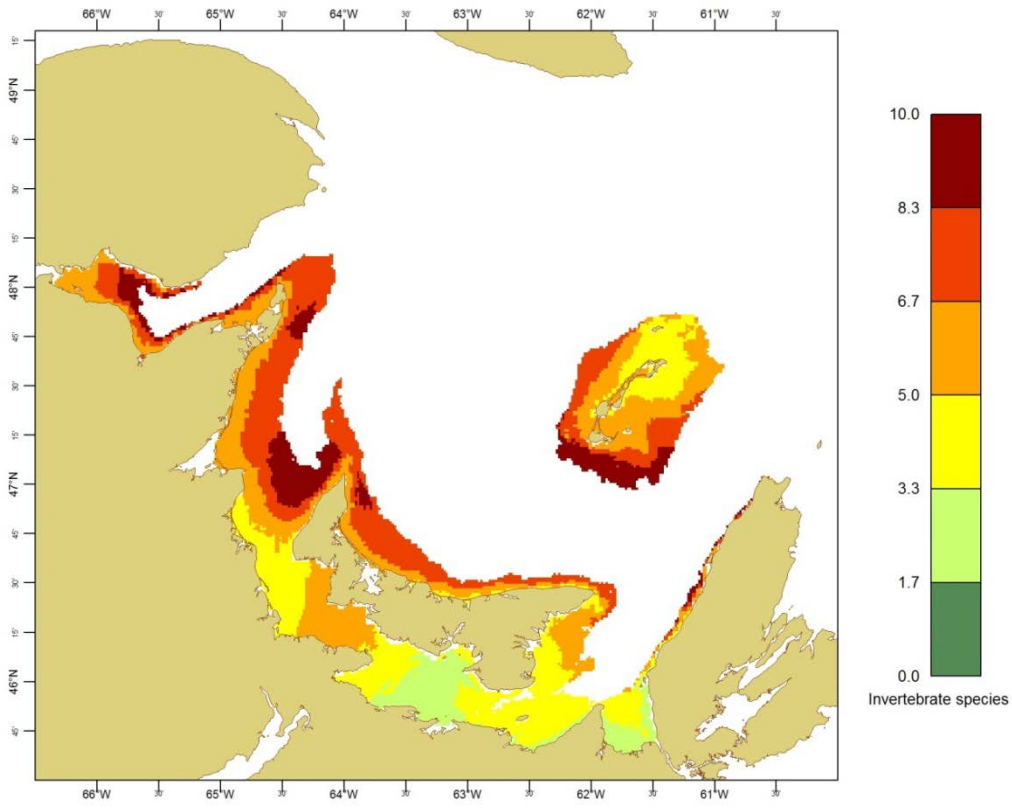


Figure 14. Pseudo-diversity contour map based on the 23 invertebrate species examined.

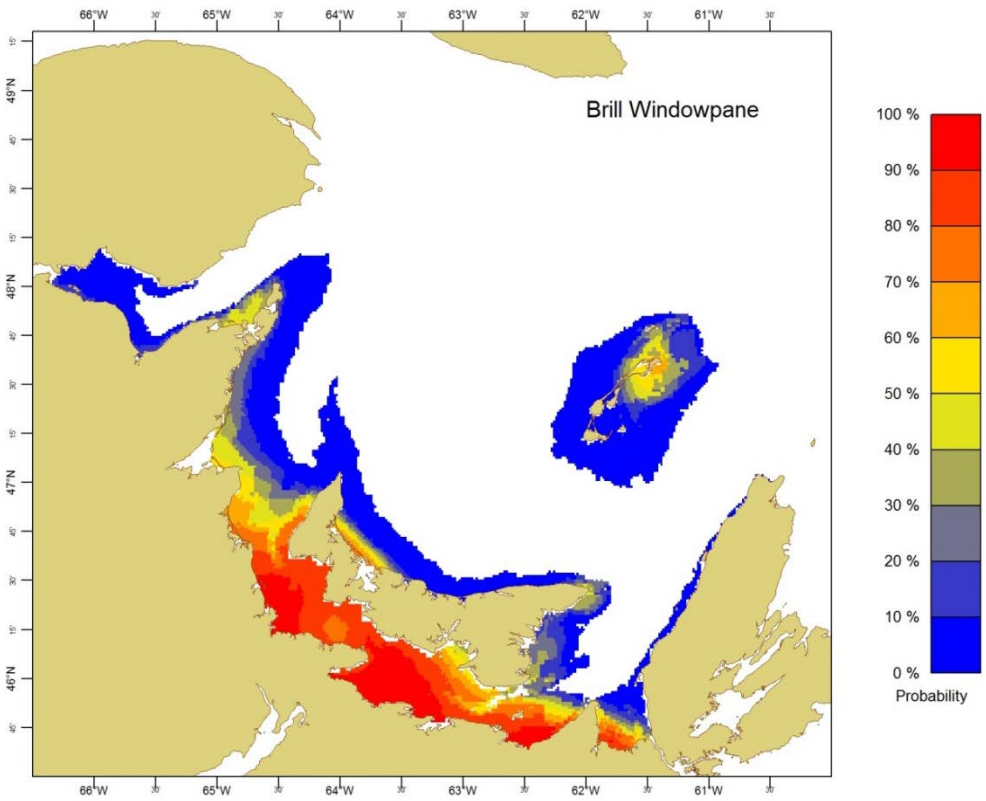


Figure 15. Contour map showing the predicted probabilities of capturing windowpane (Scophthalmus aquosus) during a standard tow, using a Western IIA bottom trawl.

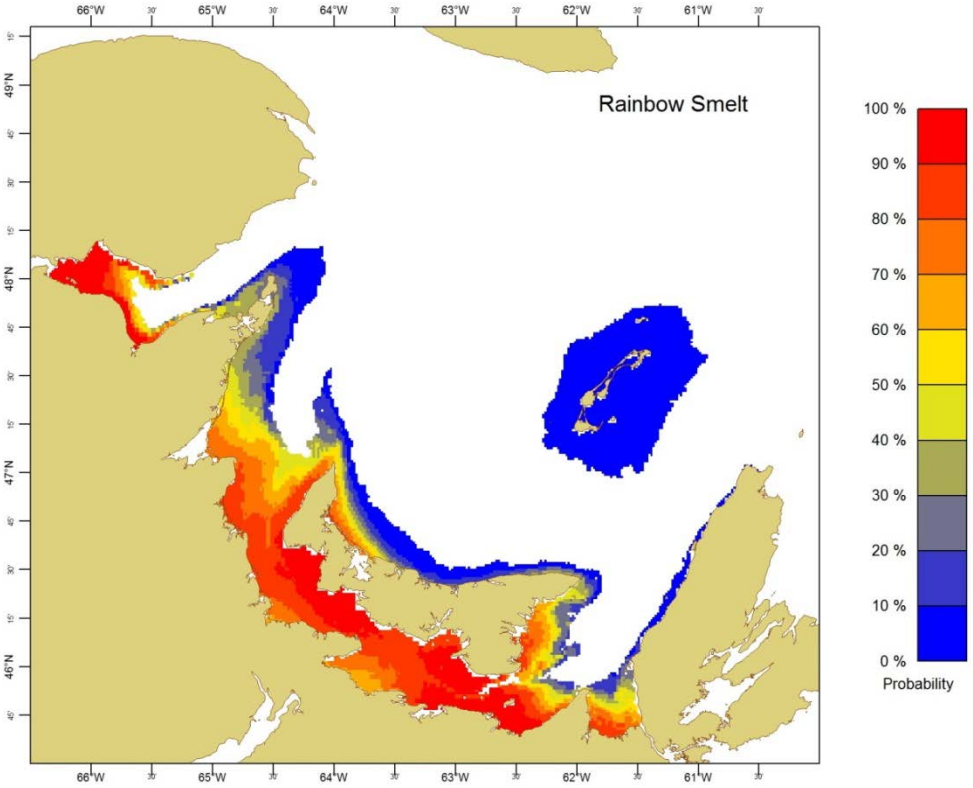


Figure 16. Contour map showing the predicted probabilities of capturing rainbow smelt (Osmerus mordax) during a standard tow, using a Western IIA bottom trawl.

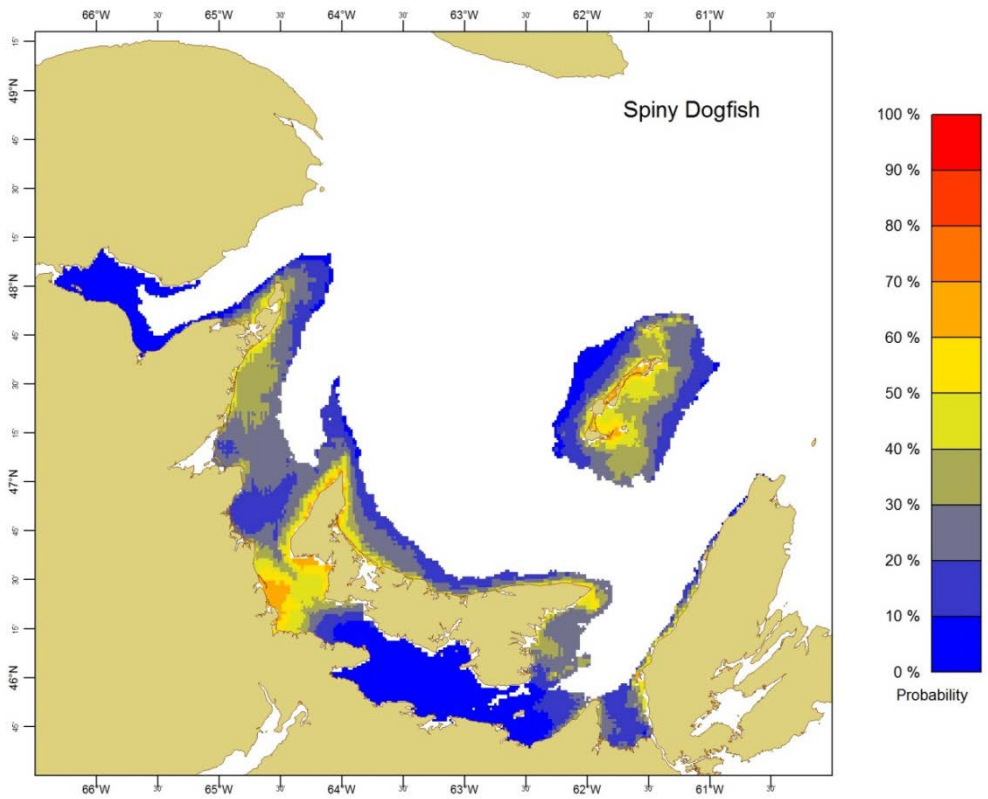


Figure 17. Contour map showing the predicted probabilities of capturing spiny dogfish (Squalus acanthias) during a standard tow, using a Western IIA bottom trawl.

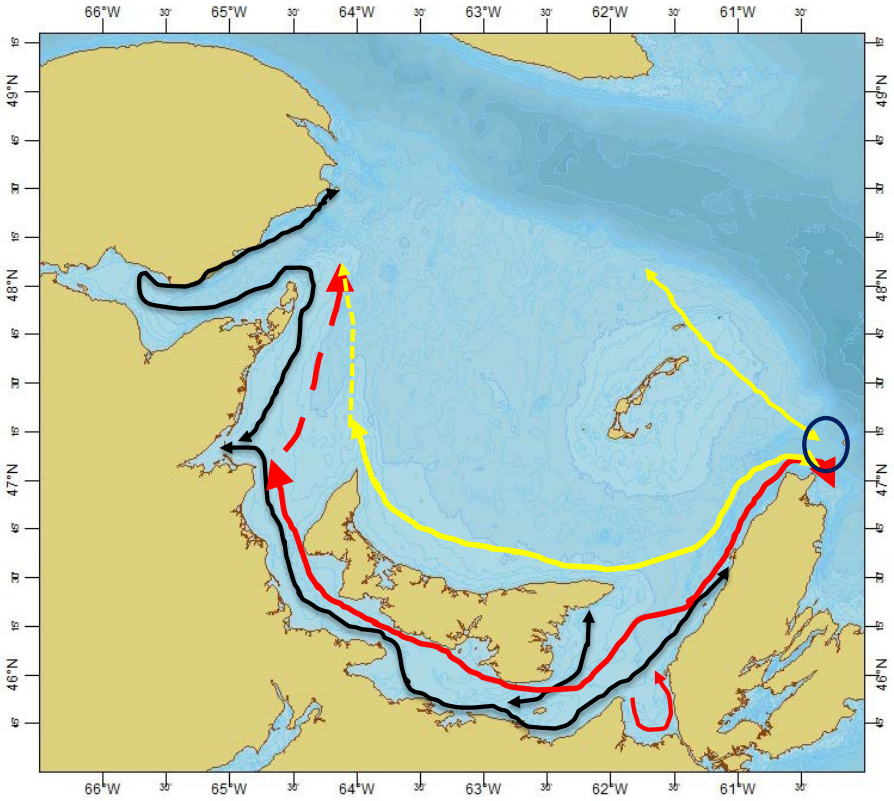


Figure 18. Major migration corridors for striped bass (black) and long distance migrants (red and yellow) with the most important route for anadromous species shown in red. The choke point through which most species presumably pass to exit the Gulf of St. Lawrence (southern route) is indicated by a dark blue circle between the tip of Cape Breton and St. Paul Island. NB. Striped bass migrate very close to shore, usually within several hundred meters, but this could not be shown to scale.

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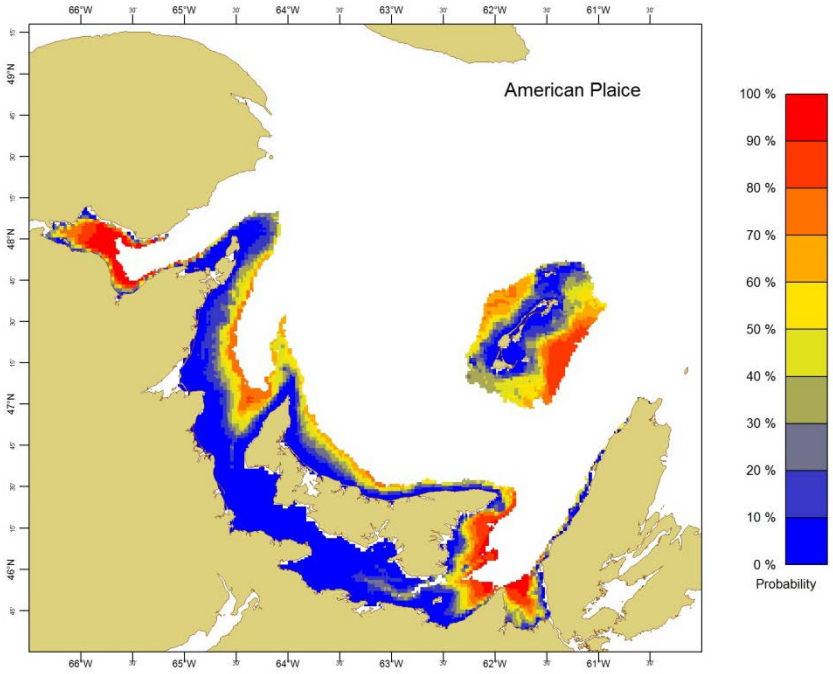
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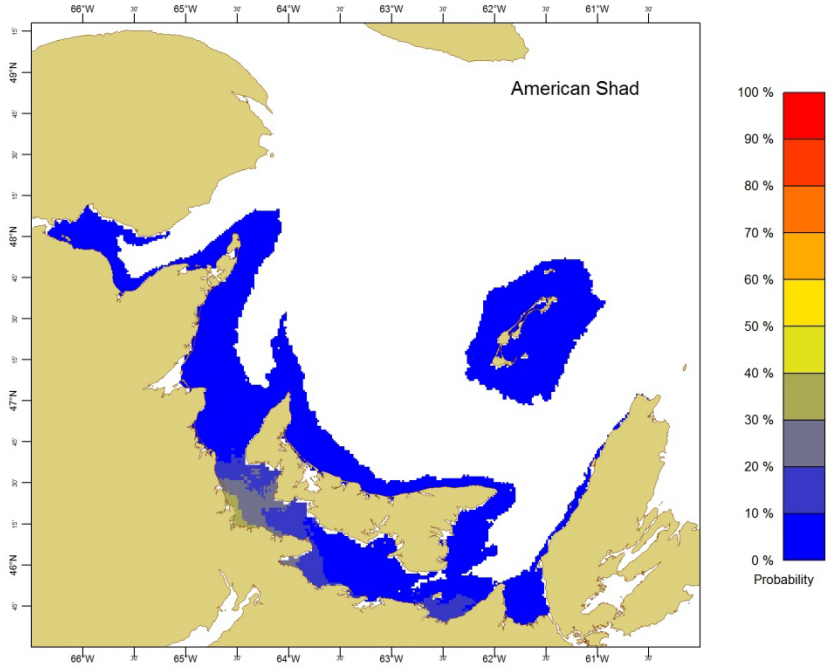
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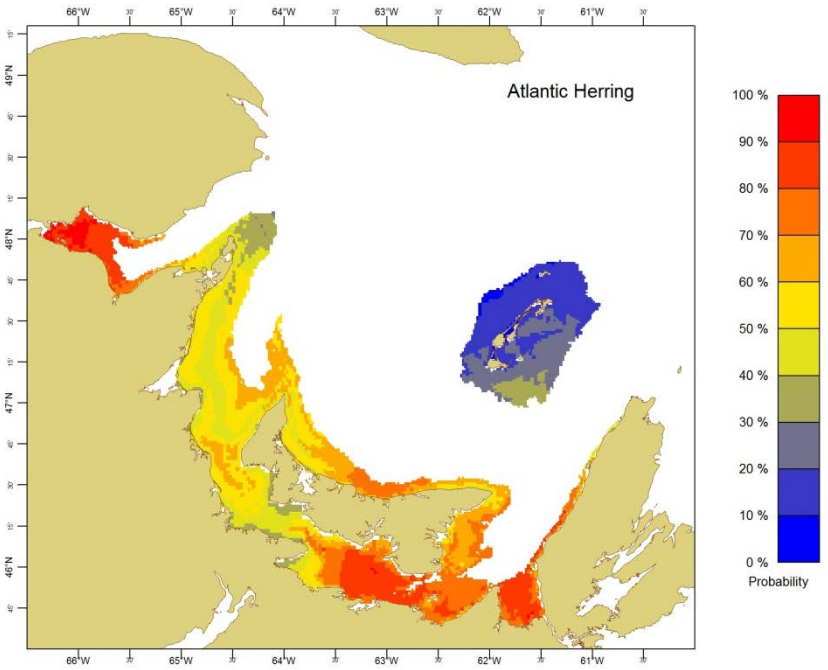
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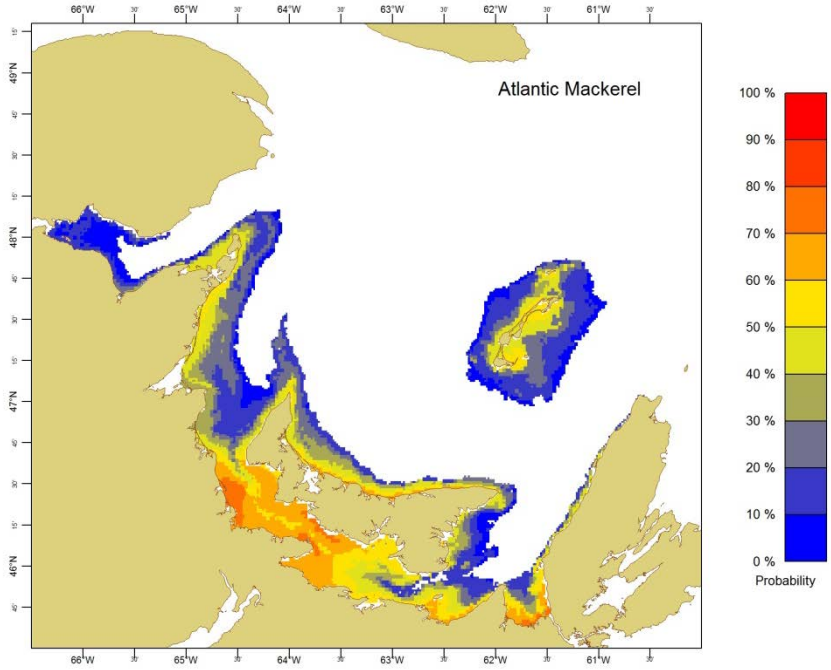
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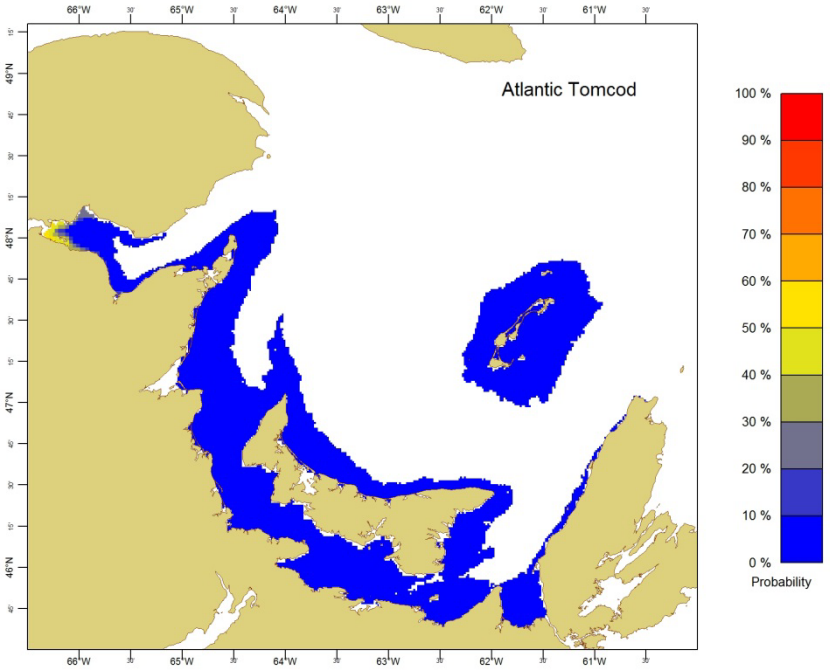
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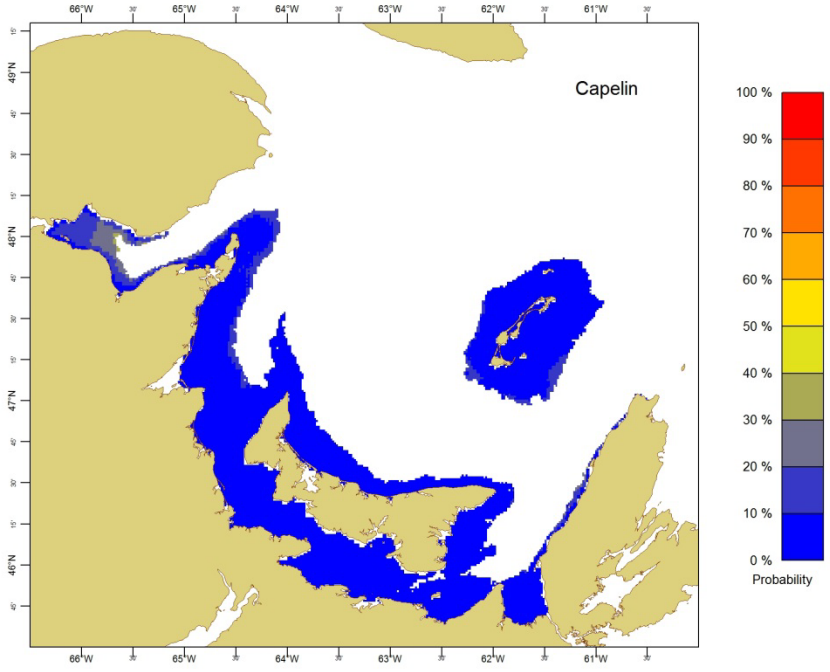
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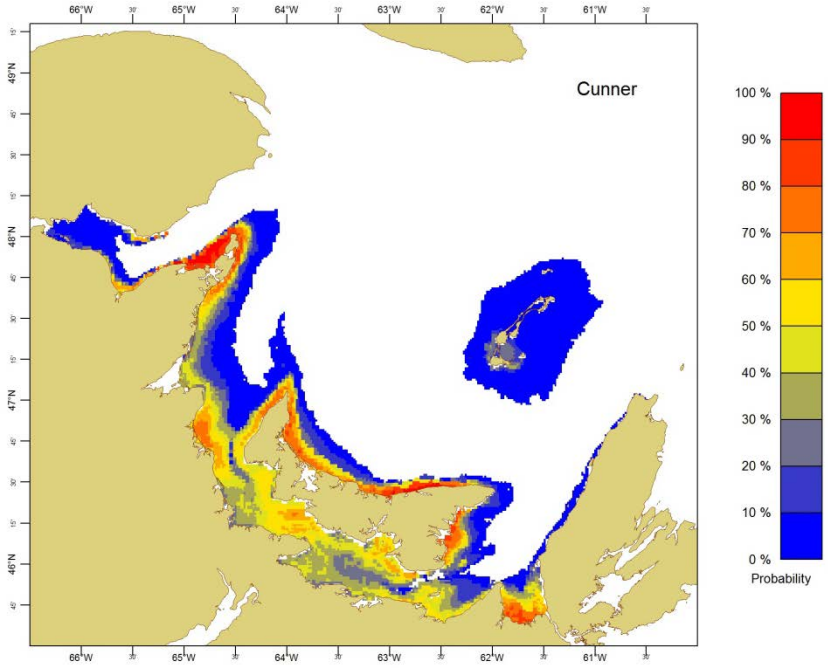
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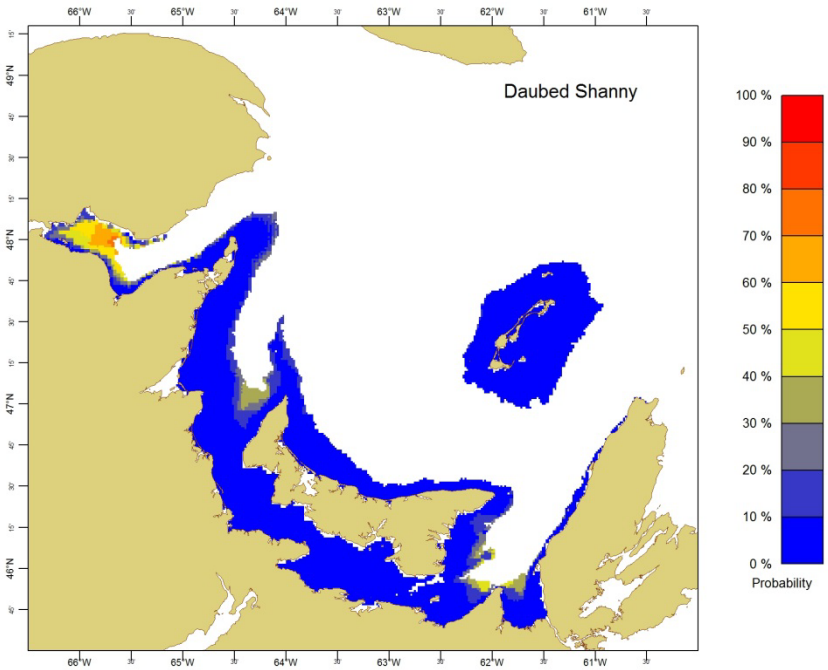
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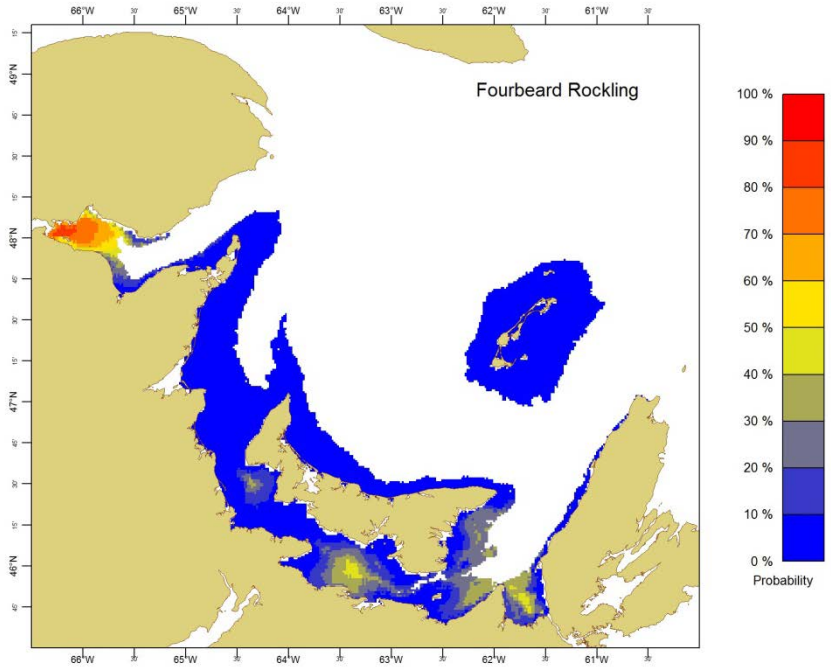
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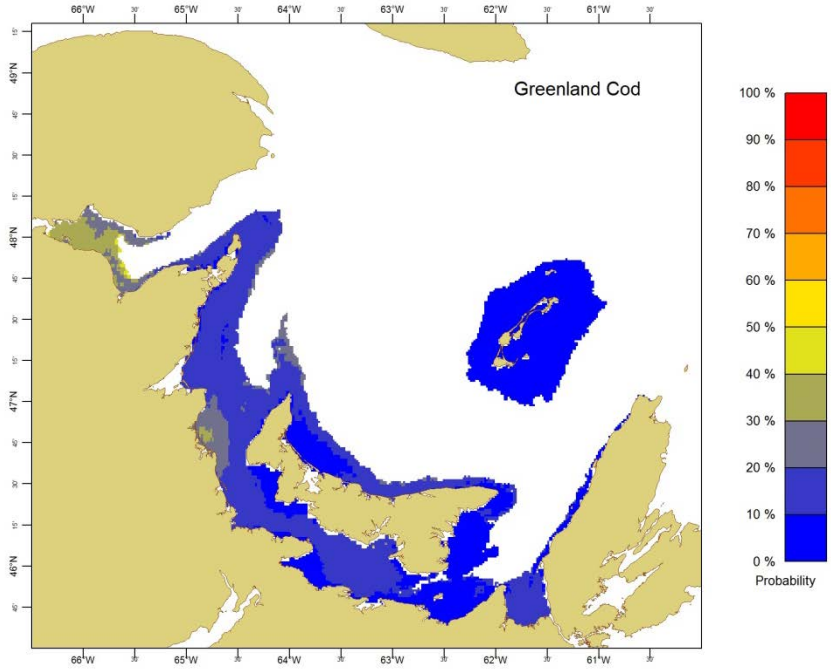
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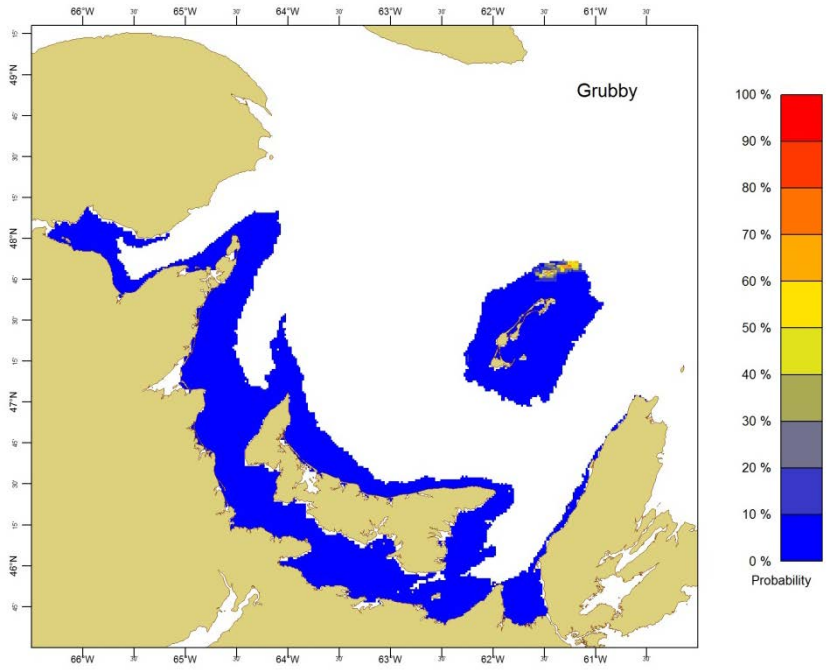
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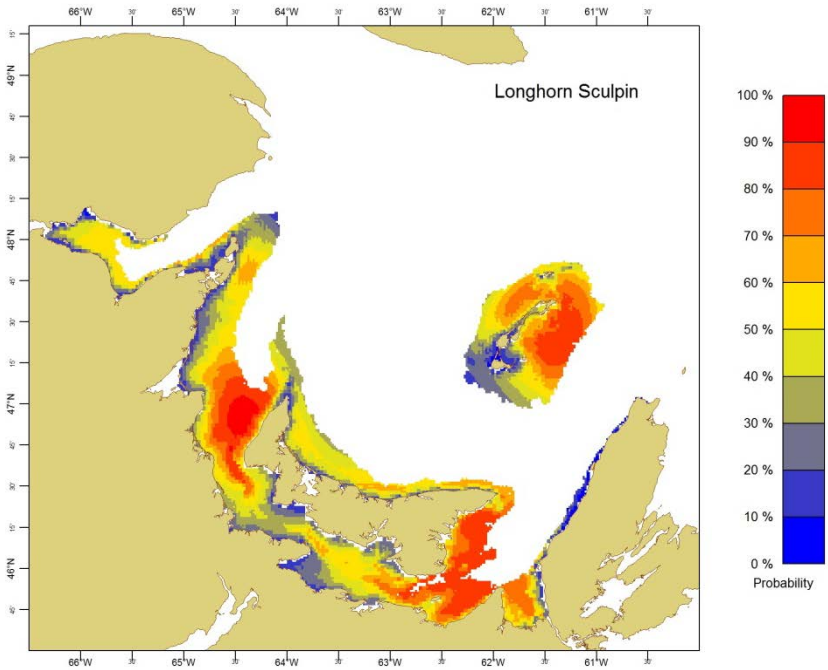
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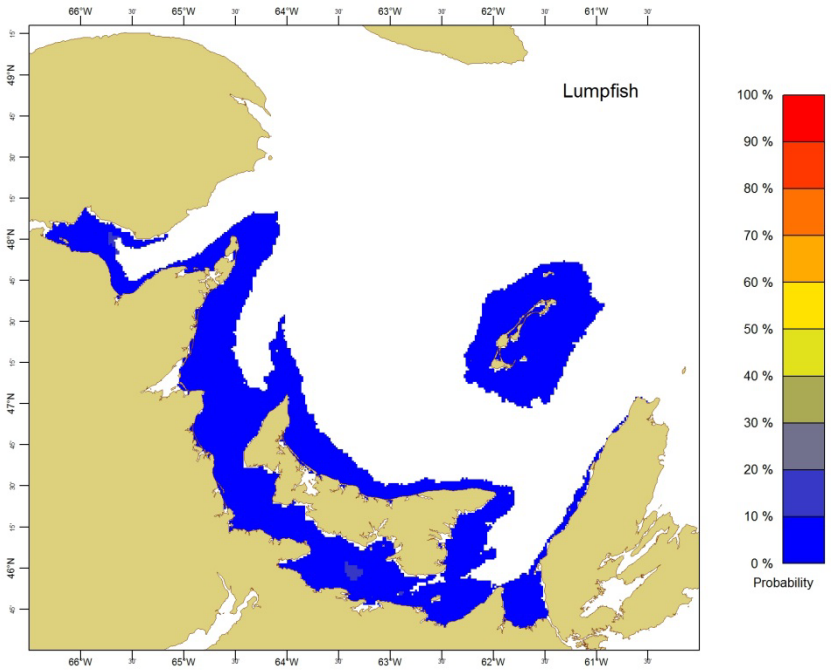
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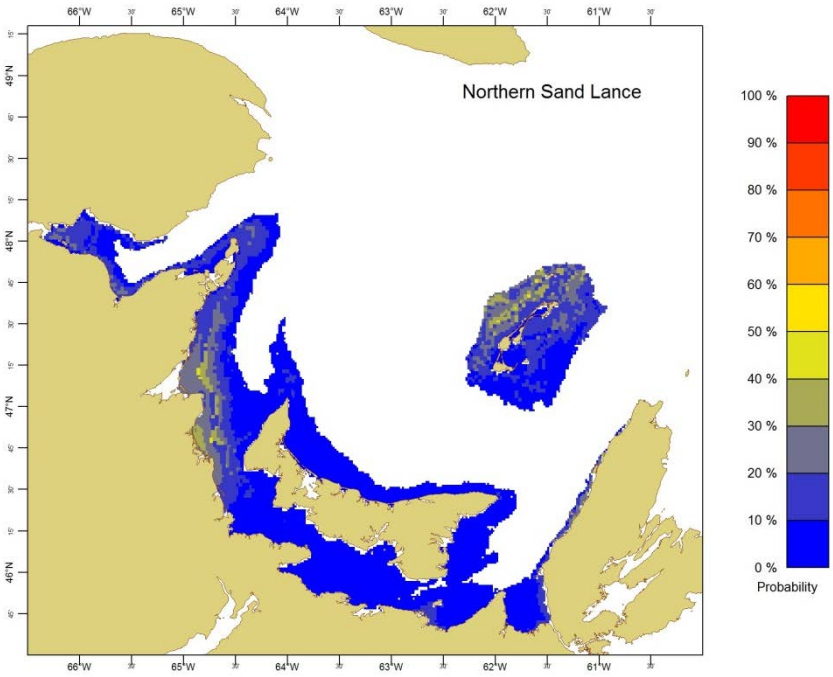
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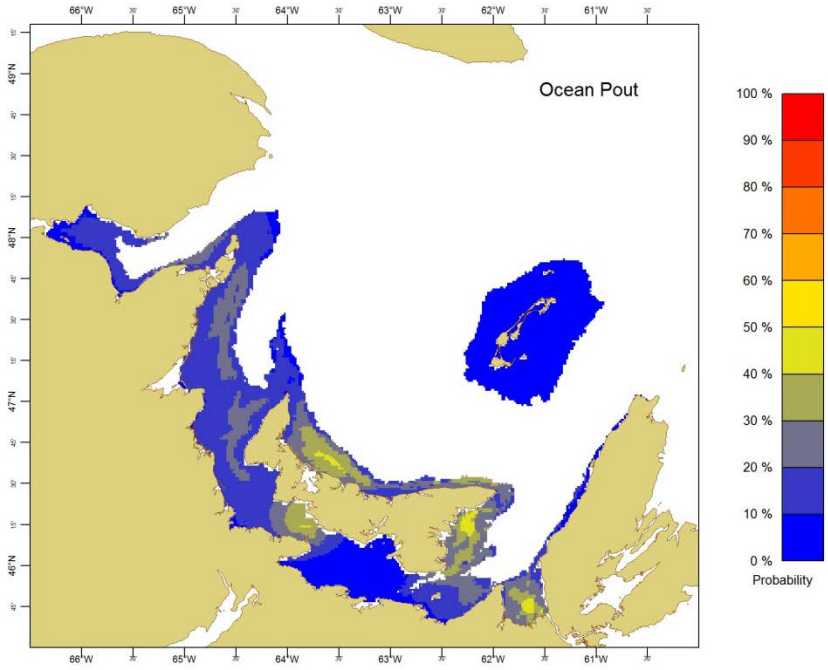
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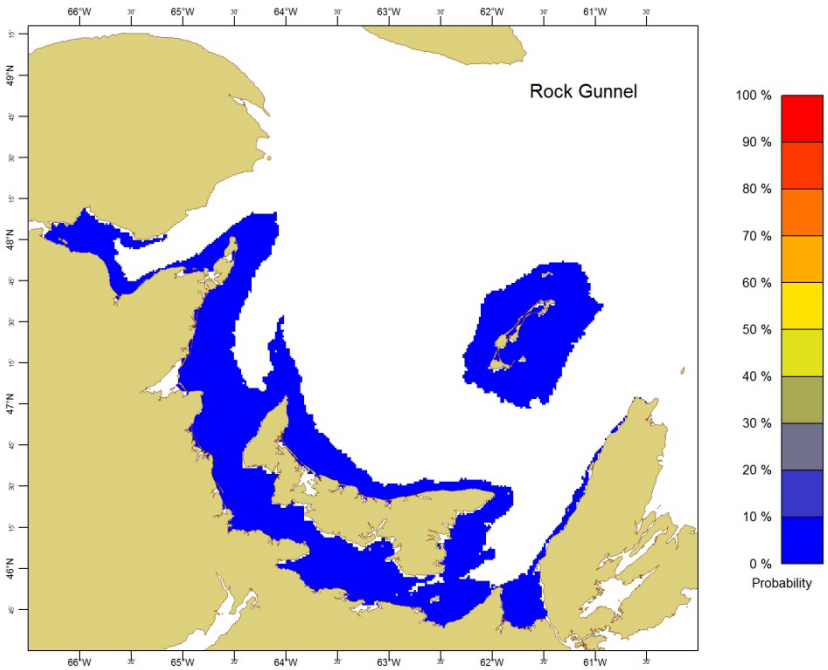
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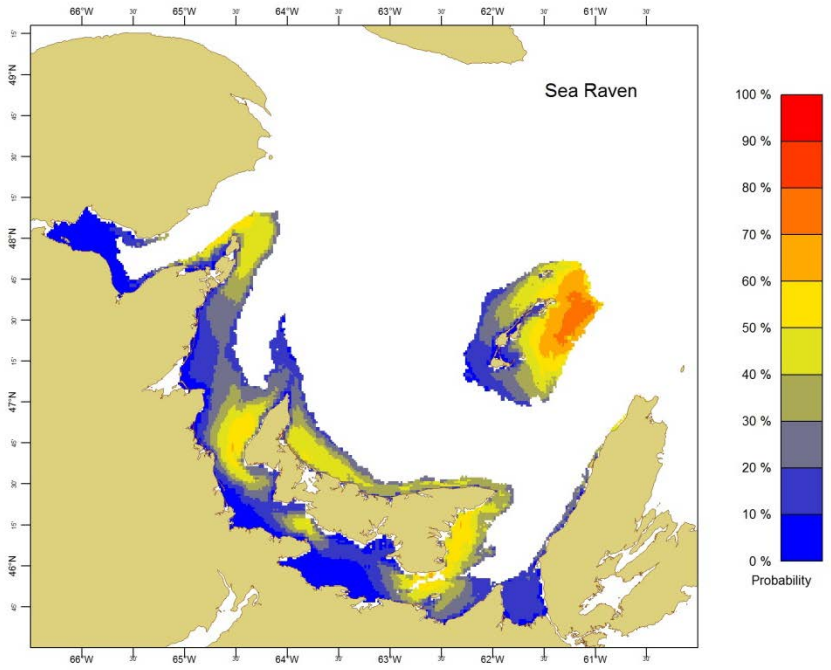
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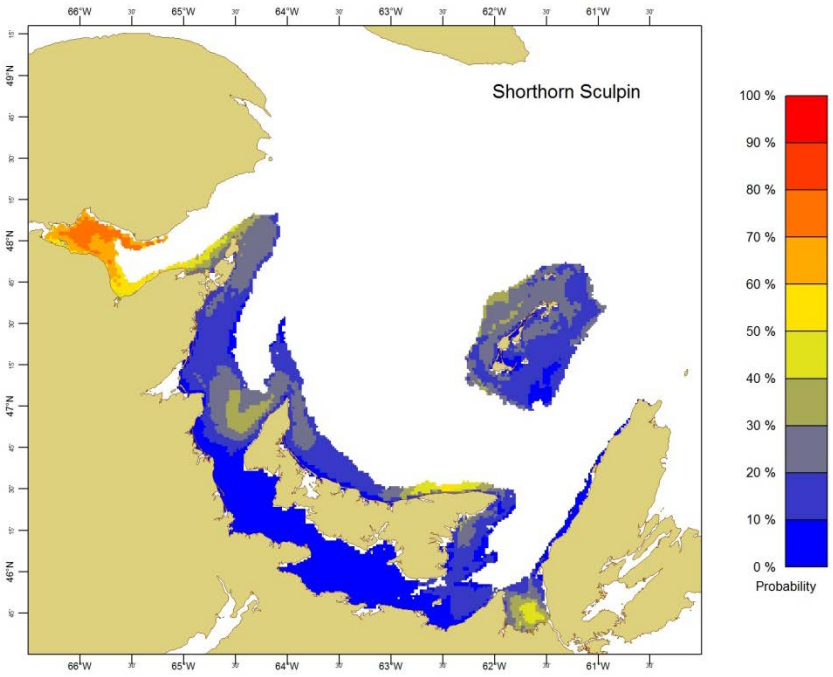
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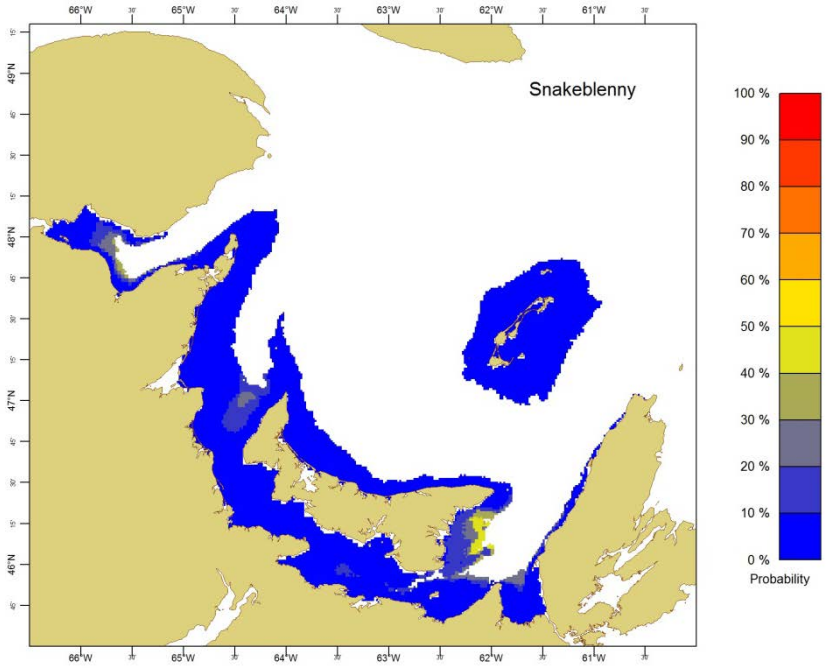
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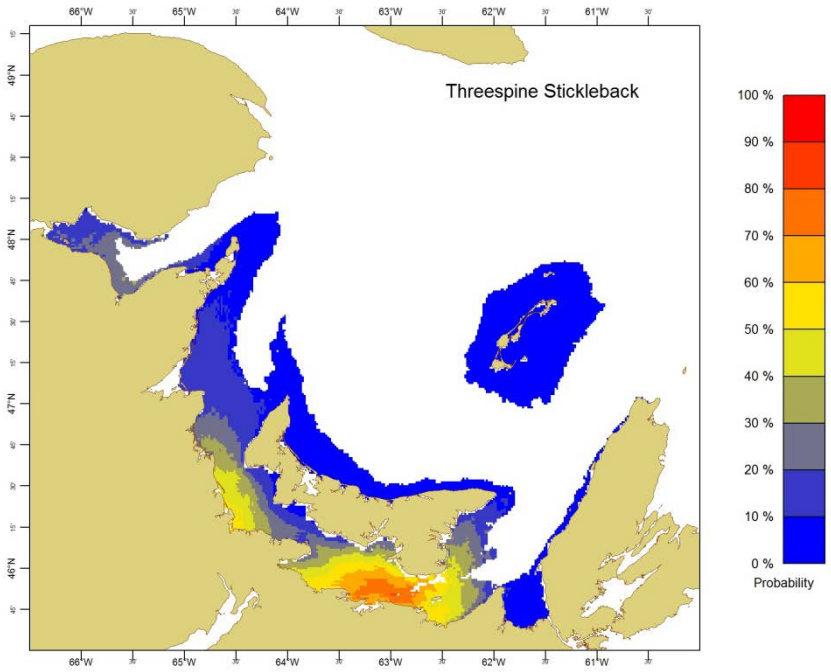
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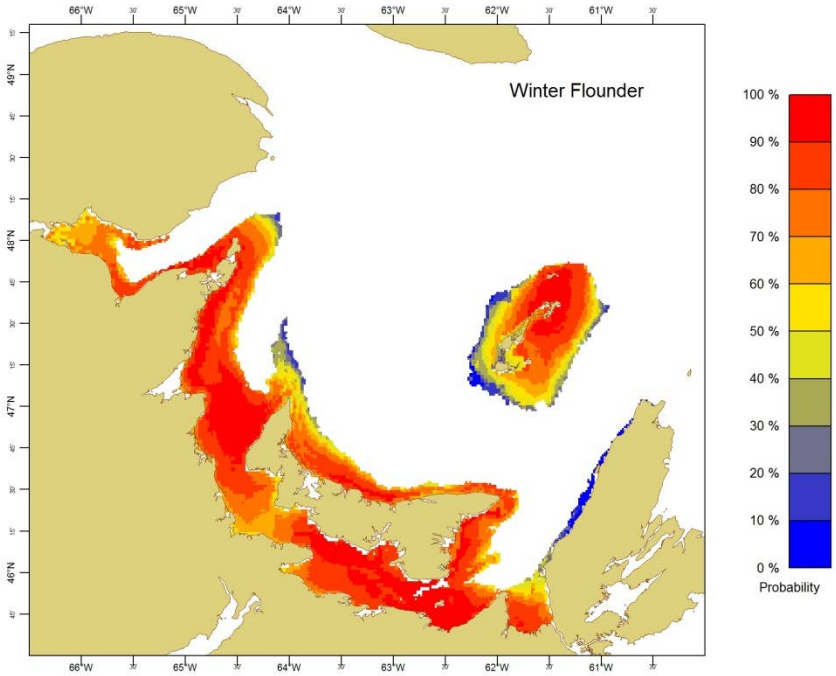
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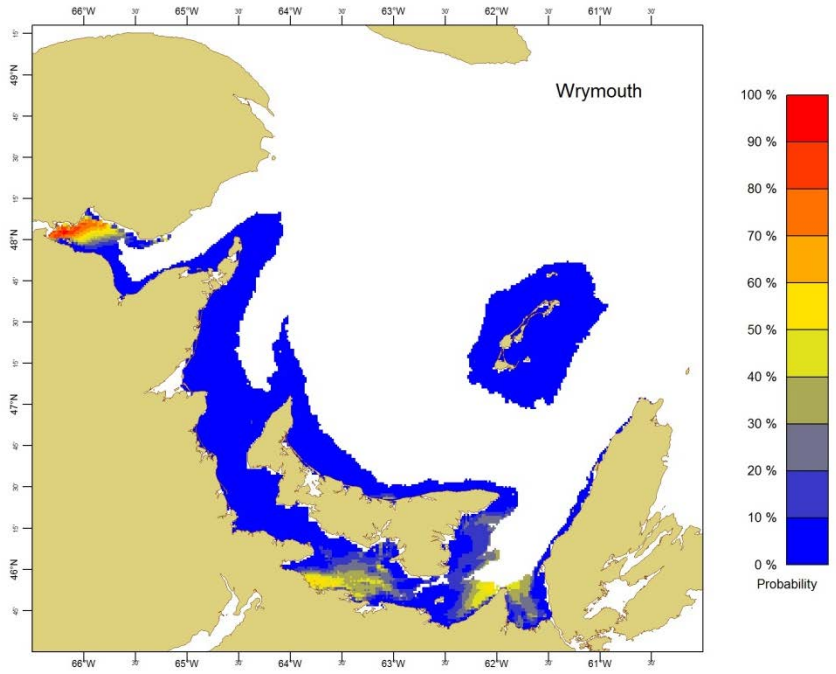
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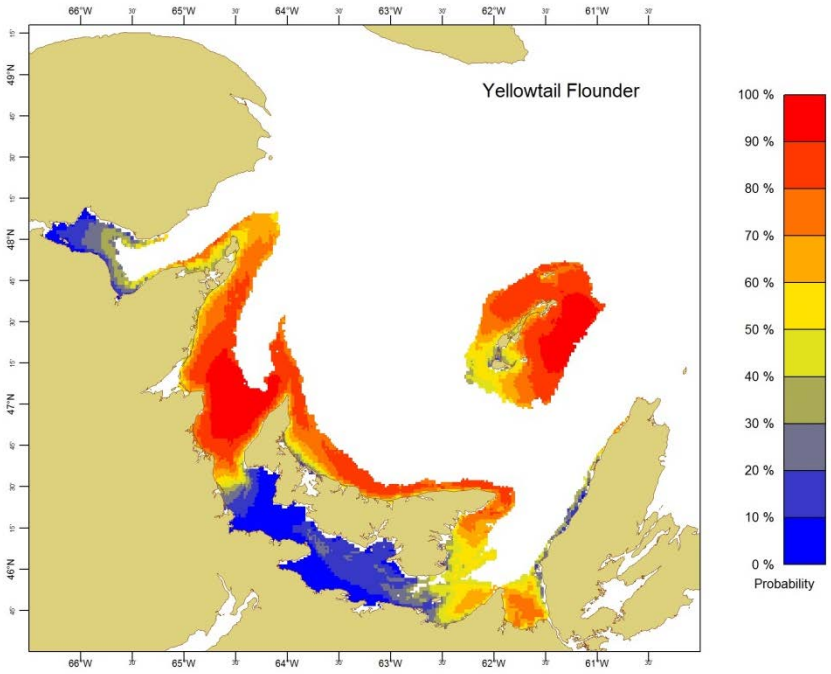
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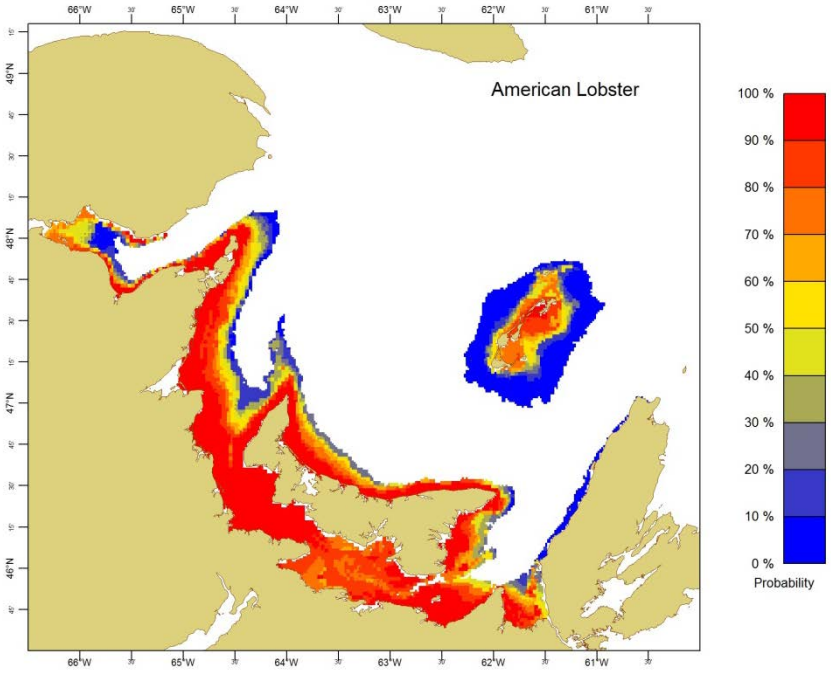
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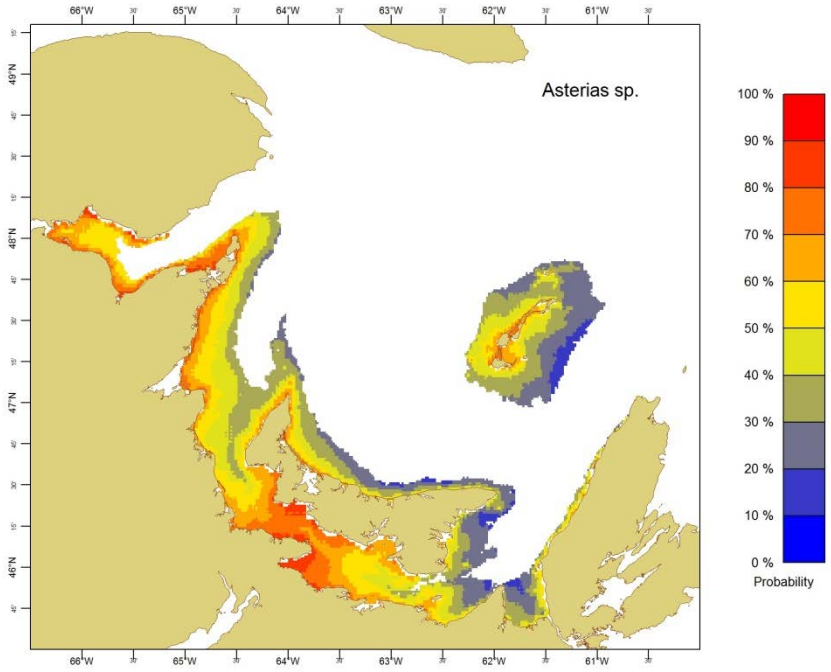
Map 22. Contour map showing the predicted probabilities of capturing wrymouth (Cryptacanthodes maculatus) during a standard tow, using a Western IIA bottom trawl.



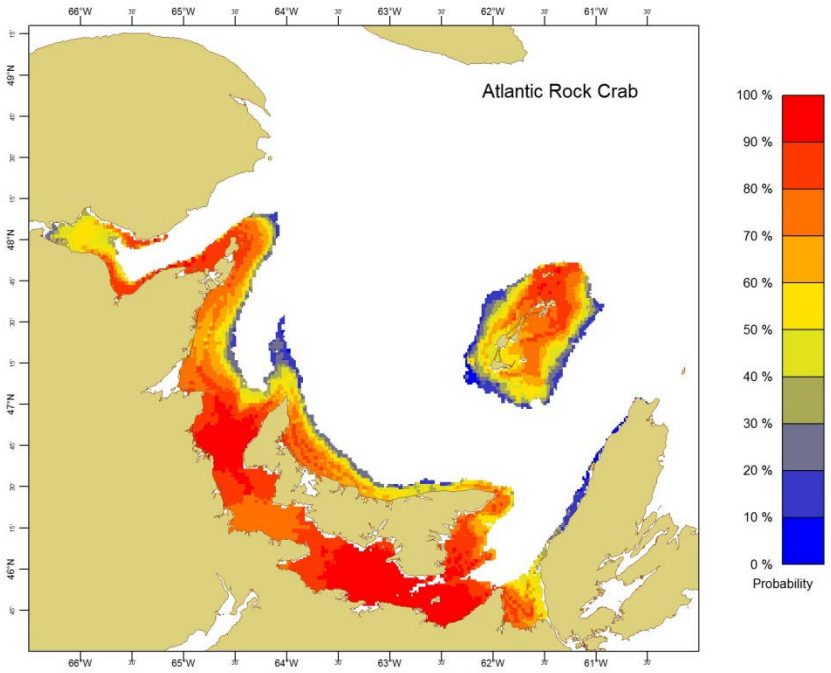
Map 23. Contour map showing the predicted probabilities of capturing yellowtail flounder (Limanda ferruginea) during a standard tow, using a Western IIA bottom trawl.



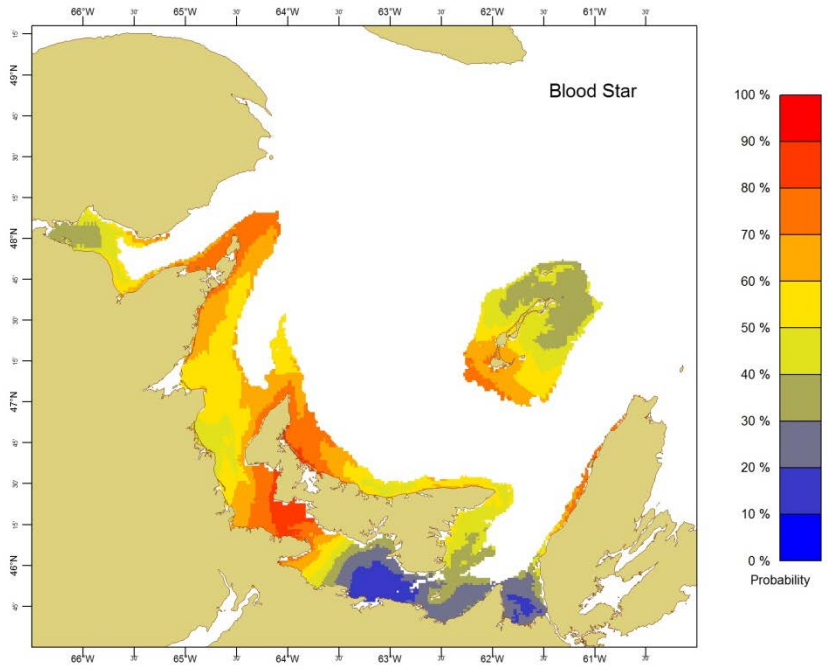
Map 24. Contour map showing the predicted probabilities of capturing American lobster (Homarus americanus) during a standard tow, using a Western IIA bottom trawl.



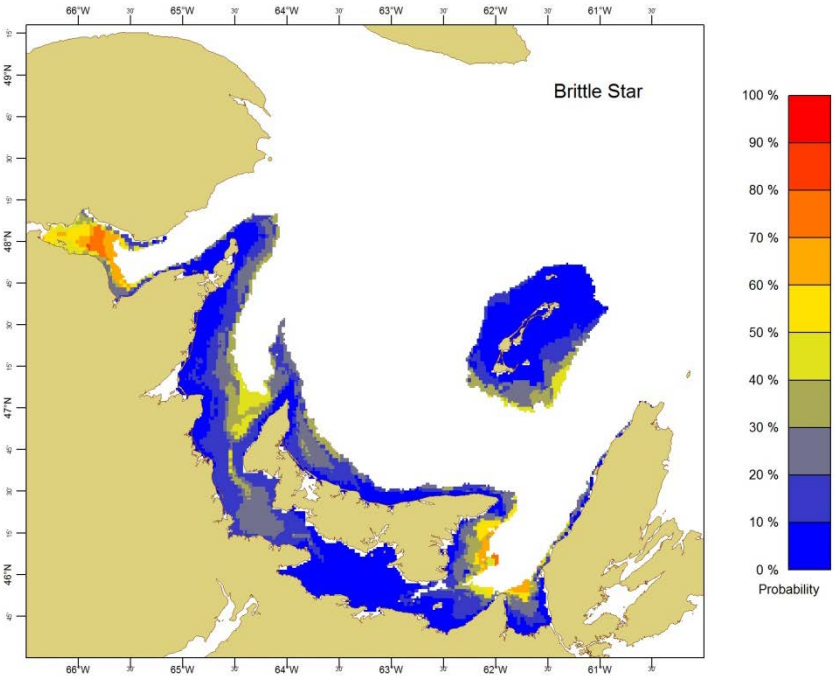
Map 25. Contour map showing the predicted probabilities of capturing asterias (Asterias sp.) during a standard tow, using a Western IIA bottom trawl.



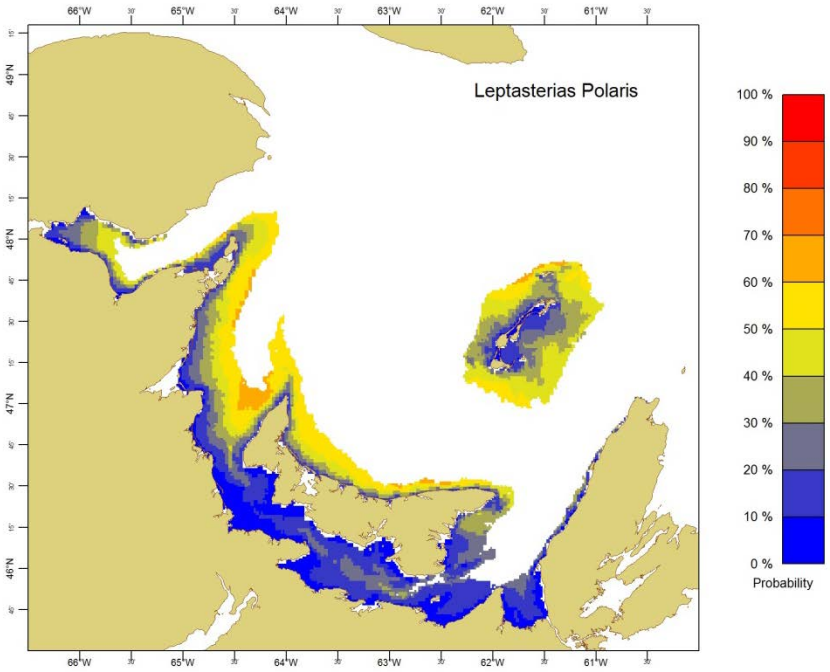
Map 26. Contour map showing the predicted probabilities of capturing Atlantic rock crab (Cancer irroratus) during a standard tow, using a Western IIA bottom trawl.



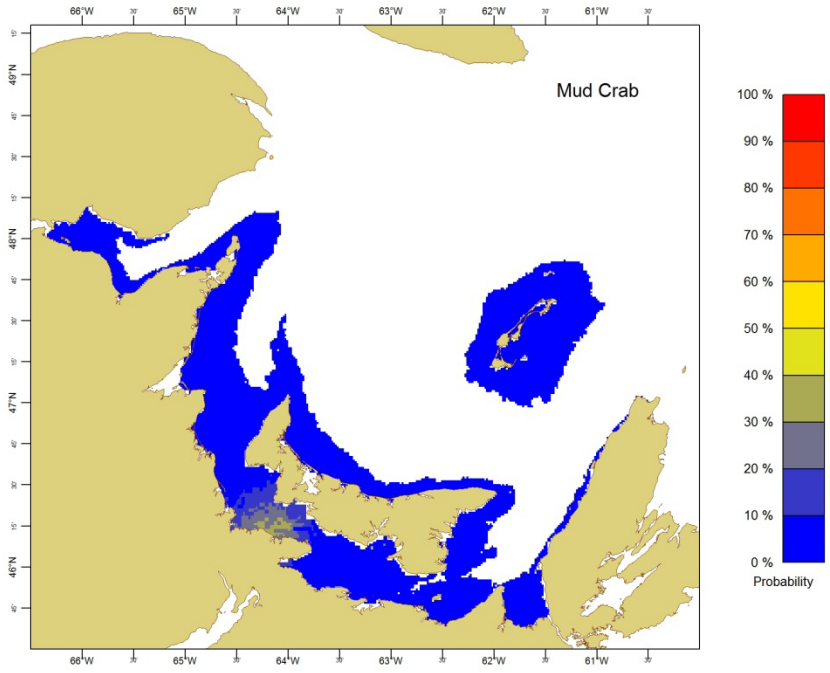
Map 27. Contour map showing the predicted probabilities of capturing blood star (Henricia sp.) during a standard tow, using a Western IIA bottom trawl.



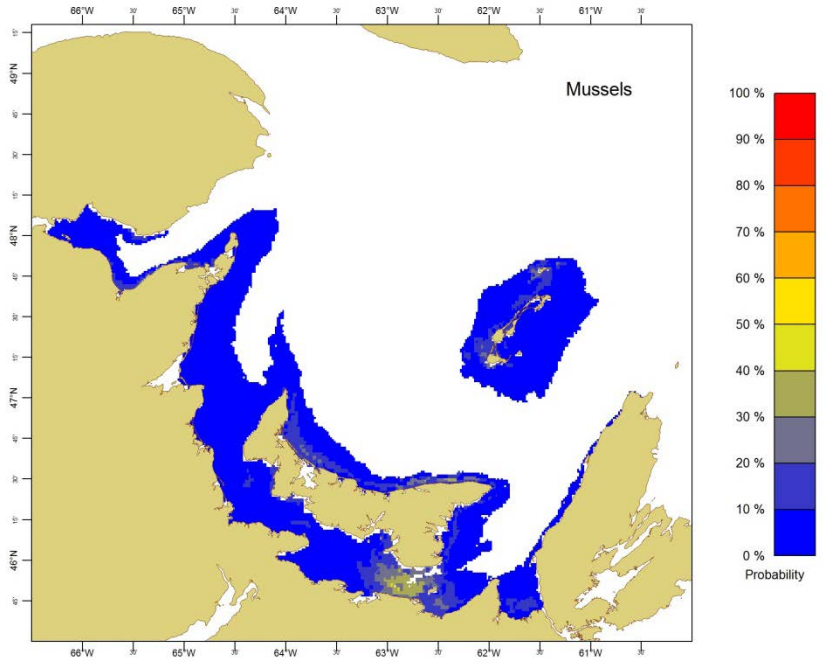
Map 28. Contour map showing the predicted probabilities of capturing brittle star (Ophiuroidea) during a standard tow, using a Western IIA bottom trawl.



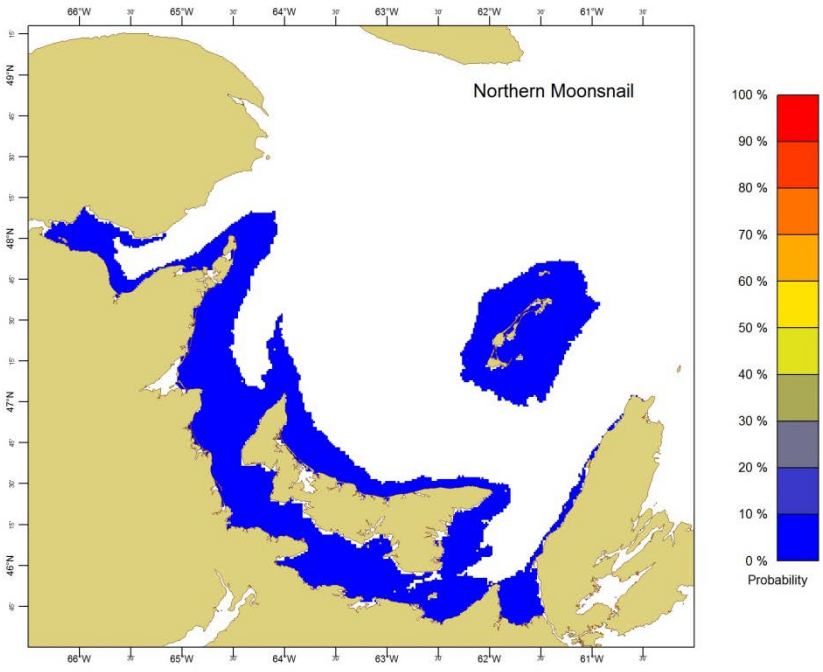
Map 29. Contour map showing the predicted probabilities of capturing polar sea star (Leptasterias polaris) during a standard tow, using a Western IIA bottom trawl.



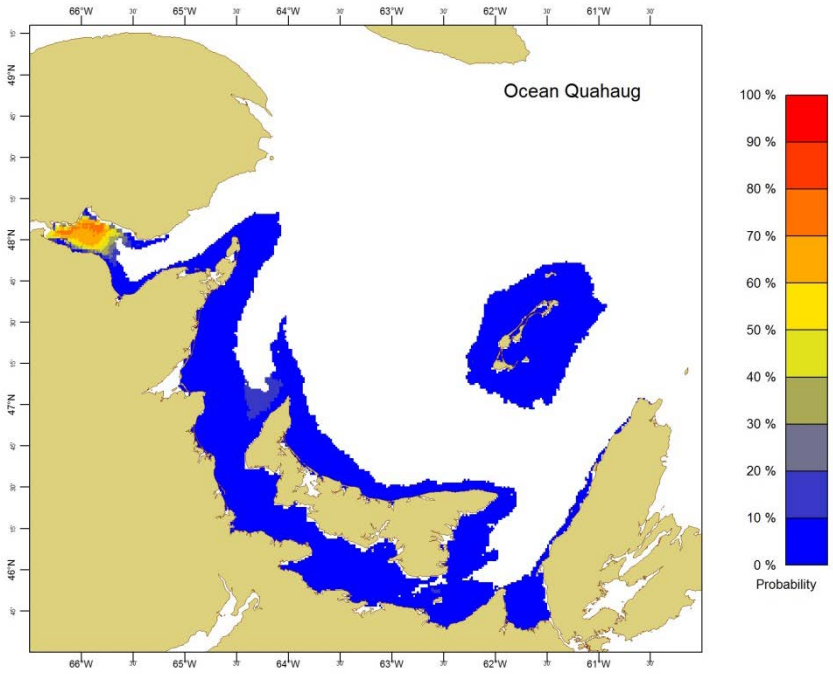
Map 30. Contour map showing the predicted probabilities of capturing mud crab (Dyspanopeus sayi) during a standard tow, using a Nephrops *trawl.*



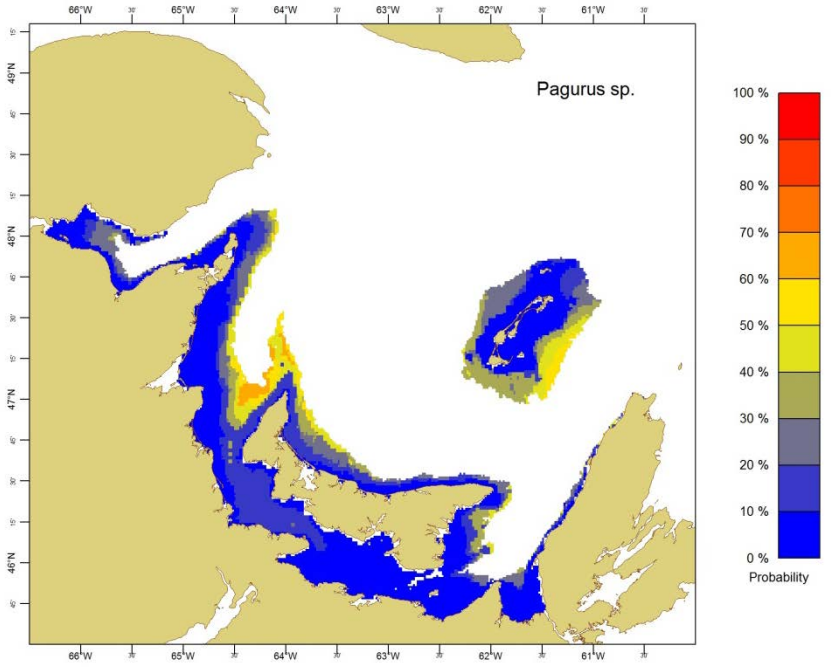
Map 31. Contour map showing the predicted probabilities of capturing mussels (includes Mytilus edulis, Musculus niger and Modiolus modiolus) during a standard tow, using a Western IIA bottom trawl.



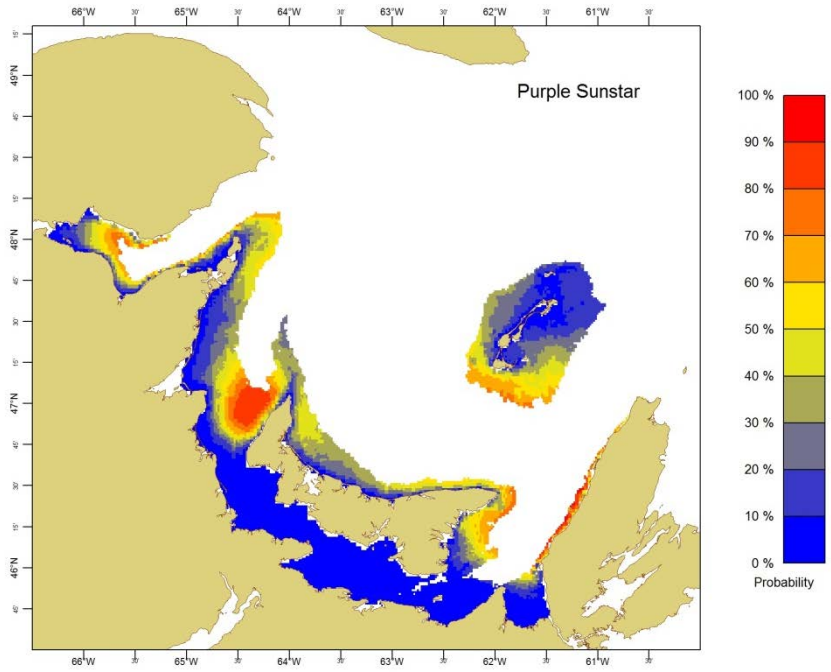
Map 32. Contour map showing the predicted probabilities of capturing northern moonsnail (Euspira eros) during a standard tow, using a Western IIA bottom trawl.



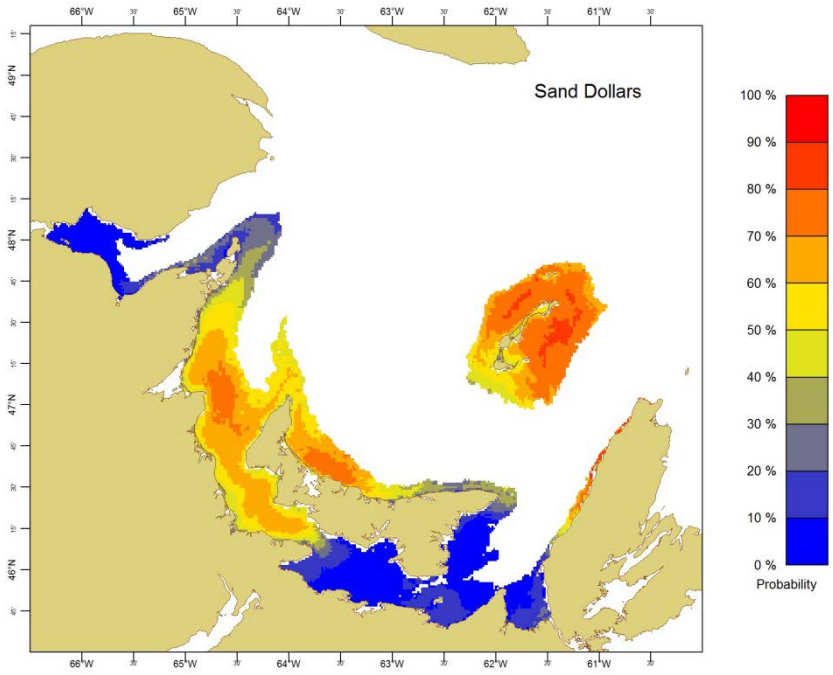
Map 33. Contour map showing the predicted probabilities of capturing ocean quahaug (Arctica islandica) during a standard tow, using a Western IIA bottom trawl.



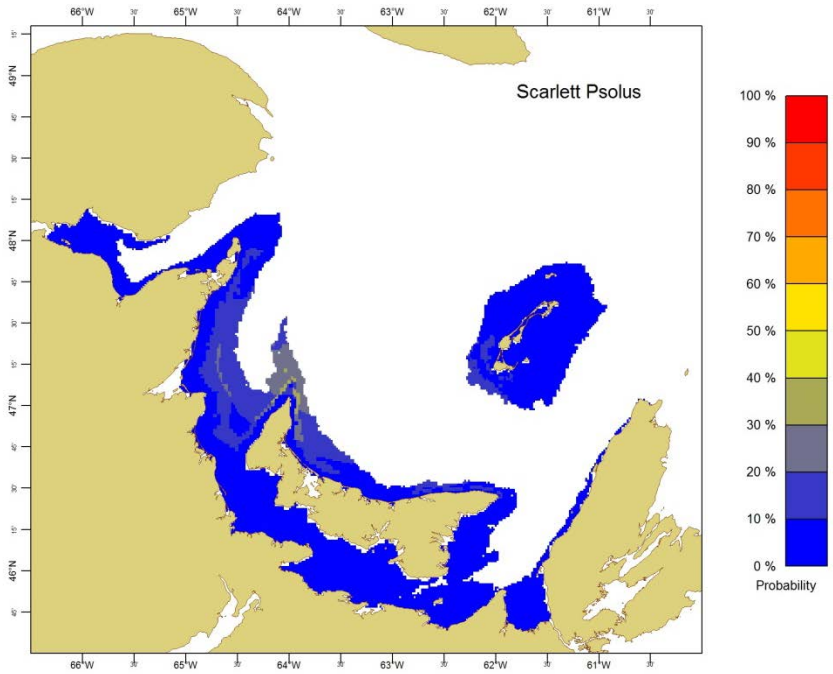
Map 34. Contour map showing the predicted probabilities of capturing hermit crab (Pagurus sp.) during a standard tow, using a Western IIA bottom trawl.



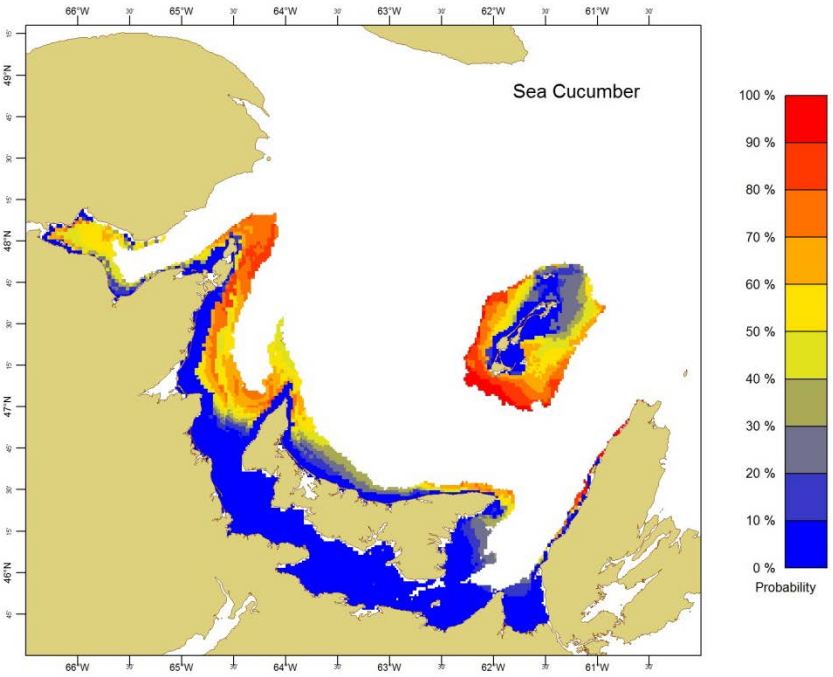
Map 35. Contour map showing the predicted probabilities of capturing purple sunstar (Solaster endeca) during a standard tow, using a Western IIA bottom trawl.



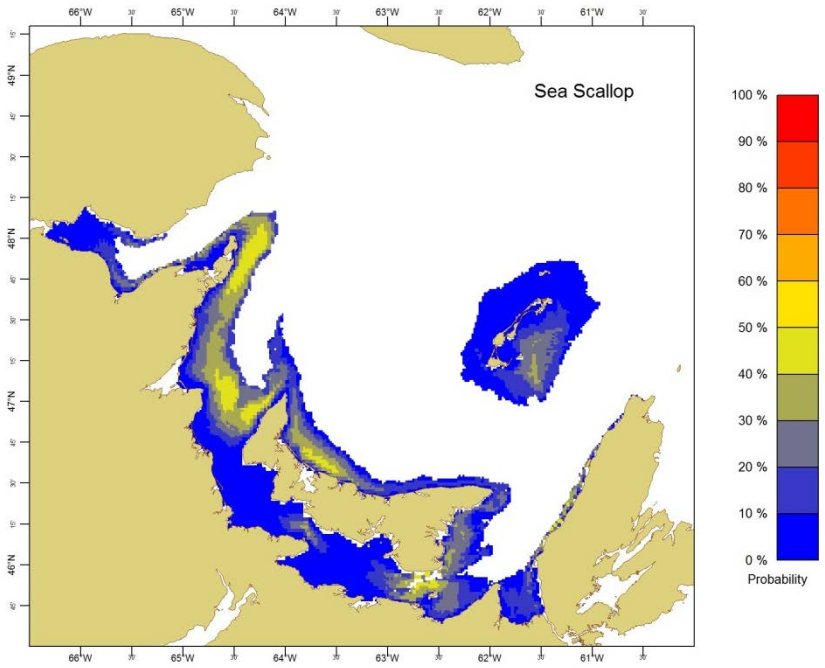
Map 36. Contour map showing the predicted probabilities of capturing sand dollars (Echinarachnius parma) during a standard tow, using a Western IIA bottom trawl.



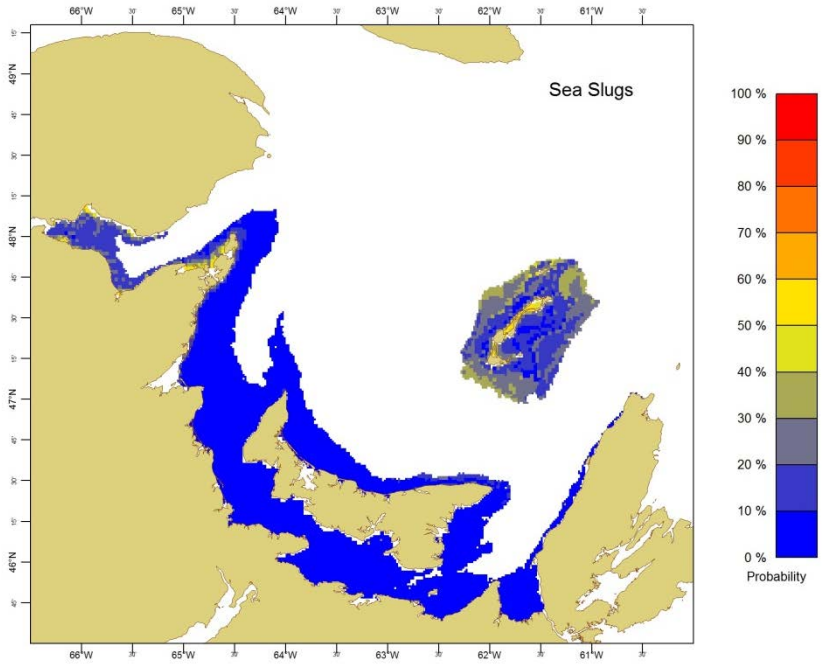
Map 37. Contour map showing the predicted probabilities of capturing scarlet psolus (Psolus fabricii) during a standard tow, using a Western IIA bottom trawl.



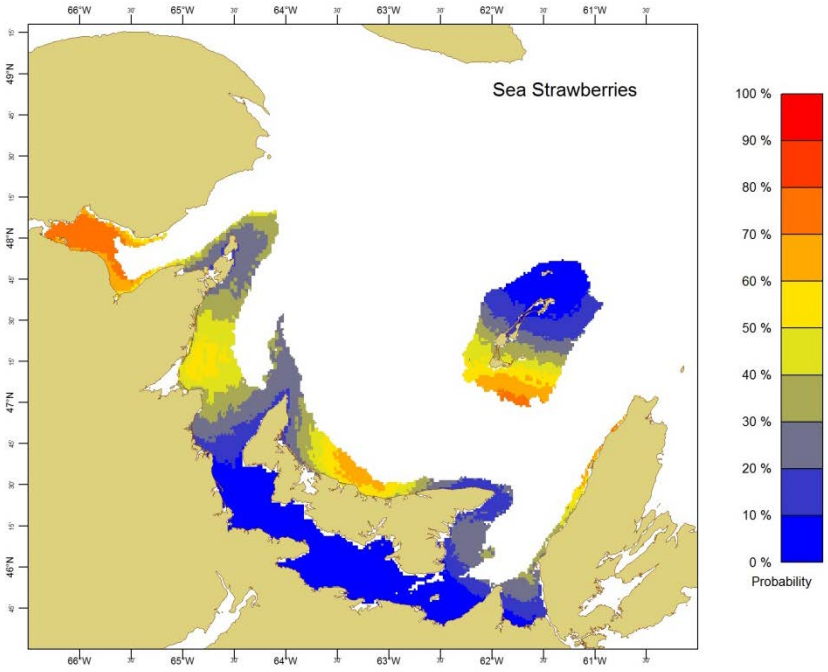
Map 38. Contour map showing the predicted probabilities of capturing sea cucumber (Cucumaria frondosa) during a standard tow, using a Western IIA bottom trawl.



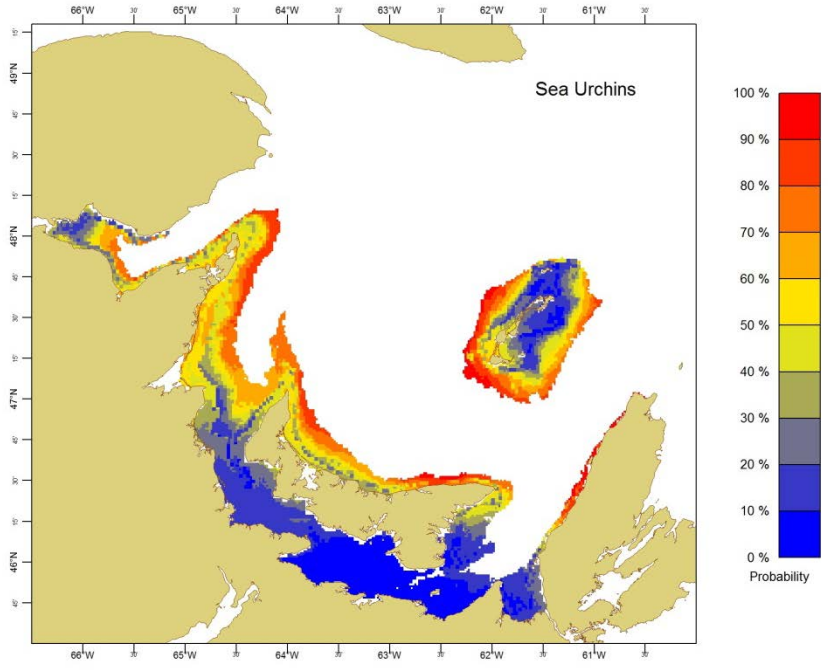
Map 39. Contour map showing the predicted probabilities of capturing sea scallop (Placopecten magellanicus) during a standard tow, using a Western IIA bottom trawl.



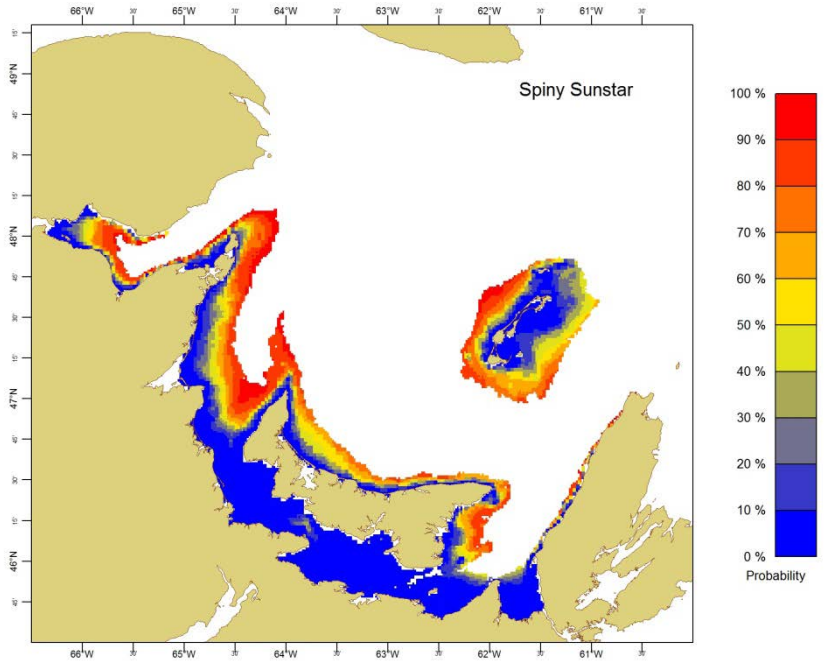
Map 40. Contour map showing the predicted probabilities of capturing sea slugs (Nudibranchia) during a standard tow, using a Western IIA bottom trawl.



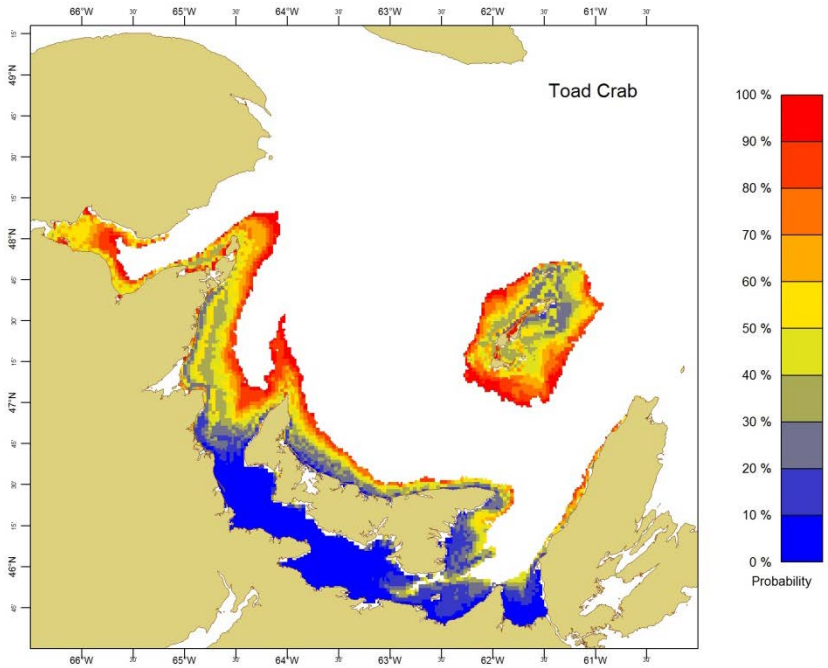
Map 41. Contour map showing the predicted probabilities of capturing sea strawberries (Gersemia sp.) during a standard tow, using a Western IIA bottom trawl.



Map 42. Contour map showing the predicted probabilities of capturing sea urchins (Strongylocentrotus sp.) during a standard tow, using a Western IIA bottom trawl.



Map 43. Contour map showing the predicted probabilities of capturing spriny sunstar (Crossaster papposus) during a standard tow, using a Western IIA bottom trawl.



Map 44. Contour map showing the predicted probabilities of capturing toad crab (Hyas sp.) during a standard tow, using a Western IIA bottom trawl.

Appendix 2. Summary of the available distribution and major habitat information[1] for the fish community (plus lady crab) found in the ≤40 m depth (coastal and upper part of the transition zone) within the southern Gulf of St. Lawrence (sGSL).

Species (reference)[1]	Guild	Portion used	Presence/ Area used
American eel (COSEWIC 2012a; DFO 2013a)	Catadromous Long-distance migrant Adults leave sGSL to breed	Both juveniles and adults transit through the study area on their migrations between oceanic spawning grounds and continental growth areas. Juveniles feed during these migrations but adults do not.	Just passing through Absent around Magdalen Islands
Atlantic salmon (COSEWIC 2010c)	Anadromous Long-distance migrant Juveniles and adults leave sGSL to feed	Pelagic Brief feeding while in transit	Just passing through
Alewife / blueback herring (Bosman et al. 2011; Cairns 1997; Darbyson and Benoît 2003; Hanson and Courtenay 1995; McQuinn et al. 2012)	Anadromous Long-distance migrant Feeding/nursery Leaves sGSL for winter	Shallow warm waters	High concentration in Northumberland Strait Absent around Magdalen Islands Leaves sGSL for winter
American shad (Bosman et al. 2011; Cairns 1997; Chaput and Bradford 2003; Hanson and Courtenay 1995; McQuinn et al. 2012)	Anadromous Long-distance migrant Feeding/nursery	Shallow warm waters	Mainly in East NB and Northumberland Strait Absent around Magdalen Islands Leaves sGSL for winter
Striped bass (Cairns 1997; COSEWIC 2012b; DFO 2014a; Douglas et al. 2009; Robinson et al. 2004)	Anadromous Resident Feeding/nursery.	Very shallow, close to shore	Absent around Magdalen Islands and north of PEI
Threespine stickleback (Bosman et al. 2011; Cairns 1997; Hanson and Courtenay 1995)	Anadromous Resident Feeding/nursery	Very shallow, close to shore	Probably ubiquitous
Atlantic tomcod (Bosman et al. 2011; Cairns 1997; Hanson and Courtenay 1995)	Anadromous Resident Feeding/nursery	Very shallow, close to shore	Absent around Magdalen Islands
Rainbow smelt (Bosman et al. 2011; Cairns 1997; Hanson and Courtenay 1995; LeBlanc et al. 1998; McQuinn et al. 2012)	Anadromous Resident Feeding/nursery	Shallow warm waters	Absent around Magdalen Islands

Species (reference)[1]	Guild	Portion used	Presence/ Area used
Butterfish (McQuinn et al. 2012)	Transient marine species Feeding only	Very shallow and estuaries Pelagic	Mainly around PEI Absent around Magdalen Islands and in Chaleur Bay Leaves sGSL for winter
Atlantic saury (Chaput and Hurlbut 2010; DFO 2010)	Transient marine species Feeding only	Poorly sampled Pelagic	Only in St. George's Bay Leaves sGSL for winter
Spiny dogfish (COSEWIC 2010b)	Transient marine species Feeding only Periodic outbursts	Shallow warm waters Semi-pelagic	Rare in Chaleur Bay Leaves sGSL for winter
Bluefin tuna (COSEWIC 2011; Vanderlaan et al. 2014)	Transient marine species Feeding only	Warm waters Pelagic	Not in Chaleur Bay Leaves sGSL for winter
Atlantic mackerel (DFO 2014b; McQuinn et al. 2012)	Marine resident Long-distance migrant	Warm waters Pelagic	Ubiquitous Leaves sGSL for winter
Juvenile white hake (Bradford et al. 1997; COSEWIC 2013; Hanson and Courtenay 1995; Swain et al. 2012)	Marine resident Winter migration to deeper waters Unique autumn feeding migration into estuaries Possible endemic	Warm waters	Currently, "high" juvenile numbers in St. George's Bay, Northumberland Strait, and east of PEI
White hake (COSEWIC 2013; Hanson and Courtenay 1995; Swain et al. 2012)	Marine resident Winter migration to deeper waters Possible endemic	Warm waters	Formerly ubiquitous. Only spawning site is in St. George's Bay
Winter skate (Clay 1991; COSEWIC 2005; Kelly and Hanson 2013a, 2013b)	Marine resident Spreads to deeper waters for winter but some stay in ≤ 40 m depths Highly likely an endemic	Warm waters	Formerly ubiquitous Now almost exclusively in Northumberland Strait (the only known breeding area)
Lady crab (Voutier and Hanson 2008)	Marine resident No seasonal movement Highly likely an endemic	Warm waters – sand	Entire lifecycle in Northumberland Strait
Cunner (Bosman et al. 2011; Dew 1976; Green et al. 1984; Johansen 1925)	Marine resident No seasonal migration	Warm waters	Ubiquitous
Rock gunnel (Scott and Scott 1988)	Marine resident No seasonal migration	Warm waters, lives under rocks	Likely ubiquitous
Wrymouth (Scott and Scott 1988)	Marine resident No seasonal migration	Warm waters, lives in burrows (need mud)	Found in Chaleur Bay, Northumberland Strait, east of PEI and St. George's Bay
Greenland cod (Bosman et al. 2011; Hanson and Courtenay 1995)	Marine resident No clear seasonal migration	May occur at all depths	Ubiquitous but scarce; may spawn in estuaries during winter

Species (reference)[1]	Guild	Portion used	Presence/ Area used
Windowpane flounder (Hanson and Wilson 2014)	Marine resident Winter migration to deeper waters Small-bodied ecotype	Warm waters	Widely distributed but scarce in Chaleur Bay, north of PEI and west of Cape Breton
Atlantic herring (Bosman et al. 2011; LeBlanc et al. 1998; McQuinn et al. 2012; Messieh 1987)	Marine resident Winter migration to deeper waters	Warm waters to transition zone	Ubiquitous Spawning rare or absent in St. George's Bay, west of Cape Breton and around Magdalen Islands
Juvenile Atlantic herring (LeBlanc et al. 1998; McQuinn et al. 2012; Messieh 1987)	Marine resident Winter migration to deeper waters	Warm waters	Rare or absent in St. George's Bay, west of Cape Breton and around Magdalen Islands
Sea raven (Bosman et al. 2011)	Marine resident Winter migration to deeper waters	Warm waters to transition waters (rare in CIL)	Ubiquitous
Longhorn sculpin (Bosman et al. 2011)	Marine resident Winter migration to deeper waters	Warm waters to transition waters Rare in <15 m depths	Ubiquitous
Winter flounder (Bosman et al. 2011; Clay 1991; Hanson and Courtenay 1995, 1996)]	Marine resident Winter migration into estuaries and to deeper waters	Warm waters to transition waters	Ubiquitous
Yellowtail flounder (Bosman et al. 2011)	Marine resident Winter migration to deeper waters	Warm waters to transition waters Rare <15 m depths	Ubiquitous
Atlantic halibut (DFO 2013b; Savoie 2014a)	Marine resident Winter migration to deeper waters	Warm waters to deep waters Rare <15 m depths	Rare species Absent from central part of Northumberland Strait
Atlantic cod juveniles (Bosman et al. 2011; Hanson 1996, 2011)	Marine resident Winter migration to deeper waters	Cooler waters – some in CIL	0+ in Northumberland Strait and most places; larger juveniles in most places
Ocean pout (Bosman et al. 2011)	Marine resident Winter migration to deeper waters	Cooler waters – some in CIL	Ubiquitous but rare in Northumberland Strait
Shorthorn sculpin (Hanson and Courtenay 1995)	Marine resident No clear seasonal migration	Found in warm and cooler waters	Ubiquitous
Atlantic cod adults (Campana et al. 1999; Comeau et al. 2001; COSEWIC 2010a; Hanson 2011; Swain et al. 1998)	Marine resident Migratory; leave sGSL for winter	Mainly a cold-water species	Ubiquitous in deepest fringe (absent from Northumberland Strait)
American plaice (COSEWIC 2009; Swain et al. 1998)	Marine resident Migratory; move to deeper waters	Mainly a cold-water species	Low numbers in Northumberland Strait

Species (reference)[1]	Guild	Portion used	Presence/ Area used
Capelin (McQuinn et al. 2012)	Marine resident No clear seasonal migration	Mainly a cold-water species	Deepest margins, not in Northumberland Strait

[1] Most of the species listed have substantial use of coastal waters except for the adult Atlantic cod, American plaice and capelin, which are mainly cold-water species. Most distribution data come from the probability maps generated for this study and atlases or survey documents derived from the September trawl surveys and sentinel surveys (Benoît 2006; Benoît et al. 2003; Benoît and Swain 2003a, 2003b; Darbyson and Benoît 2003; Savoie 2014a, 2014b). Supplemental references are provided below the species name. CIL refers to the Cold Intermediate Layer.

APPENDIX E-1

VANCOUVER CALGARY TORONTO OTTAWA HALIFAX

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520-1801 Hollis St
Halifax, NS B3J 3N4
902-417-1700, ext
File No: 1003

October 10, 2019

The Honourable Minister Gordon Wilson
Department of Environment
Barrington Tower
1894 Barrington Street, Suite 1800
P.O. Box 442
Halifax, NS B3J 2P8
Minister.Environment@novascotia.ca

Environmental Assessment Branch
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8
EA@novascotia.ca

Sent via Electronic Mail

Dear Minister Wilson:

Re: Replacement Effluent Treatment Facility Project – Northern Pulp Nova Scotia Environmental Assessment – Focus Report

We write as counsel for Friends of the Northumberland Strait to request that you grant additional time within the above-captioned environmental assessment process currently underway. Specifically, we request that you:

1. Grant additional time for the submission of public comments, with a new deadline of Monday December 9, 2019; and
2. Add 30 more days to the 25-day period within which the Administrator must submit all comments and a recommendation to you, following close of the public comment period.

As Minister, you may increase the time allotted for public comments, pursuant to section 16(2) of the *Environmental Assessment Regulations*, if the default 30 day period for review is insufficient in a particular case. Likewise, Section 17(2) of the *Regulations* empowers you to allow more time for the Administrator's review of focus reports, when the default regulatory timeframe is insufficient.

In the present case, due to the volume, complexity and highly technical nature of the Focus Report materials submitted by Northern Pulp, more time is clearly required to permit a sufficient and reasonable opportunity for the public to review and comment on the submission, and for those comments to be given serious and fair consideration by the Administrator, and ultimately by yourself.

The Focus Report and supporting materials submitted on behalf of Northern Pulp Nova Scotia amount to well over two and a half thousand pages. The materials involve many scientific disciplines and are not readily accessible or easily understandable by laypeople. Further, the Focus Report, and some of the supporting materials refer the reader back to the original materials filed within Northern Pulp's Environmental Assessment Registration Document (EARD) package submitted in February 2019. As you will be aware, that submission was also very large and consisted of many other scientific reports and technical materials. It is unfair and counterproductive to require the general public to address all of this material within the short time currently allowed.

The Focus Report was made available to the public on the Nova Scotia Environment website on October 3, 2019 at 2:32 pm. The announcement indicates that comments are due on November 8, 2019. It will be essentially impossible for people to fit a comprehensive review of all this material into their daily lives, without more time. As well, while paper copies of the Focus Report package were made available at the New Glasgow and Pictou Libraries, these are available for review only by a few people at a time, and only when the library is open.

Northern Pulp Nova Scotia has had several years to prepare these materials, and was given a second chance in April 2019, via this Focus Report, to attempt to fix all the omissions in its original submission. It is noted that most, if not all, of these materials were prepared with taxpayer monies, yet the average taxpaying resident of Pictou and area will be given almost no time to review them.

As per NSE's "Citizen's Guide to Environmental Assessment," "[p]ublic participation is vital to the success of environmental assessment."[1] In respect of Northern Pulp's original EARD, then Minister Miller acknowledged that it was very difficult for the public to address a submission of this nature, within a short timeframe. She said "I don't know that the public is really going to be able to fully digest everything that's been submitted."[2]

It is clear that this project is highly controversial and has generated a very high level of public interest and concern, within the Pictou area and across Nova Scotia. Serious concerns have also been raised by residents and officials in Prince Edward Island. Appropriately, the Terms of Reference for the Focus Report recommended that Northern Pulp Nova Scotia engage with relevant stakeholders and the Mi'kmaq including Pictou Landing First Nation, and to share relevant studies and reports, in the process of preparing its focus report. However, Northern Pulp has shared nothing with our clients or many other affected groups who have taken a consistent and active involvement in this project and the Environmental Assessment process. Instead, its materials were submitted *en masse* all at once, creating barriers for our clients and for the general public which prevent a thorough and thoughtful review. This approach has also made it very difficult for our clients to receive timely and comprehensive advice from experts in the many fields covered by this submission.

[1] Nova Scotia Environment, *A Citizen's Guide to Environmental Assessment* (Halifax, NS: Nova Scotia Environment, 2017) at p 4. Link to: https://novascotia.ca/nse/ea/docs/EA.Guide-Citizens.pdf

[2] Jean Laroche, "Northern Pulp's plans for pipeline, effluent treatment plant now public," CBC, February 7, 2019.

The additional time requested herein is also appropriate as there are materials promised, but not included in the Focus Report package. For example, it appears that the following materials are to be considered by NSE and Minister but are not included in the package:

1. Appendix 7.2 – states it includes as Appendix A an "Underwater Benthic Habitat Survey Video". However, no such video or link to any such video is included in the package.
2. Appendices 10.1 and 10.2 both refer to reports which are not provided.
3. Appendix 11.1 refers to a Mi'kmaq Ecological Knowledge Study but no such study is included in the package.

We hereby request that all these documents be posted on the NSE website forthwith, and that our clients, and all other affected groups, are given a sufficient opportunity to comment on them, and the public comment period be lengthened as requested.

As well it is unclear as to whether reports are intended to be included, or submitted late, under Appendices 3.3, 3.5, 5.2, 6.1 and 7.5 of the Focus Report. If any such report will be submitted for your consideration, it must also be made available for public comment prior to any decisions being made by you as Minister.

We make these submissions in the alternative to, and without prejudice to, our submissions dated February 12, 2019 and March 8, 2019, and our client's submission of September 27, 2018, in respect of our position that you, as Minister of Environment within the government of Nova Scotia and as a member of cabinet, have shown that a reasonable apprehension of bias exists in relation to this project and that you must recuse yourself from any further decision-making in relation to this environmental assessment process.

On behalf of the Friends of the Northumberland Strait, we therefore ask that you:

1. Provide additional time for the public comment period under section 16 of the *Regulations* such that comments may be submitted no later than Monday, December 9, 2019; and
2. Likewise, under s 17 of the *Regulations*, give the Administrator an additional 30 days, beyond the 25 day period default set out therein, to summarize all comments submitted and provide recommendations to you as Minister of Environment;

Thank you for considering these submissions and we look forward to hearing from you. As time is of the essence in this matter, we ask for a response no later than Tuesday October 15, 2019.

Barrister & Solicitor

Barrister & Solicitor

c. Friends of the Northumberland Strait, by electronic mail

APPENDIX E-2

Royal Gazette

Part I

Volume 228, No. 41
October 9, 2019
Halifax, Nova Scotia
Published by Authority

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IN THE MATTER OF: The *Change of Name Act*, R.S.N.S. 1989, c. 66

This is to certify that on August 2, 2019 at 11:56 in the forenoon change(s) was/were made under the provisions of the *Change of Name Act* for the following individual(s):

From: CAMERON JENAY MULLEN
To: CAMRYN JENAY MULLEN
Year of Birth: 2002, born: HALIFAX, NOVA SCOTIA

This is to certify that on August 2, 2019 at 15:55 in the afternoon change(s) was/were made under the provisions of the *Change of Name Act* for the following individual(s):

From: SAMANTHA NICOLE PRINCE
To: RYLAND DEXTER MALACHAI PRINCE
Year of Birth: 1994, born: WESTMORLAND, NEW BRUNSWICK

This is to certify that on August 9, 2019 at 13:33 in the afternoon change(s) was/were made under the provisions of the *Change of Name Act* for the following individual(s):

From: SHANE PORTER RALPH THOMAS PAUL
To: SHANE PORTER JAMES PAUL
Year of Birth: 2005, born: FREDERICTON, NEW BRUNSWICK

This is to certify that on August 12, 2019 at 14:40 in the afternoon change(s) was/were made under the provisions of the *Change of Name Act* for the following individual(s):

From: NEVILLE CARL TIDD
To: NEVILLE CARL TYR
Year of Birth: 1989, born: HALIFAX, NOVA SCOTIA

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From: NORAH ANNETTE CYR
To: NORAH ANNETTE TYR
Year of Birth: 1983, born: MUSQUODOBOIT HARBOUR, NOVA SCOTIA

This is to certify that on August 12, 2019 at 14:40 in the afternoon change(s) was/were made under the provisions of the *Change of Name Act* for the following individual(s):

From: LILITH ILARIA TYR
To: OCTAVIA LILITH ILARIA TYR
Year of Birth: 2016, born: HALIFAX, NOVA SCOTIA

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Registry of Joint Stock Companies
Hayley Clarke, Registrar

October 9, 2019

IN THE MATTER OF: The *Environment Act*, S.N.S. 1994-95, c. 1

Release of Focus Report Pursuant to the Nova Scotia *Environment Act*

This is to advise that on October 2, 2019, the Minister of Environment received the Focus Report for the Replacement Effluent Treatment Facility Project proposed by Northern Pulp Nova Scotia Corporation in accordance with Part IV of the *Environment Act*.

The Northern Pulp Nova Scotia Corporation Northern Bleached Softwood Kraft pulp mill is located at Abercrombie Point adjacent to Pictou Harbour in Pictou County, Nova Scotia. The proposed project will consist of the development of a new effluent (wastewater) treatment facility (ETF) constructed on Northern Pulp property, and a transmission pipeline that will carry treated effluent overland and in the marine environment and discharge via an engineered diffuser (marine outfall).

The new ETF will employ the AnoxKaldnes BAS™ Biological Activated Sludge process purchased from Veolia Water Technologies, which combines Moving Bed Biofilm Reactor (MBBR) technology with conventional activated sludge. Once treated onsite at Northern Pulp's facility, effluent will be sent through an approximately 15 km long pipeline. The pipeline will enter the south side of Pictou Harbour and make landfall on the north side of the harbour roughly following Highway 106 right-of-way to Caribou, and then re-enters the marine environment adjacent to the Northumberland Ferries marine terminal and continues for approximately 4.0 km through Caribou Harbour to the Northumberland Strait, terminating at an engineered marine outfall.

Copies of the Focus Report may be examined at the following locations:

- Pictou Library, 40 Water Street, Pictou, NS
- New Glasgow Library, 182 Dalhousie Street, New Glasgow NS
- EA website https://www.novascotia.ca/nse/ea/

The public is invited to submit written comments to:

Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442, Halifax, Nova Scotia B3J 2P8

on or before November 8, 2019, or contact the Department via Fax at (902) 424-6925 or e-mail at EA@novascotia.ca. If you have any EA process questions, please contact us at our Toll-free phone number: 833-424-8694.

All comments received from the public consultation will be posted on the department's website for public viewing. In the case of an individual, the address, email and contact information will be removed before being placed on the website. By submitting your comments, you are consenting to the posting of your comments on the department's website.

October 9-2019

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APPENDIX E-3

CBC

Nova Scotia

Minister not considering extension to comment period on Northern Pulp report

Environmental group says volume of documents warrants more time

Michael Gorman · CBC News · Posted: Oct 10, 2019 4:28 PM AT | Last Updated: October 10



The pubic has until 11:59 p.m. on Nov. 8 to submit comments on the Northern Pulp focus report. (David Gutnick/CBC)

comments

Nova Scotia Environment Minister Gordon Wilson is not considering a request to extend the public comment period on the Northern Pulp focus report or the amount of time his department staff has to review people's submissions.

Lawyers for Ecojustice, on behalf of the group Friends of the Northumberland Strait, wrote to Wilson on Thursday requesting 30 additional days for the public comment period and 30 more days for department staff to review submissions.

"It is clear that this project is highly controversial and has generated a very high level of public interest and concern, within the Pictou area and across Nova Scotia," lawyers write in the letter, which was released publicly.

Northern Pulp is seeking approval to build a new effluent treatment facility at its Pictou County mill site, a proposal that includes using a pipeline to move treated effluent to the Northumberland Strait.

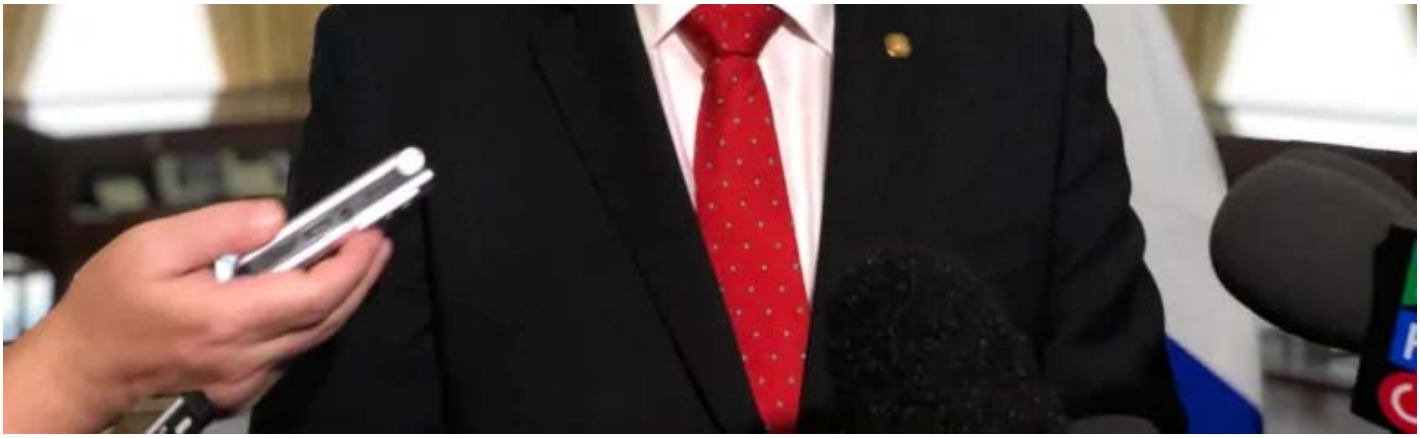
The lawyers for the environmental groups say the volume of documents involved — in the range of 2,500 pages — and technical nature of much of the material is cause to give the public more time.

But Wilson noted the public comment period for the mill's previous submission, which his predecessor deemed to be insufficient and thus ordered the focus report, was for 30 days and received about 4,000 submissions.

"We want to hear from Nova Scotians," Wilson told reporters at Province House.

"Thirty days has always been adequate in the past; it's worked very well and I certainly feel that it should meet the requirements this time also."





Environment Minister Gordon Wilson says he thinks 30 days is enough time for people to file comments on the proposal. (Craig Paisley/CBC)

Wilson said the 30-day comment period for a Class 1 environmental assessment is the standard used in the province.

But NDP Leader Gary Burrill said that's precisely the problem.

"This is a major, major project with many, many sides," he said.

"We said from the beginning that a Class 1 assessment will not work to establish the kind of public confidence that you need to get out of an environmental assessment and that's plainly the case now."

Tory Leader Tim Houston agreed, and said it's reasonable for the minister to consider the group's request.

"There's no room for error on this file," he said. "Thirty days is a short time for a document of this significance and this volume."

With no changes to the timeline, the public has until 11:59 p.m. on Nov. 8 to submit comments and Wilson must deliver his decision by Dec. 17.

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APPENDIX E-4

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HALIFAX

More time needed for review of N Pulp pipeline proposal: communi

By **Taryn Grant** Star Halifax
Thu., Oct. 10, 2019 | 3 min. read

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HALIFAX—A community group opposed to Northern Pulp's plan to pump treated effluent into the Northumberland Strait is pressing the Nova Scotia government to give more time for the review of a report that claims there won't be any significant, adverse environmental impacts.

Friends of the Northumberland Strait submitted a letter to Environment Minster Gordon Wilson Thursday morning requesting that he add another 30 days to the public consultation period for thousands of pages of new documents from Paper Excellence, the owners of the Northern Pulp kraft mill in Abercrombie, N.S. The letter also requests an extension to the internal review period.

The documents in question were submitted to the department of environment on Oct. 2 as a supplement to a submission from January. The public currently have until Nov. 8 to submit comments and the minister must announce a decision on the project by Dec. 17.

ARTICLE CONTINUES BELOW

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treatment facility and pipeline without more information. She told Paper Excellence to complete a focus report on the potential environmental and human health impacts of the project.

The public were given 36 days to consult on the focus report, which Wilson said should be enough. It's six days longer than he's legally required to give.

"I feel comfortable that we are giving Nova Scotians an opportunity to reply," he said in an interview at Province House.

Wilson said he expects the planned time-frame "to work for us very well."

ARTICLE CONTINUES BELOW

James Gunvaldsen Klaassen, a lawyer for the environmental law firm Ecojustice that's representing Friends of the Northumberland Strait, said the window for consultation is more of an issue with the focus report than it was with the initial environmental assessment submission from January.

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Paper Excellence released some pieces of the initial submission to the public months before they were formally submitted to the government, giving extra time for review. In an interview,

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"This time, everything has been (released) in one big blast, and so it's very difficult to process the entire scope of it in a very short time."

Gunvaldsen Klaassen said his firm is currently recruiting experts to review the focus report "to make sure (the data) is reliable and that the conclusions that are drawn from the data are also accurate and reasonable."

"It's very scientifically complex," he said. "It requires a lot of thought and considered response, and it's very difficult to do that in the short time that's been permitted thus far."

"I just think this extra time is vital to deal with a submission of this nature, and because of what's at stake for the strait and for the people that live in that area," Gunvaldsen Klaassen said.

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Paper Excellence is required, by law, to close Northern Pulp's current effluent treatment facility in Boat Harbour by Jan. 31, 2020. The now-polluted lagoon has significant cultural importance to the Pictou Landing First Nation, and the Mi'kmaw people of that community have been calling for it to be cleaned up for decades.

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The proposed alternative would treat effluent on-site at the mill and transport millions of litres of treated wastewater daily through a 15-kilometre pipeline into the Northumberland Strait — a plan that's opposed by environmentalists, fishers and the Pictou Landing First Nation for fear of environmental and human health risks.

Without an effluent treatment facility, the mill — a keystone of the province's forestry industry — cannot operate. According to the focus report, the new effluent treatment facility and pipeline would take 21 months to construct. By that timeline, and with the deadline for closing Boat Harbour about three months away, the closure of the mill, at least temporarily, is an almost certain eventuality.

Taryn Grant *is a Halifax-based reporter focusing on the Nova Scotia legislature. Follow her on Twitter: @tarynalgrant*

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APPENDIX E-5

VANCOUVER CALGARY TORONTO OTTAWA HALIFAX

ecojustice

@ecojustice.ca

ecojustice.ca
520-1801 Hollis St
Halifax, NS B3J 3N4
902-417-1700, ext
File No: 1003

October 23, 2019

The Honourable Minister Gordon Wilson
Department of Environment
Barrington Tower
1894 Barrington Street, Suite 1800
P.O. Box 442
Halifax, NS B3J 2P8
Minister.Environment@novascotia.ca

Environmental Assessment Branch
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8
EA@novascotia.ca

Sent via Electronic Mail

Dear Minister Wilson:

Re: Replacement Effluent Treatment Facility Project – Northern Pulp Nova Scotia Environmental Assessment – Focus Report

We write further to our letter of October 10, 2019 on behalf of our client, the Friends of the Northumberland Strait in relation to the Northern Pulp focus report. In that letter we asked that you:

1. provide additional time for the public comment period on the focus report, pursuant to section 16 of the *Environmental Assessment Regulations*; and
2. give the Administrator an additional 30 days pursuant to section 17 of the *Environmental Assessment Regulations*, to summarize all comments submitted during the comment period.

Our letter explained why, in our clients' view, more time was essential in the circumstances of this environmental assessment process. We also noted that several documents were missing from the public comment package, making it impossible to comment on such materials within the existing timeframe. Finally, we asked that we receive a response to our letter by October 15, 2019, but none has been received to date.

There is very little time remaining to complete a review of this complex package given the short timeframe you have imposed, and there is insufficient time to fully appreciate and address the

multitude of issues that are raised in this complex package. We therefore ask for your response forthwith and without further delay.

Sincerely,

Barrister & Solicitor	Barrister & Solicitor

c. Friends of the Northumberland Strait, by electronic mail

ecojustice

APPENDIX E-6

NOVA SCOTIA
Environment
Office of the Minister

PO Box 442, Halifax, Nova Scotia, Canada B3J 2P8 • www.novascotia.ca/nse

Our File number:
10700-40-55257

OCT 23 2019

Ecojustice
[redacted]@ecojustice.ca

Dear

On behalf of Premier McNeil, I am responding to your e-mail of October 3, 2019, regarding Northern Pulp's proposal.

Protecting the environment is my first priority. Northern Pulp registered the Effluent Treatment Facility Project for Class I Environmental Assessment (EA) on February 7, 2019, as required under the EA Regulations. On March 29, 2019, Margaret Miller, Minister of Environment at the time, released a decision concerning this review. The Minister determined that the registration information was insufficient to make a decision on the project, and that a focus report was required.

Public input is a key component in decision making. The public comment period as outlined in the EA Regulations is for 30 days. The department posted the Focus Report documents online on October 3, 2019, and Nova Scotians will have until November 8, 2019, to provide comments. That is 7 days longer than required. We started the comment period early because of Nova Scotians' considerable interest in the project. I appreciate your concerns and look forward to receiving your comments. This input will be considered when decisions are made.

Copies of the Focus Report may be examined at the following locations:

- Pictou Library, 40 Water Street, Pictou, NS
- New Glasgow Library, 182 Dalhousie Street, New Glasgow NS
- EA website at http://www.novascotia.ca/nse/ea

The public is invited to submit written comments to:

Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442, Halifax, Nova Scotia B3J 2P8

on or before November 8, 2019, or contact the Department via Fax at (902) 424-6925 or e-mail at EA@novascotia.ca.

.../2

Your concerns regarding the proposed project are acknowledged and have been included as part of the EA review. Please note that all comments received from the public consultation will be posted on the department's website for public viewing. In the case of an individual, the address, email and contact information will be removed before being placed on the website. On or before December 17, 2019, I will make a decision regarding the proposed project. By submitting your comments, you are consenting to the posting of your comments on the department's website.

Thank you for bringing your views forward. I appreciate your interest in this project.

Sincerely,



Gordon Wilson, MLA
Minister of Environment

APPENDIX E-7

CBC

Northern Pulp's plans for pipeline, effluent treatment plant now public

Environment minister has until March 29 to decide whether plan is acceptable

Jean Laroche · CBC News · Posted: Feb 07, 2019 1:15 PM AT | Last Updated: February 7



Northern Pulp has released details of its plan to build a new effluent treatment plant and discharge pipe. (Jeorge Sadi/CBC)

Nova Scotians now have access to the details of Northern Pulp's controversial plan to build a new effluent treatment plant and discharge pipeline that will empty into the Northumberland Strait.

The Pictou County pulp mill's 614-page document, including 18 appendices, was filed with Nova Scotia's Environment Department a week ago and was posted Thursday on the

department's website.

The plan put forward to the Environment Department is to build a "biological activated sludge" treatment facility purchased from a Paris-based multinational corporation called Veolia Water Technologies.

The corporate website says Veolia Water "specializes in water treatment solutions and provides the complete range of services required to design, build, maintain and upgrade water and wastewater treatment facilities for industrial clients and public authorities."

Nova Scotia Environment Minister Margaret Miller said the nearly 2,000-page submission was not a surprise.

"I think it's pretty much what the department was expecting," she said.

Safe drinking water a concern

The treatment facility would be located on Northern Pulp property not far from the existing plant.

The 15.5-kilometre pipeline would run from the new facility along the shoulder of Highway 106 to Caribou before entering Caribou harbour next to the Northumberland Ferries terminal. From there, it would discharge roughly four kilometres into the Northumberland Strait.





A boat doing survey work for the proposed Northern Pulp effluent pipe is tied to the wharf in Pictou, N.S. (Submitted by Ben Anderson)

That route is a concern for the town of Pictou. Mayor Jim Ryan said it means wastewater will be piped over the town's main watershed.

"This particular issue is about safe drinking water," he said in a telephone interview Thursday.

Ryan said he told Northern Pulp general manager Bruce Chapman in November that any plans for a pipe that carries treated or untreated effluent through the watershed would be unacceptable to the town.

Work would take 21 months

Northern Pulp's plan to discharge treated effluent into the strait has also been controversial.

Thousands protested last July over concerns it would hurt the environment. Fishermen had also prevented a survey crew from doing work for the company, but agreed last month to a court injunction ordering them not interfere.





Northern Pulp protesters outside a Supreme Court injunction hearing late last year. (Preston Mulligan/CBC)

Company owners have also sought a one-year extension of the provincial law requiring the mill's current treatment facility in Boat Harbour to close in January 2020. The company has argued it needs more time to build a replacement, but Premier Stephen McNeil has refused to extend the deadline.

According to company documents, the plan is to complete the work within 21 months, starting this spring. That means a working system would not be in place until 11 months — at the earliest — after the provincial government is legally mandated to turn off the tap to the provincially owned treatment plant.

Pipe would mostly be buried

The company has proposed using a polyethylene pipe that's 90 centimetres in diameter to carry the treated effluent from the plant to the dispersal site.

"The terminus of the effluent pipe consists of an outfall location with the three-port diffuser, situated at the depth of approximately 20 [metres]," says the project description.

The plan is to bury the pipe along most of the route, but the company is proposing suspending it to the exterior of the bridge that crosses the Pictou Causeway "due to the limited roadway width."

"The exposed area will be protected from damage by existing guard rails," says the document.



Northern Pulp's proposed route for the effluent pipe would go from a new treatment plant into the Northumberland Strait. (Nic Meloney/CBC)

The company has promised to mark the pipeline location with signs and post markings at public and private roads and water crossings. The system will also need a pumping station which the company states "will operate in a similar manner to municipal pumping station."

Serious impact on lobster 'highly unlikely'

The company said it looked at alternatives to the plan it has submitted for provincial approval, including simply shutting down or creating a closed wastewater recovery system, but none was feasible.

An indication of how much the company wants an extension is the people it has hired to lobby the governing Liberals on its behalf: Kirby McVicar, McNeil's former chief of staff; Stephen Moore, McNeil's former director of communications; and Trevor Floyd, a one-time executive assistant to Health Minister Randy Delorey when he held the environment portfolio.

- **Premier unmoved by Northern Pulp's ask for more time to close waste water facility**

As for concerns expressed by opponents to the plan, the company has included a response to 38 questions or comments, ranging from the possible harm to lobster stocks to heavy metal

contamination and the environmental review process.

The company stated "it is highly unlikely that there will be serious impact on lobster," and that heavy metals occurred naturally in the environment "and are released to the environment from a range of human and natural sources."

Public invited to submit comments

As for the review process, Northern Pulp noted it was a provincial process but the Canadian Environmental Assessment Agency would review the company's application to determine whether a federal environmental assessment was necessary.



Nova Scotia Environment Minister Margaret Miller has until March 29 to make a decision on Northern Pulp's plan. (CBC)

The public now has until March 9 to digest the information and submit their comments, either by mail or using an online form.

Miller has until March 29 to decide if the project will be granted conditional environmental assessment approval. Officials in her department will sift through the material to ensure it provides a complete picture of the plan and its potential impact on the environment.

If additional work is needed, they can ask the company to provide it. But Miller said the consultation period would not be extended beyond the 30 days if that were to happen.

She acknowledged the existing file could be a challenge for Nova Scotians to assess.

"I don't know that the public is really going to be able to fully digest everything that's been submitted."

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APPENDIX E-8

From: "Environment Assessment Web Account" <EA@novascotia.ca>
To: @ns.sympatico.ca>
Sent: Wednesday, October 23, 2019 1:35 PM
Subject: RE: Northern Pulp - Additional Information Requested

Good afternoon,

The Focus Report and Appendices for the project are posted on our website with the content that was submitted to NSE by the company. The NS EA process does not include a conformity review or other check that the Focus Report contains all of the items listed in the Terms of Reference. Copies of the Focus Report may be examined at the following locations:

- Pictou Library, 40 Water Street, Pictou, NS
- New Glasgow Library, 182 Dalhousie Street, New Glasgow NS

Thank you

From: @ns.sympatico.ca>
Sent: October 16, 2019 12:04 PM
To: Environment Assessment Web Account <EA@novascotia.ca>
Subject: Northern Pulp - Additional Information Requested

Hi: I am a member of Friends of the Northumberland Strait and am writing to you on their behalf. When reviewing the Terms of Reference for the Focus Report to be filed by Northern Pulp, I noted the following requirements:

7.1 Conduct fish and fish habitat baseline surveys for the freshwater environment, **to the satisfaction of Fisheries and Oceans Canada**.

7.2 Conduct fish habitat baseline surveys for the marine environment, **to the satisfaction of Fisheries and Oceans Canada**.

The Focus Report filed by Northern Pulp does not appear to include any information to determine the criteria for the surveys established by Fisheries and Oceans Canada, nor any report from Fisheries and Oceans Canada indicating whether or not the surveys were completed to their satisfaction. This information is important for the public to have in order to conduct a proper review and response to the Focus Report. Where do I obtain this information?

The Terms of Reference also set out the following requirement:

7.3 Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. **Assessment methodology must first be agreed upon by NSE in consultation with relevant federal departments**.

The Focus Report filed by Northern Pulp does not appear to include details of the assessment methodology agreed upon by NSE in consultation with relevant federal departments. This information is important for the public to have in order to conduct a proper review and response to the Focus Report.

Where do I obtain this information?

I look forward to your reply.

Pictou, NS

APPENDIX E-9

From: " @ns.sympatico.ca>
Date: October 24, 2019 11:30 AM
To: "Environment Assessment Web Account" <EA@novascotia.ca>
Subject: Re: Northern Pulp

Thank you for your reply. I wish to advise that I reviewed the Focus Report at the Pictou Library and found that the Figures were blurry and I was not able to read them in their entirety. This will impact the ability of the public to properly respond to the Focus Report. It will impact the ability of the various government departments to respond to the Focus Report as well, including Nova Scotia Environment, if the quality of the Figures in the Focus Report provided for review are similarly blurry.

Please note my concerns for the record.

Thank you,

From: Environment Assessment Web Account
Sent: Wednesday, October 23, 2019 1:35 PM
To: @ns.sympatico.ca
Subject: RE: Northern Pulp

Good afternoon,
The Focus Report and Appendices for the project are posted on our website in the manner that they were submitted to NSE by the company. Copies of the Focus Report may be examined at the following locations:
• Pictou Library, 40 Water Street, Pictou, NS
• New Glasgow Library, 182 Dalhousie Street, New Glasgow NS
Thank you

From: @ns.sympatico.ca>
Sent: October 23, 2019 11:29 AM
To: Environment Assessment Web Account <EA@novascotia.ca>
Subject: Fw: Northern Pulp

I am forwarding an email I sent to you on October 16, 2019 to which I have received no response. Kindly advise where I can obtain clear copies of the Figures. The deadline for public response to Northern Pulp's Focus Report is fast approaching and it is very important that the requested information is provided so that the public has the opportunity to review it and reply appropriately.

Thank you,

From:
Sent: Wednesday, October 16, 2019 11:24 AM
To: EA@novascotia.ca
Subject: Northern Pulp

Hi: I am a member of Friends of the Northumberland Strait and am writing to you on their behalf. When reviewing the Focus Report filed by Northern Pulp, I noted that some of the Figures were blurry and I was not able to read them, particularly the key / legend. See Figure 7.3-1 found on page 124 for one

example, but there are others. The Figures are blurry when viewed online and when printed.

Where do I obtain clear copies of these Figures?

Pictou, NS

:elephone
fax

2019-10-29

APPENDIX E-10

News release

Northern Pulp Focus Report Submitted

Environment (../search?dept=124)
October 2, 2019 - 11:57 AM

Northern Pulp submitted a focus report for its proposed effluent treatment plant in Pictou County to the Environment Department today, Wednesday, Oct. 2.

The report will be available online within 14 days once department staff have done a preliminary check to confirm it is complete.

Once it is posted online, Nova Scotians will have 30 days to share their comments as part of the environmental assessment process. A decision on the proposed effluent treatment plant will be made within 39 days after the public comment period ends.

Quick Facts:

-- the environment minister directed Northern Pulp to submit a focus report on March 29.

-30-

Media Contact:

Rachel Boomer
Cell: 902-478-9865 (tel:+19024789865)
Email: rachel.boomer@novascotia.ca (mailto:rachel.boomer@novascotia.ca)

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Related information

- Media enquiries (https://beta.novascotia.ca/media-contacts)
- Search news releases (/news/)
- Archive: news releases from 1995-97 (/news/archive.asp)

APPENDIX E-11

Profile

Printer Version

Profile Info | People Info | Activites Info | Related Reg's Info

PROFILE - FRIENDS OF THE NORTHUMBERLAND STRAIT - as of: 2018-09-06 11:00 AM

Business/Organization Name:	FRIENDS OF THE NORTHUMBERLAND STRAIT
Registry ID:	3320210
Type:	Society
Nature of Business:	
Status:	Active
Jurisdiction:	Nova Scotia
Registered Office:	94 WATER STREET PICTOU NS Canada B0K 1H0
Mailing Address:	PO BOX 1720 PICTOU NS Canada B0K 1H0

PEOPLE

Name	Position	Civic Address	Mailing Address
NICOLE MACKENZIE	Director	613 CENTRAL CARIBOU ROAD PICTOU NS B0K 1H0	
KRISTA FULTON	Director	63 JAMES STREET PICTOU NS B0K 1H0	
LINDA TOWNSEND	Director	1114 HIGHWAY 14 GREENFIELD NS B0N 1N0	
CORINNE MACKEIL	Director	2 BROOK AVENUE LYONS BROOK NS B0K 1H0	
JILL GRAHAM-SCANLAN	Director	388 ELMFIELD ROAD SCOTSBURN NS B0K 1R0	
JILL GRAHAM-SCANLAN	Recognized Agent	388 ELMFIELD ROAD SCOTSBURN NS B0K 1R0	PO BOX 1720 PICTOU NS B0K 1H0

ACTIVITIES

Activity	Date
Incorporated	2018-08-23
Filed Document	2018-08-23

RELATED REGISTRATIONS

There are no related registrations on file for this company.

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:06:58 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: After reviewing the focus report I am pleased to see that the majority of public concerns have been addressed through independent third party experts. Residents of a Nova Scotia seem to have a large distrust of both industry and government. Having an industry that is willing to commit to staying in Nova Scotia and produces a globally used commodity is something the province should be proud of. The work Northern Pulp and Paper Excellence has done to correct past issues created by former owners should be commended. I feel the narrative that fishing grounds will be negatively impacted by a new treatment facility lacks credibility. The local fishing industry is thriving and a new treatment facility would lessen any impacts compared to the current system, if there are any impacts at all. In closing, I support the continued operation of this mill and ask that our elected officials due the same. The forestry sector has always been a leading industry in this province and the approval of the proposed infrastructure would allow that to continue. Thank you for taking the time to consider my opinions on this matter. Name: @gmail.com Address: Municipality: Upper Tantallon Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 67 y: 28

From:
To: Environment Assessment Web Account
Subject: [PROBABLE-SPAM] Northern Pulp Replacement Effluent Treatment Facility
Date: November 8, 2019 6:10:54 PM
Attachments: Submission.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please find attached comments regarding Northern Pulps Focus report.

November 7, 2019

Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Email: EA@novascotia.ca

Dear Mr. Gordan Wilson:

Re: Northern Pulp Nova Scotia - Environmental Assessment Registration Document- Replacement Effluent Treatment Facility (Focus Report)

The Northern Pulp Nova Scotia Replacement Effluent treatment Facility has many concerns for me and my spouse. As residents of Pictou County, Nova Scotia this issues hits us right in our backyard. I myself am a second generation fishermen and father of two - a four year old and a nine month old.

Besides my knowledge as a fishermen I am also a Red Seal Tradesmen trained as an Industrial Mechanic (millwright) which gives me some insight into the industrial workings of a pulp mill.

In Northern Pulp's EA submission of their focus report, there are many issues that are still of great concern for me. I believe that this time the proposal needs to just be rejected, as Northern Pulp has had plenty of time and have yet to put the time and energy into a clear science based report. It needs to be rejected and Northern Pulp told to go back to the drawing board, as a pipe into the Strait isn't going to work. Northern Pulp has not ensured the heath and safety of the people of Nova Scotia and of the Northumberland Strait, which we fish and share with surrounding Provinces. I am asking that you, as the Minister for Nova Scotia Environment, reject this focus report of Northern Pulp's proposed effluent treatment facility for the following reasons.

1. Protection of Fish and Fish Habitat:

Since I am a lobster licence holder, the new treatment facility outfall is a major concern - what effects will it have on lobsters and their habitat as well as the lobsters' reproduction system which includes their larvae. This information is so important because it is what will allow the survival and future sustainability of our industry.

In Appendix R of Northern Pulp's original EARD is where you find the lobster study information which is very limited. Here in the executive summary it states, "*It is important to note that the values and distances in the Stantec reports (Stantec 2017, Stantec 2018) have been generated through modelling and not through onsite testing. Therefore, if modeling predictions prove to be inaccurate, then the predicted impact on lobsters as described in this report are invalid."*

This statement here concerns me as to how valid the receiving waters study is as well the lobster study. This area needs much much more information and in-depth studying to ensure our lobster and larvae are not harmed from the effluent leaving the outfall location.

In Appendix 7.3 of their focus report, they quote *"Several studies have identified linkages between reduced survival and developmental differences of American Lobster larvae (stages I III) and post- larvae (stage IV) when exposed to elevated temperatures."* I have yet to find where they have done studies on the lobster, lobster reproduction and juvenile lobster.

Elevated temperatures are just one of the issues that the pipe discharge of toxic effluent will have on fish health and habit. Northern Pulp's plan to do monitoring after isn't complying with the focus report requirement to have baseline data to show what will happen to our fish species.

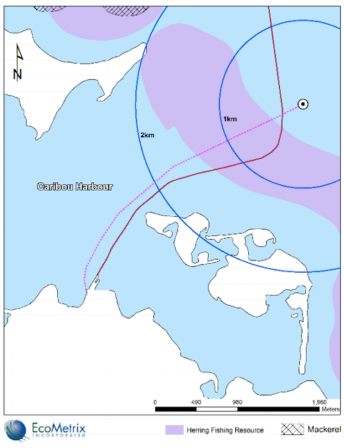


Figure 3-12: Atlantic Mackerel and Atlantic Herring distribution and harvest areas

Appendix 7.3 of the focus report contains the statement *"the proposed pipeline route will directly interact with the known Atlantic Herring resource"* (**Figure 3-12**) This is not Science. The area of the proposed outfall is one of the last remaining herring school breeding/ spawning grounds, which I fish during the fall herring season 16F. Our herring stocks are in trouble and fishermen have taken drastic quota cuts and shorter season openings in order to protect this vital specie, and a pipe line and a outfall of toxic effluent isn't a pro-active approach to protect this fish resource. For these reasons, no risk should be taken to this vital industry and vital ecosystem of the Northumberland Strait, and the project should be rejected.

2. Scallop Buffer Zone:

While on the topic of lobster, I would like to bring to your attention to a link on the DFO website that describes our scallop buffer zone. Here is how the buffer zone reads as to the conditions for the commercial fishers licence set out by DFO and enforced by DFO fishers officers as to the Fisheries Act and is found as scallop condition 7: *No person shall fish for scallops in that portion of scallop fishing area 24 in those waters adjacent to the Province of Nova Scotia within one [1] nautical mile from the nearest point of land in the counties of Cumberland, Colchester, Pictou, including Pictou Island in the Northumberland Strait, and Antigonish.*

With this pointed out I would then like to refer to Northern Pulp's focus report - section 7.3 Marine Environment Impact Assessment **(figures 3-11, 3-12, 3-13, and 3-14)** and then the wording on page 3.35 where they state the outfall location is outside of this buffer zone, but the pipe route is within the refuge. It is true the pipe route is within the refuge, but also the outfall location is within the refuge as well, as 1 nautical mile equals 1.852kms. If Northern Pulp worked with DFO more, they would have been shown and told that their figure in their focus report was incorrect and that the scallop buffer zone is one nautical mile from any point of land. This means their outfall is located inside a marine refuge area which is intended to protect the juvenile American lobster http://www.dfo-mpo.gc.ca/oceans/oeabcm-amcepz/refuges/sfa-zpp-eng.html.

Here are other limitations within scallop buffer zones that are set out by DFO.

Prohibitions:
- Scallop dragging.
- No other human activities that take place in this area are incompatible with the conservation of the ecological components of interest.

Another concern is that within this refuge to protect fish habitat, they will be digging a trench 3.6km long to lay the 36 inch pipe. To dig this trench as stated in Appendix 2.5, page 18, they will be moving 20,000 cubic meters of fill per km of pipe line. So for a 3.6 km pipe line, that's approximately 72,000+ cubic meters of material being dug within a marine refuge area. Now to

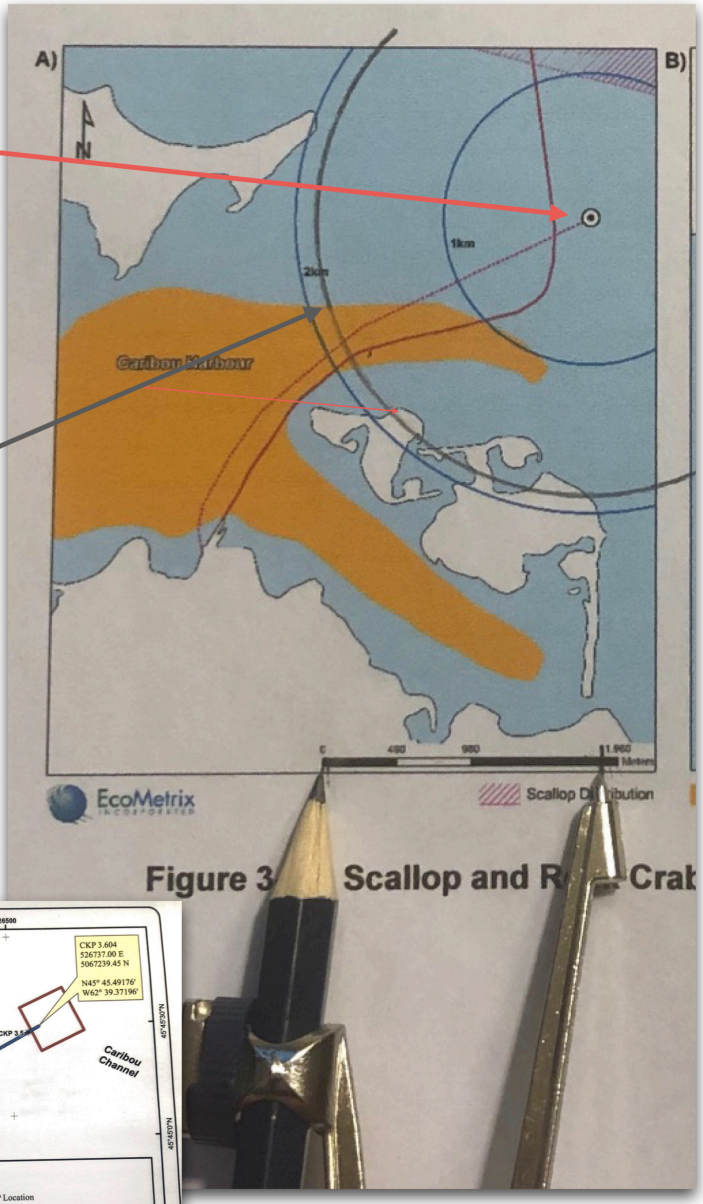
put that into perspective a dump truck travelling down the highway carries on average 7.6 -10 cubic meters per load. If we were to pick 9 cubic meters as an average, that would be like filling 8000 dump trucks of material out of a marine refuge area that is designated to protect fish and fish habitat. So as I have stated before, for the reasons above I ask you to reject this project submitted by Northern Pulp.

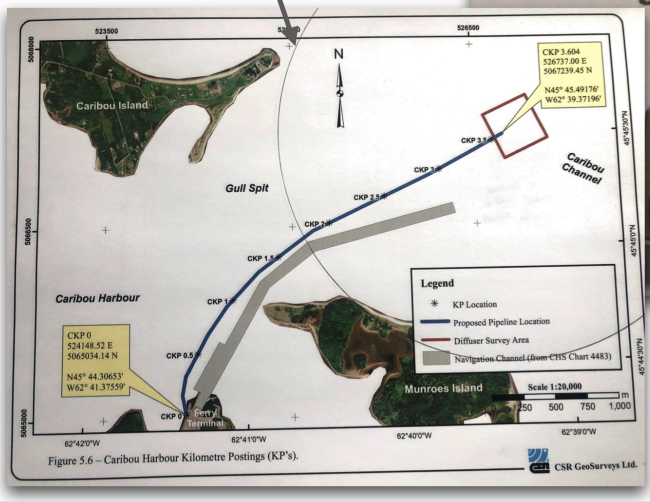
Scallop Buffer Zone

1 nautical mile = 1.852 km

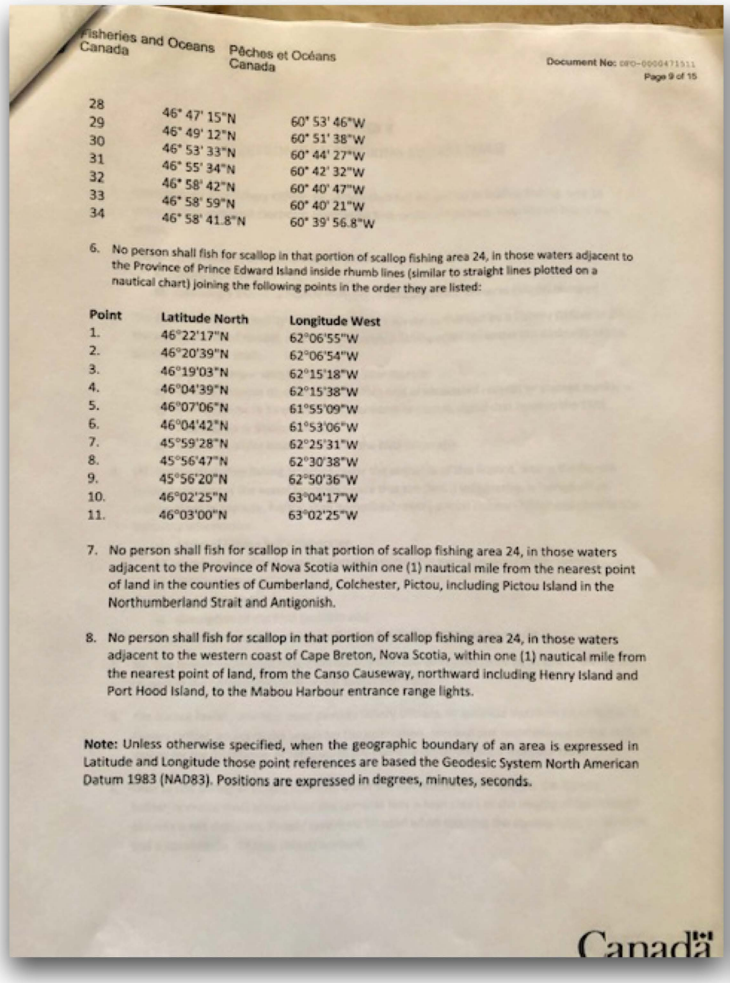
outfall is within 1 nautical mile of scallop buffer zone

pencil lined circle area represents one nautical mile around outfall coordinates





DFO Scallop Buffer Zone Regulations/Coordinates



Fisheries and Oceans Canada | Pêches et Océans Canada

Document No: DFO-0000471511
Page 9 of 15

28		
29	46° 47' 15"N	60° 53' 46"W
30	46° 49' 12"N	60° 51' 38"W
31	46° 53' 33"N	60° 44' 27"W
32	46° 55' 34"N	60° 42' 32"W
33	46° 58' 42"N	60° 40' 47"W
34	46° 58' 59"N	60° 40' 21"W
	46° 58' 41.8"N	60° 39' 56.8"W

6. No person shall fish for scallop in that portion of scallop fishing area 24, in those waters adjacent to the Province of Prince Edward Island inside rhumb lines (similar to straight lines plotted on a nautical chart) joining the following points in the order they are listed:

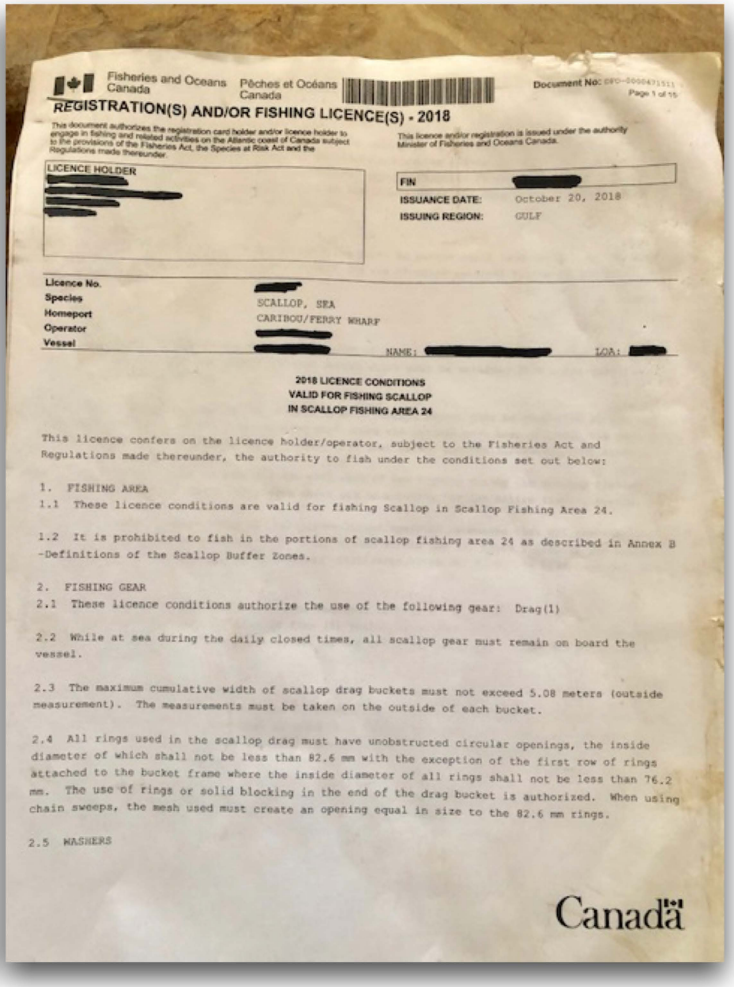
Point	Latitude North	Longitude West
1.	46°22'17"N	62°06'55"W
2.	46°20'39"N	62°06'54"W
3.	46°19'03"N	62°15'18"W
4.	46°04'39"N	62°15'38"W
5.	46°07'06"N	61°55'09"W
6.	46°04'42"N	61°53'06"W
7.	45°59'28"N	62°25'31"W
8.	45°56'47"N	62°30'38"W
9.	45°56'20"N	62°50'36"W
10.	46°02'25"N	63°04'17"W
11.	46°03'00"N	63°02'25"W

7. No person shall fish for scallop in that portion of scallop fishing area 24, in those waters adjacent to the Province of Nova Scotia within one (1) nautical mile from the nearest point of land in the counties of Cumberland, Colchester, Pictou, including Pictou Island in the Northumberland Strait and Antigonish.

8. No person shall fish for scallop in that portion of scallop fishing area 24, in those waters adjacent to the western coast of Cape Breton, Nova Scotia, within one (1) nautical mile from the nearest point of land, from the Canso Causeway, northward including Henry Island and Port Hood Island, to the Mabou Harbour entrance range lights.

Note: Unless otherwise specified, when the geographic boundary of an area is expressed in Latitude and Longitude those point references are based the Geodesic System North American Datum 1983 (NAD83). Positions are expressed in degrees, minutes, seconds.

Canada



Fisheries and Oceans Canada | Pêches et Océans Canada

Document No: DFO-0000471511
Page 1 of 15

REGISTRATION(S) AND/OR FISHING LICENCE(S) - 2018

This document authorizes the registration card holder and/or licence holder to engage in fishing and related activities on the Atlantic coast of Canada subject to the provisions of the Fisheries Act, the Species at Risk Act and the Regulations made thereunder.

This licence and/or registration is issued under the authority Minister of Fisheries and Oceans Canada.

LICENCE HOLDER [redacted]

FIN [redacted]
ISSUANCE DATE: October 20, 2018
ISSUING REGION: GULF

Licence No. [redacted]
Species SCALLOP, SEA
Homeport CARIBOU/FERRY WHARF
Operator [redacted]
Vessel [redacted] NAME: [redacted] LOA: [redacted]

2018 LICENCE CONDITIONS
VALID FOR FISHING SCALLOP
IN SCALLOP FISHING AREA 24

This licence confers on the licence holder/operator, subject to the Fisheries Act and Regulations made thereunder, the authority to fish under the conditions set out below:

1. FISHING AREA
1.1 These licence conditions are valid for fishing Scallop in Scallop Fishing Area 24.

1.2 It is prohibited to fish in the portions of scallop fishing area 24 as described in Annex B -Definitions of the Scallop Buffer Zones.

2. FISHING GEAR
2.1 These licence conditions authorize the use of the following gear: Drag(1)

2.2 While at sea during the daily closed times, all scallop gear must remain on board the vessel.

2.3 The maximum cumulative width of scallop drag buckets must not exceed 5.08 meters (outside measurement). The measurements must be taken on the outside of each bucket.

2.4 All rings used in the scallop drag must have unobstructed circular openings, the inside diameter of which shall not be less than 82.6 mm with the exception of the first row of rings attached to the bucket frame where the inside diameter of all rings shall not be less than 76.2 mm. The use of rings or solid blocking in the end of the drag bucket is authorized. When using chain sweeps, the mesh used must create an opening equal in size to the 82.6 mm rings.

2.5 WASHERS

Canada

3. Total Suspended Solids - Depths & Tides

The outfall location is located just off the Caribou Harbour channel and the accumulation affects from the suspended solids in the effluent is another huge concern. One of the first meetings with Northern Pulp and the fishers was held at the Pictou County Wellness Center in early December of 2017. At this meeting, Guy Martin from KSH Solutions was asked the following question, "Where does the heavy solids go?" His response was, “Away”.

On page 3.4 of Appendix 4.2 of the focus report, in table 15 it still states, the total suspended solids (TSS) is 48mg/L. When you do the long hand and work that out for their daily water usage of 85 million litres a day, that is over 4 tons of solids sent out into the Northumberland Strait daily. This is unacceptable. Four ton of solids won’t just go away as KSH stated.

The accumulative affect and build up is unknown and needs to be addressed. The area in which the outfall is located, is stated in Appendix 2.2 to be 20m in depth, but around the outfall location the depth decreases to 18m within 100m from the outfall and continues to rise as you go outwards from the outfall. What will the accumulation in this area be and what will happen to the diffusers in this situation as they get taken over by accumulation of suspended solids. At slack tides every 6 hr, the suspended solids won’t just go away!! So, because the cumulative effects of 4 tonnes per day of TSS are unknown I ask you to reject this project.

Northumberland Strait’s tidal range is classified as Micro-tidal, when the **tidal** range is lower than 2 metres. (https://en.wikipedia.org/wiki/Tidal_range). Northern Pulp has not proven that such a low tidal range could effectively disperse 4 tonnes of TSS daily.

Water depths surrounding proposed pipe location & outfall

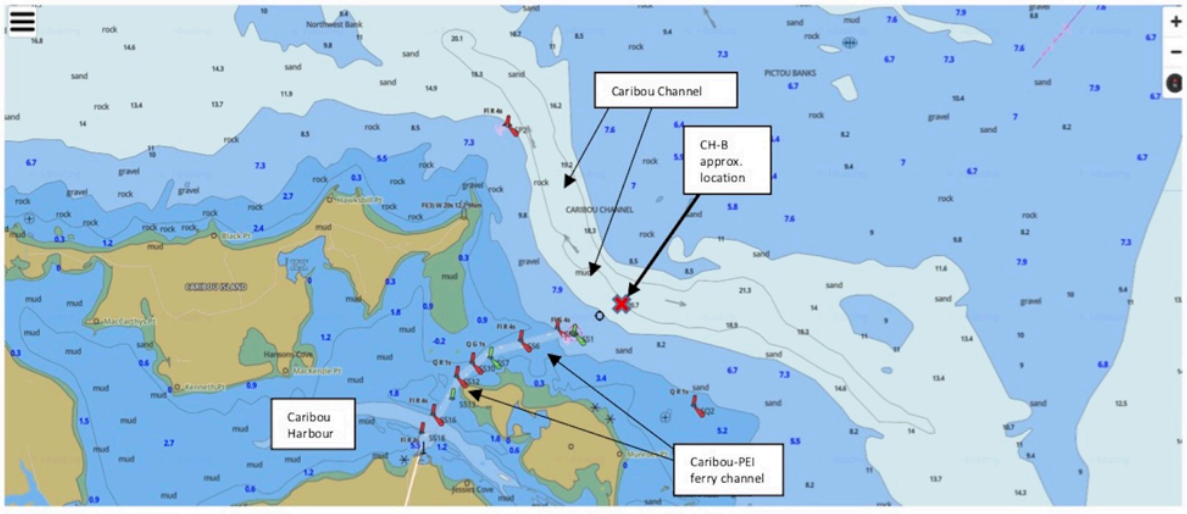


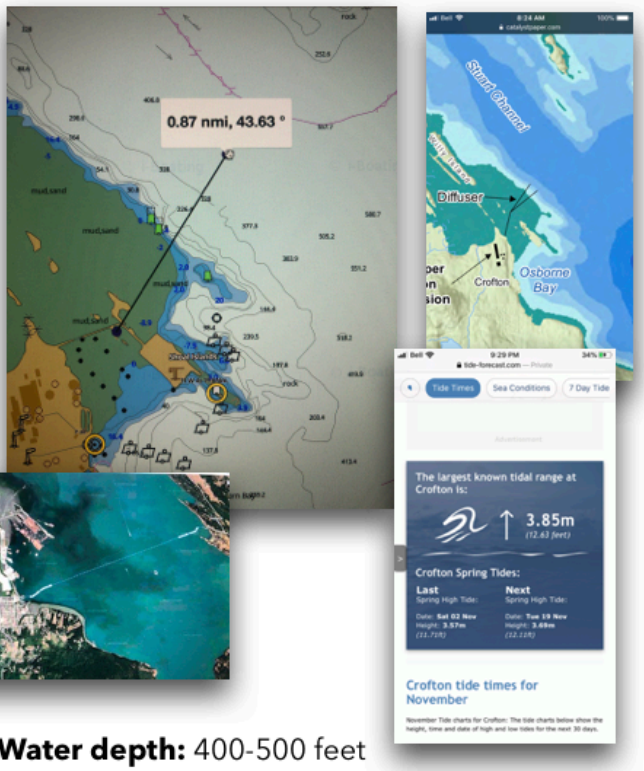
Chart of Caribou Channel and surrounding area

Northern Pulp’s proposed outfall at point CH-B in the Caribou Channel is to be placed in a relatively small area with a depth of 20 metres. As this chart illustrates, the area becomes significantly shallower within a short distance. Depths are more typically between <1 to < 8 metres in most of the surrounding Caribou Harbour and Pictou Banks area.

https://gpsnauticalcharts.com/main/ca/ca4483_1-caribou-harbour-nautical-chart.html

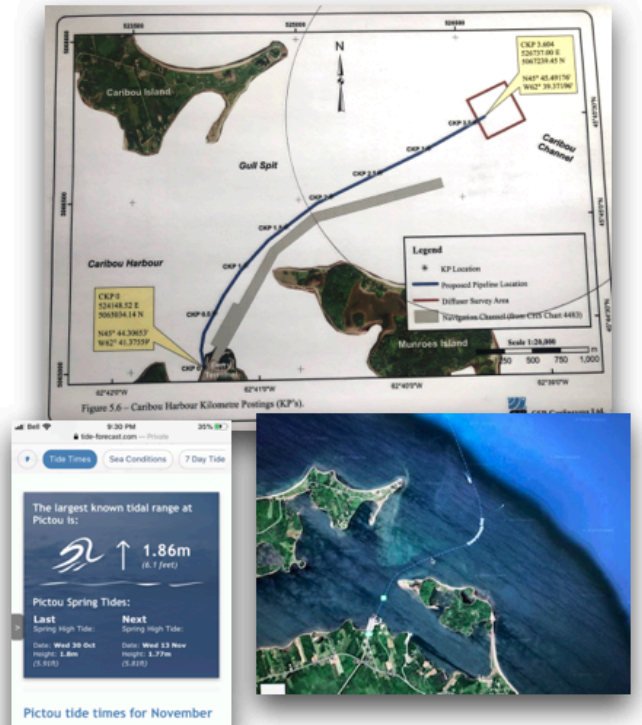
Comparison Of Outfall Depths & Tides

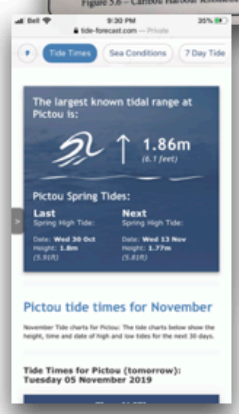
Catalyst Paper Outfall - Crofton, BC



Water depth: 400-500 feet
Distance from Shore: 1.96 nautical miles
Largest Tidal Range: 12.63 feet

Northern Pulp - Proposed Outfall





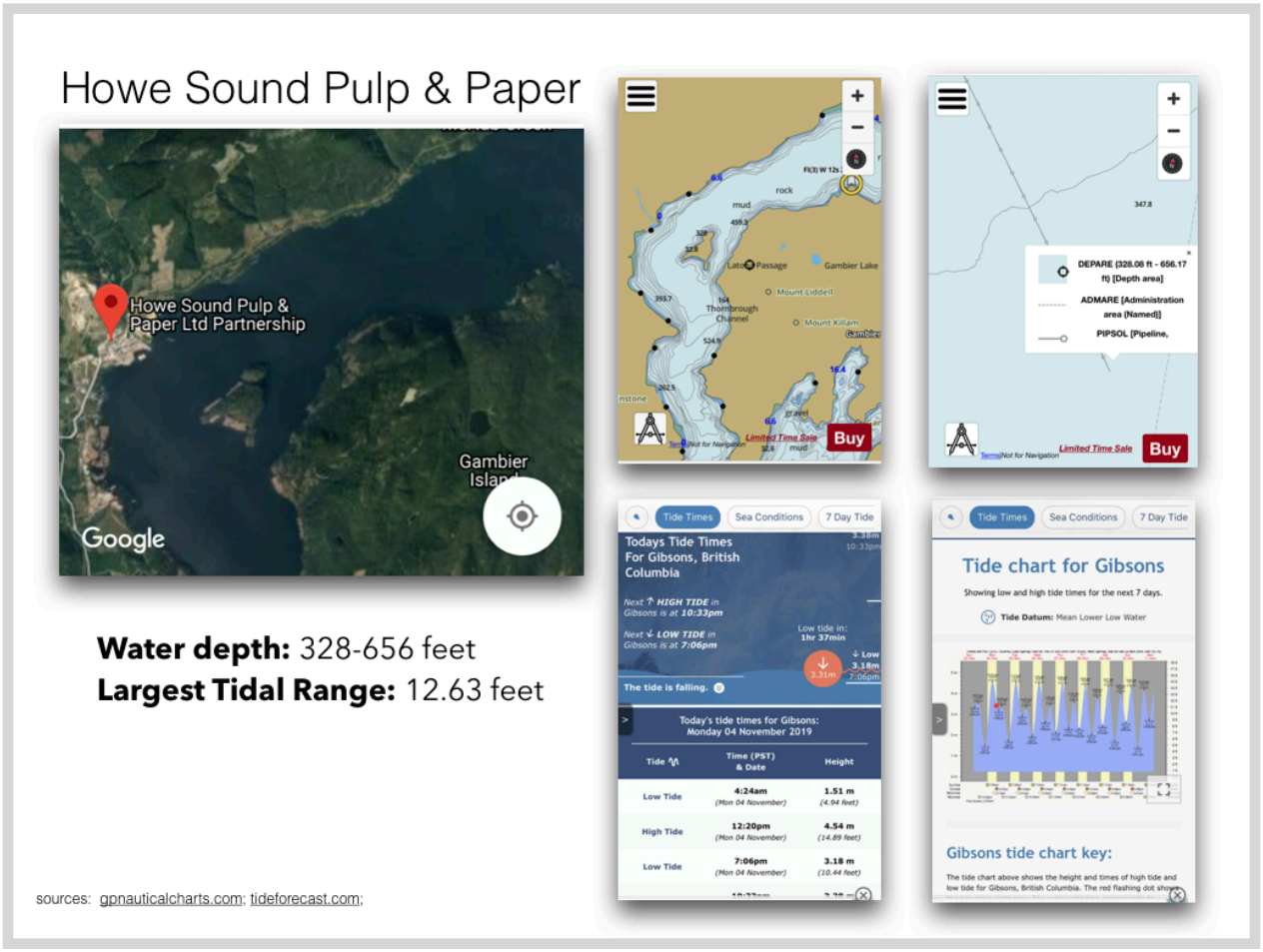
Water depth: 67 feet
Distance from Shore: 1.84 nautical miles
Largest Tidal Range: 6.1 feet

sources: gpnauticalcharts.com; tideforecast.com;

4. Shell Fish Closure Zone:

Also a concern not addressed in Northern Pulp's EA is what will be, or what is the probability of, a shell fish closure zone around the outfall. Will it be based on depth and volume of water affected? Will it be left up to DFO, not a Northern Pulp issue, but only to be an issue and concern to the fishermen?

Fishing areas in Howe Sound Bay have experienced restrictions on fishing and consumption of shellfish (https://www.pac.dfo-mpo.gc.ca/fm-gp/rec/tidal-maree/a-s28-eng.html#cr-rest). Will we experience similar restrictions should Northern Pulp's project receive approval?



5. Sea Ice

Between the sea ice issues addressed in appendix 2.2 and the pipe construction addressed in appendix 2.5, these two topics together form one major problem in regards to the Navigation Protection Act.

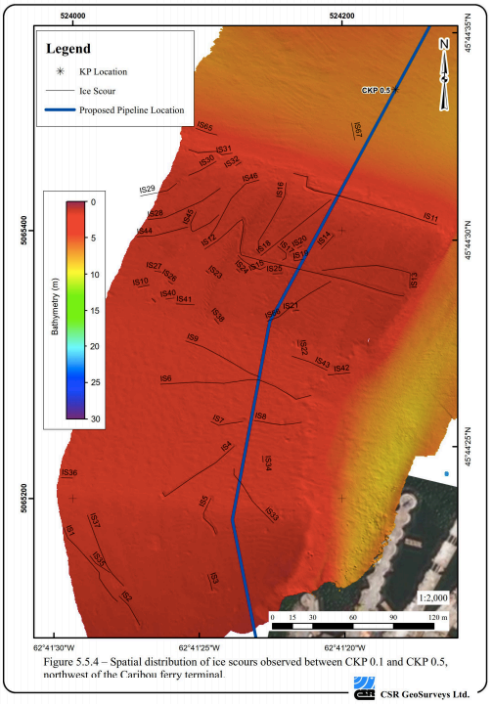


Figure 5.5.4 – Spatial distribution of ice scours observed between CKP 0.1 and CKP 0.5, northwest of the Caribou ferry terminal.

CSR GeoSurveys Ltd.

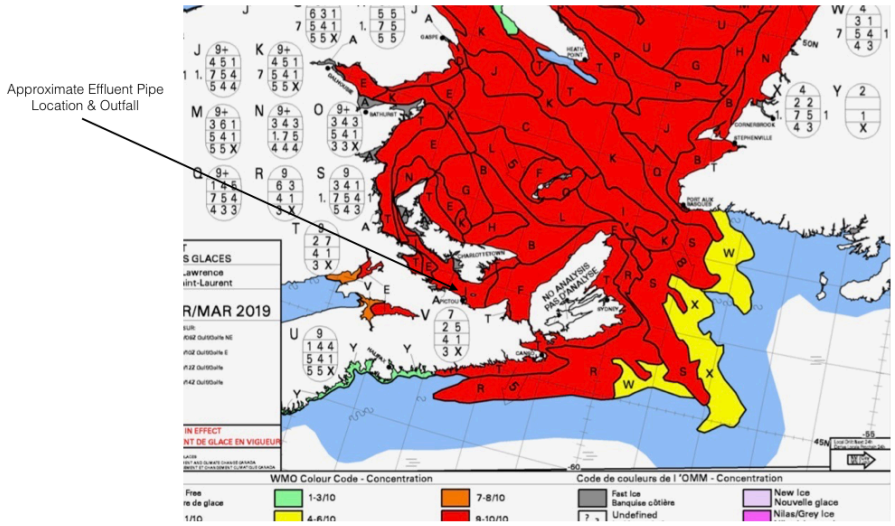
Figures 5.5.1 through 5.5.5 in appendix 2.2 show the ice scours. It is shown that there was 88 ice scours within Caribou Harbour in depths ranging from 0.22m to 19m. These scours range from 1.3m to 5.4 meters wide and 5m to 260m long and a depth of 0.4m.

With these scours and the water depth of only 0.22m to 19.06m (appendix 2.2 page119), what is the interference with the Navigation Protection Act?

As stated within the act **Prohibition 3,** *it is prohibited to construct, place, alter, repair, rebuild, remove or decommission a work in, on, over, under, through or across any navigable water that is listed in the schedule except in accordance with this Act or any other federal Act.* https://laws-lois.justice.gc.ca/eng/acts/n-22/page-1.html#h-364597

In appendix 2.5, they indicate that there plan is to dig a trench to the depth of 3m and install a 1m pipe with 2m of top soil on top. Then for sea ice scours protection in areas of concern which have yet to be decided on will be protected by armour rock which will decrease harbour depth by increasing the coverage over the pipe. How will this pipe line route, with very little depths to begin with, have enough water to avoid impeding on the Navigation Act for water travel by canoes, fishing vessels, ferry etc? How can this pipe line route be granted with the Navigation protection Act in place for the safe passage of travellers?

Ice Chart of Gulf of St Lawrence and Northumberland Strait: 03/09/19



https://ice-glaces.ec.gc.ca/prods/WIS28CT/20190219180000_WIS28CT_0010461191.pdf

As stated in the focus report, the exact route has yet to be designed and mapped, so how can a proposal be approved without knowing if no navigation will be interrupted? The depth just isn't there. So for this reason the project submitted by Northern pulp must be rejected. These are just a few of my concerns as a fisher, but working full-time this winter as a millwright and with a new born in the house, having time to study this EA in such a short time has been challenging.

As a millwright, I would like to touch on the following.

6. Power Boiler

Now my next few points of concern are with the burning of the sludge and what will be taken out of the new effluent treatment system to be burnt in their power boiler and sent out into the air.

This power boiler does not have a precipitator! This is the same power boiler that failed emissions tests in 2015, 2016 and 2017. As stated in a news article in The New Glasgow News, dated Jan 22 2018, the reason for the failure of the emission limits was because of what was burned in it.

When Northern Pulp changed their burn mix, there were improvements. "*These included changes to what went into the boiler, and how it was burned, which led to more efficient burning of that material and fewer particles leaving the boiler. One significant improvement was to reduce the amount of sawdust and shavings, and to increase the size of the bark put into the power boiler. That had a significant improvement on performance." - Northern Pulp Director of Communications, Kathy Cloutier.* https://www.ngnews.ca/news/local/northern-pulp-reports-improvements-in-quality-of-stack-emissions-179533/

If this boiler is going to be responsible for burning the sludge, it concerns me that this was not addressed fully in the focus report. How they will get their mixture right to pass any emission limits test? How will the particulate matter be taken out of the air when there is no precipitator? I feel Nova Scotia Environment needs more information on this matter to insure public heath is not at risk.

7. Plant Drainage

Now my final point that I'm going to mention and touch on is an in-plant issue that deals with their drainage and cleaning of their systems like the digester, pumps, and their pipe lines within the plant that are full of green liquor, brown liquor, white liquor, black liquor and any other chemical substances that are used in the pulp making process.

During shut-down periods, these substances get flushed with acid for cleaning purposes. During these shut-downs or during emergency break-downs within the plant, at any given time, these substances are flushed down a drain and out into Boat Harbour. Any process interruption is drained off and sent down a drain out into Boat Harbour as well.

No where in Northern Pulp's focus report does it mention how they will deal with kraft interruption or their cleaning processes for the items mentioned above. The focus report does not mention how the new system will handle these chemicals in their raw form or how the microorganisms that are used in the AST system will interact with these chemicals.

This is a major concern because these types of incidents happen far too often in this plant and more information should be required as to what will the effects be on the AST system. Any slight mix up in their process will affect their AST system, which then affects the outfall discharge.

I want to thank you for your time in reading my submission and hope that you take my concerns as serious as I do for the heath and well being of the Northumberland Strait -that all species and their larvae are protected and studied to ensure they will be around for years to come.

If fishermen are held to respect Marine Refugee Areas to insure safety of the juvenile lobster, so should Northern Pulp. There should be no risk put on any species in the Northumberland Strait that could cause adverse affects to a commercial fisheries and to human recreational enjoyment.

Let's get this assessment done right and protect the water and air from harm that can not be reversed. I look forward to hearing from you with regards to these issues, that this project is not given any approvals of any kind and is rejected.

Thank you and Sincerely,

Plvmouth Pictou County

@hotmail.com

From: @hotmail.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:12:00 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: No untreated effluent will leave the mill site. Name: @hotmail.ca Address: Municipality: Lower branch Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 65 y: 25

From: @sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:15:08 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I was born and grew up in Pictou County, and have the utmost respect for its people, and deep sorrow for what has been endured, with regard to the environmental impact of the ongoing operation of the 50 plus year old pulp mill at Abercrombie. I will leave the scientific data to others, best suited to that purpose. I am writing as a person with a life-long tie to this area, and as a person who now spends several months a year there. I firmly believe that the current situation requires an environmental assessment at the federal level through CEAA, to ensure that the highest level of professional assessment is completed, and that there is no perceived conflict of interest within the assessment process. Name: Email: @sympatico.ca Address: Municipality: Ottawa Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 71 y: 19

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:17:33 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: My family and I live in Trenton NS. For over fifty years we have suffered from the stench of NP. We have breathing problems that effect us daily from the polited air NP expects us to breathe. Itâ?Ts time our government does what they were voted in to do, No pipe to go into our waters and to hold strong on boat harbour date. Name: @hotmail.com Address: Municipality: Trenton Postal-Code: ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 28 y: 22

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:17:53 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I have been following the Northern Pulp issue for the past year. I have come to the conclusion that there is no good reason to allow an extention of the deadline. This company is a subsidiary of one of the Corporations deemed among the top ten corporate criminals in 2018. The proposal t send the effluent further out into the Northhumberland strait makes no sense especially as there is no way to determine the effect on the fishing industry. All reports I have seen indicate that the revenue from fishing dwarfs revenus from forestry so why would we risk endangering that industry? We are also at a stage where it appears that keeping our forests as carbon sinks will make more economic sense which should also bring into question do we even need our current pulp industry. Would we be better off managing our forests in a way that created older growth and more valuable wood down the road. The current practices are no longer sustainable nor do they make sense. Name: @gmail.com Address: Municipality: Hebbs Cross Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 43 y: 19

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:19:19 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I am completely against the use of the Northumberland Strait as a dumping ground for industrial waste. This option should not be considered. Name: @gmail.com Address: Municipality: Antigonish Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 79 y: 28

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:21:59 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: The same system is used in a lot of pulp mills. Itâ?Ts a proven system. Name: Email: @hotmail.com Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 45 y: 28

From: @comcast.net
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:27:06 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Northern Pulp NP has been polluting the air, lands and water of Nova Scotia far too long. They and the government have failed to correct the problems and broken too many promises for far too long. You must honour the dates set forth in the Boat Harbour Act and cease operation of the plant. The forestry industry has other resources to turn to. Our fisherman and the areas residents do not NPRs proposal relies on a disastrously flawed concept. The answer to pollution is NOT dilution. Even treated effluent flowing into the Strait can have serious effect on aquatic organisms as proven by joint Canada US EPA studies in the Great Lakes. DDT, PCBs, mercury, dioxins and many others do not break down in water and have a bio-accumulative effect in the food chain. Regulations should require treatment and containment, not release into waters. Furthermore, it is unconscionable that NP itself is conducting these studies. You are letting the fox guard the henhouse. And worst of all, those who are advocating for this project are those who will reap the benefits. And those who oppose it are the ones who will face 5he consequences. However it is decided will not be forgotten, nor forgiven. Do the right thing. Name: @comcast.net Address:
Municipality: Pictou Island Postal-Code: Fax: ### ### - ####
email_message: Privacy-Statement: agree x: 68 y: 46

From:
To: Environment Assessment Web Account
Subject: [PROBABLE-SPAM] Northern Pulp Focus Report
Date: November 8, 2019 6:29:36 PM
Attachments: northern pulp.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Please accept this pdf submission in place of the one previously sent.
Thank you,

Response to:
Focus Report on Northern Pulp's Proposed Effluent Treatment Facility Project
Nov 8, 2019

Submitted by:

Halifax NS

Submitted to:
Honourable Minister of the Environment, Gordon Wilson:

My roots in Pictou County go back several generations, and although I have lived in five Canadian provinces, the north shore of Nova Scotia is where I am most at home. My husband and I worked and raised our children in Pictou County.

My father worked in the paper industry (including Scott Paper in Abercrombie) and I grew up in paper mill towns. One of them was Dryden, Ontario, where the water-borne mercury poisoning inflicted on the Grassy Narrows First Nation people by that paper mill in the 1960s is still having a profound and tragic affect. I value good jobs in rural areas, I use paper and I had believed somehow, as seems to occur in Nordic countries, that paper production, sustainable forestry practice and careful fishery management could coexist.

https://www.researchgate.net/publication/328485222_The_Greening_of_the_Pulp_and_Paper_Industry_Sweden_in_Comparative_Perspective_Comparative_Perspectives . (January 2018)

But Pictou County has a sad history of industry using the land, water, resources and manpower for profit, with casual disregard for both the health and safety of workers, the environment and the general population. Northern Pulp's Focus Report does not convince me that its current plan can ensure the safety of our ocean and coastal areas, nor fulfill its obligation to the people of Pictou Landing First Nation.

Northern Pulp has not demonstrated to Nova Scotians that it can be a trusted partner in protecting the environment nor competently managing the environmental risks of paper production. A few reasons within the last five years:

- Paper Excellence (Northern Pulp's owner) has been charged with permit violations for recent environmental infractions in other Canadian mills (2018).
- Northern Pulp has a history of air emissions infractions (2015, 2016, 2017)
- NP has had effluent pipe leaks (2014, 2018) that went undetected
- NP is listed on Canada's Environmental Offenders Registry (2016)
- NP did not hold consultation with officials of the Town of Pictou in its

preparation for the proposed effluent pipe route into the Northumberland Strait, although the pipe would cross that town's watershed area (2018)
- NP submitted an Environmental Assessment Registration Document which was lacking important information, as noted by previous NS Minister of the Environment, Margaret Miller (2019)
- NP asked for an extension to the NS government's deadline to close Boat Harbour by January 2020, in spite of being given five years by the government to develop an effluent management plan
- NP scheduled their press conference on January 31, 2019, to request an extension to the January 2020 deadline, with complete disregard and disrespect for Pictou Landing First Nation's countdown celebration on the same day, for the legislated closure of the Boat Harbour waste water facility

On reviewing the report, vague wording such as “may”, “expected”, “will be studied”, “unlikely”, “anticipated”, ”predicted”, “minimized” and “in the unlikely event (of a leak)” cause real concern. I do not believe that Northern Pulp can convince the people of Nova Scotia that potential long-lasting risks to the environment have been adequately considered or planned for. The protection of our environment, our fishing industry, tourism and the health of people in NS must be the priority, above all else.

I urge Premier MacNeil and Minister Wilson to reject the current proposal. If this plan is not rejected, a review by the federal Impact Assessment Agency would be critical to assure the people of Nova Scotia that the current government is committed to protecting the safety of our environment, health and fishery.

Thank you.

From:
To: Environment Assessment Web Account
Subject: Environment Minister re. Pulp Mill
Date: November 8, 2019 6:36:13 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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I am concerned about the effects of the Pulp Mill's plan. The beaches, fishery, harbours and park areas need to be protected.

Thank you

Sent from my Galaxy Tab A

From:
To: Environment Assessment Web Account
Subject: No pipe and no extension
Date: November 8, 2019 6:36:21 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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As a land owner with a cottage on the North thumberland straight and kayak guiding business I am asking the Minister of the Environment to reject Northern Pulp's proposal for a pipe and not to grant an extension.

The province has allowed too much pollution from the mill already and the proposal does not do enough to protect the more valuable resources in the area. Fishing and tourism are worth more that the mill, time to close it if it can not be operated in an environmental responsible manner.

Thanks

Sent from Windows Mail

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:36:37 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: My husband and I fully support Northern Pulps efforts to clean up that awful mess, left by someone else. They help provide a livelihood to many people in this province. We believe the replacement Effluent Facility should be approved. NS needs forestry, responsibly managed forests help protect us from forest fires, they keep the forests healthy and viable. We spend almost all of our weekends either out 4 wheeling, camping, or hunting. Spending our time out in these forests, we believe that forestry is too important a renewable resource. My husband is currently cutting 30 year old trees, so even though it was once a clear cut, its now being re-cut. We tried to work out west and it just isnt the life we wanted for our children. We moved back here to NS 10 years ago, we now own property and pay taxes. If NS loses this mill, we will be forced to leave NS and our Family Friends For good. Northern Pulp, Paper Excellence, has a mill in BC, and despite all of the public outcry prior, it is fine. Its cleaner, more efficient, and is doing well. Even the fish arent bothered by it. Without Northern Pulp, you will see the Maritimes empty of people. We need to be able to work, to afford to live. Please approve the replacement of the Effluent Treatment Facility Project and ensure so many, many, people are able to stay here at home in Nova Scotia! Name: @gmail.com Address: Municipality: Amherst Point Postal-Code: Phone: 9023971071 Fax: ### ### - #### email_message: Privacy-Statement: agree x: 0 y: 0

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:36:52 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Greetings, I am a community member who has seen and prospered from the forestry sector and the spin off from the sector in the province of Nova Scotia. Living in Glace Bay I have also seen the negative affects of what happens in communities and surrounding areas when industry leaves. Pictou and the other areas along with Nova Scotia are not able to cope with the impact of losing these good paying jobs and causing an exodus of these hard-working individuals and families. In 2011 Paper excellence purchased this pulp mill. The previous owner lacked investment, development and interest to make sustainable changes to keep the mill and the environment viably stable for the future. Since the purchase Northern Pulp has invested over 130 million dollars into improvements to protect and improve their environmental foot print in the community. This included changing from bunker c oil to cleaner natural gas and the installation of a new precipitator to improve the air quality in the area. Northern Pulp is prepared to make the investment in a new state of the art effluent treatment facility that is similar to more than 80 other mills of this nature across the country. They have addressed every concern raised in the initial public consultation comments and every question raised to them by the Nova Scotia Environment department. They have answered with facts from experts including scientists and third party experts in the field. We know Nova Scotia now has some of the most stringent environmental laws in the country and Northern Pulp is will to make the investments need to respect these laws. They have a plan to move forward and continue investing in improving their environmental footprint. As the Minister of Environment for the province of Nova Scotia you really must make your decision based the scientific review of the focus report which highlights there is no adverse effects or significant environmental effects which may be caused by this undertaking. The forestry sector, as well as all stakeholders in this province is counting on the approval of this plan in order to survive. This project needs to be approved so this work can get started. Sincerely,

@gmail.com Address:
Municipality: Glace Bay Postal-Code: Fax: ### ### - ####
email_message: Privacy-Statement: agree x: 38 y: 27

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:38:06 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I support the Replacement Effluent Treatment Facility Project. I believe we need as many jobs in Nova Scotia as possible. If Northern Pulp had to close it would be a great loss to the economy. Less jobs means less people living in Nova Scotia. I am 18-years-old and would love to spend the rest of my life in Nova Scotia however, with the loss of jobs closing Northern Pulp would create, that may no longer be possible. Name: Email: @hotmail.com Address: Municipality: MacPhersons Mills Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 15

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:39:01 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Dear Minister Gordon Wilson, Fifty-two years ago the first toxic effluent flowed into the pristine lagoon of Boat Harbour and within 24 hours killed all the living organisms in those waters - fish went belly up,and the waters that were so important for Pictou Landing First Nation were rendered useless for food, living and recreation. Seven Premiers later the toxic waste from one of the most egregious polluters in the province continues to flow into Boat Harbour at a daily rate of 90 million litres. Now Northern Pulp wants more time added to the already 5 years it was given to come up with a sound plan to deal with the companys wastes and it hasnt made much or any progress to provide a viable alternative except to run pipelines through the town of Pictou and out into the Northumberland Strait. That is NOT a solution. This regime will continue to have a deleterious impact on the land, fresh water and marine habitats along the Strait. I vigorously oppose Northern Pulps current plan and want government to keep its promise to close the Northern Pulp facility at the end of January 2010. Name: Email: @gmail.com Address: Municipality: Lower Rose Bay, NS Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 18

From: @keele.ac.uk
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:39:44 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: The baseline conditions which are proposed to establish monitoring for the planned facility reflect what is already a heavily industrialised harbour. A pre-industrial baseline and restoration to those conditions should be the management goal. It is not sufficient to suggest there will be no further deleterious effects from the proposed pipe facility when there have already been significant losses of biodiversity, bioaccumulation of toxins in marine biota, and contamination with municipal and private residential sewage. The pipe may not make a bad situation worse, but it will in no way remediate the current damage. First Nations, fisheries, tourism, and local property values will all benefit from as full an ecological restoration as possible. An effluent pipe is simply not part of this picture. 60 years ago, you could jig for lobster in Pictou Harbour with a worm on a safety pin and safely eat your catch. Those conditions should be the baseline for an assessment of deleterious effects. If a full EIA can show how the effluent pipe will restore the harbour and Strait ecosystem above and beyond its current degraded conditions, that data should be produced and made public. Otherwise the proposed facility only adds insult to injury. Name: @keele.ac.uk Address: Municipality: Halifax Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 78 y: 16

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:43:33 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I believe instead of everyone fighting so hard to shut the mill down they should all come together to find a solution ! Some people just need to take a step back and take a look at everyoneâ?Ts views ! Name: @gmail.com Address: Municipality: Westville Postal-Code: ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 65 y: 36

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:45:50 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Hon. Gordon Wilson I am writing to you to approve northern pulps replacement effluent treatment facility project. The new facility is going to produce a better quality effluent being released into the strait then is currently going in now. For 52 years effluent has been going into the strait and every time the mill made a change the effluent quality improved. There is currently 88 NBSK mills discharging effluent in Canada now. Other mills in Canada have fishing coexisting with effluent discharge as in pictou county. In conclusion I hope the science included in the focus report meets or exceeds Canadas standards for effluent and gets a approval as a lot of families including mine depend on Northern Pulp for a living and do not want to be forced to move out of province for work. Name: @hotmail.com Address: Municipality: New Glasgow Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 54 y: 25

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: November Response to Northern Pulp Replacement Effluent Treatment
Date: November 8, 2019 6:46:22 PM
Attachments: November Reply to Northern Pulp Replacement Effluent Treatment.pdf

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** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please confirm receipt of my email. Thank you.

Honourable Gordon Wilson

Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, NS, B3J 2P8

March 9, 2019

Hon Minister Gordon Wilson,

I am writing in response to the proposal submitted to the Department of Environment regarding the Northern Pulp Replacement Effluent Treatment Facility Project.

My name is I am a resident living in Pictou years.

I served as a Town of Pictou citizen representative on the Town of Pictou Ramsay Report Committee for approximately years ending . The Town of Pictou Organization Study was competed by Richard G. Ramsay Management Consultants Inc. to address the Town of Pictou's fiscal situation and develop a strategy toward a number of areas including residential, business development in the town of Pictou, increased quality and deliver of water services including our watershed and improved Town services and support to tourism, culture and community organizations.

Source: http://pictouproud.com/Portals/18/documents/20.ramsayfinal.pdf

I now am a member of the Town of Pictou, Water Source Protection Committee as of

My submission to you will include two topic areas:

1. The watershed for the Town of Pictou and surrounding community of Caribou
2. The impact of the toxic effluent dumped into the Northumberland Strait.

Focus 1: The watershed for the Town of Pictou and surrounding community of Caribou

As stated in the Northern Pulp Nova Scotia Corporation, Focus Report - Replacement Toxic effluent Treatment - October 2019 | 17-6461

Land-based Pipeline Portion - *"The pipeline will begin on-land at a pump station where treated toxic effluent from the ETF is pumped into the pipeline. For approximately the first kilometre of the pipeline, the pipe will be located on NPNS property until it meets and enters Pictou Harbour. The pipeline will be submerged across Pictou Harbour, aligned immediately to the east of the Pictou Causeway until it meets the north bank of Pictou Harbour. On the north side of Pictou Harbour, it enters the Nova Scotia Department of Transportation and Infrastructure Renewal's (TIR's) Highway 106 (Trans-Canada Highway, also known as Jubilee Highway) right-of-way (ROW) and follows Highway 106 north toward Caribou, NS. Project Overview xxxiv Northern Pulp Nova Scotia Corporation Focus Report - Replacement Toxic effluent Treatment October 2019 | 17-6461 The pipeline will be installed generally parallel to Highway 106, along the outermost eastern portion of the NSTIR ROW. It will be situated predominantly on the east side until it reaches Caribou. At this point, the pipeline will cross under Highway 106 to the west side and enter the marine environment at Caribou Harbour to the north, and to the west of the Northumberland Ferries marine terminal building and parking area. There will be automated leak detection of the land-based pipe between Pictou and Caribou to identify issues in the unlikely event that a leak does occur*.

The second submission from Northern Pulp demonstrates a total disregard to the safety of the Town of Pictou Watershed that supplies water to approximately 3200 residents and the Municipality of Pictou County residents and businesses who live and rely on this watershed.

This watershed supplies drinking water, household use including hygiene care and business use including long term care, businesses and tourism. Without a safe water supply the Town of Pictou will not be able to survive when something goes wrong. And something will go wrong.

In the **Pictou / Caribou Source Water Protection Plan,** the risks to water quality were identified as transportation, residential development, waste disposal, agriculture, **industrial development** and recreation and environment.

The procedures for development of the Pictou / Caribou Source Water Protection Plan are:
1) Form a Source Water Protection Advisory Committee (Committee);
2) Delineate a Source Water Protection Area Boundary;
3) **Identify Potential Contaminants and Assess Risk;**
4) Develop a Source Water Protection Management Plan; and

5) Develop a Monitoring Program to Evaluate the Effectiveness of a Plan.

https://www.townofpictou.ca/assets/PDFs/Water/Pictou-SWPP-Update-October-2017.pdf

I will focus on #**3 Identify Potential Contaminants and Assess Risk:**

Almost every activity on the land has the potential to affect the quality of water in our community. The Town of Pictou focuses on the following to protect its watershed:

Acquisition of Land: "*The acquisition of land by the Town gives direct ownership and control of portions of the source water area to the Town. This allows for a high level of protection of a source area due to direct control over the activities that can take place there." (Page 14)*

Best Management Practices (BMP's): "*These standardized and widely accepted practices for activities and products are the most **practical and effective means of preventing or reducing contaminants from reaching source water.** BMP's have been developed for most activities, which occur in a well field. They can be applied to various aspects of residential development, including septic system and oil tank installation and maintenance, and construction activities. Most aspects of agriculture have operating BMP's in place through a variety of regulatory and market driven processes. Many of these practices are specifically designed to manage specific activities, which may affect water quality. BMP's are also in place for many industrial products, services, and activities related to motorized recreation and transportation.) (Page 14)*

For a toxic effluent pipe to go through this watershed and the likelihood of a break in that pipe and it will happen, the province of Nova Scotia will have Boat Harbour #2 happen again in the Town of Pictou and the Municipality of Pictou County's watershed.

We have the human right to have safe drinking water for our families and community in Canada. It is 2019 and we are supposed to be living in a First World Country.

Northern Pulp states in their report: "*There will be automated leak detection of the land-based pipe between Pictou and Caribou to identify issues in the **unlikely event** that a leak does occur."*

Northern Pulp History 2014

On June 10, 2014 a leak of 47 million litres of "toxic" pulp mill toxic effluent / waste spilled on sacred Mi'kmaw burial grounds at Indian Cross Point, and into the East River that flows into Pictou Harbour.

On October, 21, 2018, at Indian Cross Point. Northern Pulp had another leak which was only found by found by local residents, not NP staff or equipment.

From my inquiry with Friends of The Northumberland Strait, they made a request for information about the October 21, 2018 leak to the Province of Nova Scotia asking the to release three key pieces of information including:

- 1.the size or cause of the leak in October 2018
- 2.the composition of the toxic effluent that leaked
- 3.why the pipe break went initially undetected by the pulp and paper firm owned by Paper Excellence.

Checking with of the Friends of the Northumberland Strait, they have not received a reply to their request of information from the Province of Nova Scotia Department of Environment or any other department or representative from the Nova Scotia government. That is unacceptable.

In an review of responses from Northern Pulp, the National Post stated in an article https://nationalpost.com/pmn/news-pmn/canada-news-pmn/n-s-group-seeks-data-on-october-toxic effluent-leak-from-northern-pulp-pipeline, "*Cloutier said the leak was at a fibreglass joint, the technology of the day in the 1960s, and the proposed new treatment system will have fusion welded joints that "are leak proof and as strong as the pipeline itself."*

Technology from 2019 will also be outdated in the years ahead. And with the newest technology, leaks and accidents happen. My question is why is the Province of Nova Scotia taking a chance on equipment that may very well break down in the ground as well as the breakdown of the automated leak detection that is suppose to monitor it? The pipe is located in the watershed of the Town of Pictou and Municipality of Pictou County.

If a real-world example is needed to demonstrate how modern technology can and will break down, I offer the latest example that took place in late October 2019 when Keystone XL pipeline shut down after spilling *1.4 million litres of oil* of oil in North Dakota. There is not even a clear date when this happened. A couple of websites state October 30, October 31 and the best guess- late October. Here it is 2019 and an oil pipeline commissioned in 2010, does not have the technology to firmly report a pipeline break in any situation. This is the third spill along the pipeline's route in three years.

https://www.cbc.ca/news/business/keystone-spils-over-1-million-litres-oil-north-dakota-1.5343509

"An estimated 1.4 million litres of oil have spilled from TC Energy Corp.'s Keystone crude pipeline in North Dakota, state authorities said on Thursday, a major leak at a time of increased regulatory scrutiny of oil pipeline expansions."

A warning on page 6 in the section from Northern Pulp's latest report:

"Due to this robust design, ***there is not expected*** *to be any residual environmental effects of the project on the groundwater supplies"* **Not expected is not guaranteed**. This is not good enough for a town and municipality whose citizens, health and long-term care and business community will require water to survive. Just not good enough.

The Keystone Pipeline spill demonstrates the truth that pipelines break down and control systems fail. I rest my case on the statement of expectation in the event of a break or leak from Northern Pulp.

Page 59 of Northern Pulp Report - *"The mill has been in operation for many years and there are already many active emergency procedures. For example, to address a* ***potential toxic effluent release to the environment, there is an emergency water reduction plan already in place.*** *Standard operating procedures will be updated to include the new replacement ETF during commissioning, but the general operating philosophy remains unchanged. Steps will be taken, up to and including slowing or stopping pulp production, to manage upsets in a manner that does not see untreated toxic effluent entering Pictou Harbour from the mill site.* ***The mill will not continue normal operation if there is a risk of overflow to the environment."***

Again, Northern Pulp had two spills in the past five years. These spills still went into the ground, impacting the local ecosystems including sacred Mi'kmaw burial grounds. Were these spills caught as per the statement, "…*potential toxic effluent release to the environment, there is an emergency water reduction plan already in place", from page 59 of Northern Pulp report?"* Not very well.

On June 10, 2014 a leak of 47 million litres of "toxic" pulp mill toxic effluent / waste spilled on sacred Mi'kmaw burial grounds at Indian Cross Point, and into the East River that flows into Pictou Harbour.

On October, 21, 2018, at Indian Cross Point. Northern Pulp has a failed history of this happening at last date October 21, 2018 only found by local residents, not NP staff or equipment.

Page 63 of Northern Pulp Response:

Town of Pictou's Water Supply Protection Area

"The proposed toxic effluent pipeline route runs adjacent to Highway 106 on its east side and will pass through the Town of Pictou and its source water protection area. Of the 13 wells located in these areas, ***all except one well*** *are located in excess of 900 m away from the pipeline route. NPNS obtained Light Detection and Ranging (LiDAR) survey data from the Province of Nova Scotia and overlaid it on the map of the Town of*

Pictou's source water protection area. The data contained elevation information that was accurate within +/- 15 cm and was used to delineate Surface Flow Accumulation areas around the proposed pipeline location. This information was used to understand the likely paths of surface water movement and determine collection points, called flow accumulation points, based on topography or the lay of the land. Figure 3.5-1 ***indicates that surface runoff from a potential breach of the pipeline will flow away from the Pictou Wellfields in all of the identified Surface Flow Accumulation areas."***

Not much comfort. *"Of the 13 wells located in these areas, all except one well are located in excess of 900 m away from the pipeline route."* That one well is active and toxic effluent will impact the water supply for Town of Pictou and Caribou, Municipality of Pictou County residents.

The statement, "… ***indicates*** *that surface runoff from a potential breach of the pipeline will flow away from the Pictou Wellfields in all of the identified Surface Flow Accumulation areas," is just not acceptable.*

The word **"indicates"** is a best guess estimate. Not good enough. I like my drinking water without toxic effluent. And what about the families that live outside of the Town of Pictou Wellfields? Do they not count? My family and neighbours do count. This is not acceptable and deadly to the lives of our citizens.

There is a history lesson here, think of Walkerton, Ontario, May 2000. The outbreak there was E. coli. The contamination sickened more than two thousand people and resulted in six deaths.

I reference a report here: **Entrance of paper mill toxic effluent chemicals into ecosystems and their subsequent biomagnification and interaction with humans—a review. -** Brion Harrison, Coral Mullen, James Rupinski, Alec Schweinberg

http://marinesciencetoday.com/wp-content/uploads/2015/02/2-23-EntranceofPaperMillToxicEffluentChemicalsIntoEcosystems.pdf

"Paper mills present a source of highly concentrated chemicals being added directly to the surrounding environments. Many of these chemicals are known to be toxic to animals and humans. Some have been proven genotoxic, or DNA destroying (Pokhrel & Viraraghaval, 2004, p. 41). Such chemicals are usually fatal or cancer causing on contact, especially chronic contact as one would expect from presence in a water source. Beyond the possible impacts chemicals have on the individual organisms that they contact, they have the possibility to completely reshape or destroy the environments surrounding the paper mills. According to a commercial diver employed at Crofton Diving Corporation that has worked with the International Paper mill in Franklin, Virginia, most paper mills, such as the mill in Franklin, have special procedures in place should a meltdown occur and untreated chemicals exit the plant into

the surrounding environment (personal communication, November 4, 2014) (Appendix). – Page 1-2.

Impact of chemicals on humans. *"There are many chemicals in paper mill toxic effluent that can be harmful to humans. Tetrachlorodibenzo-dioxin (TCDD) is one of the most toxic chemicals that can be found in paper mill effluent and is most commonly consumed by eating contaminated fish or drinking contaminated water. Dioxins are some of the most toxic chemicals known to man and are supposed to be limited to small amounts in paper mill effluent, the problem is that even small amounts can be harmful to humans. The tolerable daily intake of dioxins is 1-4 picograms (1.0x10^-15grams) per kilogram body mass* (Leeuwen, 2000). TDCC has been proven to be a very aggressive carcinogen. It also impairs reproductive health and can render healthy adults sterile. - Page 14

"Like many other chemicals that are present in the ecosystem, pollutants introduced by paper mills are capable of entering the food web, at which point many will undergo biomagnification, increasing in concentration as it moves up the food chain, creating a landslide effect on sensitive ecosystems. Humans, the cause of the pollution, are not free from its effects, as the chemicals present in the water are harmful to the physical and economic health of communities around or downstream of paper mills."

"Biomagnification of chemicals within the food chain. Pulp paper mills release toxic organic compounds into waterways in the form of toxic effluent. Some compounds found in the toxic effluent can have a negative impact on the health of organisms that inhabit the surrounding areas. 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin (TCDD) is a highly toxic dioxin found in paper mill toxic effluent. TCDD. Factors such as: bioconcentration, bioaccumulation, and biomagnification contribute to the increased concentrations of dioxin in organisms near paper mills. High levels of dioxins can have adverse effect on an organism's reproductive success. – Page 11

This is a pipe designed to pollute prime fishing grounds." "Boat Harbour is as dead as a door nail. Black, dead water. I wouldn't stick my finger — or anything else in it," Merigomish resident, and long-time lobster fishermen, .

https://ipolitics.ca/2018/10/08/the-fight-to-keep-a-pulp-mill-from-poisoning-the-northumberland-strait/

Focus 2: The impact of the toxic effluent dumped into the Northumberland Strait.

The revised NP report does not address the areas I outline in my original submission made to Minister Margaret Miller in March 2019.

This submission requires a Class 2 Environmental Assessment by the Government of Canada,

The Veolia testing to get the "expected " future toxic effluent parameters is showing higher numbers than what is presently measured at Point C in Boat Harbour.

Point C is where NP takes its toxic effluent measurements and meets the pulp and paper toxic effluent regulations. Point C is also a dead zone.

Table 1-5: Effluent Loadings Comparison

	2018 Point C Treated Effluent Loading (kg/day) [3]	Veolia Expected Loading (kg/day) [4]	RWS Loading (kg/day)
BOD	1,526	≤ 1,875	4,080
TSS	1,717	≤ 1,875	4,080
COD	39,521	≤ 37,500	61,625
AOX	87	≤ 225	663
Nitrogen	299	≤ 450	510
Phosphorous	95	95 [5]	128

Dillion Consulting stated:

In an email between Northern Pulp's technical manager and Dillon Consulting written on Nov. 29, 2017 the technical manager said in reference to the toxic effluent coming from the proposed Northumberland Strait pipeline, "some say toxic effluent quality will be worse than today because of all the polishing that is happening across the Boat Harbor basin—and they are correct to some extent."

Stantec said this about current waste process to show the additional treatment the toxic effluent got …

Primary toxic effluent treatment is provided in the north settling pond (12-h retention time), secondary treatment in an aerated lagoon (8-day retention time), and subsequently in a stabilization basin (20–30-day retention time) (Stantec 2004).

Northern Pulp said this…..

The proposed toxic effluent will be equivalent to what is being measured at Point C of Boat Harbour today (CBC Mar 5, 2019)

In the document, ***Canada's Challenges and Opportunities to Address Contaminants in Wastewater Supporting Document 2, Wastewater Treatment Practice and Regulations in Canada and Other Jurisdictions*** – Environment Canada, March 2018, it states on **page 8**, under the header: **1.2 Regulatory structure for wastewater treatment,** the following states:

"***The primary federal tool to control the wastewater releases is the Fisheries Act***. *Within the Fisheries Act, Environment and Climate Change Canada (ECCC) administers the key pollution prevention provisions (subsections 36 (3) to (6)), which* ***prohibit the deposit of deleterious substances in water frequented by fish, unless authorized by regulations (Environment and Climate Change Canada, 2017a). A deleterious substance may be any substance that degrades or alters water quality such that it could be harmful to fish, fish habitat, or the use of fish by people****. Under the pollution prevention provisions, ECCC administers and* ***enforces several regulations, such as those governing toxic effluents from pulp and paper mills, metal mining operations, and municipal wastewater.*** *The Wastewater Systems Toxic Effluent Regulations (WSER; SOR/2012-139) establish baseline municipal toxic effluent quality standards for suspended solids (SS), carbonaceous biochemical oxygen-demanding material (CBOD), total residual chlorine, and un-ionized ammonia (NH3), as outlined in Table 1.1. These regulations impose minimum standards for municipal toxic effluent quality nationwide, and are intended to be achievable through secondary wastewater treatment or equivalent."*

This continues with the following information on page 9*: "In addition to the Fisheries Act, the Canadian Environmental Protection Act (CEPA) is also used to prevent and manage risks posed by toxic and harmful substance. This legal framework may contribute to improved wastewater toxic effluents by controlling substances that are otherwise difficult to treat (CCME, 2009). Under CEPA, owners or operators of wastewater treatment facilities that meet reporting requirements are required to report discharges to the National Pollutant Release Inventory (NPRI), which is a publicly accessible inventory of pollutant releases. NPRI tracks releases of several substances associated with municipal wastewater, such as ammonia, chlorine, metals, phosphorus, and greenhouse gases. However, reporting to the NPRI is only mandatory for facilities in which employees work a total of ≥20,000 hours during the calendar year, thresholds for specific substances are met, or total discharges exceed 10 000 m3 /day (Environment and Climate Change Canada Change, 2016). Because only about 200 WWTPs (out of ~3500) across Canada meet these requirements (Holeton et al., 2011), the contaminant releases shown in this database represent only a subset of the total contaminant loads released into the environment from wastewater treatment facilities."*

The Northern Pulp proposal states: *The group also visited two NBSK pulp mills that operate Veolia BAS™ treatment systems (Södra Cell Värö mill in Väröbacka, Sweden and the Södra Cell Mörrum mill in Mörrum, Sweden) in May 2018. Both of these mills successfully*

manage the BAS™ treatment system to meet applicable regulations and have ocean discharges for their treated toxic effluent. These visits confirmed that the proposed Veolia BAS™ treatment system will provide the required treatment needs for NPNS to meet current and an anticipated future regulations." (Page 64 - 4.0 Project Justification and Alternatives Considered - - DILLON CONSULTING LIMITED)

"*There is an increased project risk due to lack of reliability in disposal: weather conditions, vehicle maintenance/problems, and appropriate staffing redundancy to accommodate volume of discharge. There will be a significant increase in truck traffic, which will increase noise and potentially the risk to public safety*." (page 67- DILLON CONSULTING LIMITED).

The report goes on to state: "*Use of a pipeline increases the reliability of disposal as it is not as subject to weather conditions and staffing as trucking. Additional infrastructure may be necessary, including additional pumping and length of pipe, which includes risks of potential failure. NPNS may be required to purchase/lease additional land to construct a pipeline. Additional approvals and studies will be necessary*." (page 67- DILLON CONSULTING LIMITED).

If I read this correctly, then piping toxic effluent through a watershed into a final drop off into prime fishing grounds and for ocean currents to carry it out into the large mass of Northumberland Strait is a better plan? Let's look at some of the materials that will be in that toxic effluent.

The method that's used at Northern Pulp will create chlorinated pollutants such as chloroform, dioxins and furans and other contaminates released include, heavy metals such as mercury, zinc, cadmium chromium, along with organics, alkyl phenols and oxygen depleting nutrients. I will address two of the nine pollutants stated above from this article:

Source: Report shows heavy metals in pulp mill toxic effluent, Cape Breton Post, Published: Nov 07, 2014 at midnight, Updated: Oct 02, 2017 at 11:27 a.m. https://www.capebretonpost.com/news/local/report-shows-heavy-metals-in-pulp-mill-toxic effluent-7486/

Mercury in the Food Chain:

Source: NORTHERN PULP'S ENVIRONMENTAL DOCUMENTS: MISSING MERCURY, A PULP MILL THAT NEVER WAS, AND OODLES OF CONTRADICTIONS - MARCH 5, 2019 BY JOAN BAXTER

https://www.halifaxexaminer.ca/province-house/northern-pulps-environmental-documents-missing-mercury-a-pulp-mill-that-never-was-and-oodles-of-contradictions/?fbclid=IwAR1O3kOUAvSC5KFq-pHKBJYEpk1dwa2olmkWOoITHpaaFEDCkH8BYaE-b6o#Missing%20answers,%20missing%20mercury

Source: https://www.canada.ca/en/environment-climate-change/services/pollutants/mercury-environment/health-concerns/food-chain.html

Mercury in the Food Chain: The Government of Canada website states in its introduction to mercury in the food chain that, "*Almost all mercury compounds are toxic and can be dangerous at very low levels in both aquatic and terrestrial ecosystems. Because mercury is a persistent substance, it can build up, or bioaccumulate, in living organisms, inflicting increasing levels of harm on higher order species such as predatory fish and fish eating birds and mammals through a process known as "biomagnification"... "In the environment, particularly lakes, waterways and wetlands, mercury can be converted to a highly toxic, organic compound called methylmercury through biogeochemical interactions. Methylmercury, which is absorbed into the body about six times more easily than inorganic mercury, can migrate through cells which normally form a barrier to toxins. It can cross the blood-brain and placental barriers, allowing it to react directly with brain and fetal cells."*

"The most important pathway for mercury bioaccumulation is through the food chain, as illustrated in the figure below. In the water, plants and small organisms like plankton take up mercury through passive surface absorption or through food intake. For "autotrophic" organisms (which do not eat other organisms), passive absorption is the only route of exposure. The amount of mercury that results in these species from even a lifetime of passive absorption is not generally harmful to the organism. On the other hand, heterotrophic organisms (animals which eat other life forms) may be exposed to dangerous concentrations via a second route. Methylmercury biomagnifies through the food chain as predators eat other organisms and absorb the contaminants that their food sources contained. Over time, an individual who consumes plants or prey contaminated with methylmercury will acquire levels greater than in either its habitat or its food. ***As a result, top predators acquire greater body burdens of mercury than the fish they consume."*** **The top predator is "We", the human consumer.**

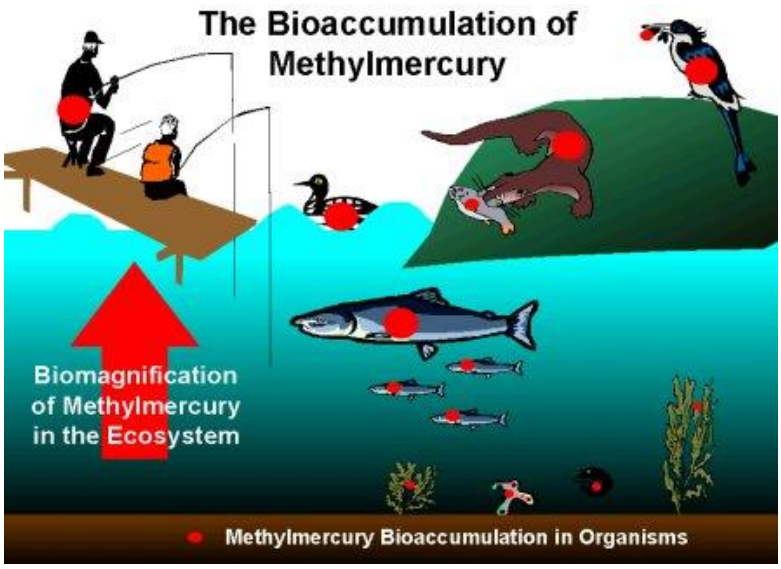


Photo Source: https://www.canada.ca/en/environment-climate-change/services/pollutants/mercury-environment/health-concerns/food-chain.html

Zinc in the Food Chain:

Source: https://www.lenntech.com/periodic/elements/zn.htm

"Water is polluted with zinc, due to the presence of large quantities of zinc in the wastewater of industrial plants. This wastewater is not purified satisfactory. One of the consequences is that rivers are depositing zinc-polluted sludge on their banks. Zinc may also increase the acidity of waters.

"Some fish can accumulate zinc in their bodies, when they live in zinc-contaminated waterways. When zinc enters the bodies of these fish it is able to ***bio magnify up the food chain****." As we humans are many times the final customer on the food chain, zinc impacts our health by, "Very high levels of zinc can damage the pancreas and disturb the protein metabolism, and cause arteriosclerosis. Extensive exposure to zinc chloride can cause respiratory disorders…Zinc can be a danger to unborn and newborn children. When their mothers have absorbed large concentrations of zinc the children may be exposed to it through blood or milk of their mothers."*
Source: https://www.lenntech.com/periodic/elements/zn.htm

"Industrial sources or toxic waste sites may cause the zinc amounts in drinking water to reach levels that can cause health problems."
Source: https://www.lenntech.com/periodic/elements/zn.htm

Other Sources:

- http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=71EF4032-1&offset=2&toc=show
- https://www.ccme.ca/files/Resources/supporting_scientific_documents/Zinc%20CWQG%20SCD.pdf
- https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/alaska/sw/cpa/Documents/L2010CadmiumLR122010.pdf
- https://novascotia.ca/fish/commercial-fisheries/industry-overview/
- http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/comm/atl-arc/lobster-homard-en.html
- http://www.assembly.pe.ca/sittings/2018spring/transcripts/17_2018-19-10-transcript.pdf
- http://employmentjourney.com/industries/fisheries/
- http://cwn-rce.ca/wp-content/uploads/projects/other-files/Canadas-Challenges-and-Opportunities-to-Address-Contaminants-in-Wastewater/CWN-Report-on-Contaminants-in-WW-Supporting-Doc-2.pdf
- http://cwn-rce.ca/report/canadas-challenges-and-opportunities-to-address-contaminants-in-wastewater/
- https://nsadvocate.org/2019/01/24/matt-dort-on-northern-pulp-toxic effluents-and-the-northumberland-strait-its-about-more-than-meeting-flawed-regulations/

Northern Pulp on under the Human Health Evaluation starting on page 489 of the original report states, *"Public and regulatory concerns regarding the potential human health effects of project emissions and treated toxic effluent discharges have been raised throughout the project development period, and it is likely that such health-related concerns will continue to be raised during NSE's EA review process.*

The project has two main sources of emissions/discharges that may result in potential human exposure to project-associated chemicals:

• The marine treated toxic effluent diffuser; and,

• Air emissions from the replacement ETF and existing NPNS mill due to future planned co-combustion of sludge with hog fuel in the mill power boiler.

At this time, toxic effluent chemistry characteristics (including the specific substances present in treated toxic effluent and their anticipated concentrations) ***will not be known with certainty until the project is operational."***

"Will not be known with certainty until the project is operational?" This is totally unacceptable. We the citizens in direct path of air emissions made up on sludge with hog fuel are to wait until the gases come across the harbour at us and we are diagnosed with cancer that we will find out at that time the new process burning sludge is not good for us?

The Government of Nova Scotia is putting itself in a precarious position to even think of allowing industry to act this out in 2020.

One more point:

On page 34 in the original EARD submission from Northern Pulp in earlier this year, the Executive Summary submitted by DILLON CONSULTING in Table E.1.1-1: Summary of the Significance of Project-Related Residual Environmental Effects, the abbreviation of NS = No Significant Residual Environmental Effect Predicted is assigned for each Valued Environmental Component (VEC) with sub headers of Project Phase Accidents (Malfunctions, and Unplanned Events), Project Overall, Construction, Operation and Maintenance.

How can a project of this magnitude to be completed and up and running by January 31, 2020 not have at least a minimal of two of the following risks?

S = Significant Residual Environmental Effect Predicted.

L = Residual Environmental Effect is Likely to Occur.

U = Residual Environmental Effect is Unlikely to Occur.

P = Positive Residual Environmental Effect Predicted.

And where in this report is a contingency plan? This proposal is best case scenario with worst case results for those of us in its path.

There is just no way can this project be trusted by any of us who will be directly impacted by this project. There is just no trust with this company.

Final Thoughts:

Premier Stephen McNeil rightfully stated many times over that Northern Pulp was given 5 years to come up with a plan. Five years is a long time. This timeline gave Northern Pulp ample time for them to come up with a plan, submit a plan, tweak the plan and resubmit and repeat. The Jan 31, 2020 Boat Harbour closure date in the Boat Harbour Act falls on the last day of Northern Pulp's current Industrial Approval. This deadline is clear and respectful.

From what I see there was not a lot of action by Northern Pulp until the past two years. When they filed their EARD in February, they stated that they would need an extension 'until they built their ETF or they would have to shut down.

We are being asked to trust their plan to move upwards of 85 million litres of toxic effluent per day through Pictou Harbour, across the Town of Pictou's watershed, through various water courses to be pumped into Caribou Harbour about 4kms into the Northumberland Strait after passing by Munroe's Island which is part of the province's 12% protected area because of its delicate eco system.

The Northumberland Strait is home to a large fishing industry between Northern Nova Scotia and Prince Edward Island. The Northumberland Strait is the home to a tourism sector that employees hundreds of people, both in Northern Nova Scotia and Prince Edward Island.

A written contract was stated and signed by all political parties and the legislative members was signed and dates May 11, 2015.

https://nslegislature.ca/sites/default/files/legc/statutes/boat%20harbour.pdf

The government of 2019 cannot go back on this signed, sealed and delivered contract. This contract cannot be given an extension. This contract was made as a commitment to the community of Pictou Landing First Nations.

This proposal will forever impact the drinking water for the Town of Pictou and Municipality of Pictou County residents in this area. This proposal will forever impact the fishing industry in this region and beyond. This proposal and the results will come with more health issues, respiratory illnesses and cancer rates in addition to a spoiled reputation of Canada's Ocean Playground. This proposal will impact our province, the province of Prince Edward Island and as far away as New Brunswick. It took only one mad cow to stop an industry in its tracks.

This is not an "if" statement. This is a "when" statement. History will repeat itself.

I urge the Hon. Gordon Wilson to reject the Northern Pulp Replacement Toxic Effluent Treatment Facility Project.

Thank you

Pictou, Nova Scotia

Email: @eastlink.ca

From:
To: Environment Assessment Web Account
Subject: Northern Pulp
Date: November 8, 2019 6:47:40 PM

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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is . I moved to Lyons Brook, Pictou County in . I am deeply concerned about Northern Pulps plan to deal with effluent once Boat harbour closes.

Premier Stephen McNeil stated that it would be wrong to move one disaster into a new location when he referenced Northern Pulp's ETF proposal. Of course that wasn't a statement on whether Northern Pulp's project was a disaster, simply that it would be wrong for the province to approve a project that could be characterized as creating a new disaster. Pictou County has too many precious resources that cannot continue to be put at risk with schemes such as this.

Mr. McNeil also rightfully stated many times over that the company was given 5 years to come up with a plan and that was more than enough time. Not only did the 5 year plan give ample time to Northern Pulp but this wasn't an 'arbitrary date' picked out of thin air. The Jan 31, 2020 Boat Harbour closure date in the Boat Harbour Act also falls on the last day of Northern Pulp's current Industrial Approval.

Northern Pulp were slow to get moving on their attempt to complete the project. When they filed their EARD in February, they stated that they would need an extension 'until they built their ETF or they would have to shut down'.

Asking for an indefinite extension as Northern Pulp's plan to build an ETF that pumps effluent described by their own technical engineer as being worse than what comes out of Boat Harbour, would set up the risk to move the disaster that is Boat Harbour and make it the disaster in the Northumberland Strait.

They cannot be given an extension. That would break the deal that was made in good faith and written into law between the long suffering PLFN and the province that saved Northern Pulp from having to close in 2014. They also cannot be given an extension because they don't have a sound plan for a new ETF so it may never be built. Northern Pulp cannot be given an indefinite extension.

Northern Pulp have been given ample opportunity, financial assistance, profits, and time while owning and running the mill and entrusted to ensure it runs properly, efficiently and safely. At some point you have to admit it can't be done. Send this environmental disaster packing, and stand up for your people, and your environment over foreign profit.
Please do what is right and put an end to this devastation of our county.

Thank you,

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 6:55:20 PM

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Project: replacement_effluent_treatment_facility_project Comments: If northern pulp closes, this will mean the s of thousands of indirect jobs lost Name: Email: @gmail.com Address: Brookfield Municipality: Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 23

From:
To: Environment Assessment Web Account
Subject: Nortern Pulp Focus Report
Date: November 8, 2019 6:58:14 PM

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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is and I've lived in Pictou for the last 18 years and I have several concerns about Northern Pulp's Effluent Treatment Facility Proposal.

1) I believe that Northern Pulp's plan to pump up to 85 million litres (31 Billion Litres per year) of effluent into the Northumberland Strait is a **bad idea**. I do not believe the Northumberland Strait and its marine life, which is already under a lot of stress, can withstand this incredible influx of effluent.

In addition to what it would do to the marine environment, I worry about the potential risk that this poses to our fisheries. The livelihood of our fishers is being threatened by both the make up of the effluent as well as the temperature. I do not believe the province would have even considered a proposal from Northern Pulp if that proposal was one that would put the Michelin plant next door at risk. I don't see how this is different.

2) The air emissions from Northern Pulp are also a great concern to me. They have failed to miss the limits set out in their Industrial Approval many times. In June, their stack tests failed one of their three tests and only passed thanks to the average of those three tests being under the limits set in their Industrial Approval. Testing on the power boiler, the stack from where these results came, are only done four times a year. Seeing that they are given a pass even though they failed one of the tests makes me wonder how many failures are going undetected.

Northern Pulp's plan for their new effluent treatment facility includes burning 'sludge' in that power boiler. This company has had a history of failing to meet their limits, their mill is over 50 years old and was only designed to last 25, they are not monitored enough to make me feel they are under the targets laid out in their Industrial Approval consistently and if this project is approved, they plan to add to those air emissions. The air that we breathe in Pictou County is bad enough, I don't see a plan to add more pollution to a mill that already seems taxed in its capabilities is a smart move and I don't approve this project.

3) Northern Pulp's pipe route raised a lot of concerns for me with their EA submission and seeing that they are sticking with the same basic pipe route as outlined in their focus report does nothing to alleviate those concerns.

I **do not trust** Northern Pulp's ability to monitor a pipe line and I don't trust their leak monitoring detection system that was mentioned in the focus report does enough to protect the Town of Pictou's water. A new route should have been chosen. The focus report talks about 'compensation' should problems be unavoidable. 'Compensation' does little for me if I can't trust the water that I drink. Northern Pulp were supposed to have a leak monitoring system on their current pipe but the massive raw effluent leak from October 2018 was not discovered by Northern Pulp, it was discovered by someone walking in the woods.

Northern Pulp's findings in their earlier EA submission found that their were no concerns. The need for the focus report was in part due to Northern Pulp not doing the proper work on species at risk, migratory birds, marine surveys, land surveys or water course surveys. I do not trust any of the new conclusions that they've come to because they demonstrated that they were just going to say that everything was fine

anyway. The focus report also pointed out that present conditions are putting a strain on migratory birds. Adding more stress does not help that.

The marine portion of the pipe won't have any leak detection system. If there were a leak during that stretch we would not know it. Munroe's Island is supposed to be a protected area. I don't see how this project can be approved if there isn't a system to prevent a catastrophic event in that area.

Regards,

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:05:08 PM

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Project: replacement_effluent_treatment_facility_project Comments: I am writing to show that I am in support of the new state of the art treatment facility that Northern Pulp plans to build. My families lively hood depends on Northern Pulp staying open. It has been a huge topic between many of our family and friends. I am a employee there, and the one providing for our family. I am all for not causing harm to the waters, however after reading the focus report, it clearly shows that there will be no harm done. It shows that the project will have little impact on the straight and the fisheries. One of the main things I took from it, is that water quality within FIVE meters of the diffuser will meet Canadian Marine guidelines. The effluent has been pumped into the straight for 50 years already, and the fishing industry has always been able to successfully fish, some of the best places are close to where the outfall is right now from Northern Pulp. The report shows that there will be no significant impacts to the fisheries or the fish habitat. Northern Pulp plans on making this facility one of the cleanest mills in the country! One way to show that, is that the treated effluent will not be visible at the waters surface, which is even better then what we can say now, also that when construction is happening it will have only minor impacts on marine species and habitat. Putting the pipe into the straight is only a small thing we would be doing when you consider all the other construction that has occurred in our waters. When the PEI bridge was built, that also disrupted the marine life, and now it is thriving more then it ever was before, I know many fishermen that would say this is true. So it shows that the construction will not hurt the waters. Northern Pulp is willing to provide a thicker pipe then required for the job and place an automated leak detection system which will alert us if anything was going wrong. It shows that they are willing to reduce their environmental footprint, they want to provide good paying jobs and stay here in our community. They dont just create jobs they also do a lot for our community in terms of fundraising and helping us out in ways that help our community as well. They want the forestry and fishing industry to all co-exist with us, and they are trying everything they can do get it right. If Northern Pulp is to close, its not just our family that will be without a job, but also all the spin off jobs that come from Northern Pulp running, this is 1000â?Ts of jobs at stake. It will affect our county heavily but it will ALSO affect all of Nova Scotia as well. Trying to find a job in Pictou County will be hard but it doesnt seem appealing to even want to stay in Nova Scotia, so many of us will have to move else where. Please APPROVE the Environmental Assessment and allow Northern Pulp to continue to bring good paying jobs and money here in Nova Scotia. Thank you for your time. Name: @hotmail.com Address: Municipality: New Glasgow Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 59 y: 36

From: @dal.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:11:48 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I offer this critique of the recently submitted document: FOCUS REPORT, REPLACEMENT EFFLUENT TREATMENT FACILITY, NORTHERN PULP NOVA SCOTIA, dated Oct 2019, in relation to whether the report adequately addresses the potential human health impacts of Northern Pulpâ?Ts application to upgrade its pulp and paper facility in Pictou Nova Scotia. By way of credentials, I am a full professor in the Department of
at Dalhousie University Faculty of Medicine. I received my PhD from the University of
Department of after
graduating with Honours in Biology from University. The scope of my review is based primarily upon the mandate letter, as issued by the Minister, dated March 29, 2019, which stated: â?oThe focus report shall examine potential impacts of the Project and include information on: the project description such as pipeline location facility design, construction, operation and maintenance water resources and sediment quality air quality fish and fish habitat flora and fauna human health archaeology Mikmaq land uses and engagement with the public, Mikmaq and governmentâ?, in response to Northern Pulpâ?Ts application. I am focusing specifically on sections pertaining to human health Section 9 in particular. 9. HUMAN HEALTH â?oCommence a Human Health Risk Assessment HHRA to assess potential project-related impacts on human health. The risk assessment must consider human consumption of fish and other seafood, consumption of potentially contaminated drinking water, exposure to recreational water and sediment, outdoor air inhalation, and any other potential exposure pathways. The analysis must inform the identification of contaminants of concern and updating of the receiving water study.â? My assessment of this report is that it failed to meet this deliverable. I have made this conclusion on the basis that the Dillon Focus Report defers to the EcoMetrix report for their findings. On page 165, a statement â?oEcoMetrix has initiated the HHRA and it is currently ongoing however, its completion is not anticipated until spring of 2020â? clearly indicates that the EcoMetrix work is not complete. In relation to specific elements of the report, Section 9.1 appears to be an analysis of tissue data from 5 lobsters, 5 rock crabs and 4 quahogs. Section 9.2, completed by Stantec, provides a listing of air contaminants of interest, an updated AERMOD dispersion model and projected emissions rates of some of these contaminants. It identifies some agents that require further follow up. No scientific interpretation or discussion of these COPCs are provided beyond stating that the modeled emission or concentration levels are below recommended guidelines. The Focus Report also states, in section 9.2.4, that â?oEcoMetrix has been hired by NPNS to complete the HHRA as part of the requirements of the project. EcoMetrixâ?Ts licensed professional engineers and health experts are using air dispersion models that have been developed for the project by Stantec as well as effluent dilution models that have been developed by Stantec.â? I conclude from this statement that this deliverable has also not been met. Subsequent statements in 9.2.5, 9.2.6, and 9.2.8 suggest that work is ongoing. My specific comments on the report are as follows. 9.0 Human Health Section 9.1 Baseline Study Marine Survey Ecometrix report- Appendix 9.1 Data from the Ecometrix multi-media survey are presented in Appendix 9.1. It comprises an analysis of tissue from 5 lobsters, 5 rock crabs

and 4 quahogs 14 samples. They state the study is initiated and is ongoing results are not anticipated until spring of 2020. Initial analysis of 14 crustacean samples in total, included lobster, rock crab and quohogs from outfall area. Data are included as an attachment to their report in 9.1. This study is highly limited as the response to the request for a full multi-media exposure study. There are no data presented for concentrations of contaminants in nearby wells, soils, recreational water or local sediment. Nor are there data available for the effluent. Addition of biocides and other chemicals in the activated sludge plant, other see p. 7955, Hubbe, M. A., Metts, J. R., Hermosilla, D., Blanco, M. A., Yerushalmi, L., Haghighat, F., Lindholm-Lehto, P., Khodaparast, Z., Kamali, M., and Elliott, A. 2016. Wastewater treatment and reclamation: A review of pulp and paper industry practices and opportunities, BioRes. 113, 7953-8091. and, as noted by the authors, generation of greenhouse gases, are all factors that are worthy of consideration when considering implications of pulp and paper plants processes on human health. Preliminary findings from this study identified elevated total arsenic concentrations in the majority of 14 tissue samples lobster, rock crab, quahogs collected median levels in lobster were double the edible guideline. As noted in the Dillon Focus Report: â?oA highlighted result is that arsenic levels in the majority of samples analyzed exceeded the Canadian Food Inspection Agency CFIA edible guideline. However, Health Canada has acknowledged that the form of arsenic rather than the absolute concentration is the main contributor to potential human health risks associated with the consumption of food e.g., fish tissue containing arsenic. Organic forms of arsenic that comprise the majority of the arsenic concentrations in fish and shellfish are recognized to pose a lower potential for adverse effects to human health compared to inorganic arsenic. It seems unusual that the Dillon report concludes that â?odespite the exceedance of the guideline, the elevated levels of arsenic currently reported are anticipated to pose a negligible potential for adverse effects to human health.â? Methyl mercury was also tested but the results are not included in the report and there is no comment about this contaminant. Historically mercury-based fungicides were used as biocides to clean settling facilities of pulp and paper plants. The choice of crustaceans provides less informative data. Crustaceans are short-lived and are less likely to bioaccumulate contaminants when compared to fish and mammals. Bottom-feeding, older fish such as cod would have been better species to test. The report also discounts the important role of small streams and estuaries as possible exposure zones for fish habitat. Yet it is generally acknowledged that such estuaries serve as â?~nurseriesâ?T for fish and other marine species and young fish are more susceptible to toxic effects of contaminants. The Focus Report states: â?oEcoMetrix plans on conducting up to two additional rounds of tissue collection prior to beginning construction targeting additional shellfish scallop, blue mussel and oyster, and locally relevant fish such as Atlantic striped bass, Atlantic mackerel and Atlantic herring.â? These data are not available in the report. In summary, one may easily conclude that the Focus Report is deficient in meeting deliverable 9.1. Section 9.2 Human Health Risk Assessment This analysis is presented in Appendices 9.2 and 6.2. The first stage in the Ecometrix analysis was to set up a conceptual site model which guided their subsequent analysis. They rely upon a study conducted by Stantec presented in Appendix 6.2 involving an expanded air dispersion model to set the boundaries for their air contaminants study. The Stantec report states that the primary sources of air contaminants of interest to this study include biomass boiler, recovery boiler, smelt dissolving tank, lime kiln, high level roof vent, and the replacement AST ETF. Stantec completed air dispersion modelling scenarios, updating a previous 2017 analysis, using AERMOD methods and expanded their analysis to include a revised inventory of potential contaminants. These hypothetical data are presented as emission rates and not as air concentrations, as per usual air quality standards. Rates of emissions will go up and down, depending upon production levels. These data are not helpful for an analysis of human health risk. The authors report emission exceedances for ammonia,

chloroform, total reduced sulphur, hexavalent chromium yet conclude that the number of days this will happen will be negligible- based upon assumptions which they do not describe in the report. The authors confine their focus to outdoor air emissions from the combustion of ETF biosludge in the biomass boiler and the new ETF activated sludge treatment process, and 2 the marine discharge of treated effluent from the diffuser near Caribou Point. The Ecometrix authors discount the likelihood that treated effluent might potentially contaminate groundwater from a spill from the effluent pipe onto land and conclude it is not a valid exposure pathway. The authors also discount ocean intrusion into wells as a pathway â?obecause residents would likely stop drinking their groundwater due to taste from the salt and would therefore have minimal exposureâ? . In conclusion, I do not support acceptance of this report. Name: @dal.ca Address: Dalhousie University Municipality: Halifax Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 51 y: 24

From: @unifor.org
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:13:35 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Having worked in the forestry industry for over 20 years and seen first hand the devastating effects a mill closure can have on a small community. In Pictou County the mill closure would lead to a potential loss of 2700 direct and indirect jobs in the community. This would have a devastating effect on the economy in Pictou County and Nova Scotia as a whole. The science based study submitted by Northern Pulp on the installation of the Effluent treatment facility at Northern Pulp shows that the mill can provide both stable jobs for many years to come in the community while protecting the environment in Pictou County.It is critical that the provincial government allow the time need for Northern Pulp to install the new effluent treatment facility in Pictou County to protect good forestry jobs and the environment. Name: Email: @unifor.org Address: Municipality: Saint John Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 54 y: 21

From: @comcast.net
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:18:11 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Northern Pulp NP has been polluting the air, lands and water of Nova Scotia far too long. They and the government have failed to correct the problems and broken too many promises for far too long. You must honour the dates set forth in the Boat Harbour Act and cease operation of the plant. The forestry industry has other resources to turn to. Our fisherman and the areas residents do not NPRs proposal relies on a disastrously flawed concept. The answer to pollution is NOT dilution. Even treated effluent flowing into the Strait can have serious effect on aquatic organisms as proven by joint Canada US EPA studies in the Great Lakes. DDT, PCBs, mercury, dioxins and many others do not break down in water and have a bio-accumulative effect in the food chain. Regulations should require treatment and containment, not release into waters. Furthermore, it is unconscionable that NP itself is conducting these studies. You are letting the fox guard the henhouse. And worst of all, those who are advocating for this project are those who will reap the benefits. And those who oppose it are the ones who will face 5he consequences. However it is decided will not be forgotten, nor forgiven. Do the right thing. Name: @comcast.net Address:
Municipality: Pictou Island Postal-Code: Fax: ### ### - ####
email_message: Privacy-Statement: agree x: 89 y: 34

From: @tncwireless.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:18:27 PM

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Project: replacement_effluent_treatment_facility_project Comments: I support the Effluent Treatment Facility Project. My family has always worked in the forestry industry and Northern Pulp is essential in providing thousands of jobs in Nova Scotia. The Effluent Treatment Facility will have no significant impacts on the environment. Name: @tncwireless.ca Address: Municipality: MacPhersons Mills Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 58 y: 11

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:28:42 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Other pulp mills have found ways to treat effluent. Northern Pulp has not shown any interest in fuller treatment of its waste or toward working toward such a goal in a timely manner. There is sufficient evidence that harm will come from pumping lightly treated effluent into the Strait. This is a tremendously complex issue, with so much at stake. But allowing the lightly treated effluent to flow into the Strait makes no environmental sense. Northern Pulps initial proposal showed its cavalier attitude. I believe that a collective running the pulp mill would support all sides of this. That would take government will and support. Name: Email: @gmail.com Address: Municipality: Halifax Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 63 y: 22

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Northern Pulp Effluent Treatment Facility Response to Focus Report
Date: November 8, 2019 7:28:42 PM
Attachments: Northern Pulp Focus Report Response .pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please see letter attached.

Scotsburn
Nova Scotia
November 7, 2019

Environmental Assessment Branch
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

Via email at ea@novascotia.ca
and fax 902-424-6925

Dear Sir or Madam:

RE: Northern Pulp's Replacement Effluent Treatment Facility Project

I am writing to comment on the Focus Report regarding Northern Pulp's proposed Effluent Treatment Facility Project. I previously responded to the Environmental Assessment by way of a letter dated March 8, 2019. I attach a copy of this letter for your review. Most of the concerns I expressed in my previous letter have not been addressed in the Focus Report and so I still have the same concerns.

As I stated in my previous letter, I am a commercial fisher and a resident of Pictou County. I grew up in Caribou, very near the . My father and many other family members were commercial fishers in Caribou. I fished in the industry since the 1970's, starting when I was 8 years old. Following attendance at university, I was drawn back home by the Northumberland Strait. I have owned my own fishing enterprise for the last 26 years. I fish rock crab, herring and scallops out of Caribou. I fish lobster in another area. I have a large financial investment in the fishing industry. The health of the Northumberland Strait is vital to my retirement and my future. has recently started fishing with me and a clean and sustainable Northumberland Strait is essential for him to have a future in the fishing industry.

I have reviewed the Focus Report submitted by Northern Pulp dated October 2019. I have deep concerns as to the adverse effects and significant environmental effects that releasing treated pulp waste into the Northumberland Strait will have on the ecosystem in the strait.

On page 127 of the Focus Report, it states that, "…marine invertebrates and marine fin-fish species sightings were rare and not found in any abundance". This statement is indicative of many other statements in the Focus Report that show insufficient study of the strait, a misunderstanding of the strait, or a misrepresentation of the strait.

A quick snap shot of the marine environment doesn't provide an accurate depiction of the fin fish that migrate into the strait at different times of the year as the water temperature changes. For example, smelts, caplin, mackerel, bass, silversides, stickle backs, sea trout, gaspereau are types of fish that migrate to that area during different times of the year. Just because you don't see them at one point of the year, doesn't mean they're not there at another time. The staggering of the fishing seasons coincides with the migration of the fish to the area, such as herring season, tuna season, mackerel season.

The observation that "…marine invertebrates and marine fin-fish species sightings were rare and not found in any abundance" is concerning because on page 129, it is stated that "the fish observed in the area were also categorized using Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designations…" All fish known to inhabit the strait at any time of the year ought to be categorized, not just the ones which were "observed".

I also question how those carrying out the studies looked for the fish while using sidescan sonar and video. Was the camera put over the side of a moving boat? Did a diver use the video camera? Either of these techniques would disburse the schools of fish as the fish would react to the noise from the boat or the diver as if they were being chased by a predator. For example, when fishing herring, the fish disburse as you sail along because the noise drives them away. That doesn't mean the fish aren't there. I know they were there because I see them on my sounder, and when I set my nets and come back to them, the fish are caught.

The video that was taken of the area, and the report of the survey findings, should be included in the Focus Report for the public to review. The public would like to see the efforts and techniques used to find the fish.

Yesterday, I observed several different schools of fish around the wharf before I set sail from Caribou wharf. It appeared that they were being chased by larger predatory fish because they were breaching the surface of the water to evade being eaten. Four days ago, the area entering Caribou Harbour was being fished by hundreds, if not thousands, of cormorants – so many that the water was black with cormorants. This tells me that a school of fish was coming into the harbour. Seals are also often seen within the wharf area feeding on fish, which would be the larger predatory fish. This is the circle of life in the harbour and the area of the diffuser – bigger fish-eating smaller fish, all dependant on each other to survive. These are observations that I make without the use of sonar or video. Why wasn't Northern Pulp able to see the same thing in the five years that they had to conduct their studies?

This is just one example of many instances where the conclusions made by NP are not accurate because of how they conducted their study, or what they based their studies on. Sometimes conclusions are made without NP giving any basis for their conclusions.

Here are more examples of issues I found in the Focus Report:

1. Table 7.3-2 is called, "Summary of Marine Impacts, Mitigation Measures, and Overall Significance" and is found on page 142. There is no explanation any where in the Focus Report as to where they got the information and conclusions set out in this table. How can anyone rely on the table if the source of this information is not disclosed? The Table is essentially just inserted in the Focus Report without any explanation.

2. Similarly with Appendix D of Appendix 7.3 (Fish Species and Fish Habitat Presence Screening) and the heading called "Notes" that has various conclusions. Where is the science to support these conclusions?

   Although it appears that Ecometrix provided the report that is attached as Appendix 7 to the Focus Report, there is no information as to the specific qualifications, expertise and experience of any of the individuals preparing the report. How do we know the

information is credible and reliable? Does a CPESC or a M. Sc. Automatically qualify someone to draw such conclusions about fish, without knowing what area of study they completed and the experience they have? Northern Pulp has provided no evidence to show that the conclusions are correct or should be relied on.

3. Page 131 – it is not correct to state that herring is found at depths of only10m and greater. This even contradicts the information in Appendix D of Appendix 7.3 where it is stated that herring is found at depths of 0 - 200m. I've fished herring for 40 years, and I regularly see herring at depths of as little as 8 feet.

   Figure 7.3-5 is wrong. Herring is located from the inner Caribou Harbour to the middle of the Atlantic Ocean, including the area of the proposed diffuser. This area is also a herring spawning ground.

4. Fishing of many species occurs at the diffuser and all around it. A fishing harvest area cannot be accurately captured on a map. It's like having an aquarium and saying that the fish only swim in certain areas. We fish wherever the fish are, and that can change from year to year. The species maps included in the Focus Report may make an argument that suits Northern Pulp's purposes, but it does not reflect reality. It is frustrating that Northern Pulp refuses to listen to information fishers have given them many times, including in public responses to the EA in January. Northern Pulp simply does not understand what happens in the Northumberland Strait and they refuse to listen to those of us who do.

5. Page 132 – In May and June, large amounts of flounder can be observed all around the wharf in Caribou. Some people use handline to catch flounder and then sell it to fishers for bait.

6. Page 133 – It is not accurate to say rock crab is not found at depths greater than 10m or near the diffuser location. I fish rock crab commercially. Rock crab is found at all depths, from very shallow (biting your toes while swimming) to depths of over 100 feet, including at the proposed site of the diffuser.

7. Page 133 – Northern Pulp is wrong when they speak about SFA 24. SFA 24 refers to "Scallop Fishing Area 24" and is a huge area of water as depicted on the attached map. The scallop buffer zone is something completely different. It is a "no scallop fishing zone" within 1 nautical mile of any point of land in order to protect lobster. The proposed diffuser location would fall within that zone. Recreational scallop divers dive for scallops in the area proposed for the diffuser.

8. Figure 7.3-8 on page 135 is an incomplete map. The area to the east of the diffuser is not shown, even the circles that are drawn are not complete. Why? How can conclusions be reached and accepted without the entire area being shown? This is just one example of many such incomplete maps in the Focus Report. It makes me wonder what they are trying to hide.

9. Appendix 7.3 page 4.20 – The author obviously cut the information from lobster and then pasted it under the heading for rock crab. As such, no conclusions are made for rock crab in this section.

10. Appendix 7.3 page 4.20 – It states, "Within the mixing zone, larval Atlantic Herring may be present, however in this planktonic stage, the duration of their residence in this small zone of influence is likely to be very short. As such, a very small proportion of larvae within the vicinity of the diffuser (up to 200m) will interact with treated effluent, and of those that may, their interaction with the effluent will be of short-duration and transient." Where is the science to prove this statement? How do they know only a "very small proportion of larvae" will interact? How did they reach this conclusion? What if the effluent contaminates the spawn?

11. Even with the errors and claims of mixing, Northern Pulp still admits that there will be irreversible effects (see Appendix 7.3 Table 4.6). They say these effects can be mitigated, and state that several studies should be done after the diffuser is running to test their theories. What good does it do to my fishery, my future, and my community to take a "wait and see" approach to see if their predictions are correct? What if their predictions are wrong? The risk is too great to allow this project to proceed.

12. Page 101 states, "For the worse case condition, 90% of the TSS particles dropping from the diffuser port are expected to transport **and deposit 4.8 km away from the outfall location** and not settle near the diffuser." This is very concerning. Does this mean that there will be a circle of particles forming a 9.6 km diameter build up of particles around the diffuser? Have they studied the results of this ring of particles? How will it impact the fish and habitat in that area? How will it impact the currents and waves? What long term effects will this build up have over the course of many years? Will some of this build up be along my favourite beach?

I have given many examples of the baseline information in the Focus Report being wrong, and there are many other examples. If the baseline data is wrong, then the conclusions reached in the rest of the report are wrong too. My fear is that the back flow from the diffuser will kill everything in the harbour, and beyond.

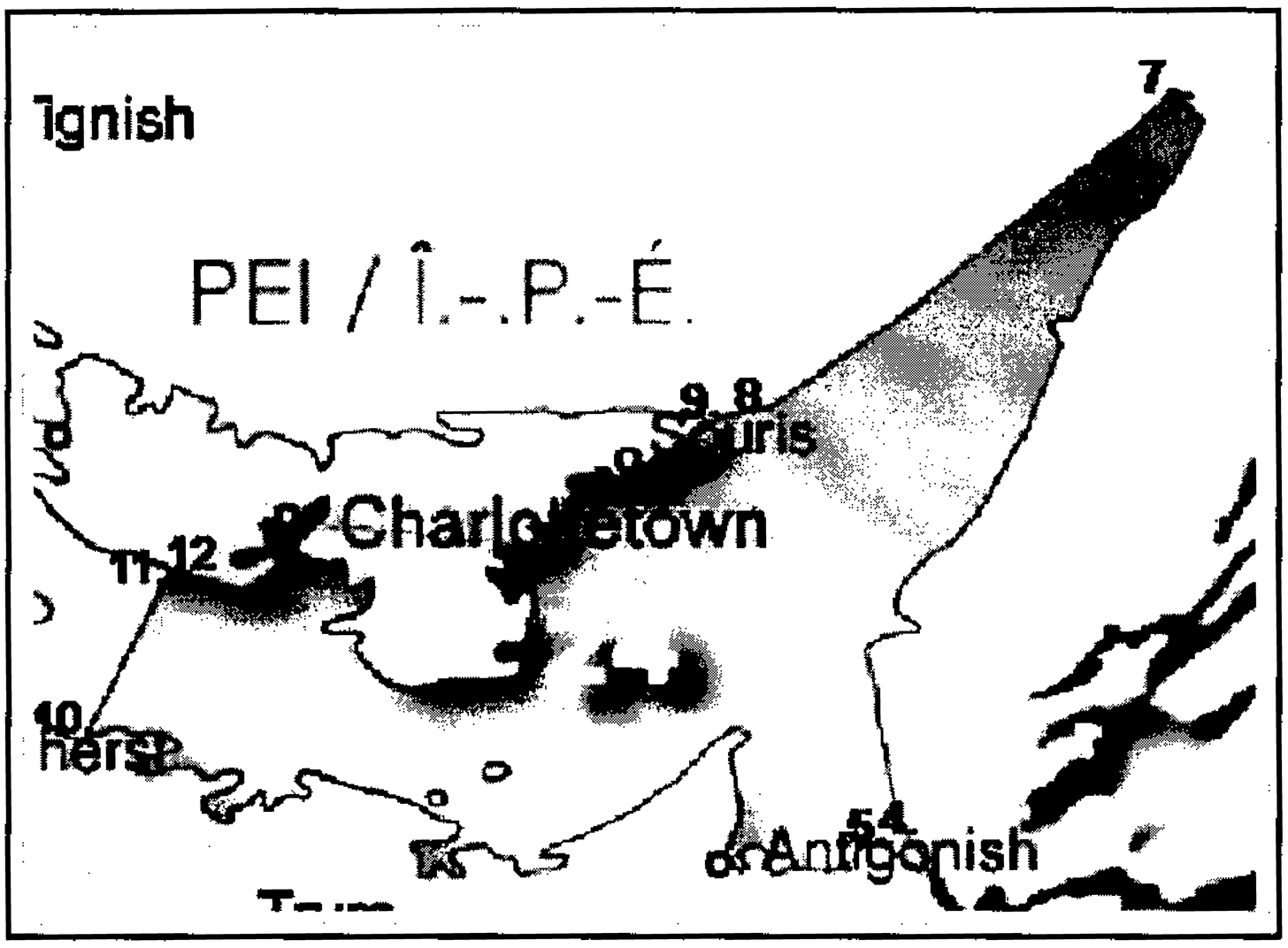
The Focus Report relies on modelling for many of its conclusions that there will be no harm to the strait. Computer modeling has failed in the past. A recent example is the tidal turbine in the Bay of Fundy, the failure of which will cost the Nova Scotia taxpayer $4.3 million to remove. A polluted Northumberland Strait will not be fixed as easily, if at all. Modelling does not prevent harm in real life situations.

The volume of material to review in such a short period of time is over whelming. I feel that I have not been given a fair chance to read the Focus Report or to address every mistake I see. There are many errors that need to be pointed out that will help the minister make a good decision on this issue but I simply do not have the time to point out everything I see. This makes the process unfair.

Also, many of the charts in the Focus Report are blurry. This makes them hard to read and impossible to decipher the information they are trying to convey. For example, on page 124, Figure 7.3-1, I can't read the print on the right-hand side. There are many other examples.

The Focus Report contains substantial and many glaring errors. Because many of the errors were pointed out to Northern Pulp in the past, the continued use of the wrong information appears to be deliberate. It is very obvious that this project can not proceed. It will destroy the ecosystem of the Northumberland Strait, along with the fisheries and communities that rely on it. You must reject this proposal.

Sincerely,



Scallop Fishing Area 24 - Map

Map showing the boundary lines of the scallop fishing area 24 in the Gulf of St. Lawrence. The area includes the southeastern part of Northumberland Strait between Nova Scotia and Prince Edward Island and the western half between Prince Edward Island and Cape Breton, Nova Scotia.

Scallop Fishing Area 24 – Coordinates Table

Point	Latitude - North	Longitude - West
10.	45° 51′ 45″	63° 42′ 42″
11.	46° 10′ 35″	63° 28′ 03″
12.	46° 12′ 58″	63° 29′ 26″
9.	46° 26′ 55″	61° 58′ 25″
8.	46° 27′ 52″	61° 51′ 06″
7.	47° 02′ 18″	60° 45′ 00″
6.	46° 58′ 42″	60° 40′ 00″
4.	45° 38′ 30″	61° 24′ 15″
5.	45° 38′ 10″	61° 25′ 45″

Table description:

Table showing the coordinates that represent the boundary lines of the scallop fishing area 24 in the Gulf of St. Lawrence. Row one is the title. Column one represents the label given to each coordinate. Column two represents the latitude coordinate for each point. Column three represents the longitude coordinate for each point.

Top of the page

Date modified: 2019-04-25

Scotsburn
Nova Scotia,
@ns.sympatico.ca
March 9, 2019

Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, Nova Scotia B3J 2P8
Fax: (902) 424-6925

Via e-mail at ea@novascotia.ca
and fax 1-902-424-6925

Dear Sir or Madam:

RE: Northern Pulp's Replacement Effluent Treatment Facility Project

I am a commercial fisher and a resident of Pictou County. I grew up in Caribou very near the . My father and many other family members were commercial fishers in Caribou. I fished in the industry since the 1970's, starting when I was 8 years old. Following attendance at university, I was drawn back home by the Northumberland Strait. I have owned my own fishing enterprise for the last 26 years. I fish rock crab, herring and scallops out of Caribou. I fish lobster in another area. I have a large financial investment in the fishing industry. The health of the Northumberland Strait is vital to my retirement and my future. My son has recently started fishing with me and a clean and sustainable Northumberland Strait is essential for him to have a future in the fishing industry.

As fishers, we invest a lot of time, energy and money to maintain the sustainability of the fishing industry. We regulate ourselves by proposing and agreeing to such things as catch limits, buffer zones, reduced efforts, and modified nets and traps. The EA proposal will harm the Northumberland Strait, our fishery, and our future.

There are many errors and missing information in the proposal, as follows:

1. The proposal did not consider the behaviour of herring. Herring gather in the deep waters of the ferry channel and other deep water areas to get away from predators. They come out of the deep waters at night to spawn on the shallow banks in the adjacent areas. If fresh, hot water containing who knows what is pumped into their deep water hiding zone, the herring will not go there and will have no where to hide. I believe this will have irreversible effects on the herring species in the area, and their spawn.

2. Tuna are in the area of the outfall. While fishing herring last year, I saw approximately 6 tuna charter vessels at one time in the area outside Caribou Harbour. Last year, tuna washed ashore in

Caribou Island and Simpsons Beach (part of Caribou - Munros Island provincial park).

3. Contrary to what is showing in Figure 8.12-3 of the proposal, rock crab is fished all over the proposed effected area. The rock crab fishing area we call "Africa" because of its shape, runs from Caribou Island, Pictou Island to about Arisaig. The footprint of the pipe runs through a vital rock crab nursery where juvenile crab are spawned and grow to maturity.

4. As fishers, we are required to maintain a log book while fishing rock crab, herring, scallops and lobster. Although we fish these species in a very large area throughout a day of fishing, we are required to record our fishing location just once per day. As such, our logs do not accurately reflect the expansive areas where we fish. For example, in one day, a fisher may leave Caribou Harbour and travel to Charlottetown Harbour and fish everywhere in between. In the fishery log, if a fisher records fishing in Charlottetown Harbour, the fishing effort in all other areas is not reflected.

5. Fishing of some sort is conducted everywhere in the Northumberland Strait. It is fair to say there is no area of the strait that is not fished. Fishing areas for a certain species may vary from year to year. Therefore, using data of fishing areas from 2001, for example, as was used in the proposal, may not accurately reflect the fishing area in 2018 for that same species. Fish move and follow food sources. Piping of effluent will be detrimental to phytoplankton and zooplankton which are the food source for fish and mammals and are building blocks for all ocean creatures.

6. Some fishing bottoms also may change over time, or from year to year, due to storms or man made causes. I have fished lobster in Wallace since 1993. The construction of the fixed link between New Brunswick and Prince Edward Island took place between 1993 and 1997. The building of the fixed link brought great changes to the lobster fishery in my area - huge decline in lobster catches and changes to the sea floor. I witnessed a change in the water which went from clear to very muddy everyday. I lost a large area of my fishing bottom due to sedimentation. What was once a rocky floor was covered by mud or silt. When I pulled my lobster traps, they were covered with a fine muddy film. The film also covered the bait on my traps which hindered their ability to attract lobster, caused the bait to rot, and attracted sand fleas which ate the bait. I suspect that the silt interfered with the lobster's respiratory and other functions as they were covered with the muddy film as well.

The lobster fishery in that area is only very recently starting to recover. I notice less silt in my traps and the water is becoming clearer. Things are going back to where they were when I first bought my lobster licence in 1993 before the start of the fixed link construction. My catches are finally returning to what they were before the construction. The value of fishing enterprises was greatly reduced in this area for the last 20 years or so, and they are now just recovering to be on par with fishing areas not effected by the fixed link. I did not receive any compensation for my economic loss or the damage to the environment. I don't want that to happen again.

7. The scallop information in Figure 8.12-5 is not accurate. In the scallop logs fishers must complete, there is no place to enter fishing location for every area where scallops are fished. There is no way to determine where scallops are caught in the strait. This figure also shows

scallop catches in areas where there is a buffer zone and therefore no scallop fishing in that area. This proves that the figure is not accurate and should not be relied on. It should also be noted that recreational scallop divers dive for scallops in the area behind Munros Island, and in the area around the outfall location. They are permitted to dive for scallops within the 1 mile buffer zone, but they don't keep logs or report where they have fished.

8. Figure 8.12-6 is also not accurate. The map does not show the herring nursery which is in the area of the outfall. Also, there is herring fishing all around Pictou Island and not just as indicated. We also fish for herring in the area of the proposed outfall location. Herring is a fixed gear fishery. We use anchors on each end of our herring nets. The pipe and proposed no anchor zone will significantly interfere with our herring fishery. It is not possible for us to simply go somewhere else to fish if the fish are located in the area of the outfall or the no anchor zone and not anywhere else. The herring pack consists of a large group of boats all fishing for herring at once - possibly 200 boats in the same close area at one time. The pack is so large that sometimes the PEI ferry steers out of its normal route to avoid us.

9. Figure 8.12-8 is also not accurate. There are mackerel around Pictou Island and Caribou Island and in area of the outfall. There is mackerel in Caribou channel and Pictou channel, and around every wharf. There are many people who fish mackerel from all the wharves in the area, including Caribou. They also fish for bass, smelts, capelin and other fish from the wharves. This is an important healthy food source for many people in our area and part of our tradition and culture and must be protected.

Mackerel like going along the edge of the channel because it is deep, and they are hunting the bait fish which is also in the channel. They tend to swim back and forth from deep to shallow water.

10. The scallop buffer zone is not accurately depicted in Figure 8.12-10. The scallop buffer zone extends all around Munros Island and Caribou Island. The buffer zone is 1 mile from any point of land, which includes all islands.

11. It is not appropriate or accurate to use the characteristics of Pictou Harbour as a proxy for those of Caribou Harbour. Caribou Harbour is closed except for a narrow opening. It does not flush well. There is more flushing in Pictou Harbour and 3 large rivers flow into it. My father, who grew up in the area, used to tell stories of his grandparents walking cattle from Caribou Island to Munros Island (which in the past, was also known as Doctor's Island) at low tide. This shows how narrow and shallow that area is. The ferry channel is artificial and was created when the ferry services started, and is maintained only through periodic dredging.

12. The wharves at Caribou Harbour are used for more than tying up vessels. We sell our catches to the public and commercial buyers at the wharf. During herring season, for example, fish buyers set up buying stations where we off load our catches. Buyers who use the vacuum system to remove herring from the boats, pump water from the harbour onto the vessel in order to suck up the herring. It is like a wet vac.

During lobster season, the buyers tie large numbers of lobster in floats in Caribou Harbour until they are transported for processing. Floats are large containers which allow for water to flow in and out to keep the lobster alive. Will this water be contaminated by effluent thus making the fish toxic?

We use water from the strait to keep our catch alive during the day. I am concerned that I will inadvertently use effluent water on my fish which could cause contamination. How will I know the difference between water that contains toxic effluent and water that does not? I also use that water to wash my fishing boat and gear as I enter the channel at the end of my day. I don't want to use effluent to clean my boat and gear. What effect will this have on my heath and my equipment?

There is a lack of information provided in this proposal and large gaps in terms of the effect on the environment and ecosystem of the Northumberland Strait. Much of the information that is provided is not accurate and there are a lot of discrepancies. This makes me question the credibility of the entire proposal. The proposal must be rejected. Nova Scotia is supposed to be Canada's ocean playground. We don't want it to become Canada's ocean dump. Northern Pulp should give in, give up and get out.

Concerned fisher,

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:28:49 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Having limited time to read the lengthy report I will confine my comments to concerns with plans for monitoring of the outfall. -Who will be responsible for monitoring the output .Based on track records neither Northern Pulp or the Gov.of Nova Scotia would be trusted. - I believe the most important factors should be monitored constantly and no other periodical checks are acceptable. - What happens when the output from the mill exceeds the preset expectable range. Does the mill shutdown? Th existing boat harbor treatment facility has a 28 day retention time that tends to be very forgiving. A new facility with a 12 hour retention time will not be. in closing I also want to state that I fully expect the government of Nova Scotia to honor the law and close the boay harbor treatment facility on Jan 31, 2020. Name: Email: @eastlink.ca Address: Municipality: New Glasgow Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 61 y: 21

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:30:37 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: - Choose - Comments: All I ask is would you want youre children/grandchildren living here without any healthy changes? Name: Email: @gmail.com Address: : Pictou Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: x: 0 y: 0

From: @tncwireless.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:34:10 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I support the Replacement Effluent Treatment Facility Project. I worked as a for the mill since it opened. I seen first hand the benefits the mill has on the economy. If Northern Pulp ever closed, the affects would be much further spread than the forestry industry. There would be nothing left in Pictou County. Name: Email: @tncwireless.ca Address: Municipality: MacPhersons Mills Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 78 y: 21

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 7:38:54 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson

My name is and I've lived in Pictou for Over 50 years, I'm a daughter, sister, mother and nurse for over30 years, and I'm concerned about Northern Pulp's Effluent Treatment Facility Proposal.
I fear for my health, the health of my family, and the health of my neighbours.

Premier Stephen McNeil stated that it would be wrong to move one disaster into a new location when he referenced Northern Pulp's ETF proposal. Of course that wasn't a statement on whether Northern Pulp's project was a disaster, simply that it would be wrong for the province to approve a project that could be characterized as creating a new disaster.

Mr. McNeil also rightfully stated many times over that the company was given 5 years to come up with a plan and that was more than enough time. Not only did the 5 year plan give ample time to Northern Pulp but this wasn't an 'arbitrary date' picked out of thin air. The Jan 31, 2020 Boat Harbour closure date in the Boat Harbour Act also falls on the last day of Northern Pulp's current Industrial Approval.

Northern Pulp were slow to get moving on their attempt to complete the project. When they filed their EARD in February, they stated that they would need an extension 'until they built their ETF or they would have to shut down'.

That ask is for an indefinite extension as Northern Pulp's plan to build an ETF that pumps effluent described by their own technical engineer as being worse than what comes out of Boat Harbour, would set up the risk to move the disaster that is Boat Harbour and make it the disaster in the Northumberland Strait.

They cannot be given an extension. That would break the deal that was made in good faith and written into law between the PLFN and the province that saved Northern Pulp from having to close in 2014. They also cannot be given an extension because they don't have a sound plan for a new ETF so it may never be built. Northern Pulp cannot be given an indefinite extension.

Northern Pulp have been given ample opportunity over their time owning the mill to ensure it runs properly. At some point you have to admit it can't be done.

What is the criteria that the province looks at when it comes to accepting a company's proposal to start a project of this magnitude? I know there has to be guidelines and targets that are outlined so a company knows what is expected of them when they are making a submission to start a project in this province. I recognize these are guidelines and not a checklist since every situation would have a unique set of characteristics.

How much does a company's integrity and their ability to complete a project properly when their integrity is taken into consideration?

Northern Pulp have 14 failed air emissions tests, 2 Ash slurry spills, 8 directives, 5 ministerial order and 2 warning reports. They were put on Canada's Environmental Offenders Registry for their 47 Million Litre effluent leak in 2014 and their present Industrial Approval says they have to have a flow monitoring system in place to indicate if there were another leak. They are currently under investigation for yet another large raw effluent leak.

If a company's track record is that bad with maintaining what they have, how can they be trusted with building something of this size in the first place?

According to their current Industrial Approval, Northern Pulp were supposed to have a monitoring system in place that would notify them if there was a leak in their effluent pipe yet they had another large raw effluent leak that from the pictures and time it took to clean up, it looks like it was on par with the leak from 2014. What that tells me is either a) they did not meet the terms of their Industrial Approval, b) they weren't monitoring it or worse c) they had everything in place, discovered the leak and said nothing hoping to avoid the bad publicity.

I don't believe Northern Pulp should even be considered for a project until the current investigation has been completed and based on their track record, I really don't believe they deserve to be given the chance to go forward with this project.

Thanks you

Sent from my iPhone

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Proposed Effluent Treatment Facility Focus Report Response
Date: November 8, 2019 7:39:26 PM
Attachments: NP ETF Focus Report Response -Scan0001.pdf

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Please see attached letter.

Thank you,

Scotsburn
Nova Scotia
@gmail.com
November 8, 2019

Environmental Assessment Branch
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

Via email at ea@novascotia.ca
and fax 902-424-6925

Dear Sir or Madam:

RE: Northern Pulp's Replacement Effluent Treatment Facility Project – Response to Focus Report

I write in response to the Focus Report submitted by Northern Pulp in support of their proposed Effluent Treatment Facility Project. I previously responded to the Environmental Assessment by way of a letter dated March 8, 2019. I attach a copy of this letter for your review. Most of the concerns I expressed in my previous letter have not been addressed in the Focus Report and so I still have the same concerns.

As I stated in my previous letter, I am a life long resident of Pictou County and have many ties to the Northumberland Strait. For over 40 years, my family has owned a cottage along the Northumberland Strait. I have spent each summer walking the beaches and swimming the waters. I have worked in Pictou as a lawyer for over 25 years and am a volunteer member of several boards and organizations in the area, including the Northumberland Fisheries Museum and Heritage Association, which is dedicated both to the preservation of fishing history and the celebration of the fishing culture. I am married to a commercial fisherman who fishes the waters of the strait, like many generations of his family who came before him. Involvement in the commercial fishery is a family commitment that is shared by our children and shapes our lives on a day to day basis. Like so many people in Pictou County and beyond, the Northumberland Strait is beloved by me and my family and is the cornerstone of our economic prosperity, social enjoyment and mental well being. The risk that Northern Pulp's proposed Effluent Treatment Facility Project poses to the Northumberland Strait and all who rely on it is simply too great for the Minister to grant approval.

As I am comfortable reviewing large volumes of material in a short period of time. Despite this, I found it very difficult to review the huge number of documents that comprise this file within the 30 day public response period, and then provide a thorough and effective response. Like other members of the public, in order to effectively respond to the Focus Report, it was necessary for me to read and understand thousands of pages. Not only did I have to read the Focus Report and all the attachments, I had to refer to the initial Environmental Assessment proposal filing and the many government and public responses to that proposal. This is a

monumental task that is not possible to accomplish in 30 days, particularly when many of us have full time jobs, families and other commitments.

When reading the public's response to the initial filing, it becomes very apparent that the public's input into this process is vital. The public provided valuable information that was either lacking in Northern Pulp's initial filing, or was wrong. The public shared local knowledge of the area that is important for the Minister and government departments to understand. This is not knowledge that can be read in a book or gleaned from a study. It is real life information that must be considered in order for the impact of the proposal to be fully understood. The public raised serious concerns about the proposal which must be taken seriously.

The inability of the public to provide an effective response to the Focus Report, due to the volume of material and the limited time in which to respond to it, will significantly impact the ability of the Minister to come to a proper decision as he will not have all the facts before him.

The numerous reports and studies that have not been completed and included in the Focus Report also raise significant concern. If the Minister requires these studies or reports to be filed at a later date as one of the conditions of his approval of the project, the public will not have the opportunity to review the studies and provide their response. This will impact the usefulness of these studies to the Minister, and put the ecosystem of the Northumberland Strait at risk.

As it is not possible to respond to all the significant errors and shortcomings in the Focus Report, I will focus on the following only:

1. Temperature
2. Point A
3. Misrepresentations

1. <u>Temperature</u>

The temperature of the effluent as it enters the Northumberland Strait is a concern. The CCME (Canadian Council of Ministers on the Environment) Water Quality for the Protection of Acquatic Life, for the marine environment, states that, "Human activities should not cause changes in ambient temperature of marine and estuarine water to exceed ±1°C at any time, location, or depth. The natural temperature cycle characteristic of the site should not be altered in amplitude of frequency by human activities. The maximum rate of any human-induced temperature change should not exceed 0.5 °C per hour."

Table 7.3-1, found on page 138, states that the temperature in Caribou Harbour is between 16.8 and 17.6 degrees Celsius in summer and between 0 and 1 degree Celsius in winter. The predicted temperature of the effluent is said to be 35 degrees Celsius as it leaves the diffuser, and that the distance from diffuser that ambient conditions are reached are within 2m. As such, before that 2m is reached, the ambient temperature of the marine water will exceed 1 degree Celsius at some point. Therefore the CCME guideline is breached.

Table 7.3-1 misrepresents the distance from the diffuser that the ambient condition will be met as it relates to the winter temperature. In 2018, the winter temperature of the water is said to be 0

degrees Celsius. At 5m, the temperature is said to be 1.5 degrees Celsius. Therefore, 5m beyond the diffuser, the temperature is still more than 1 degree Celsius over the ambient temperature. However, the Table misrepresents this fact by stating that the ambient temperature is reached less than 2m from the diffuser.

Achieving an effluent temperature of 35 degrees Celsius as it enters the effluent treatment facility is also a concern. Table 7.3-1 shows that the temperature of the effluent at Point C is 35 degrees Celsius. It must be remembered that Point C is a point that follows aeration and a period of time in a settling pond. The temperature of the raw effluent at Point A, before it is aerated and spends time in a settling pond, is said to between 40 and 55 degrees Celsius (see page 28). Although it is promised that cooling towers will be installed in order to lower the temperature of the effluent, there is no evidence to show that the cooling towers will be effective in lowering the temperature as required, and that they will have the ability to lower the temperature at all times, under all conditions.

The temperature of the effluent during the tests conducted at Veolia/AnoxKaldnes Laboratories was 37 degrees Celsius. As such, it is not known whether the proposed AST system will be effective at temperatures higher than 37 degrees. It makes one wonder why all the tests were conducted at 37 degrees Celsius, and not at the temperature set out in the design specification, which was 55 degrees Celsius (see Table 2-3.3 at page 30).

Temperature is important because, as stated in the Focus Report at page 151, "Controlling untreated effluent temperature within the mill is necessary to optimize microbiological growth in the AST system, which ensures that treatment processes can occur." However, as stated at page 47, "With increasing effluent temperature, bacterial activity increases. The maximum acceptable operating temperature for typical AS systems is limited to about 39°C, which corresponds to the maximum temperature for the growth of mesophilic organisms." This raises questions as to what would happen if the temperature exceeds 39 degrees because of malfunction or other reason? If the microorganisms die, how long will the mill have to shut down in order for them to grow again? How will the deaths of the microorganisms be detected? How long will it take to detect the deaths? Will the untreated effluent continue to flow to the strait? These questions ought to have been addressed in the Focus Report.

2. **Point A**

Section 3.2 of the Terms of Reference instructs Northern Pulp to, "Provide effluent flow data to support the proposed peak treatment capacity of 85,000 m3 maximum flow of effluent per day. At a minimum, data from 2017 and 2018 is required. **Provide flow data for Point A**, clarify source of the effluent flow volumes given in the EARD, and provide other relevant data and information to support the proposed treatment system design. If the 85,000 m3 cannot be justified based on historical data, identify water reduction projects, or reevaluate the treatment system design and update the receiving water study accordingly." (Emphasis is mine)

It is clear that Northern Pulp is required to provide flow data for Point A in order to satisfy this section of the Terms of Reference. It is very concerning that Northern Pulp is not able to provide

this data because as stated on page 48, "Point A flow data would have been used for the design review if the flow meter at that location possessed the accuracy required for the evaluation. The flow measurement at Point A, used only to assist operations at the mill, is less accurate than the regulatory flow measurement (i.e. Parshall Flume) used at Point C."

Appendix 3.2 states at page 3, "Flow is not measured at Point A, the inlet to the BH ETF: Flow is measured using a doppler-type system at the effluent feed pumps at the mill, but this measurement is for indication purposes only, as its accuracy is not sufficient for either data analysis or regulatory purposes."

The inability of Northern Pulp to provide accurate flow data from Point A not only leaves the Terms of Reference unsatisfied, it also violates a provision in Northern Pulp's Industrial Approval. Section 7 of the Industrial Approval reads,

(d) The Approval Holder shall monitor flow at Point A, the end of the effluent transmission pipe, on a continuous basis. This data shall be recorded daily and tabulated monthly.

(e) The Approval Holder shall operate and maintain real time flow monitoring equipment at the end of the effluent transmission pipeline which is designed to immediately notify the Approval Holder in the event of a total loss of flow or a reduction of flow below normal operating conditions.

If Northern Pulp is not able to provide accurate flow data from Point A to satisfy the Terms of Reference, I suggest they are not in compliance with their Industrial Approval. If they are not able to accurately determine their flow from Point A, they are not able to determine if there is a flow below normal operating conditions. This is a serious violation which makes one wonder if this is the reason they have not been able to detect leaks from their effluent pipe, such as the leaks that occurred in 2014 and 2018. It raises concern as to Northern Pulp's willingness to comply with standard operating procedures or any conditions set out in an environmental assessment approval.

At page 49 of the Focus Report, Northern Pulp engages in a questionable math exercise. They try to verify the accuracy of flow data at Point C by stating it is well known that "the effluent flow is roughly 10% lower than the raw water flow due to water vabour lost through four wet scrubbers (ie. air pollution control devices)…". They go on to say that the inflow of water from Middle River was 72,600 m3/day, and the average flow from Point C was 63,500 m3/day, and then concludes that, "The difference of 9,100 m3/day represents the average flow of water lost to evaporation during that period (an approximate 10% loss)." A 10% loss from the inflow of 72,600 m3/day would be 7,260, not 9,100. The 9,100 difference is actually a 12.5% loss, not 10%.

In addition to this obvious math error, it is not logical to say that the flow at Point C is the same as the flow at Point A. The effluent that is discharged from Point A is hot (40 – 55 degrees C), while the effluent that is discharged at Point C is cooler (around 35 degrees C). Between Point A and Point C, some of the effluent evaporates given its high temperature. As well, the effluent passes through bodies of water between the two points that allows for other natural processes and

seepage into the ground. It is quite likely that the effluent flow from Point A is much higher than the effluent flow at Point C.

The flow rates set out in Appendix 3.2 are concerning as they show many flow rate readings close to 85,000m3/day at Point C. Given the error in their math suggested above, it is likely that the effluent flow at Point A on those days greatly exceed 85,000m3/day, which exceeds the design capacity of the proposed new effluent treatment facility.

Northern Pulp has failed to prove enough of a correlation between the effluent flow at Point A and the effluent flow at Point C to justify the use of data from Point C.

3. Misrepresentations

Table 7.3-1 found on page 138 contains many errors or misrepresentations of findings. The easiest misrepresentation to understand is in relation to mercury. Under the heading, "Concentrations", one can see that no trace of mercury was found in Caribou Harbour. Mercury at Point C is said to be 0.028. Based on modelling, the level of mercury at 5m is .028 and at 10m is 0.028. The conclusion in the last column under the heading, "Distance from Diffuse Ambient conditions are reached" is <2m. However, if there is no mercury in the receiving water (ie Caribou Harbour) how can one conclude that the ambient condition will be met at less than 2m if at 10m the amount of mercury is 0.028?

This misrepresentation of conclusions is repeated many times in Table 7.3-1, including the conclusions for cadmium and BOD. This leads one to question the credibility of many of the findings in the Focus Report.

4. Other

- It is unclear whether the spacing of the diffusers will be 25m apart or 50m apart. Page 85 states that "As outlined in the 2018 RWS, the diffuser will be 3-port, spaced 50 m apart at a height of 1 m above the bottom of the seabed." However, Table 16 found on page 3.8 of Appendix 4.2 states the port spacing is 25m. This raises the question as to the effects of the different diffuser spacing on the Receiving Water Study.
- Section 9.2 of the Terms of Reference requires Northern Pulp to commence a Human Health Risk Assessment, which must consider, among other things, "consumption of potentially contaminated drinking water". It does not appear that this issue is considered in the Focus Report.
- There is no plan in the Focus Report for a leak detection system on the marine portion of the effluent pipe. This is not acceptable.
- The leak detection system proposed for the on land portion of the pipe does not appear to detect leaks less than 60 L/hour. If there is a leak less than 60 L/hour, over time, this leak can become catastrophic. It is not acceptable that a leak can go undetected.

- The conclusion that there will be no significant residual impacts to "fisheries" instead of "fish" is concerning and deceptive (see page 123). There is also no evidence to support this claim.
- Many of the Figures are blurry and it is not possible to read the legends. As such, I am not able to comment on many of the Figures because all the information is not available for me to review and consider. See Figure 7.3-1 for one example, but there are many others.
- The Focus Report is incomplete. Many studies are yet to be conducted (see for example page 126, page 165, page 166, Appendix 9.1), and many documents are missing (see for example Appendix 10.1 where completed ARIA is to be located, and Appendix 10.2 which is to contain the Land-Based Archaeological Investigation, Addendum 2.0 makes reference to a COD study which was to be attached, but it was not).
- At page 136, it is stated that only "direct mortality" of fish is considered. What about other changes to fish that do not result in their death? What if the fish mutate or fail to reproduce? These are important changes to consider.
- The migratory bird study found in Appendix 8.2 is not completed. It was conducted in May 9, 24, June 10 and July 5 only. Birds that pass the area at other times are not considered. It appears from Figure A8.2-1 that no survey was conducted along the causeway or in marine areas. This is required under section 8.3 of the Terms of Reference that states Northern Pulp is to "Complete a bird baseline survey…for the entire project area which includes the re-aligned pipeline route."
- Section 4.3 of the Terms of Reference states that Northern Pulp "…should include chemical and physical characterization of the solids proposed to be discharged…" It appears that Northern Pulp failed to include chemical characterization of the solids.

As stated in the attached article, "Baseline assessment of contaminants in marine biota prior to remediation of industrial effluent impacted sediments in a former tidal estuary in Nova Scotia, Canada", by Jessica Romo, Meenakshi Chaudhary and Tony R. Walker, "Industrial effluent wastewater is widely recognized as a major contributor of aquatic pollution". I submit that a review of the Focus Report filed by Northern Pulp indicates that there is a likelihood that the undertaking will cause adverse effects or significant environmental effects which are unacceptable and as such, the undertaking must be rejected.

Yours truly,

Scotsburn
Nova Scotia,
@gmail.com
March 8, 2019

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Via e-mail at ea@novascotia.ca
and fax 1-902-424-6925

Dear Sir or Madam:

RE: Northern Pulp's Replacement Effluent Treatment Facility Project

I am writing to comment on Northern Pulp's proposed Replacement Effluent Treatment Facility Project.

I am a life long resident of Pictou County and have many ties to the Northumberland Strait. For over 40 years, my family has owned a cottage along the Northumberland Strait. I have spent each summer walking the beaches and swimming the waters. I have worked in Pictou as for over 25 years and am a volunteer member of several boards and organizations in the area, including the Northumberland Fisheries Museum and Heritage Association, which is dedicated both to the preservation of fishing history and the celebration of the fishing culture. I am married to a commercial fisherman who fishes the waters of the strait, like many generations of his family who came before him. Involvement in the commercial fishery is a family commitment that is shared by our children and shapes our lives on a day to day basis. Like so many people in Pictou County and beyond, the Northumberland Strait is beloved by me and my family and is the cornerstone of our economic prosperity, social enjoyment and mental well being. The risk that Northern Pulp's proposed Effluent Treatment Facility Project poses to the Northumberland Strait and all who rely on it is simply too great for the Minister to grant approval.

Regulation 12 of the Nova Scotia *Environment Act* sets out the factors the Minister must consider when making her decision:

> 12 All of the following information shall be considered by the Minister in formulating a decision under subsection 34(1) of the Act:
>
> (a) the location of the proposed undertaking and the nature and sensitivity of the surrounding area;

(b) the size, scope and complexity of the proposed undertaking;

(c) concerns expressed by the public and aboriginal people about the adverse effects or the environmental effects of the proposed undertaking;

(d) steps taken by the proponent to address environmental concerns expressed by the public and aboriginal people;

(da) whether environmental baseline information submitted under subclause 9(1A)(b)(x) for the undertaking is sufficient for predicting adverse effects or environmental effects related to the undertaking;

(e) potential and known adverse effects or environmental effects of the proposed undertaking, including identifying any effects on species at risk, species of conservation concern and their habitats;

(f) project schedules where applicable;

(g) planned or existing land use in the area of the undertaking;

(h) other undertakings in the area;

(ha) whether compliance with licences, certificates, permits, approvals or other documents of authorization required by law will mitigate the environmental effects;

(i) such other information as the Minister may require.

Regulation 13(1)(e) made pursuant to the *Environment Act* states that one of the decisions of the Minister upon registration of a Class 1 undertaking may be as follows:

> "that a review of the information indicates that there is a likelihood that the undertaking will cause adverse effects or significant environmental effects which are unacceptable and the undertaking is rejected."

Section 34 (1) of the Nova Scotia *Environment Act* states that the Minister shall make one of six listed determinations upon the registration and review of an undertaking. I submit that, based on the factors listed in Regulation 12 set out above, it is appropriate that the Minister reject the undertaking as per section 34(1)(f) "because of the likelihood that it will cause adverse effects or environmental effects that cannot be mitigated."

ERRORS, MISREPRESENTATIONS, CONCERNS

In my review of Northern Pulp's proposed Replacement Effluent Treatment Facility (ETF) Project, I identified many errors, misrepresentations, and concerns. These are as follows:

1. Definitions: Commencing at Page xxiii, there are a number of words that are defined for the purposes of the proposal. Not all of the definitions used are the same as the definitions of the same terms used in relevant legislation, including the following definitions (emphasis are mine):

(a) **Contaminant** is defined in the *Environment Act* as: "contaminant" means, unless otherwise defined in the regulations, a substance that causes or may cause an adverse effect;

Contaminant is defined in the ETF proposal as: "A biological, chemical, physical or radiological substance that becomes harmful for humans or living organisms, when accidentally or deliberately introduced to air, water, soil or food."

(b) **Deleterious** substance is defined in the *Fisheries Act* as: deleterious substance means
(a) any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or
(b) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water,
and without limiting the generality of the foregoing includes
(c) any substance or class of substances prescribed pursuant to paragraph (2)(a),
(d) any water that contains any substance or class of substances in a quantity or concentration that is equal to or in excess of a quantity or concentration prescribed in respect of that substance or class of substances pursuant to paragraph (2)(b), and
(e) any water that has been subjected to a treatment, process or change prescribed pursuant to paragraph (2)(c); (substance nocive)"

Deleterious substance is defined in the ETF proposal as: "A substance that is dangerous and harmful."

(c) **Mitigate** is defined in the *Environment Act Regulations* as: "mitigate" means, with respect to an undertaking, to eliminate, reduce, or control the adverse effects or the significant environmental effects of an undertaking, and may include restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means;

Mitigation is defined in the ETF proposal as: "With respect to a project, refers to the elimination, reduction or control of the adverse environmental effects of the project and includes restitution for any damage to the environment caused by such effects through

replacement, restoration, compensation or any other means."

(d) **Significant** is defined in the *Environment Act Regulations* as: "significant" means, with respect to an environmental effect, an adverse effect that occurs or could occur as a result of any of the following:

(i) the magnitude of the effect,
(ii) the geographic extent of the effect,
(iii) the duration of the effect,
(iv) the frequency of the effect,
(v) the degree of reversibility of the effect,
(vi) the possibility of occurrence of the effect;

Significance is defined in the ETF proposal as: "A defined threshold of acceptability. The significance of adverse environmental effects is determined by a combination of scientific data, regulated thresholds, standards, social values and professional judgment. For example, the ecological context of a project may be determinant of whether likely adverse effects are significant."

It is noted that the term "**adverse effect**" is not defined in the ETF proposal. It is defined in the *Environment Act* as " an effect that impairs or damages the environment or changes the environment in a manner that negatively affects aspects of human health".

Also noteworthy is the definition of the term "**reach**" in the ETF proposal. It is defined as, "In the context of this project, a reach is a section of watercourse of defined length (usually 100 m) in which fish and fish habitat surveys are completed, and water quality measurements are taken." The term "reach" is not defined in the *Environment Act*, regulations or other applicable legislation.

Because the ETF proposal uses definitions which are different than those set out in the relevant legislation, when the proposal reaches a conclusion or makes a statement, the standards for that conclusion or statement may not be what is set out in the legislation. The conclusion or statement may satisfy the definition the ETF chooses to apply, but it may not satisfy the standard set out in the actual legislation.

Also of concern is the definition of "**change in water quality**" found on page 346 of the ETF proposal, which states, "For the purposes of this assessment, a change in water quality refers to any alteration to pH, dissolved oxygen (DO), temperature, total suspended solids (TSS) or contaminants in the water column." The definition does not include such things as AOX, BOD, COD or colour.

The definition of "**change in marine fish population**" set out in the proposal is also of concern. On page 384, a change in marine fish population is said to "include any physical injury or mortality on fish attributable to the project, and any destruction or alteration of habitat from disturbance of the marine environment." It is not clear whether this definition includes such things as bio-accumulation and any other effect or change to fish.

2. The ETF proposal states that the temperature of the treated effluent will reach ambient temperatures within 2 meters of the diffuser and therefore will comply with CCME Guidelines for temperature . This is a misrepresentation of the CCME Guidelines (Canadian Water Quality Guidelines for the Protection of Aquatic Life - see attached), which state, "Human activities should not cause changes in ambient temperature of marine and estuarine waters to exceed +/- 1degree Celsius at any time, location, or depth."

3. On page 123 of the proposal, it is stated that, "Dioxins and furans in NPNS's effluent have virtually been eliminated since the conversion to chlorine dioxide bleaching in 1998. NPNS has never exceeded the limits as per the Pulp and Page Mill Effluent Chlorinated Dioxins and Furans Regulations. In fact, dioxins and furans testing for the last 5 years has consistently shown that all of the compounds required to be tested under the regulations have not been detected in NPNS' effluent (non-dedect)." This statement runs contrary to the test results of samples taken June 11, 2014 from NPNS' effluent leak. The test results are published on NSE's website and attached hereto. The test results appear to reveal that there were exceedences of dioxins and furans beyond what is permitted under the Pulp and Paper Effluent Regulations.

4. On page 433 of the proposal, the physical land use in the vicinity of the land-based portion of the effluent pipeline route is set out. There are a number of land uses missing from this list, including single family homes and cottages in the area between the causeway and Division Road, and near the ferry wharf. Also in the vicinity of the ferry wharf and missing from the list are the Caribou fishing wharf, the fishing wharf at North Nova Seafoods, the North Nova Seafoods fish plant, and the Pictou Island ferry. At the fishing wharves, the uses extend beyond the tying up of fishing vessels. At the wharves is where fish buyers set up their buying stations for various fisheries and store bait and catches. It is where fishers work on their vessels and gear. Fishers use water from the Northumberland Strait to wash down their vessels and hydrate and store their catches. The wharves are used by recreational boaters, barges and tugs and those seeking shelter from storms or rough seas. The proposal puts all of these uses at risk.

The ferry service between Caribou, Nova Scotia, and Wood Islands, Prince Edward Island, is a vital link between the two provinces. Any infrastructure or impediment to the use or expansion of the ferry wharf at Caribou should not be permitted. The proposal does not set out details as to the specific location of the proposed effluent pipe. Insufficient details are provided to determine whether the proposed pipe will impact the ferry service now or in the future. The attached article from CBC dated May 5, 2017 confirms that changes to the ferry service are being contemplated.

5. The proposal claims that "operation of the outfall will not interact with use of community beaches in the surrounding area." (see page 440). This statement appears to contradict the results of the Stantec Final Caribou Discharge Receiving Water Study found in Appendix E1 which shows effluent concentrations washed ashore in various areas. For example, Figures 2.7 and 2.9 shows effluent on the beach at Munro's Island which is a popular provincial park. Figure 2.11 shows effluent on a beach at Caribou Island which is enjoyed by many locals, cottagers and tourists. I suggest that the presence of effluent in any form on any beach or shoreline will interact

with the use of community beaches.

6. On page 505 of the proposal, it is stated that "Stantec (2019) also reported that ambient air monitoring data for 2015, 2016 and 2017 showed no exceedances of the applicable Nova Scotia regulatory AQC for the air contaminants monitored under the NPNS approval to operate." This does not appear to be a true statement. Attached is Source Emission Test Results for Winter 2015 and Summer 2015. Both tests were conducted by Stantec and the results were found on NSE's website. The test results show exceedances for both the recovery boiler and the power boiler as outlined in the company's industrial approval.

7. The proposal claims that "the loss of vegetation and associated bird habitat within the pipeline footprint area along the road shoulder (if it occurs) will be consistent with existing road maintenance activities along Highway 106 and thus, will not result in any additional loss of bird habitat." (see page 561). This statement fails to consider the habitat of the double breasted and great cormorant which are located along the Harvey A. Veniot Causeway. Their habitat will be destroyed with the construction of the pipeline, and will not likely recover.

8. The proponent's public consultation was not adequate. I attended the open houses in New Glasgow and Pictou Landing which were both held prior to the new route of the pipe to Caribou Harbour being announced. The open houses were conducted on the basis of the pipe going into Pictou Harbour. No open houses were conducted following the announcement of the new route to Caribou, even though Dillon Consulting Limited promised me in two letters that they would hold additional open houses. Dillon also promised me in the same correspondence that they would release studies to the public as they became available. Very few studies were released to the public prior to the registration of the proposal. The correspondence from Dillon are included with Ecojustice's submission to the proposal on behalf of Friends of the Northumberland Strait.

The open houses were crowded, loud, and not conducive to conversation, asking questions or obtaining information. They did not allow for meaningful discussion and it was difficult to engage the proponents. They did not have any means of taking notes of my concerns for future reference, consideration or documenting purposes.

The information provided at the open houses, in a subsequent mail out and advertisements represented that the project would include an oxygen delignification system which would improve the quality of the effluent. This system does not appear to be included in the proposal. There was no consultation by the proponent with the public following the announcement of the new route or the elimination of the oxygen delignification system from the project.

9. I am concerned that the environmental assessment is proceeding on the basis of a Class 1 environmental assessment which limits the time the pubic has to respond to the proposal. The proposal is almost 1700 pages long and takes a lot of time to read, analyse and reply. Because of the short length of time provided, I submit that the pubic consultation is not meaningful or as fulsome as it could otherwise be. This raises significant public policy concerns which are exacerbated by the lack of input the public will have to the additional information and studies the proponent has stated it will file at a later date. Pubic review and input is vitally important to the EA process but the public is not being this opportunity.

Missing Information

Aside from the many studies yet to be completed, the proposal is missing several pieces of information, as follows:

(a) The proposal states that the proponent's "Toxicity Prevention and Remediation Plan" will be used. This plan was not included in the proposal, and as such, it is not possible to determine whether it is complete or effective. Any reference to this plan and its use to mitigate or address any issue should not be considered.

(b) Page 28 of the proposal refers to a brochure attached to Appendix D. No such brochure is attached.

(c) Page 349 and 351 makes reference to "occurring in a context of previous disturbance". There is no information provided as to what the previous disturbances refers to.

(d) Page 460 sets out 10 known ship wrecks in the vicinity of the marine PFA/LAA. Attached is a list of 17 ship wrecks which I found after searching the Marine Heritage Database if the Maritime Museum of the Atlantic which is the same database the proponent claimed to have used.

(e) There appears to be information missing from Table 11.1-1 (page 535) as not all VEC's set out in section 8 of the proposal are summarized.

(f) Appendix Q (Bird Data) sets out data collected for the month of December only. As such, any data from migratory birds who left the area by December is not captured.

(g) The proposal fails to disclose that the location of the new on-site ETF will be located adjacent to Canso Chemicals which is a former chemical plant that has known deposits of mercury on its property. The proposal does not address the potential interaction that the presence of mercury will have on the construction and operation of the ETF and the environment.

(h) Although the proponent appears to imply that the lack of cooperation from fishers is the reason for the deficiencies in the proposal's information relating to commercial fishery in the area, it must be noted that area fishery information is contained in the most recent Environmental Effects Monitoring Study (EEM), which is attached as Appendix J of the proposal. The Receiving Waters Study completed by Stantec (attached as Appendix E2 of the proposal) sets out less information on the area fishery than the EEM study which was prepared prior to the Receiving Water Study. Also, during the open houses I attended in both New Glasgow and Pictou Landing hosted by the proponent as part of this environmental assessment process, I personally witnessed fishers and others drawing on a map the location of the fishery and explaining in detail the location of the area fishery to the proponent. The proponent appears to have disregarded this information as it has not been included in the proposal.

(i) A provision in the sign off sheet contained in the Receiving Water Study found in Appendix E3 of the proposal limits the usefulness of the study. The provision states, "The material in it [the Receiving Water Study] reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client." Unless the contract between Stantec and KSH (the Client) is disclosed, it is not possible to understand the effect that the "scope, schedule and other limitations" imposed in the contract may have had on the results of the Receiving Water Study. As such, the Receiving Water Study ought not to be relied upon in the review of the proposal.

(j) On page 336 of the proposal, the marine local assessment area (LAA) is said to consist of a corridor approximately 300 m wide, including an area of 300 m encircling the outfall. There is no explanation as to how this area was determined or developed. It appears to be an arbitrary area with no basis for its existence.

CONCLUSION

This proposal was submitted prematurely without proper study or consideration for the environment and the adverse effects of the proposal on the Northumberland Strait. On page 12 of the proposal, the proponent admits that "due to EA Registration submission timing, the study period did not facilitate full biological field assessments for the current proposed transmission pipeline corridor", and "...it was not possible to conduct field work in the new pipeline corridor or marine environment in order to inform this EA Registration." The time constraints were created and were self imposed by the proponent. They could have chosen to complete the required studies and then file the proposal. Failure by the proponent to do so, and acceptance by the minister of this tactic if the proposal is approved, sets a very dangerous precedent for future EA registrations. It would convey the message that EA registrations do not need to be complete at the time of registration. Instead, a proponent can file an incomplete EA, receive approval, and then complete important studies. These studies would be filed without public review and input which would eliminate a vital component of an EA. This is not acceptable and is against public policy and violates procedural fairness.

I suggest that the proposal ought not to have been accepted for registration because it was not complete. Regulations 9(1A) made pursuant to the *Environment Act* states that the proponent must submit, "environmental baseline information". This was not included in the proposal.

To protect the integrity of the EA process in Nova Scotia, this proposal must be rejected. The proponent must start the process from the beginning once it has gathered the required environmental baseline information and all studies required to properly review it's proposal. The precautionary principle, set out in section 2(b)(ii) of the Environment Act, ought to be followed. It states,

> "(ii) the precautionary principle will be used in decision making so that where there are threats of serious or irreversible damage, the lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation."

The environmental effects which would occur as a result of the proposal cannot be mitigated.

The proposal suggests that fishers can be compensated and therefore mitigation will be served. Money cannot address the harm that this project will bring because there is more than monetary or commercial issues at play. Money cannot compensate for the loss of a beloved beach or shoreline. Money cannot compensate for the loss of peace and enjoyment of a day on the strait with family and friends. Money cannot compensate future generations of fishers who want to fish the pristine waters of the strait. Money cannot compensate a rural community who is dependent on the strait for its economic prosperity, social well being and mental health.

This project must be rejeted because of the likelihood that it will cause adverse effects or environmental effects that cannot be mitigated.

Yours truly,

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Baseline

Baseline assessment of contaminants in marine biota prior to remediation of industrial effluent impacted sediments in a former tidal estuary in Nova Scotia, Canada

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ABSTRACT

Contaminated sediments at a pulp mill and former chor-alkali effluent treatment facility in Nova Scotia, Canada will undergo remediation. However, baseline studies assessing contaminants in marine biota in the marine receiving environment are lacking. Historical qualitative and quantitative contaminant data in biota from Boat Harbour (a former tidal lagoon which was used to treat industrial effluent since 1967), and surrounding marine environment were reviewed to establish baseline pollution from industrial effluent and contaminated sediments. Elevated metal, dioxins and furan concentrations previously measured in marine biota needs updating to help inform pre-remediation monitoring. Selection of species, contaminants of concern and sampling locations were ad hoc and often inconsistent with environmental effects monitoring requirements under Canadian federal *Pulp and Paper Effluent Regulations*. These consolidated baseline data are required to determine historical impacts and to assist future monitoring during Boat Harbour sediment remediation to compare against.

Industrial effluent wastewater is widely recognized as a major contributor of aquatic pollution (Sunito et al., 1988; Ali and Sreekrishnan, 2001; Chaudhary and Walker, 2019). A bleached kraft pulp mill and chlor-alkali facility (operating from 1971 to 1992) in Nova Scotia, Canada discharged industrial effluent into Boat Harbour for 50 years (Fig. 1) and historically reported as a source of local marine pollution (Seakem Oceanography, 1990; SeaTech Ltd., 1996; Andrews and Parker, 1999; St-Jean et al., 2003). Before 1967 Boat Harbour was a natural tidal estuary and was used for fishing, hunting and ceremonial purposes by the Pictou Landing First Nation (PLFN) community. PLFN is a Mi'kmaq First Nation band government located in Nova Scotia. The Boat Harbour estuary (roughly 142 ha) was connected to the Northumberland Strait. Boat Harbour was used to treat raw industrial effluent in 1967. In 1969, the Boat Harbour Treatment Facility (BHTF) was built and operated by the province to treat effluent prior to discharging into Boat Harbour (BHTF stabilization lagoon) (Fig. 2; Hoffman et al., 2017). In 1972, a dam was built cutting Boat Harbour off from the ocean.

Contaminants associated with bleached kraft mill and chlor-alkali effluent include: dioxins and furans, metal(loid)s, polycyclic aromatic hydrocarbons (PAHs), hydrogen sulfide, methyl-mercaptans, methyl-mercury (Me-Hg), chlorate, chlorite, resin acids, chlorophenols, catechols, vanillins, veratols, guaiacols and syringaldehydes (Dillon Consulting Limited, 2012; Hoffman et al., 2015). On January 31, 2020, discharge of mill effluent will cease under the *Boat Harbour Act* (Hoffman et al., 2017). Following cessation of effluent discharge, contaminated sediments in Boat Harbour will be remediated and returned to tidal influences. Legacy metal and organic contaminants in Boat Harbour sediments have already been characterized by Hoffman et al., 2017). Ongoing studies are also characterizing impacted wetlands, soils, and groundwater to inform remediation planning. Despite numerous studies documenting effluent impacts on sediments, consolidated by Hoffman et al. (2017) to help inform remediation decisions, comparable baseline data related to contaminants in marine biota are lacking. Consolidated marine biota baseline data are required to determine historical impacts and to assist future monitoring during Boat Harbour sediment remediation to compare against.

This study aims to: (1) assess historical qualitative and quantitative contaminant data in marine biota (e.g., Blue mussels, *Mytilus edulis*; Lobster, *Homarus americanus*; and Rock crabs, *Cancer irroratus*); (2) compare historical marine biota data to regional data from Nova Scotia and New Brunswick and current Canadian Food Inspection Agency (CFIA) guidelines (CFIA, 2014); and, (3) identify gaps and limitations associated with historical marine biota data to develop a baseline

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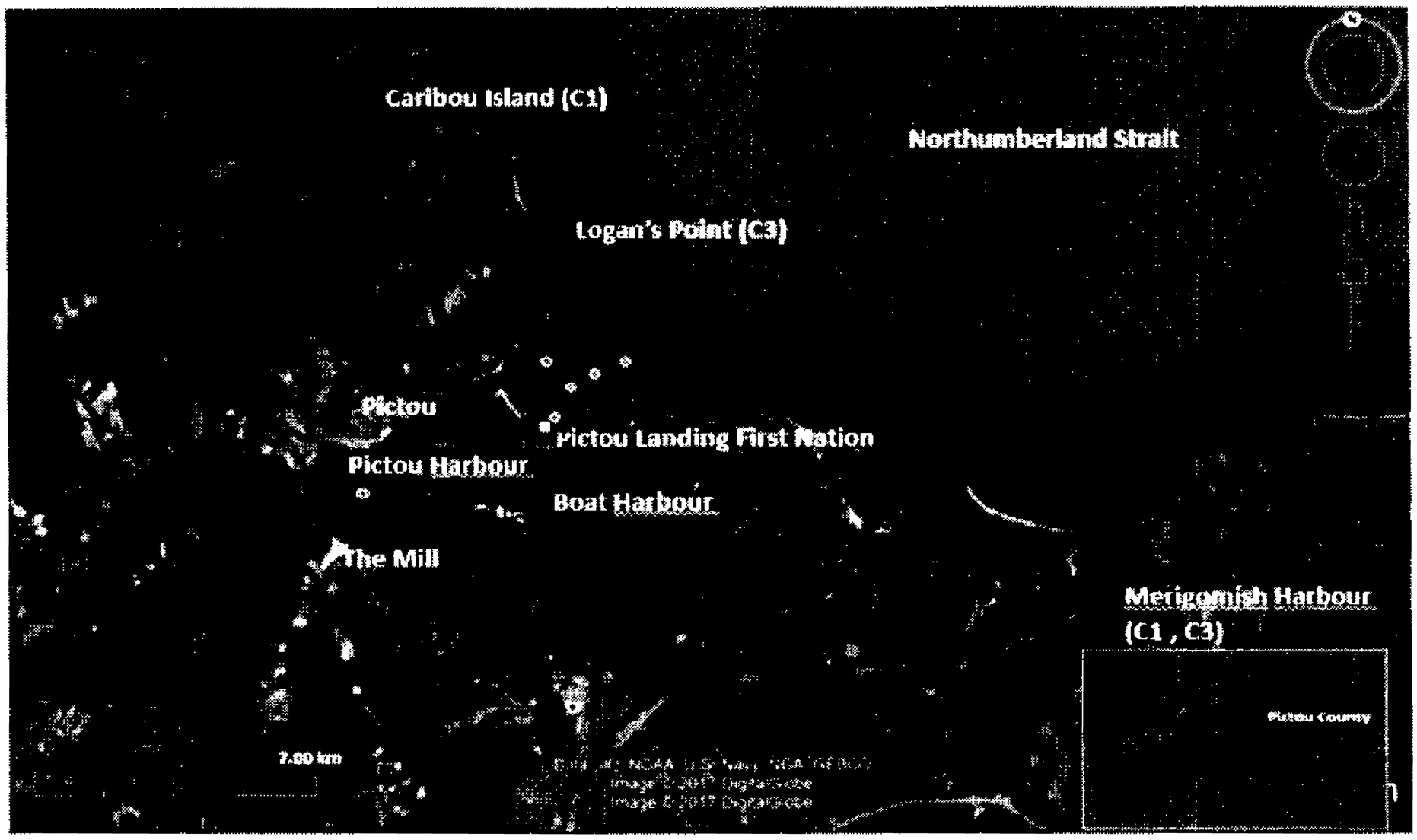


Fig. 1. Location of Boat Harbour in Pictou County, Nova Scotia (adapted from Hoffman et al., 2017). Blue circle represents blue mussel (*Mytilus edulis*), green triangle represents rock crabs (*Cancer irroratus*), red circle lobsters (*Homarus americanus*) and yellow square clams sampling locations. C1, C2 and C3 represent reference locations used in EEM cycles 1, 2 and 3 cycle, respectively. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

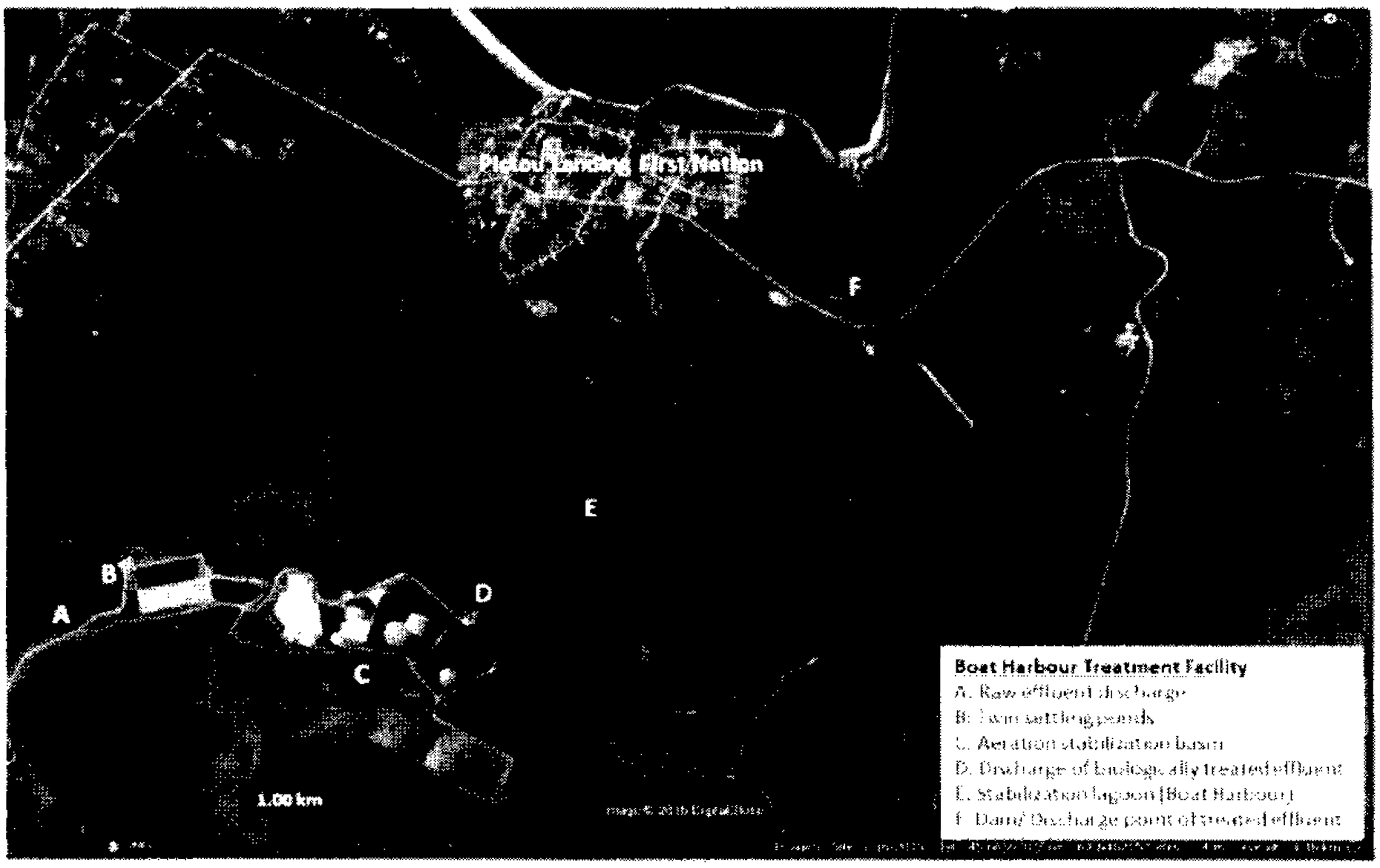


Fig. 2. The Boat Harbour Treatment Facility (BHTF) relative to the Pictou Landing First Nation (PLFN) community (adapted from Hoffman et al., 2017).

against which future monitoring studies can be compared *before*, *during*, and *after* remediation of industrial effluent impacted sediments in Boat Harbour. Additionally, this baseline data will help support science-based decision-making in the environmental impact assessment process (MacKinnon et al., 2018) required for the construction and operation of a proposed replacement effluent treatment facility for the pulp mill

Table 1
Chronology of documents containing information of marine/aquatic biota in Boat Harbour and surrounding areas.

Reference	Analysis of aquatic biota		
	Spatial location and contaminant concentrations included	Spatial location and/or contaminant concentrations omitted	No analysis of aquatic biota
Scarratt (1969)	–	–	X
Scarratt (1975)	–	–	X
DFO (1989)	X	–	–
Zenon Environmental Inc. (1989)	–	X	–
Seakem Oceanography Ltd. (1990)	–	–	X
Environment Canada (1990)	–	–	X
Painter and Stewart (1992)	–	X	–
JWEL (1993)	X	–	–
JWEL (1994)	–	X	–
LEM Laboratory (1994)	–	X	–
Prouse (1994)	–	X	–
JWEL (1996)	X	–	–
Andrews and Parker (1999)	X	–	–
JWEL (2001)	–	–	X
St-Jean (2002)	–	X	–
King and Chou (2003)	–	X	–
St-Jean et al. (2003)	X	–	–
Stantec (2004)	–	X	–
St-Jean et al. (2005)	–	X	–
EcoMatrix Inc. (2007)	–	X	–
Johnson (2013)	–	–	X
Castleden et al. (2016)	–	X	–
Oakes (2016)	–	–	X
EcoMatrix Inc. (2016)	–	X	–

Note: cycle 2 not accessible, conclusions drawn from cross referencing other EEM reports (indicated with grey highlights).

(Northern Pulp Nova Scotia Corporation and Dillon Consulting Limited, 2017; Nova Scotia Environment, 2019).

Government reports (> 200) and eight peer-reviewed articles were reviewed for marine/aquatic biota data from Boat Harbour, Pictou Harbour, Northumberland Strait or reference locations (see Hoffman et al., 2017 Supplementary Material for a comprehensive list of all documents reviewed). Of 24 documents containing marine/aquatic biota data from all reviewed (Table 1), only five contained relevant quantitative data from 1989 and 2003 that met criteria (Table 2). Criteria included: contaminant concentrations (i.e., metals, dioxins and furans, chlorophenols, resin and fatty acids) and sample locations (*x*,*y* coordinates in decimal degrees). Sample coordinates were generated by overlaying report maps in Google Earth©, if not provided. Another 15 reports contained qualitative information about biota from 1969 to 2016 and were assigned a level of impact based on report findings (e.g., *limited*, *moderate* or *impacted*).

After the BHTF began operating, negative qualitative impacts to marine/aquatic biota in Boat Harbour and Northumberland Strait were reported (Scarratt, 1969; Scarratt, 1975; Painter and Stewart, 1992; JWEL, 1994; Johnson, 2013). Many species including: American eels (*Anguilla rostrata*), soft-shell clams (*Mya arenaria*) and quahogs (*Mercenaria mercenaria*), died off following early effluent exposure (Seakem Oceanography, 1990). Concerns were also raised about perceived lobster population declines and depletion of local intertidal fauna (Scarratt, 1969). However, few studies quantified contaminants in biota until the late 1980s when Fisheries and Oceans Canada (DFO) reported dioxin and furan concentrations in fish and shellfish tissues from regional pulp and paper mills (DFO, 1989). *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* under the *Environmental Protection Act* (CEPA, 1999) prohibit discharge of 2,3,7,8-TCDD and

Table 2
Documents containing relevant marine biota data.

Reference	Summary of marine/aquatic biota data
DFO (1989)	Fish and shellfish in Pictou Harbour analyzed for resin and fatty acids (cited in JWEL, 1993).
JWEL (1993)	Crabs (*Cancer* spp.), lobsters (*Homarus americanus*), clams and blue mussels (*Mytilus edulis*) analyzed for dioxins and furans in Pictou Harbour (data from DFO (1989)).
JWEL (1996)	Hepatopancreas tissue from rock crabs (*Cancer irroratus*) and liver of winter flounder (*Pseudopleuronectes americanus*) analyzed for resin and fatty acids from study (Pictou Road) and reference (Merigomish Harbour) areas. Blue mussel tissue analyzed for dioxins and furans (10 congeners) from Boat Harbour and reference areas (Caribou Harbour).
Andrews and Parker (1999)	Blue mussels in Pictou Harbour analyzed for chlorophenols, resin acids, plant sterols and metals (Table 4). Reference locations, noted in cycle 3 EEM report, indicated two cages furthest away from effluent discharge in Pictou Harbour (Stantec, 2004). 'Baseline' data reported, but no specific locations indicated.
St-Jean et al. (2003)	Blue mussel tissues analyzed for six metals (Table 4) (cited in Andrews and Parker, 1999), after 90d exposure to effluent at increasing distances from Boat Harbour. Reference areas located outside Pictou Harbour.

Note: criteria included: contaminant concentrations (i.e., metals, dioxins and furans, chlorophenols, resin and fatty acids) and sample locations (*x*,*y* coordinates in decimal degrees). Sample coordinates were generated by overlaying report maps in Google Earth©, if not provided.

| Species tested | Reference | Sample Location | Sample | | Dioxins and furans (ppt) | | |

Table 4
Studies containing qualitative information of impacts on marine/aquatic biota.

References	Aquatic species	Analysis of aquatic biota data		Level of Impact determined in report
		Spatial reference and contaminant concentrations available	Missing spatial reference and contaminant concentrations	
Zenon Environmental Inc. (1989) *Unable to access report, cited in Prouse (1994)	Blue mussel (*M. edulis*)	* Unable to gain access to report to determine georeference locations Contaminants (VOCs, PAH, pesticides)		Limited
JWEL (1993) *Data from DFO (1989)	Rock crab (*Cancer irroratus*), lobster (*H. americanus*), clams (species not specified), blue mussel (*M. edulis*), inland silverside (*M. beryllina*), sea urchin (*Strongylocentrotus droebachiensis*)	Contaminants (dioxin and furans), toxicity testing	–	Limited
JWEL (1994)	Rainbow trout, sea urchin (*S. droebachiensis*)	–	Toxicity testing	Limited
LEM Laboratory (1994)	Lobster (*H. americanus*)	–	Taint testing	Moderate
JWEL (1996)	Rock crab (*C. irroratus*), Winter flounder (*P. americanus*), blue mussel (*M. edulis*), inland silverside, sea urchin (*S. droebachiensis*), barrel weed (*Champia parvula*)	Contaminants (resin and fatty acids, dioxins and furans), morphological measurements (carapace width, body weight, hepatopancreas/liver weight, gonad weight, egg weight), toxicity testing	–	Limited
Andrews and Parker (1999)	Blue mussel (*M. edulis*)	Contaminants (resin and fatty acids, plant sterols, chlorophenols, metals), survival rates, growth trends, wet tissue weight	–	Limited
JWEL (2001)	Freshwater amphipod	–	Toxicity testing	Limited
St-Jean (2002) *Discussed in Stantec (2004)	Blue mussel (*M. edulis*), mummichog (*F. heteroclitus*)	–	Stress response, immunological measurements (phagocytic activity, lysosome retention, nitro blue tetrazolium reduction, hydrogen peroxide production, *p*-nitrophenyl acid glucosaminide assay, total protein)	Impacted
King and Chou (2003)	Lobster (*H. americanus*)	–	Contaminants (PAHs, PCBs)	Limited
St-Jean et al. (2003)	Blue mussel (*M. edulis*)	Contaminants (metals), wet tissue weight, immunological parameters (lysosome retention, phagocytic activity, bacterial clearance)	–	Moderate
Stantec Consulting Ltd. (2004)	Inland silverside, sea urchin (*S. droebachiensis*), barrel weed (*C. parvula*)	–	Toxicity testing	Limited
EcoMatrix Inc. (2007)	Inland silverside, sea urchin (*S. droebachiensis*), barrel weed (*C. parvula*)	–	Toxicity testing	Limited
Castleden et al. (2016)	Mummichogs (*F. heteroclitus*), plankton	–	Contaminants (dioxins, dioxin-like PCBs), toxicity testing	Impacted
EcoMatrix Inc. (2016)	Sea urchin (*Lytechinus picatus*), Barrel weed (*C. parvula*)	–	Toxicity testing	Limited
EcoMatrix Inc. (2016)	Mummichogs (*F. heteroclitus*)	Histologicalogical, lipid and glycogen analysis for liver size	–	Limited

– Not applicable to report/document referenced; level of impact: *limited, moderate, impacted.*

2.1 ± 0.03 SD; Cu, 2.9 ± 0.8 SD; Zn, 20 ± 3.6 SD $\mu g\, g^{-1}$ ($n = 5$) (Fig. 3; Table 5). Concentrations of Cr and Pb were < DL (DL for Cr and Pb are 0.5 and 0.18 $\mu g\, g^{-1}$, respectively). Arsenic is naturally elevated in coastal sediments in Nova Scotia (Zhang et al., 2019), which may partly explain why mussels exhibited relatively high As concentrations (Walker and MacAskill, 2014). However, CFIA guidelines (3.5 $\mu g\, g^{-1}$) were exceeded at only one station (3.6 $\mu g\, g^{-1}$) (Table 5).

Bioaccumulation of other metals (Cd, Cu, Zn) in mussels were marginally higher than other industrial harbours in Nova Scotia (McCullough et al., 2005; Walker and MacAskill, 2014; Walker and Grant, 2015; Table 6). Utility of parameters previously analyzed requires scrutiny. For example, JWEL (1996) detected higher concentrations of oleic acid in blue mussels and winter flounder (*P. americanus*) close to Boat Harbour compared to reference sites but was not attributed to industrial effluents as oleic acid is naturally occurring in animal fats. Furthermore, bioavailability of contaminants in aquatic organisms should be monitored. Mercury has never been analyzed, nor Me-Hg which indicates bioaccumulation (Del Aguila Feijooa and Walker, 2018), despite Hg concentrations exceeding highest effect thresholds in Boat Harbour sediments (Hoffman et al., 2017). The former chlor-alkali facility which discharged effluent into Boat Harbour for 21 years was a likely source of Hg (Walker, 2016).

Painter and Stewart (1992) measured fecal coliform contamination in clams near Boat Harbour in the 1970s which lead to historical shellfish closures. A lobster taint study by LEM Laboratory (1994) reported differences in taste of lobsters subjected to > 10% dilutions of Boat Harbour effluent, but no effluent contaminant concentrations were provided. Other studies measured immunological, morphological and physiological (gonad weight, carapace size, stress response, survival rate) endpoint differences between reference and study sites to assess effluent pollution impacts. Immunological markers in mussels and mummichogs exhibited higher levels of stress in Boat Harbour compared to reference sites (JWEL, 1996). Mussels near effluent discharge were immunosuppressed (St-Jean et al., 2003), and in a subsequent study had more leukemia cells compared to reference sites indicating stress response to effluent exposure (St-Jean et al., 2005).

However, these studies lacked contaminant concentrations and georeference locations, so putative impacts could not be attributed to specific locations. In a study by Oakes (2016), only pollution tolerant fish (mummichogs and ninespine sticklebacks) were found in Boat Harbour and lacked pigmentation due to poor light penetration.

Although analysis of dioxin and furans in fish is required under *PPER*, if mills *ever* used chlorine for bleaching, this analysis was not completed beyond the EEM pre-design study and only partially completed for cycle one citing bleaching process changes, despite guidelines stating otherwise. Two dioxin and furan congeners (2,3,7,8-TCDD and 2,3,7,8-TCDF) outlined in the *PPER*, under Section 48 of CEPA (1999), were not analyzed in the first EEM cycle contradicting claims that program requirements were being met (Table 7). Despite changes in the mills bleaching process, dioxins and furans bioaccumulate in biota, are highly toxic and persist in the environment (Sunito et al., 1988; Hites, 2011; Hoffman et al. submitted). Remobilization of dioxins and furans in sediments can cause residual effects (Richman et al., 2016), thus continued testing for dioxins and furans in EEM programs using identical study and reference sampling locations for inter-annual comparison of results is warranted.

Selection of suitable biota for monitoring marine pollution is crucial to adequately assess impacts of industrial effluent. Lobsters and crabs are effective bioindicators with limited ability to metabolize contaminants which accumulate in their digestive glands (hepatopancreas) (Chou et al., 2003; Walker and Grant, 2015). Filter feeding blue mussels are also effective water quality bioindicators (Cantillo, 1998; Chase et al., 2001). Mussels bioaccumulate contaminants at concentrations much higher than detected in ambient seawater (Fraser et al., 2011; Walker and MacAskill, 2014). Monitoring sites should be established in areas with known impacts, using biota with known impacts, including blue mussels (Andrews and Parker, 1999; St-Jean et al., 2003), lobster (King and Chou, 2003) and rock crabs (JWEL, 1996). Establishing baseline and future long-term monitoring programs should choose appropriate size and age classes of target species (e.g., blue mussels, rock crabs, lobster) to assess environmental conditions before, during and after remediation (Walker et al., 2013a, 2013b). Further, consistent contaminants of concern (metals [including Hg and Me-Hg], dioxins and furans), toxicity testing and benthic invertebrate surveys should be used to assess effluent impacts on the marine environment.

Review of historical documents to identify and characterize impacts in Boat Harbour and surrounding area, indicate that available marine/aquatic biota data is insufficient to accurately assess impacts. Significant gaps and inconsistencies were found in marine biota data. Addressing inconsistencies and gaps of impacted marine biota in the area, will help informing long-term monitoring *before*, *during*, and *after* remediation. Establishing consistent future monitoring stations to assess impacts in marine biota in near-field, mid-field, and far-field sites will help confirm effectiveness of remediation of Boat Harbour and prior to the construction and operation of a proposed replacement effluent treatment facility for the pulp mill (Northern Pulp Nova Scotia Corporation and Dillon Consulting Limited, 2017; Nova Scotia Environment, 2019). Baseline marine data reported herein can then be

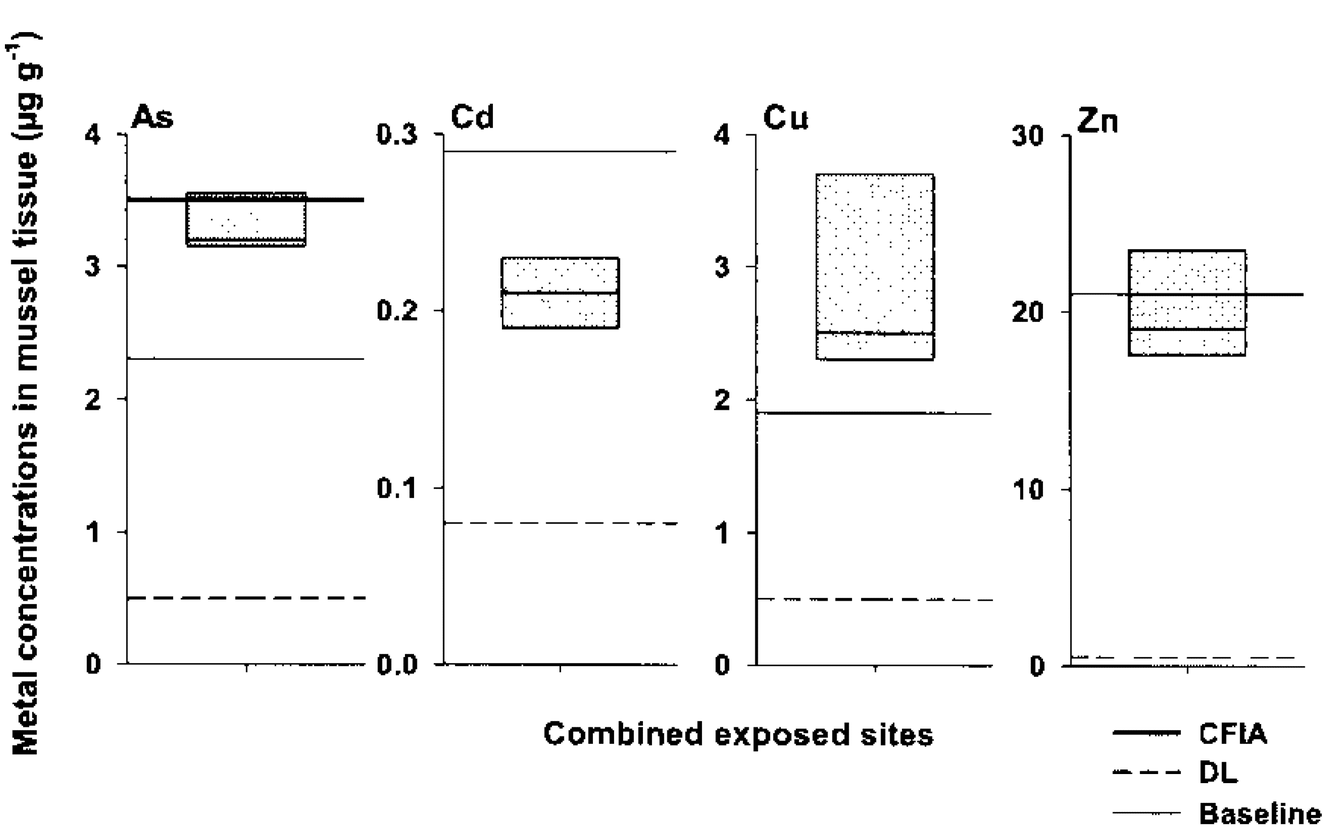


Fig. 3. Box plot composite metal concentrations ($n = 5$) in mussel tissues from near-field stations monitored between 1989 and 1999 compared to 'baseline' concentrations and Canadian Food Inspection Agency (CFIA) guidelines (adapted from Andrews and Parker, 1999; St-Jean et al., 2003). Solid horizontal line = baseline; Bold solid horizontal line = CFIA guidelines; dashed horizontal line = detection level (DL).

Table 5
Summary of metal concentrations in marine biota.

Species tested	Reference	Sample location	Sample	Metals (mg/kg)							
				Al	As	Cd	Cr	Cu	Fe	Pb	Zn
CFIA guidelines				–	3.5	–	–	–	–	0.5	–
DLs from Andrews and Parker (1999)				2.5	0.5	0.08	0.5	0.5	5	0.18	0.5
DLs from St-Jean et al. (2003)				2.5	2.3	–	–	0.5	5	–	0.5
Blue mussel (*M. edulis*)	Andrews and Parker (1999) as cited in St-Jean et al. (2003)	Pictou Harbour	Tissue (composite)	31	3.1	0.17	< 0.5	2.3	68	< 0.18	18
		Pictou Harbour		25	3.5	0.21	< 0.5	2.5	57	< 0.18	19
		Pictou Harbour		24	3.2	0.22	< 0.5	4	55	< 0.18	17
		Pictou Harbour		19	**3.6**	0.24	< 0.5	2.3	45	< 0.18	21
		Pictou Harbour		21	3.2	0.21	< 0.5	3.4	61	< 0.18	26
		Baseline		11	2.3	0.29	< 0.5	1.9	46	0.22	21

Note: - indicates no guideline; bold indicates guideline exceedance; underline indicates concentration that was also republished in St-Jean et al. (2003).

Table 6
Comparison of metal(loid) concentrations in mussels tissue with other studies ($\mu g\, g^{-1}$).

Location	As	Cd	Cu	Hg	Pb	Zn	Reference
Pictou Harbour, NS, Canada (DL)	3.1–3.6 (0.5)	0.17–0.24 (0.08)	0.8–6.7 (0.5)	ND	< 0.18 (0.18)	17–26 (0.5)	Present study
Isaacs and Country Harbours, NS	1.3–2.0	0.16–0.19	0.8–6.7	0.02–0.05	0.15–1.31	7.4–11	Walker and Grant (2015)
Sydney Harbour, NS	1.5–3.9	0.14–0.29	0.8–1.9	< 0.01–0.03	< 0.18–0.43	10–24	Walker and MacAskill (2014)
Halifax Harbour, NS	1.9–2.5	0.10–0.44	1.5–2.4	0.01–0.04	0.1–2.4	17–41	McCullough et al. (2005)
Baie des Chaleurs, NB, Canada	ND	0.55–4.2	0.5–1.1	ND	< 2.5–31	4.8–42	Fraser et al. (2011)
CFIA	3.5	nv	nv	0.5	0.5	nv	CFIA (2014)

DL – detection limits for present study presented in parentheses; nv - no guideline value; ND - not determined; CFIA - Canadian Guidelines for Chemical Contaminants and Toxins in Fish and Fish Products (CFIA, 2014).

Table 7
Summary of EEM program requirements compared to EEM components completed for the mill.

EEM program requirement		Dioxin and furans*	Taint testing **	Fish/ caged bivalve survey	Toxicity testing	Benthic invertebrate community survey
EEM cycle	Year	X	X	X	X	X
1st	1996	X	X	X	X	X
2nd	2000	–	–	X	X	X
3rd	2004	–	NR	X	X	X
4th	2007	–	NR	X	X	X
5th	2010	–	NR	X	X	X
6th	2013	–	NR	X	X	–
7th	2016	–	NR	X	X	X

Note: cycle 2 not accessible, conclusions drawn from cross referencing other EEM reports. Cycle 5 and 6 not accessible conclusions drawn from cross referencing cycle 7. – Not completed. X Completed. * Analysis of dioxins and furans in fish tissue required if mill historically used chlorine bleaching. ** Taint studies required if complaints received of tainting of fish or shellfish (taste or odour). Cycle 3,4,5,6,7 removed taint testing stating it was not required (NR).

used to compare against potential marine pollution in the future.

Historical baseline data are now dated. Elevated concentrations in some marine biota were understated for decades and require scrutiny from government regulators. Selection of target biota species, assessment of contaminants of concern and sampling locations were ad hoc and often inconsistent with EEM requirements. Target biota, distribution of sampling sites (near-field, mid-field and far-field) and contaminants of concern (metals [including Hg and Me-Hg], dioxins and furans) need prioritizing by government regulators. Future monitoring will be required during remediation of Boat Harbour and construction and operation of a proposed replacement effluent treatment facility for the pulp mill requires historical baseline data reported herein to compare against.

Acknowledgments

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Project: replacement_effluent_treatment_facility_project Comments: I support Northern Pulps effluent Replacement. Name: Email: @hotmail.com Address: St. Andrews Municipality: Nova Scotia Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 80 y: 26

From: @ns.aliantzinc.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:42:25 PM

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Project: replacement_effluent_treatment_facility_project Comments: I am glad to see a modern treatment facility being built good for the people good for the environment Name: @ns.aliantzinc.ca Address: Municipality: North Riverside Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 85 y: 24

From: @nrc-cnrc.gc.ca
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Project: replacement_effluent_treatment_facility_project Comments: To whom it may concern, I am writing to express my concerns about the proposed Replacement Effluent Treatment Facility outlined in the Focus Report submitted by Northern Pulp. Our family has a cottage located on the shores of Caribou, not far from the Northumberland Ferry Marine Terminal. We spend most of year enjoying the shores of the Northumberland Straight, especially in the summer as we all enjoy being in and on the ocean. I find it incomprehensible that there is even a consideration of allowing Norther Pulp to pollute our waters more than they already have. How could the Strait possibly remain suitable for recreation purposes if the proposed effluent treatment facility were to go ahead? The report states that there will be â?ochanges to the water quality due to the discharge of effluent into the Straitâ? . I am concerned our children and grandchildren, and those of the local residents will not be able to enjoy the Strait in the future. Many restaurants and small businesses rely on tourism to survive. Caribou, Waterside, and the town of Pictou are prime destinations for tourists. This proposed effluent strategy will definitely deter tourists. Another concern is that the proposed termination of the outfall is directly located where many local fishermen catch their lobster, herring, and other fish and shellfish. As per the report â?olobster represents one of the most important species harvested by commercial and indigenous fisheriesâ? . The effluent flow is expected to be 85,000 m3/day, equivalent to 85,000,000 L per DAY. This volume is outstanding and will result in hundreds, if not thousands of kilograms of contaminants per day. These are unacceptable levels of contaminants to add to the strait on a daily basis. It is inconceivable that there would not be any environmental adverse effects. Just the temperature effect of the effluent alone will influence the reproduction, survival and growth of larval and adult lobster. In this day and age, how can we consciously make a decision to reduce the quality of our waters and put the health of the local wildlife as risk? I trust our Honorable Minister of Environment will make the correct decision and not allow Norther Pulp to continue to pollute our waters. Email: @nrc-cnrc.gc.ca Address: Municipality: Halifax Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 73 y: 21

From:
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Subject: Northern Pulp Focus Report
Date: November 8, 2019 7:46:46 PM

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Re: Northern Pulp Focus Report From:

I have lived in Pictou for 71 years and worked as a Commercial Fisherman for 40 years, my watch is near over but we have to protect our children and grandchildren. This poisoning of the air and water by the pulp mill has gone on for 50 years and it is time to put a stop to it, not give it approval to poison a larger area. A pipe carrying treated but still toxic effluent through the Pictou Caribou watershed is unacceptable. Northern pulp has a history of broken pipes carrying effluent to boat harbour, notably in 2014 and last year (still waiting for a report on that one) They have proved that they cannot manage a pipe ! If Northern Pulp will not know for sure what the chemical content of the still toxic treated effluent coming out of the diffuser will be until after the system is operational, how can they draw conclusions and estimate risk ? Where are the recent studies on lobster larvae and herring spawn in this particular still toxic effluent? Mackerel ? Rock crab ? what are it effects on the grandchildren playing on the beach when it backwashes onto Munroes Island beach ? Where are the accurate year round studies on currents, tides, wind and their ever changing combinations … the ever changing combinations part has been totally missed. East or Nor'east wind on a rising tide will bring the whole toxic mess into caribou harbour. The diffuser is in a commercial fishing area...Lobster travel thru the immediate area into traps on all sides of it picking up a dose of chemical contamination. The other species do the same swimming from one place to another … the entire water environment is one of movement, constant motion. Ice movement at break up: it is possible to stand at the end of Caribou Island and watch pans of ice flowing at the same time in opposite directions...Where is the study on how this will affect dispersion and the integrity of the diffuser ? Water temperature: In the middle of an ocean warming crisis, why would you approve adding still toxic effluent which will be warmer than the existing water temperature. What happens when you add hot water to a dish basin of perfect temp water...your hands notice the temperature increase, so will the lobster larvae and other sensitive species ! This proposed plan show a complete lack of understanding of the marine environment into which it would be dumping warm, still toxic, treated effluent and and the irreversible damage that will be created. It also shows complete disrespect for the people of the Pictou area who rely on the watershed for their drinking and household water.

Pictou NS,

Sent from Mail for Windows 10

From:
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Subject: Northern Pulp Focus Report
Date: November 8, 2019 7:51:15 PM

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We are writing to express our opposition to Northern Pulps proposal to pipe effluent (treated or not) into the Northumberland Strait. Northern Pulp has proven it does not follow the rules. Past behaviour is a prediction of future actions. It's our opinion Nova Scotia needs to refer this file to the Federal Government for a Federal Environmental Assessment. The number of interested parties, the potential for loss to our fishing and tourist industry as well as impact to those who regularly enjoy the Northumberland Shore depends on this being assessed properly.
>
> Sincerely,
>
>
>
>
> Sent from my iPhone

From: @live.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:51:18 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: - Choose - Comments: I am the owner of a forestry company and our survival depends on having Northern Pulp being user of pulpwood. We take pride in protecting the environment in all aspects of our operations and certainly understand the importance of reducing environmental pollutions. With all the stake holders being involved it is disappointing that then cannot come to a comprise to allow the solutions being put forth by the mill that will mimic other companies operations to satisfy the environmental regulations. The forestry economy would be devastated if this mill closes. Name: Email: @live.com Address: Municipality: Frenchvale Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 73 y: 28

From: @icloud.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:52:56 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I support the ETF system as designed by experienced competent professionals trained in the applicable sciences and with due respect to their personal integrity and that of their professions. Name: Email: @icloud.com Address: Municipality: Dartmouth Postal-Code: Fax: email_message: Privacy-Statement: agree x: 64 y: 29

From:
To: Environment Assessment Web Account
Subject: Re: Northern Pulp's Replacement Effluent Treatment Facility Project
Date: November 8, 2019 7:54:42 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister,

I am writing in relation to the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project. I am a resident of Pictou and Caribou Island with a BA from Acadia University. I would like to address one main point in relation to the Environmental Assessment.

My primary concern in this letter centers around the quality of air emissions in Pictou County and their impact on human health. According to a study by Hoffman et al., many volatile organic compounds (VOCs) have been known or largely suspected to have harmful effects on human health. In an independent consultant study of ambient air emissions, it is noted by Northern Pulp "...that VOC levels were elevated in the community surrounding the NPNS mill" (pg. 504) yet they claim the pilot study conducted on VOCs in Pictou County by Hoffman et al.“...did not attempt to rule out contributions from other potential sources of VOCs in the area." It is strongly suggested by Northern Pulp's focus report that this alone demonstrates there is no issue with air quality in Pictou County. It was stated that further research is needed to support the findings. Northern Pulp has had ample time to pursue this and that has not been accomplished. Rather, they have misrepresented the data of pilot studies like Hoffman et al. to suggest there is no reason for concern, when those studies have demonstrated there is at least some risk associated with the emissions. Therefore, I do not feel Northern Pulp has done it's due diligence to fully determine the possible impacts, nor have they provided alternative solutions.

I cite Section 2 (b)(ii) of the Environment Act in stating "the precautionary principle will be used in decision-making so that where there are threats of serious or irreversible damage, the lack of scientific certainty shall not be used as a reason for postposing measures to prevent environmental degradation." It is unacceptable that Northern Pulp ask that residents of Pictou County - specifically those living in the highest concentration of VOCs - accept the health and environmental risks associated with VOCS so that the mill can remain in operation. Furthermore, it is unacceptable that the decades of environmental racism to the Indigenous Peoples of Pictou Landing be permitted to continue.

Based on the information provided, I do not believe there was a thorough risk assessment conducted in regards to air quality. Thus, I do not believe there is conclusive evidence against the likelihood of significant environmental damage and risk to public health. I request that the Minister reject the proposal on the basis of likelihood of adverse environmental effects that cannot be mitigated.

Yours respectfully,

References:

Hoffman, E., Guernsey, J.R., Walker, T.R., Kim, J.S., Sherren, K., & Andreou, P. (2017). Pilot study investigating ambient air toxics emissions near a Canadian kraft pulp and paper facility in Pictou County, Nova Scotia. Environmental Science Pollution Research International Journal. Retrieved from: https://www.researchgate.net/publication/318381271_Pilot_study_investigating_ambient_air_toxics_emissions_near_a_Canadian_kraft_pulp_and_paper_facility_in_Pictou_County_Nova_Scotia).

https://www.halifaxexaminer.ca/province-house/dalhousie-researcher-breaks-silence-over-pulp-mills-cancer-causing-air-emissions/#Northern%20Pulp%20says%20Hoffman%E2%80%99s%20study%20is%20flawed

Sent from Mail for Windows 10

From: @hotmail.con
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:56:43 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Forestry worker in support of Northern Pulp and the Pipe Name: @hotmail.con Address: PEI Municipality: Montague Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 41 y: 31

From: @ .ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 7:58:28 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am opposed to the approval of the pumping of Northern Pulps effluent in the Northumberland Strait. Northern Pulp has not provided proper proof that the effluent will not affect fisheries and water quality. The fisheries are opposed. Municipalities dont want the piped effluent anywhere near where leaks will affect their water supply. It is time to understand the long term effects of these irresponsible decisions that end up costing the province millions in increased healthcare costs as well as ultimately attempting to clean it up after it is clear that this kind of solution causes health risks to our communities. The NS gov has a long history of turning a blind eye to what matters most to its citizens when there is a seemingly short term economic gain.The truth is that the cleanup costs willful outweigh any benefit. Wise leadership sees beyond short term gain and takes into consideration the wellbeing of the people and the environment as central to a thriving prov incial economy. Let us be a province that has a future rather than selling out our future for a few extra dollars in our pocket. Be wise in making these decisions. Our childrens future depends on your long term insight rather than short term economic and political gain.Deals made behind closed doors that go against the wish of the people are undemocratic unethical and deceitful. Name: Email: @ .ca Address: NS Municipality: Glen Haven Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 61 y: 20

From:
To: Environment Assessment Web Account
Subject: My name is I am employed in the forestry sector
Date: November 8, 2019 7:59:20 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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My name is and I am the owner/operator of . I have a contract with Northern Pulp to truck their roundwood from their harvest blocks to the various mills in the province.

I believe the government should grant Northern Pulp the allotted time to put in the new waste water facility. It is my understanding that Paper Excellence has the ability and knowledge to build a state-of-the-art water treatment facility. Paper Excellence has built these such facilities all over the world.

I realize Northern Pulp has been pumping waste water into Boat Harbour for fifty years and agree that something needs to be done to alleviate this problem. With an eighteen-month extension to keep Boat Harbour open and the opportunity to rectify the problem to help keep the forestry industry viable in the province. We should not lose this industry and all the jobs that feed into Northern Pulp for a year and a half that it takes to install the new treatment facility.

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:01:02 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: i have lived here for 45 years and I have eaten from the waters aswell as swam in them. I have seen many places come here over my lifetime and saw the mill change hands many times. I thinks it great to see an ouwer wanting to put money back back into mill to make it run for many years to come. I would like to all parties involed in this matter come together as one. would asl lso be nice to the county become one again but that will never happen again. I to see the mill run for my kids and grandkids for msany years. I am getting tried off ppl always blaming the mill for everything that happens in their life, it not the mill it life itseft. we need to have this place going along with the foresty together to make nova scotia shine like it has bin and also to ppl working at home and not away. so lets all come together and keep the mill going and hpoey thing may returne to the way things use to be around the county as one great place again. Name: @gmail.com Address: Municipality: trenton novascotia Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 73 y: 29

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:05:33 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: This project is good for the provinces economy .Many families that would be negatively affected by the closure of Northern Pulp Name: @gmail.com Address: Municipality: Greenfield Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 60 y: 36

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 8:07:17 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier McNeil and Minister Wilson,

My name is and I I grew up in Scotsburn, Pictou County. grew up in Pictou, Nova Scotia. During our childhood and teenage years we spent a great deal of time in the summer at the beautiful beaches in Pictou County. We and moved away from the area but always returned in the summer. In we made a permanent move to where we both found employment, Every summer we would come home to Nova Scotia and enjoy the wonderful beaches of the Northumberland Strait and eat the fresh local seafood from the Strait. In we were fortunate enough to be able to purchase a cottage in Caribou River that has a direct view of the Strait and PEI. It is truly a place of serenity from the busy city of . We plan to move back to Pictou County in and make it our permanent home once again.

grew up with the stentch of the mill. The smell sometimes would make it all the way to Scotsburn when I was a child. Driving across the cause way we would always have to make sure the car windows were up. remembers sulphur flakes landing in Pictou shorty after the mill was opened. I have read Joan Baxter's book and can't believe what the mill has gotten away with throughout all the years. How could the Nova Scotia government allow this to happen. And our first nations people, this has been unacceptable how they have been treated.

I am completely opposed to allowing an effluent pipe to run from the mill into the Northumberland Strait. This will kill everything in the waters and destroy the beaches and anything living there.
The owners of the mill do not care about the people of Pictou County. The province should not accept this. Our country should not accept this. It is unacceptable that the federal government has not stepped in and demanded a full environmental review of this. Boat harbour needs to close and the deadline should not be extended. This is environmental racism.

The track record for Northernn Pulp has been deplorable. They cannot be trusted. They have failed air emissions tests, ash slurry spills and there was a major effluent leak in 2014 that I believe someone out walking in the area discoveredWasn't there a monitoring system in place?

I belive the province chose incorrectly when deciding that Northern Pulp's effluent Treatment facility should be given a class 1 provincial assessment. As well I don't believe that Northern Pulp has had any sort of public consultations. I cannot see how they can even pass a basic environmental assessment.

Please do the right thing for Nova Scotians and do not let this disaster continue. I do not believe Northern Pulp are meeting the terms of the process because they have always tried to cheat the system. Pictou County and Nova Scotia will prosper without them. Tourism will flourish and our seafood exports will be known to be the best in the world because they will be coming from the pristine waters of the Strait.

I thank you for taking the time to read my concerns.

Caribou River

From: @ccrce.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:10:30 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Dear Hon Gordon Wilson As a lifelong resident of Pictou County, I am writing you to express my thoughts about the replacement effluent treatment facility. Northern Pulp provided a scientific, fact-based Focus Report which allowed the government and public to review their steps to complete the project. The facts state that this wastewater treatment facility will be industry leading, allowing Northern Pulp to be one of the most environmentally responsible mills in North America. Therefore, the information Northern Pulp provided by studies completed by third party environmental experts shows evidence of leaving a positive environmental footprint, allowing for maintaining the forestry industry, as well as the continuation of the fisheries industry. As the Minister of Environment, it is your responsibility to approve the Environmental Assessment and allow Northern Pulp to begin building the new effluent treatment facility. Our province depends on both the forestry and fishery industries. Our community depends on these industries and unfortunately, much of our community has been divided because of this issue, which can hopefully be resolved, by supporting both the fishery and forestry industries. By approving the Environmental Assessment and continuing the operation of Northern Pulp, the forestry and fishery industries will continue to co-exist, which will help support our community and province. Name: Email: @ccrce.ca Address: Municipality: Trenton Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 76 y: 25

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 8:11:50 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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To Whom It May Concern:

My name is and I live in Woodburn, NS with . I'm sure you will be receiving many letters from concerned citizens regarding this issue, so for the sake of brevity I would like to begin by saying that the four of us are opposed to Northern Pulp's plan to dispose of their effluent in the Northumberland Strait. We are also opposed to extending the January 31, 2020 deadline to close the Boat Harbour treatment facility.

If Northern Pulp was genuinely concerned about being responsible corporate citizens, they would've made a concerted effort during the past five years to come up with an acceptable method to treat their effluent. Instead, they have devised what appears to be the absolute cheapest, half-baked idea possible. I wouldn't go so far as to say that Northern Pulp's management are cognitively delayed, or that they believe the residents of Pictou County are, but one could be forgiven for thinking it. Nor would I say that they seem more concerned with their bottom line than with the health and well being of the people who live and work here, but trying to bully the province into compliance through veiled threats of massive job losses doesn't help their image. If I was prone to believing conspiracy theories, I might wonder if Paper Excellence's plan all along was to extract as much value from this plant, with as little investment as possible, before they were forced to clean it up or it fell apart.

There are many signs along the roads and on front lawns that say "Nova Scotia Needs Forestry". That slogan was only 80% correct. I would say instead "Nova Scotia Needs Responsible Forestry". No one wants anyone to lose their livelihood, but I don't want my family to grow up in an area where it's not safe to swim at the local beaches or eat the seafood from the surrounding waters. Northern Pulp's plan to dump their effluent into the Northumberland Strait is not just lazy and shortsighted, but also irresponsible and should be illegal.

Regards,

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 8:14:47 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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My name is I own a home in Caribou. My land is the proposed route. Northern Pulp's pipe route raised a lot of concerns for me with their EA submission.

All effluent is toxic.

I do not trust Northern Pulp's ability to monitor a pipe line and I don't trust their leak monitoring detection system that was mentioned in the focus report. Northern Pulp were supposed to have a leak monitoring system on their current pipe but the massive raw effluent leak from October 2018 was not discovered by Northern Pulp, it was discovered by someone walking in the woods.

I am so afraid this could happen to me.

What will happen to my drinking water and the town of Pictou's drinking water WHEN millions of litres of effluent leaks out ?

The marine portion of the pipe won't have any leak detection system. If there were a leak during that stretch we would not know it. Munroe's Island is supposed to be a protected area. They were put on Canada's Environmental Offenders Registry for their 47 Million Litre effluent leak in 2014.

If a company's track record is that bad with maintaining what they have, how can they be trusted with building something of this size in the first place?

I really don't believe they deserve to be given the chance to go forward with this project.

Thanks for your time.

NO PIPE!

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From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:16:48 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am in support of the NP Replacement Effluent Treatment Facility Project as this company is showing Nova Scotia that they are willing to do anything to keep the mill going and to keep the jobs and all the spin off jobs going. This company has gone above and beyond most of which the majority of the public doesnt even know about to meet the guidelines and requests that the government has placed upon them. The people against the mill say that the mill has had 5 years to create an alternative solution to using Boat Harbor and they have done nothing until now. That could not be any further from the truth. What they dont know is that NP has been conducting test after test in order to meet the requests that were required by the government to complete. I guess that they dont realize that everything take time. The government has said that they are having Boat Harbor cleaned up they cannot even start that until 2021 as long as there are no delays and will take approximately 4-7 years to complete. This timeframe is only as far as everything goes according to plan. We all know that with this timeframe there will be hiccups along the way and will likely take longer that. I have no idea why the non-supporters would think that this new effluent treatment plan could be constructed and being used in 5 years. This is not reasonable. Nothing ever goes as planned and there are always delays. NP had submitted an Environmental Assessment and was reviewed earlier this year by the previous Environment Minister and she advised that they needed additional information. NP had spent a great deal of money and time preparing the Assessment and has now spent additional money and time on preparing the Focus Report. This goes to show that NP is committed to the project and are willing to provide whatever the government needs. I believe that NP, PLFN and the Fisheries can all coexist. The focus report shows the technology and the science is there and this can happen with the new and improved treatment facility. The Premier has said time and time again that if the science is there the plan would be approved. Well the science is all there in the report. This same technology is already being used in other parts of the world with no adverse effects to marine life. Since the science is there we owe it to Nova Scotia to approve the plan and let everyone coexist. This will keep the economy going and people will be staying here to work and play. If this mill was to close it will not only have a major effect on Pictou County. There are not many good paying jobs in this community and these jobs are what keep the economy going. This mill produces a lot of money for the province and without it Nova Scotia as a whole will suffer. Please take the time to review the focus report with an open mind and let science prevail. If this treatment plan works elsewhere in the world it can work here to. Name: @hotmail.com Address: Municipality: Greenhill Postal-Code: Phone: Fax: email_message: Privacy-Statement: agree x: 72 y: 15

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 8:23:59 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is I have lived in Pictou County since 1974, moving here because of the natural beauty and lifestyle. After originally settling in a lovely old house in the charming town of Pictou, and lying awake at night enraged by the toxic fumes that choked us, we moved to the countryside. I couldn't believe that level of pollution was allowed by the government in this day and age (and that was 1974!), but people assured me the mill would be gone within five years. And here we are, 45 years later and nothing has changed except our awareness of the horrific damage that mill has inflicted upon the people of this county and the surrounding environment. (Have you read recent scientific reports on the effects of air pollution on brain development, respiratory disease, cancers, and dementia, to name a few health impacts?) And now, Northern Pulp wants to dump it all into our waters, as well---Canada's Ocean Playground, which supports an extremely lucrative fishing industry and a tourist industry with potential for huge future growth.

I have five grandchildren growing up in this county. I fear for their future, their health, and the health and well being of this beautiful place I chose to call home for all of us.

Northern Pulp have 14 failed air emissions tests, 2 ash slurry spills, 8 directives, 5 ministerial orders and 2 warning reports. They were put on Canada's Environmental Offenders Registry for their 47 Million Litre effluent leak in 2014 and their present Industrial Approval says they have to have a flow monitoring system in place to indicate if there were another leak. They are currently under investigation for yet another large raw effluent leak.

If a company's track record is that bad with maintaining what they already have, how can they be trusted with building a new effluent treatment facility far more complex? Mr. McNeil bravely and rightly stated many times over that the company was given 5 years to come up with a plan; that was ample time if they were serious about doing a thorough, responsible, and honest job. They were slow to get moving on their attempt to complete the project. When they filed their EARD in February, they stated that they would need an extension 'until they built their ETF or they would have to shut down'. So be it.

They cannot be given an extension. That would break the deal that was made in good faith and written into law between the PLFN and the province that saved Northern Pulp from

having to close in 2014. They also cannot be given an extension because they don't have a sound plan for a new ETF so it may never be built. Northern Pulp cannot be given an indefinite extension. And the people of Pictou County, the town of Pictou, the lucrative fishing and tourist industry, and the health of the children and other citizens of the area, deserve much better than what we have suffered for the past 50 years.

It is time to move on. The environment is the Number 1 concern in developed countries around the world. Let us move out of the dark ages and into the future. The days of sail and steam are over; horse drawn carriages have been replaced by automobiles; coal has been banned in practically all progressive countries and mines have closed. But new jobs and opportunities have arisen as a result.

Please. Place your legacy on the right side of history. For the sake of our beautiful province, our children, our earth, and our sea do not allow an extension to Northern Pulp.

I am trusting that you will do the right thing.

Sincerely,

Scotsburn, Nova Scotia

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:27:18 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I support northern pulp. Give them a chance Name: Email: @hotmail.com Address: Caledonia Municipality: Queens county Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 69 y: 24

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:29:52 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: What Northern Pulp is trying to do by putting effluent into the Straight is wrong, and criminal. We that live here have been hurt enough. It is time to stop the madness now. Close boat harbour to Northern Pulp. Say no to the pipe going into the Straight! Name: @hotmail.com Address: Municipality: Pictou Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 54 y: 36

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:32:05 PM

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Project: replacement_effluent_treatment_facility_project Comments: I fully support project Name: @gmail.com Address: Municipality: North Wiltshire Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 73 y: 25

From: @rogers.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:36:23 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: The lahey report and good forestry practices depend on a market for low grade fibre, and northern pulp is one of the largest consumers. Name: @rogers.com Address:
rd Municipality: Dorchester Postal-Code: Fax: ### ### - ####
email_message: Privacy-Statement: agree x: 59 y: 20

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:38:50 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: We support northern pulp Name: Email: @hotmail.com Address: Caledonia Municipality: Queens county Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 63 y: 24

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:38:54 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I support the proposed replacement treatment Facility Project at Northern Pulp. I urge all sides to shed their egos and get this done quickly Name: Email: @eastlink.ca Address: Caledonia, Queens Co. N S Municipality: West Caledonia Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 58 y: 27

From:	@hotmail.com
To:	Environment Assessment Web Account
Subject:	Proposed Project Comments
Date:	November 8, 2019 8:42:31 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am sending this correspondence in support of the effluent treatment project for the Northern Pulp Mill. I have seen the Focus Report that was required in addition to the original document that was submitted and to me it looks like Paper Excellence has provided everything that was requested with the required health study that will follow in 2020. Since purchasing this Mill, Paper Excellence has done more for the environmental footprint then any previous owner. The design allows for more that the average effluent flow per day to be treated and there will be no untreated effluent leaving the Site. This technology is not from the 1960s this is a leading edge company well known in their Field. The people of Nova Scotia cannot take another hit and be responsible for coming up with the Funds our Government will be short of IF this Mill closes. We already have a major issue in the health field in this Province. We are losing big tax dollars with the shutting down of Ex xon Mobile and Encana in the Offshore. If we lose the Mill and all the Industries connected to it where are we going to make up those lost tax dollars. I hope none of you responsible for making this decision are naÃ¯ve enough to think this Province can sustain itself on the Tourism Industry! Honourable Minister and Environmental Assessment Board please consider the science and technology that Paper Excellence has put in front of you and give them the green light to proceed. Name: Email: @hotmail.com Address: 392 Municipality: Heatherton Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 39 y: 28

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:43:47 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am writing on behalf of myself, as I have worked here and started a life in new Glasgow just over years ago. Let me just start by saying I have purchased a house here and got married, and plan to start a family here. If this mill closes the government is taking my livelihood away. Sure I can get another job somewhere , most likely at a lower wage, but does that mean I have to destroy my credit and lose my house while doing so? And does my wife who has a great job have to quit that and move away? Or do I travel for work? I work at Northern Pulp and have witnessed first hand the improvements this company has made. Since I started working here the company has installed a new precipitator on the recovery boiler which has worked flawlessly to keep our emissions under environmental limits. They have also significantly reduced the water usage as well as have been passing power boiler emissions tests with no problem yet the public opinion has be en swayed due to information which is incorrect, whether it be through opinion pieces in the newspaper or local news. The company wants to do the right thing, they are spending copious money and doing the research. How many pulp mills exist in Canada let alone the world? If this is such an issue here then why do we use so much paper and paper products? Why are we moving away from plastic and using more paper? Where does the effluent from household sewage go? Where does the effluent from PEI potato farming go? The same place, and people are oblivious to the fact that it does go there. How can we justify shutting down an Industry which produces hundreds of millions of dollars annually and provides good paying jobs while being more environmentally friendly? There are significant groups of individuals in the community who are bred to hate this place, they always have hated it and it doesnâ?Tt matter what facts are presented to them, their minds will not be changed. The gover nment basically has the final say in my fate - either I keep a good job which will help contribute to the economy of new Glasgow let alone Nova Scotia, and while doing so is an environmental improvement compared to what is going on now. This has already caused enough of a divide in the county let alone the province and its going to take a long time to recover. Do the right thing. I have lobster and crab fished in my life I grew up in which is a large fishing community so I understand the concern however the science is there to prove there will be less impact than what is going on now. The two industries can co exist, they already have for 50 years. This project is an improvement on what is going on now I can say that with confidence as I work with the effluent on a daily basis. The fact that a small group of people with virtually no expertise on the subject may have the ability to shut down a major economic driver for our province one that will be more envi ronmentally friendly than it is now is ridiculous. The fact that effluent has been going to boat harbour and then the northumberland strait for 50 years , and now is going to be cleaner should be enough to show the government along with the entire environmental assessment document that this project needs to go through. I believe as a tax payer the government should uphold the responsibility to do the right thing for everyone. Make the right decision. Name: Email: @hotmail.com Address: Municipality: New Glasgow Postal-Code: ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 44 y: 20

From: @unifor.org
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:46:17 PM

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Project: replacement_effluent_treatment_facility_project Comments: I support the ETF project, Paper Excellence, and this ETF are improving the mill. The goal and stated objective has always been to find a solution at Northern Pulp that supports thousands of good jobs, protects the environment, and respects Pictou Landing First Nation. I believe this effluent treatment facility ETF project does just that. Name: @unifor.org Address: Municipality: Mississauga Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 47 y: 21

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:48:46 PM

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Project: replacement_effluent_treatment_facility_project Comments: 3. Nova Scotia Needs Forestry. Northern Pulp grows more than 6,000,000 seedlings every year. That is impressive! Treated effluent from the mill has been flowing into the Northumberland Strait for over 50 years. Northern Pulpâ?Ts plan is to re-route the treated effluent to a different location. For 50 years, the fishing industry has successfully fished the Strait. Third party environmental experts have assessed that no significant impacts are expected on any fisheries or fish habitat as a result of this project. Name: @hotmail.com Address: Municipality: Baie verte nb Postal-Code: Fax: email_message: Privacy-Statement: agree x: 68 y: 24

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:54:38 PM

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Project: replacement_effluent_treatment_facility_project Comments: We can successfully clean the effluent from the mill , the technology is there . We cleaned up the stack emissions with a new precipitator. We cleaned up Halifax Harbour with a new state of the art sewage treatment plant. Nobody talks about these â?o challenges â?o we collectively have over come. There really non issues now! The technologies are there! Get on with it so all Nova Scotians can move on and prosper ! Name: @eastlink.ca Address: Municipality: Halifax Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 69 y: 20

From: @ .com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:56:21 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: As a young Nova Scotian whoâ?Ts family is supported by my work in the forest industry, the decision around the mills survival will have very personal effect. With the recent addition of a new baby to our family this decision may also have drastic consequences for our life in this province. That being said we still believe that industry in our province has a responsibility to operate as efficiently and environmentally responsible as possible. After reviewing the material in the environmental assessment and comparing the new system with the existing boat harbour, that everyone would agree needs to be decommissioned, it appearâ?Ts that northern pulp has developed a system that will achieve the governmentâ?Ts objectives and maintain the cornerstone of Nova Scotiaâ?Ts forestry sector operating. I hope the minister is able to make a non biased, science based decision on the continued operation of Northern pulp because it has far more than just the 300 mill jobs relying on it. Name: Email: .com Address: Municipality: Port Williams Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 62 y: 13

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:57:49 PM

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Project: replacement_effluent_treatment_facility_project Comments: I believe this project should be approved. Not only does it allow Northern Pulp to reduce itâ?Ts environmental footprint and helps to protect the environment but it also very important for the provincial economy. The focus report provides scientific evidence of improved environmental impact on the quality of effluent waste water disposed into the Northumberland Strait compared to current dispersement. Effluent from the new system will meet current regulations in every province in Canada as well as the more stringent federal pulp and paper limits being proposed. Name: @gmail.com Address: Municipality: Blockhouse Postal-Code: Fax: email_message: Privacy-Statement: agree x: 40 y: 8

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 8:58:53 PM

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Project: replacement_effluent_treatment_facility_project Comments: We need good paying jobs. My family will be affected. The place I work at will be affected. I totally support Northern Pulp. I think the economic spinoff would be detrimental to everyone. Everyone will feel the loss, from retail outlets,car dealerships, forestry workers, truckers, restaurants even those opposed will feel the effects of a closure. Name: Email: @eastlink.ca Address: Municipality: New Glasgow Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 86 y: 24

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:01:59 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am in support of approving Northern Pulpâ?Ts environmental assessment to allow them to replace the existing effluent treatment facility with a state-of-the-art effluent treatment facility including a pipeline to the new outfall location. Northern Pulps focus report data indicates no significant impacts on the marine species important to the fisheries surrounding the proposed new ETF pipeline discharge area, allowing the fisheries and forestry industries to continue working together as they have for more than 50 years in the area. The focus report provides scientific evidence of improved environmental impact on the quality of effluent waste water disposed into the Northumberland Strait compared to current dispersement. Name: Email: @gmail.com Address: Municipality: Blockhouse Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 46 y: 39

From:
To: Environment Assessment Web Account
Subject: focus report letters
Date: November 8, 2019 9:02:16 PM
Attachments: focus report letter .docx
focus report letter .docx
Focus report letter .docx
focus report letter - .docx

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Dear Minister Wilson,

I am writing to you regarding the focus report submitted by Northern Pulp in regards to their Proposed Replacement Effluent Treatment Facility Project.

My name is I am a commercial fisherman from Pictou Nova Scotia, and fish off Pictou Island in the Northumberland Strait. I am writing to you to voice some of my concerns regarding the Northern Pulp Focus report, regarding their plan to put an Effluent Pipeline into the Northumberland Strait. I'll start off by saying that I do not agree with their plan in the slightest. There should be effluent pumped into the Strait at any cost. But I will be providing a couple quick reasons as to why this should be the case.

I feel as though many people's concerns about this Pipeline project were not quashed with this new information put forth by Northern Pulp, and that includes my own concerns. As a person who directly depends on the Northumberland Strait as a source of income, I feel that the Province and Northern Pulp are not taking my concerns and the concerns of people with similar views of my own.

As a lobster fisherman, I worry a great deal of the longevity of the resource and wish to take any measures to keep the stock healthy and thriving. I do not believe this what Northern Pulp wants at all. In order to successfully and conclusively say that there will be no long-term effect on lobster and lobster larvae, there must be a long-term study done on the matter. This was not done. A study of this magnitude could take upwards of 30 years to do properly, so that it could examined through multiple generations of lobsters from a larvae stage to a fully grown adult. It is in that way only that we could properly examine long term effect. And I for one am not willing to give Northern Pulp the benefit of the doubt when it comes to our shore's most valuable resource. Northern Pulp continues with the ideology that pumping this effluent into the Strait will cause it to just go away. How can this be when the

effluent itself is not only extremely hot, but full of suspended solids? That warm water inserted into the marine environment will no doubt have some sort of an impact on the overall environment. What if all of a sudden a room full of people had the ambient temperature go up by 25 degrees? Things in that room would change. The idea that these problems will go away because the effluent will mix with ocean waters and not have any of the effluent accumulate. How can this be? The tide will only move it back and forth. Eventually the environment around the diffusers will accumulate higher levels of whatever could potentially be in the effluent, and potentially become toxic and harmful to not only lobsters but every living creature including humans. These potentially large issues I feel were not fully addressed in the focus report that was put forth by Northern Pulp, or in the very least only passed over and not given enough attention.

So, I plead with you Minister, to think this decision you're going to make very seriously. The choice you make will not only impact mine and my families lives, as well as our friends extended family and community. The future of my kids could be jeopardized. They may not get to live the life that I got to live, because of pollution. We must support our children because they are the future. What example do we set, when we begin to dump our problems into the environment? This is something we should know better not to do. Show our kids that money is not as important as personal health and healthy environment. I know in heart that you will make the proper decision, one that says our earth is more important than a full bank account.

Thank you

Dear Minister Wilson,

I am writing to you regarding the Focus Report submitted by Northern Pulp regarding their Proposed Replacement Effluent Treatment Facility Project.

My name is and I live just outside on Pictou, Nova Scotia, in the small community of Caribou River. I have lived in this area for all of my years. I am a commercial fishing license holder, for 25 years fishing out of Toney River, Nova Scotia, and fished in the area long before purchasing my own license. The threat of this new project impacts me and my family a great deal. Not only am I employed in the commercial fishery, but my father is also a commercial license holder and my brother, and son are both currently employed in the fishery. My family has been fishing in this area for many years and have depended on the Northumberland Strait for an income, but it is also a key to our way of life and culture. My family is not the only one with this sort of bloodline dependency and history with the fishery and the Strait. My community is full of people who depend on the Strait for survival. The Northumberland Strait is more than just a body of water, it is our life.

I feel as though many people's concerns about this Pipeline project were not quashed with this new information put forth by Northern Pulp, and that includes my own concerns. As a person who directly depends on the Northumberland Strait as a source of income, I feel that the Province and Northern Pulp are not taking my concerns and the concerns of people with similar views of my own.

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Thank you

Dear Minister Wilson,

I am writing to you regarding the Focus Report submitted by Northern Pulp regarding their Proposed Replacement Effluent Treatment Facility Project.

My name is I live in Toney River, Nova Scotia. I have been a commercial fisherman in the Pictou area for years now, and have both my sons employed in the fishery, one of whom is a and the other that I employ. I also have a grandson employed in the Fisheries. So, to say that the Northumberland Strait and the local fishing industries is not gravely important to my family would be a substantial understatement. Fishing has been a way of life in our family for many years, since before I was born, and will continue well into the future, so long as we protect the Northumberland Strait and all the resources that live in it. Therefore, I write to you today, to demonstrate my objection and involvement with the project. I want to express concern for my children, their children and my family's future well-being and wish to make sure that they are taken care of and their way of life is not jeopardized in the future.

I feel as though many people's concerns about this Pipeline project were not quashed with this new information put forth by Northern Pulp, and that includes my own concerns. As a person who directly depends on the Northumberland Strait as a source of income, I feel that the Province and Northern Pulp are not taking my concerns and the concerns of people with similar views of my own.

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know in heart that you will make the proper decision, one that says our earth is more important than a full bank account.

Thank you

Dear Minister Wilson,

I am writing to you in relation to the Focus Report Submitted by Northern Pulp regarding their Replacement Effluent Treatment Facility Project.

My name is and I live in Caribou River Nova Scotia. My family has a history of being fishermen in this area, and currently my father, grandfather, uncle and myself are all employed in the local industry, two of whom are license owners. Combined, we own over 80 years of personal knowledge of the fisheries within the talked about area. More personally, coupled with working on fishing boats, I have been employed by multiple fisheries science organizations, including

Included with my family knowledge, and personal work experience, I have also Attended

I feel as though many people's concerns about this Pipeline project were not quashed with this new information put forth by Northern Pulp, and that includes my own concerns. As a person who directly depends on the Northumberland Strait as a source of income, I feel that the Province and Northern Pulp are not taking my concerns and the concerns of people with similar views of my own.

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environment? This is something we should know better not to do. Show our kids that money is not as important as personal health and healthy environment. I know in heart that you will make the proper decision, one that says our earth is more important than a full bank account.

Thank you

I am attaching my Original Letter for reference

The Proposal by the Northern Pulp company affects me a great deal, due to my great involvement with the local fisheries in all aspects. My personal fishing endeavors, as well as all my immediately family work to make a living on the Northumberland Strait, and this proposal is of great threat to our way of life. The strait maintains a way of life for many people in this area, as we all depend on this beautiful body of water to support our lives and well being.

I would like to raise three separate points as to why I object to the pipe proposal, first of which would be the whole idea of pumping this so called treated effluent directly into the marine environment. Living in and fishing in this area for my entire years of life, I have observed that the proposed area of discharge is subject to extremely strong tidal flows. The theory behind changing proposals, as stated on page 33/34 is that the Pictou harbor area was not selected because it did not have enough tidal flows and that nutrients etc. could build up in the harbor and over time become harmful. The key here to me, are the words over time. This means that these chemicals in certain amounts are harmful, because over time they would accumulate. This statement also applies to the proposed outfall, because even though the area is subject to more tidal flow, therein lies the problem. The tide will go out and move the effluent and mix it, but then what will happen when the tide comes back in? This tidal flow can be confirmed, because whenever we are fishing, and someone loses a buoy, marking where their traps are located, it can normally be found further along the shore, by another fisherman, or even on the beach by a passerby. The tide coming in will already have the effluent in it and be subject to accepting more effluent from the pipe, and therefore, will start to accumulate, essentially causing the same problem that northern pulp was trying to avoid with the change of outfall location. Throughout the entire document, Northern Pulp only mentions the term Bioaccumulation once, and that's in the definitions page, at the very first of the report. This to me, is blatant ignorance. With increased nutrients in the water column, and to think the effluent will not make its way to the top of the water column is ludicrous, the process of photosynthesis will take in those extra nutrients will therein be passed along the food chain and be biomagnified. This will lead to the eventual time when the nutrients will be too high and become harmful, and they will already be passed through the entire food chain. This idea ca n also be visualized more clearly if you take into the consideration the suspended solids within the effluent. On page 84 in table 5.6-1 Of the report, it claims that there will be 4.8 grams/liter of effluent. If this is pumped at the maximum of 85,000 cubic meters per day, this would equal out to be over 4 tons of suspended solids per day. Where will those suspended solids go? Do they disappear? This process will not just stay in the immediate outfall site, pumping such a large amount of effluent will begin to displace the water

already occupying that space, and the affected area will begin to grow, magnifying these adverse impacts to a much greater area than is indicated in the Northern Pulp document. This relatively simple concept is a blatantly overlooked by northern pulp, who seem to be employing the "tides will take the effluent away and then it won't be our problem anyway" and that is just unacceptable. In this day and age, to have such a close-minded approach is disastrous, and I am not willing to put my future way of life into the hands of an organization so blinded by reality.

Secondly, I would like to raise an issue with the effluent itself, that being the proposed temperature of the effluent when it exists the pipe. On page 46 of Northern Pulp's report, is the table that comprises of the anticipated daily maximum effluent water quality. In this table it states that the temperature of the effluent will be 37 degrees Celsius in the summer, and 25 degrees Celsius in the winter months. This is just too warm. It is unacceptable to be pumping anything into the Strait at this temperature, as it can be extremely harmful to the ecosystem. There was a study conducted on the ambient temperature done by the Gulf Nova Scotia Fleet Planning Board in 2017, where the sent-out temperature probes throughout the Strait, from April to late fall, and throughout that entire time, there was not a single temperature recorded that was above 23 degrees. This includes the height of summer. (these probes were on the sea floor and not the water's surface.)[1] This means that the effluent emitted from the pipe is at least 10 degrees warmer on average. It doesn't take a scientist to figure out that water with a 10-degree difference is vastly different and could potentially cause a lot of problems. I believe there is not sufficient research on the potential impacts to the lobster populations with relation to temperature. Appendix R in Northern Pulp's report consistently cites a paper from the 1960's that deals with lobster larvae exposure to effluent. Would it not be better to do some updated research on the subject? Also in appendix R, its stated that larvae as well as adult lobsters will be unaffected within a certain distance from the diffuser? How can this be? will there be a fence holding all the effluent in? introducing a constant flow into the area will permanently change the makeup, and this will be a constantly changing number? Eventually that 2-10 meters could be 2-10 miles? How do we know for sure? There is very little research conducted in this area. This effluent is not going to stay in one spot, and will spread like a disease, and I'm not willing to risk that disease killing off one of the most commercially important fisheries in the province.

My last point that I would like to bring up, would be section 4, on page 25/26 where it states that Northern Pulp would not be able to remain competitive. This is a very loose term, that being competitive. What exactly does that mean? Does that mean that they immediately lose money and would have to shut down? Or simply mean that their profit would not be the same as it would be with the current pulp it produces. In that section it cites appendix B. Upon reading that appendix, it claims high wood use as well as electrical costs would make it not viable for their company. This seems to be very misleading, because after a quick google search of Northern Pulp’s own website, they claim to be almost entirely self-sufficient, because they use their own power generation facility to produce 90% of their electrical needs.[2] So, which is it? Seems that citing electrical costs as a means of not being able to switch to a different product and change operation systems, is a round about way of saying they won’t make as much money, because they only pay 10% of their electricity in the first place. It would not appear to be very good business practice if paying for more than 10% of your electricity consumption would cause the business to close. It appears to me, that looking at changing products and systems for the Northern Pulp Mill Is more a matter of unwillingness based on very grey area terms, versus an idea that it is not possible.

Based on these three points,

1) The tides providing lasting impacts that can cause the toxins to spread and become bioaccumulated and potentially toxic over time
2) The potential threat to lobster fisheries and other fisheries due to the extremely elevated temperature of the effluent, coupled with the lack of research into the fisheries and the impact this project could have
3) The shady reasoning provided by Northern Pulp that they have investigated other options

I think a decision such as this should be forwarded to the federal government. The province should be willing to defer the decision making process, because it affects people that are not in their jurisdiction to begin with, coupled with the idea that such an important decision should be more thoroughly looked at, and not just a 30 day assessment when there is the possibility for much more research to ensure the well being of not only hard working people but also ensure that the animals and creature of the Northumberland Strait are safe and are able to thrive in their natural habitat. This request is not only founded on it being a big decision, but in fact that the Government of Nova Scotia has been helping fund the design and planning for this project, and that, therefore, would be a conflict of interests and hence the decisions should be handed over to the Federal Government.

https://fleetplanningboard.ca/wp-content/uploads/2017/10/Temperature-report-2017-.pdf
2) http://www.paperexcellence.com/npns-operations-today

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 9:03:04 PM

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Dear Premier McNeil and Minister of the Environment, Gordon Wilson,

I am not someone who can weight through technical data and so I doubt that my comments will be anything that you have not heard before. But it is important for me to add my voice to the many present and former citizens of Pictou County who are fed up with the effects the Abercrombie Point Mill, in it various iterations, has had the land, forests, air and waters of this area.

I grew up in the town of Pictou. I remember when the waters we swam in turned brown and then the plumes of noxious air emissions wafted actress the harbour on a regular basis; when Pictou became the town that stank.

We should have, but we did not know any better in those days, and it is deeply painful to see what this industry has been allowed to do here. We have been held hostage by this industry and the jobs it creates for 50 + years. We have all been betrayed, none more so than the people of Pictou Landing First Nations.

There is absolutely no way this industry should be allowed to continue its bleach craft operations, diverting its effluent from Boat Harbour to the Northumberland Straight, endangering marine environments and the livelihoods of fisher people, while continuing to poison our air and forcing those with sensitive lung conditions to leave the area.

I am so incensed by the comments and letters from various municipal counsels asking for extensions to the Boat Harbour Act and continuance of this industry who has been anything but a good corporate citizen. Northern Pulp have 14 failed air emissions tests, 2 Ash slurry spills, 8 directives, 5 ministerial order and 2 warning reports. They were put on Canada's Environmental Offenders Registry for their 47 Million Litre effluent leak in 2014. This industry has zero credibility and I would challenge these municipal counsellors to walk a mile in our shoes.

The time has come for a very different environmental ethic to be legislated by our government. Time to make reconciliation for the sins of the past. Do not approved this plan and extend the damage into the future.

Pictou County, Nova Scotia

From:
To: Environment Assessment Web Account
Subject: Comments on Northern Pulps Focus Report
Date: November 8, 2019 9:03:32 PM
Attachments: focus.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Gulf NS Herring Federation

Pictou, NS

Sent from Mail for Windows 10

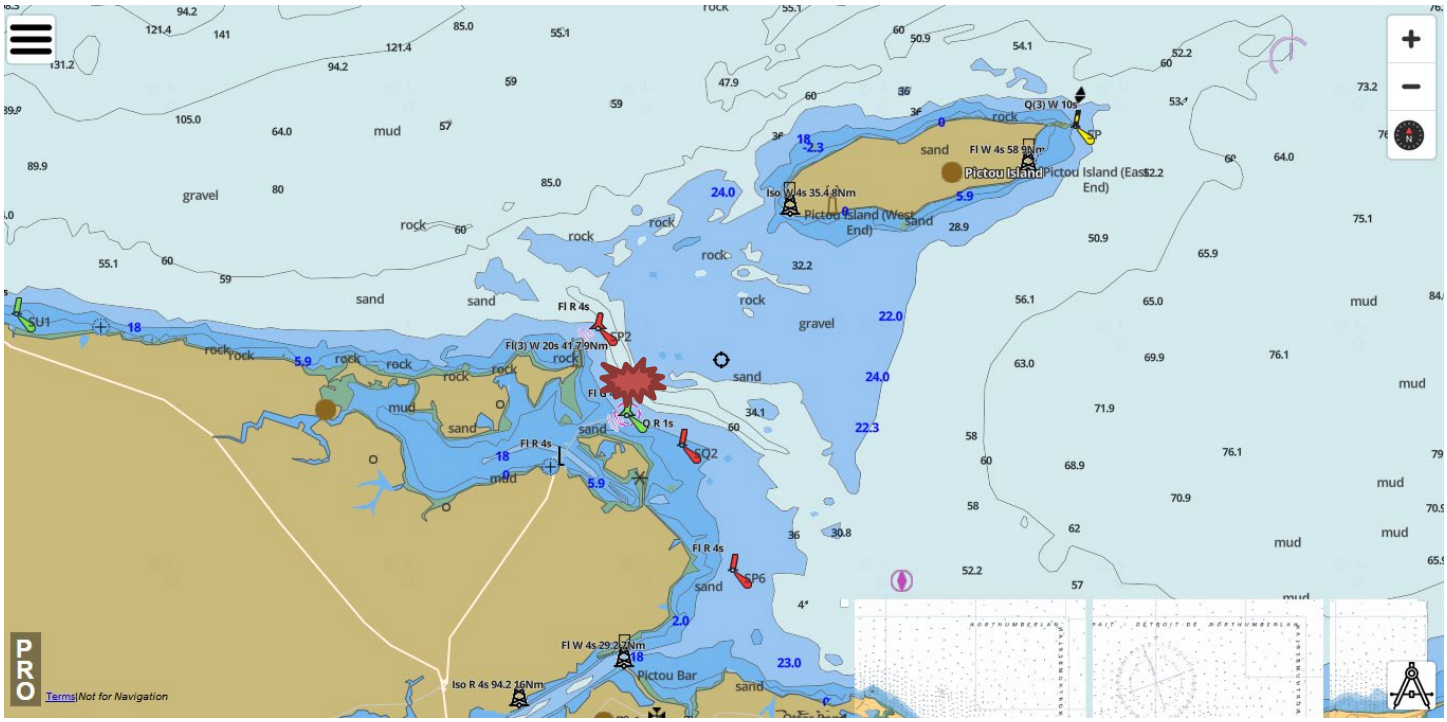
Re: Comments on the " Focus Report Replacement

Effluent Treatment "

Gulf Nova Scotia Herring

Federation

I've been fishing, for the most part, in the area pictured below for the past 45 years. Fishing my own vessel for 32 years for lobster, herring, mackerel, scallops, tuna and groundfish and on other vessels before that. I begin lobster fishing most days fifty (50) meters from the proposed outfall location. This area is one most diverse, dynamic and productive ecosystems in the Eastern Northumberland Strait. Northern Pulp's plan to pump 60 to 90 million liters per/day into this system at the location of the "Red star" below is ludicrous and cannot be considered for many reasons. Contrary to the proponent's claims, the area is extensively fished and sustainably fished and there is no room an effluent pipe here.



Diversity

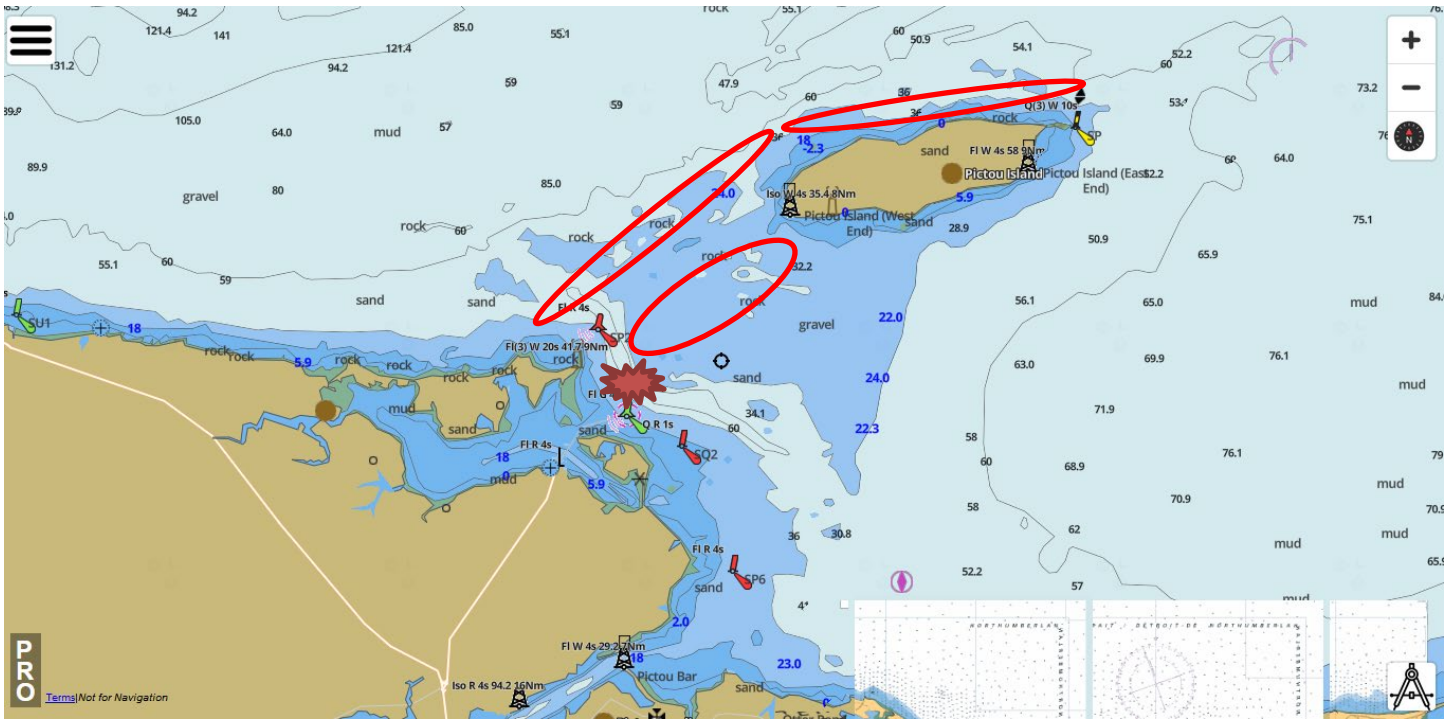
The area above contains the <u>spawning and nursery grounds</u> for the commercial species Lobster, Rock crab, Scallop and Herring and many more less commercial species. In September the area to the north and east (in blue) of the proposed outfall, several square kilometers is covered in a carpet of herring spawn 10 cms. thick. For the past three years this area has been the ONLY area in the Eastern Northumberland Strait where this occurs. In July and August lobster are spawning and moulting here. In October/November, in Caribou Harbour,

the exact area Northern Pulp plans to dig up, is covered in spawning female rock crab. Information gathered in a few days in May does not provide any real baseline. It's only relevant on that day, and changes drastically the next day.

Dynamic Area

The area of the proposed outfall is one of the most dynamic areas in the Eastern Gulf. The deep channel focuses and delivers large amounts of nutrient rich water to the Pictou Banks (blue area) four times daily with the changing of the tides. It also flows in and out of Caribou Harbour twice each day. The flow changes speed and direction constantly with time and is different every 100 meters in every direction from the proposed outfall.

The Receiving Water Study and the modeling done in this area doesn't begin to show the complexity of this system. The 2D model fails miserably to demonstrate the tidal interactions of the area and presents only a generalized Northwest/Southeast flow. It's very different in real life. The deeper waters both east and west of this area funnel through the channel (lighter blue) and upwelling feeds nutrients to the shallow water ecosystems on either side. This tidal flow also transports larvae to locations favourable to their development in the shallow estuaries nearby. Injecting 4 to 6 tonnes of suspended solids (TSS) and 60 to 90 million liters of effluent per/day into this ecosystem at this point is a dagger in the Heart of the entire system. The upwelling that occurs at each twist and turn of the channel is not accounted for in any of the models. The millions of gallons of water that race into Caribou Harbour twice each day from the outfall area are not shown. These shallow estuaries are where all this TSS (suspended solids) will end up settling. Supplanting larvae and roe in the process.



Productivity

The area pictured above is one of the most productive in the Northumberland Strait. Approximately 25,000 lobster traps are set each spring here. Despite degradation in the entire Gulf landings have been stable or increasing for the past 10 years suggesting that the resource is being harvested sustainably.

The Fall Herring population in the Southern Gulf has been in a steep decline for the last number of years. For the past four years catches in northern Nova Scotia have been predominately (90%) in the circled areas above. In years past spawning occurred in many more places both east and west of this area. This is currently not the case.

The Fisheries Act prohibits dumping deleterious substances on spawning grounds and this is the last major spawning area for herring in the Eastern Gulf. This alone should end this charade. It's also a lobster spawning area.

The Fishery in this area

A few Other Reasons

1. Its meters away from the Scallop Buffer Zone!! A protected area for scallop brood stock 1 mile wide from land that is off limits to scallop fishing and is counted as a Marine Protected Area (MPA) in DFO's grand total of protected areas.
2. Its adjacent to Caribou-Munroe's Island Provincial Park and the beach about a mile from the planned outfall.
3. There are two other Provincial Parks with beaches (Melmerby and Waterside) in the area above.
4. There are 7 or more other public beaches in the immediate area .
5. Its an "Entry Way" to our province and anyone arriving or leaving on the ferry to PEI will sail directly over the outfall, an aroma(tic) welcome to all our visitors for sure.
6. The entire surrounding area (in blue) is a spawning and nursery for lobsters, rock crabs, scallops, herring and many other species.
7. The entire Gulf of Saint Lawrence is in distress from pollution, acid rain, deoxygenation, fertilizer and on and on. It's all cumulative and must stop sooner rather than later.

There are many more good reasons to deny this proposal by Northern Pulp and no "good" reason to support it.

Respectfully

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 9:03:46 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Pictou Nova Scotia,

November 8th, 2019

To the Hon. Gordon Wilson, MLA, Minister of Her Majesty's Government for Environment

I am writing to you in response to the Northern Pulp effluent pipeline going into the Northumberland Strait. I do not feel that my initial concerns raised in my previous letter dated March 5th, 2019 have been addressed sufficiently with the addition of the Focus Report.

My primary concern is the location of the effluent pipeline outfall. Northern Pulp states that the location of the outfall pipe was chosen as to minimize the impact in active fishing areas. However, this location is in fact the busiest harbour on the north shore of Nova Scotia. Seventy boats fish lobster out of Caribou Harbour and there are over one hundred during herring season. Caribou Harbour is where Northumberland Ferries docks, is home to North Nova Seafoods, oyster leases, as well as Caribou-Munroe's Island's Provincial Park. The Mill could not have picked a busier and more active fishing area and it concerns me that they would not know this with even the slightest amount of research. It draws into question the validity of the entirety of their EA and Focus Report if they cannot get this simple fact correct. The Mill reiterates that there is no active fishing in the area of the outfall but I have personally caught lobster in this area for many seasons as have other fisherman throughout the years and including the present day.

Having fished for 40 years I am highly aware of the tides in this area and can absolutely guarantee that the effluent will come back into the harbour on a rising tide and become trapped and concentrated! This is a major concern of mine as Caribou Harbour is a vital ecosystem - home to many species (including rare) of plants, animals, birds, and more.

In my opinion, Northern Pulp should not be allowed to pollute the Northumberland Strait and Caribou Harbour. We have fished this area for generations and we were here well

before the pulp mill.

Respectfully submitted,

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:05:09 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I support this project because it is good for the environment compared to the current situation and it is good for the economy of Nova scotia. The focus report provides scientific evidence of improved environmental impact on the quality of effluent waste water disposed into the Northumberland Strait compared to current situation. Effluent from the new system will meet current regulations in every province in Canada as well as the more stringent federal pulp and paper limits being proposed. Both the existing and future effluent outfalls are located in the Northumberland Strait. The future outfall has less potential environmental impact than the existing outfall due to a considerable improvement in mixing conditions. The fishery and forestry industries have co-existed for over fifty years and these environmental improvements will allow this co-existence to continue Name: Email: @gmail.com Address: Nova Scotia Municipality: Valley Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 68 y: 25

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:06:12 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Dear Premier Stephen McNeil and Minister for Environment Gordon Wilson. Re: Northern Pulp Focus Report It was wrong to pump pulp mill effluent into Boat Harbour next to the Pictou Landing First Nations communityback in 1967.It was wrong to have that continue for five decades. I applaud you, Mr. McNeil for finally being the one who leads the government that fulfills the promise to put an end to the use of Boat Harbour by honouring the Boat Harbour Act. Thank you for that. The idea of piping the effluent from Northern Pulp into the Northumberland Strait would be unthinkable. Our children know before they are school age that it is wrong to put garbage where it doesnt belong. Pulp mill effluent doesnt belong in our precious Strait. If, God forbid, the pipe were to be approved, there would be an uprising of enormous proportions. The people opposed to damaging the Northumberland Strait are defending what is right. I sincerely hope that you would not want to be on the side of the aggressor. Knowing that you are doing the right thing with honouring the Boat Harbour Act and the date January 31, 2020, I have faith that you will also be the ones to prevent further environmental damage from this mill. Thank you. Name: Email: @eastlink.ca Address: Municipality: Pictou Postal-Code: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 41 y: 32

From:
To: Environment Assessment Web Account
Subject: Clean water is a human right!
Date: November 8, 2019 9:07:11 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister of Environment (thank you!), Honourable Gordon Wilson,

Back in the early fall, the town of Pictou lost its water for nearly 24 hours. While it was a planned 'outage', it did last a bit longer than planned. Of course, not everyone was prepared, so many were upset at the loss of easy access to this basic human right that we can so easily take for granted. Most of the time, we're very lucky to have access to clean water here in Pictou County...but that's unfortunately unlike many other communities in Canada/worldwide.

Having been an advocate of, and having integrated the United Nations Sustainable Development Goals in my everyday classroom teaching, I'm aware of the international push to secure clean, accessible water for the countless communities worldwide, that don't currently have it. I also hope that the Canadian government is working to secure this for all Canadian communities; I suppose it'd be somewhat your responsibility to ensure that's the case here, in Nova Scotia? And, would it also be your responsibility to ensure that no proposed projects would threaten a community's access to clean water - and endanger this human right?

This is the biggest flaw that trumps any and all other flaws with Northern Pulp's proposed effluent pipeline - it jeopardizes the Town of Pictou's watershed. I don't understand how a company - no matter how many jobs it provides - can propose to compromise a basic human right here in Pictou, Nova Scotia, Canada in 2019. I just don't know how the puck doesn't stop here. It should, as the submitted focus report fails to address this giant red-flag-of-a-concern!

I trust you will make the right decision with this proposal...and when you really think about it, the risk of contaminated water, is really not worth it for us to have the luxury of wiping our butts with white toilet paper! I have a source for recycled toilet paper, and I'd be happy to send you a roll to try, if you're interested!

Kindest regards, and deepest respect for the position you hold,

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:07:59 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: The new facility will be over and above all the guide lines for environmental protection with most advanced state of the art technology available .It will surpass all present environmental guidelines known to science for this reason not to mention the economic disaster for Pictou Co and the province of Nova Scotia I feel this project should 100 percent MOVE FORWARD. Name: Email: @hotmail.com Address: Municipality: Trenton Postal-Code: Phone: ### ### - ### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 64 y: 20

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:10:15 PM

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Project: replacement_effluent_treatment_facility_project Comments: Nova Scotia needs the forestry jobs, will effect alot of people if it shuts down. We dont need anymore loss in the forestry sector!Environment is also very important so lets see a plan that works for both sides. Name: @eastlink.ca Address: New Germany Municipality: Lunenburg County Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 32 y: 6

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:12:00 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Minister Gordon Wilson, I have noticed some advertisements for the Catalyst Paper Mill in B.C. being promoted by Northern Pulp. They are comparing this effluent Mills system to Northern Pulps in their focus report. However, they fail to mention that this mill has a dioxin contamination for miles on either side of it and seafood consumption is limited to 40-50 grams per week. an egg weighs 40 grams for reference. all this contamination and yet this mill has much deeper water and higher tides than the Northumberland strait. Imagine what it will do to the seafood in our Strait! The Catalyst Mill does not even have a commercial fishery around it,only a recreational one. The Northumberland Strait has one of the richest fishing grounds in Atlantic provinces. This proposed plan has so much risk that I can only advice you Mr. Wilson to reject this proposal. Thank you @ns.sympatico.ca Address: Municipality: pictou Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 58 y: 35

From: @ .ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:12:35 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I oppose this project. It will have potential and actual negative effects on marine habitats, the land, and the air. The company must be directed to ensure treatment of the waste produced by the plant, not offload it to the public and to the environment and future generations. Name: Email: Municipality: Halifax Postal-Code: Phone: : ### ### - #### email_message: Privacy-Statement: agree x: 51 y: 20

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Replacement Effluent Treatment Facility Project
Date: November 8, 2019 9:14:20 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Hon Gordon Wilson :
I am writing to show support for the Effluent Treatment Facility being constructed for the Northern Pulp Mill in Nova Scotia.
As a woodlot owner , a lifelong employee in the forestry business , an avid outdoorsman , and an optimistic supporter of making a decent
living in this Province ; without having to commute westerly ; I believe that Northern Pulp continued operation is critical to thousands of
Nova Scotians that have similar beliefs or experiences . I have read most of the Focus Report and listened to most of the concerns that
have been raised , both positive and negative . I believe Northern Pulp is doing its due diligence and is committing to build a state of the art
facility, better than most in North America.

"The extensive, scientific, fact-based Focus Report we submitted to Nova Scotia's Minster of Environment highlights that our proposed wastewater treatment facility will be industry leading and significantly reduce our environmental footprint. In fact, Northern Pulp will be one of the most environmentally responsible mills in North America.

When this state-of-the-art wastewater treatment facility is complete, Northern Pulp's environment footprint will be significantly reduced. Forestry and fishing industries will be able to thrive and co-exist and finally, and very importantly, the community can begin to heal."

This statement sums up what should be happening in our Province . Please make it happen
Sincerely,

From: @yahoo.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:14:22 PM

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Project: - Choose - Comments: I have been a member of the forest section on many different levels for 25 years and very honest have seen the best and the worst not all over the years have been done right nor have they been done fairly but have this mill close will completely destroy all the good that we have tried to do over the last 25 years with updates in management and adoption of better ways .if we loose one of the biggest factors to the industry we will set our selves back on a management level decades and will be difficult to recover my mind one of the biggest factor to consider. Name: @yahoo.ca Address: Municipality: Maccan Postal-Code: Phone: ### ### - ### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 74 y: 22

From: @rogers.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:15:34 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Re: Northern Pulp Focus Report While I am currently only a part-time resident of Nova Scotia, my mother was born in Pictou and lived there for sixty years. For the last thirty of those years she lived on facing the mill, so I am personally familiar with the situation. It is beyond bizarre to me that the millâ?Ts airborne toxicity, its stench, isnâ?Tt even up for discussion here! But so be it . . . You will have received many comments from many people, and many of these comments will go into extensive detail about the science and engineering involved. There will have been interpretations that support NP and interpretations that oppose that position. Iâ?Tm not a scientist and I wont attempt to argue technical details. I will simply argue that the level of risk is far too high to allow this project to go ahead. There is far too much uncertainty involved given all thats at stake for the fisheries, for tourism, for relations with First Nations, and for the quality of life for all residents of the area. And given Northern Pulpâ?Ts well-documented track record of toxicity â?" both deliberate the air, Boat Harbour etc. and accidental various leaks of toxic effluent -- it would be jaw-droppingly irresponsible to roll the dice one more time by approving this proposal. The deliberate toxicity would be permitted to continue, redirected now to the Northumberland Strait, a fisheries , residential and tourism area, while the inevitable pipeline leaks would instead be spread across Pictouâ?Ts watershed! It would be extremely irresponsible to allow NPs project to go ahead when there is no consensus on the science. Northern Pulps track record for honesty, for transparency, is a very poor one and it stretches back several decades. During those decades, while they claimed otherwise, their effluent has been poisoning parts of Pictou County. It is difficult, in fact it is impossible, to believe their current claims that this new process will have no negative environmental impact. There are many concerned citizens and scientists who are familiar with the technical details and are adamantly opposed to this proposal. Im sure you have heard from many of them and those concerns must not be brushed aside in order to gamble recklessly on this highly controversial project. We know that there are already numerous stresses on the health of the Northumberland Strait and history will not look kindly on those who allow those stresses to be ramped up in ways that no one can accurately predict a t this point. But surely it is obvious ! that 80 million litres of effluent a day ! will have a serious impact on what is a relatively small and shallow body of water. That body of water is crucial to the fisheries, to tourism and to wildlife. Given the complexity of the science and engineering involved in this project, the situation is made even more difficult when the project is only undergoing a Class One provincial assessment rather than the more thorough Class Two or federal assessment. Oceans are federal, fisheries are federal, interprovincial affairs are federal, Indigeneous affairs are federal. This process has from the beginning raised doubts and alarms rather than encouraging a sense that the consequences are being evaluated with all the careful attention to both the big picture and the fine-grained detail that the project requires. The history of Northern Pulpâ?Ts influence over the province and its political processes only contributes to the sense that justice has not been done and that bad decisions will continue to be made in order to serve the Mill regardless of the environmental consequences. Again, the risk of allowing this to go ahead without the absolute certainty that a full scale armâ?Ts length

assessment might provide, and thus allowing the fifty years of toxicity to continue, would be reckless and unacceptable. Approval of the project itself is only part of the issue. NP, by its own account, will apparently require a long delay of the legislated January 2020 Boat Harbour deadline in order to complete construction and the toxic effluent would presumably continue to flow during that time. The current environmental assessment should thus include consideration of this environmental fact as well since the two are completely interdependent. This part of the project has absolutely nothing to do with risk or uncertainty. Its toxicity is a matter of public record, its effect has been nothing short of disastrous, and it constitutes one of the major examples of environmental racism in Canada. If implemented, this proposal would have the effect of continuing this overt racism. It is utterly unthinkable that in 2019 this racist policy could be approved and permitted against the clearly stated wishes of the Pictou Landing First Nations community who have endured more than fifty years of lies and poison. Bad enough that such racism was acceptable in the 1960s, but to continue with such a devastating policy today? Yet this astonishing betrayal of trust, this perpetuation of an oppressive and explicitly racist policy, is precisely what NPs plan entails. There has been far too much damage already and the risk going forward is far too great. The mill was not built to last even this long and we all know itâ?Ts going to close sooner or later anyway and that those jobs will unfortunately be lost. But to keep it going for a little longer, given all thatâ?Ts at stake, would be as environmentally short-sighted and morally compromised as the original decision to pump the effluent into Boat Harbour. Fifty years is enough. Much more than enough. Itâ?Ts time to move on. Just say no! Name: @rogers.com Address: Municipality: Ottawa Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 47 y: 25

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:15:43 PM

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Project: replacement_effluent_treatment_facility_project Comments: How is the new effluent treatment facility going to prove to be a better solution when the effluent is piped straight into the strait? When will an error or malfunction or wrong doing be too much ? The aftermath of their trusted solution, from the last 50 years is still too toxic to be managed without hazmat being strategically investigated for removal from a land locked pond...how will they fix it when its in the ocean? It is going to kill or alter devastatingly the life cycle of the fishes we all eat. Effluent treated is still toic effluent in some form, or they wouldnt be trying to prove to us, its harmlessness . And why would it have taken all these years to produce a harmless and nontoxic effluent, if it is just that? The mill is going to cost us regardless of our govts decision. Weve paid in many ways already, tragically and financially. Why not pay for the betterment of our health, our lives, our homes,our food chain...if the better treatment is better, why h avent they offered before now to make it better ? Dont allow this better treatment facility to be another unknown. Name: @gmail.com Address: Municipality: RIVER JOHN Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 39 y: 11

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:16:17 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I absolutely oppose Northern Pulps proposal to pump toxic effluent and so much of it! into the Northumberland Strait. It is time for NP to cease adversely affecting the NS environment, sea life and the community welfare of Pictou and the North Shore region. Economic viability and environmental responsibility need not be mutually exclusive. To allow NP to continue to perpetuate - and indeed renew - its toxic legacy would be an outrage. Name: @gmail.com Address: Municipality: Halifax Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 70 y: 26

From: @bellaliant.net
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:19:05 PM

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Project: replacement_effluent_treatment_facility_project Comments: I am in support of approving Northern Pulpâ?Ts environmental assessment to allow them to replace the existing effluent treatment facility with a state-of-the-art effluent treatment facility including a pipeline to the new outfall location. Northern Pulps focus report data indicates no significant impacts on the marine species important to the fisheries surrounding the proposed new ETF pipeline discharge area, allowing the fisheries and forestry industries to continue working together as they have for more than 50 years in the area. Both the existing and future effluent outfalls are located in the Northumberland Strait. The future outfall has less potential environmental impact than the existing outfall due to a considerable improvement in mixing conditions. The scientific studies show that the outfall area is predominantly sand with some gravel. Sandy areas surrounding the outfall show significant sand ripples up to 0.5 m in height that indicate high currents are present in the area that will provide good effluent mixing. Name: @bellaliant.net Address: Municipality: Valley Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 30 y: 18

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:19:49 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am indeed for this operation, it benefits so many people across Nova Scotia it would make no sense to take it away. After looking into the testing it is clear that the pipe will not cause damage, specifically to the fishing industry. I value the environment, and this is why I am comfortable with the additions made to the company to ensure no damage to the environment. I have no worry about the fishing industry or habitat. Name: @gmail.com Address: . Municipality: Pictou Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 33 y: 16

From:
To: Environment Assessment Web Account
Subject: Response to Northern Pulp Effluent project
Date: November 8, 2019 9:19:57 PM

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To the Honourable Gordon Wilson,

My name is and I grew up in the town of Pictou. The mill (once named Scott Paper, Kimberly Clark, and presently Northern Pulp) has been a looming statue in the backdrop of our beautiful town for decades. When family and friends visit Pictou for the first time, they are always so surprised by how picturesque the town is, but the same comment would inevitably come, "It's a shame that there has to be such an unsightly factory across the water and....that smog and the smell...it's awful...it smells like a dirty diaper". Residents like me always give the same response, something with a hint of humor and embarrassment, "Oh, well we call that the the smell of money". Money. We have always rationalized the mill's presence, pollution and controversy with money, jobs, stability, economic growth. These have all been wonderful things for our community to have; however, we have been sacrificing basic human rights, health, environment, air quality, Boat Harbour...the list goes on. Now, we are faced with a potentially catastrophic impact to our waters of the Northumberland Strait. When I first heard that Northern Pulp wanted to disperse their effluent into the Strait, I thought it was a joke, that it couldn't be a realistic, viable proposal in 2019 - aren't we suppose to know better? Turns out we don't. Northern Pulp has failed to prove that their effluent will not impact the ecology and marine life of our waters. They cannot say for certain that our beaches won't be ruined, our lobster poisoned, or our water turned a dark brown- the color of Boat Harbour. There is too much uncertainty, too many "should not" or "probably won't" cause harm comments in their project report. The risk is far too great.

Please, come visit the town of Pictou and spend a weekend. Smell the air, breathe the smog. Take it all in. You may understand a fraction of what we have endured for over 50 years and, hopefully, you'll understand why, "Enough is Enough". Stop this major polluter who has already caused enough damage to Nova Scotia's environment. After all, aren't you the Minister of Environment?

Thank you.

Pictou, Nova Scotia

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:20:42 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: From what I have read in the Focus Report, it seems to me that Northern Pulp is doing what is necessary in meeting the standards set out by the government,No undertaking can be void of some risk....But if they are meeting the standards set forth...then why should they not be allowed to build their effluent treatment facility and pipeline diffuser... Northern Pulps closure will have a huge economic impact on Nova Scotia and its families...not just for forestry families. I would like to see Northern Pulp remain open and all sectors work together , instead of being so divided....thanks Name: @gmail.com Address: Municipality: New Glasgow Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 49 y: 34

From:
To: Environment Assessment Web Account
Subject: Comments on Norther Pulp"s Proposed Effluent Treatment Facility Project
Date: November 8, 2019 9:26:40 PM
Attachments: Comments on NP ETF.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Hello - Please find attached my comments and concerns about this project.

If you need to reach me for clarification, you can contact me at this email, or by cell phone.

Thank you for this opportunity,

PE

PE

November 8, 2019

To:
The Minister of the Environment
Nova Scotia

Dear Sir /Madam,

I am writing this letter to raise my concerns in relation to the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project.

My name is I am a veterinarian who recently

Prior to receiving my Doctor of Veterinary Medicine (DVM) degree, I also received a Masters of Science (M.Sc.) in veterinary epidemiology. Epidemiology is the study of factors affecting health and well-being in populations, and there is a strong emphasis on statistical methods and analyses.

I live in Prince Edward Island, and have family and friends who work in the lobster industry, so the health of this body of water is very important to all of us. This is why I am very concerned about the significant damage which could occur to the Strait, should Northern Pulp be approved to dump effluent into it. And I believe there are signficant gaps in the information provided, which do not effectively address the potential detrimental effects.

Given the size of the the report, I decided to focus specifically on Point 9.1 of the Terms of Reference; specifically:

> **Complete baseline studies for fish and shellfish tissue (via chemical analysis) of representative key marine species important for commercial, recreational and Aboriginal fisheries in the vicinity of the proposed effluent pipeline and diffuser location.**

I also wish to reference Section 12(da) of the Nova Scotia Environmental Assessment Regulations:

> **12. All of the following information shall be considered by the Minister in formulating a decision under subsection 34(1) of the Act:**
> **...**
> **(da) whether environmental baseline information submitted under subclause 9(1A)(b)(x) for the undertaking is sufficient for predicting adverse effects or environmental effects related to the undertaking; ...**

As I reviewed the information provided in Appendix 9.1, I believe the baseline chemical analysis data provided are **NOT** sufficient to be used for predicting or detecting any adverse effects of the proposed effluent, given the very small sample sizes (number (n) = 5; sometimes, only n = 2). In addition, any estimate of a population parameter must also include a measurement of the amount of variability (e.g.

variance, standard deviation, standard error of the mean, confidence interval) in the sample values, and these are missing from the presented data. (Note: The formulas used to calculate the required sample size to estimate a population parameter require the input of this measure of variability in the population.)

Also, estimation of a population parameter through sampling must also ensure that the sampled animals are truly representative of the population. Often there are factors, both intrinsic to the animal (e.g. age, gender, size, metabolic rate) and extrinsic to it (e.g. temperature, environmental conditions, water salinity), that may affect the parameter being estimated. In these situations, more detailed sampling procedures must be taken, to address these sources of variability, and sub-population specific estimates may be required.

Reference:

1. **Sergeant, E.; Perkins, N. 2015. Epidemiology for field veterinarians: An introduction. Chapter 8: Sampling populations. CABI, Oxfordshire, UK. ISBN-13: 978 1 84593 691 4 (paperback).**
2. **Any statistics textbook.**

For example: Given that we are looking at poikilotherm (cold blooded) species, I would argue that it would be important to collect adequate samples from these species both in the warmest temperatures (when their metabolisms would be highest) and the coldest temperatures (when their metabolisms are slowest), because the differences in metabolic rates could result in different levels of accumulation of toxins, and subsequent deleterious effects.

(Please note: As I scanned other parts of the report, there were other instances where either the number of samples were not adequate in number (e.g. Section 4.1 - Caribou Harbour water samples - number of samples = 6), or were not even listed, or where potential sources of variability in the estimated parameters (e.g. temperature) were not considered in the sample collection plan.)

Given the lack of adequate baseline data in Appendix 9.1 (and likely in other sections, but not enough time to fully document them), I believe that **Northern Pulp's submission has not provided the Minister with the required data to enable the proper and rapid identification of negative impacts of the proposed effluent on the imporant marine species residing in the Northumberland Strait. This contravenes the requirements set out in Section 12 (da) of the Nova Scotia Environment Assessment Regulations.**

Given the above, I strongly request that the Minister reject the proposed project, as there are too many potential risks that have not been adequately addressed.

Thank you for the opportunity to voice my concerns with this project. Please contact me if you have any questions about my submission.

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Support Letter
Date: November 8, 2019 9:27:59 PM
Attachments: Northern Pulp admission from a Pulp and Paper worker.docx

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To: Environmental Assessment

On behalf of pulp and paper worker in Espanola, Ontario.

Thank You,

Sudbury, ON.

@unifor.org

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Environmental Assessment – Nova Scotia

Northern Pulp admission from a Pulp and Paper worker

I am sending this letter in support of Norther Pulp's Effluent treatment facility project. As someone who works in the Pulp and Papers sector for 32 years in the small town of Espanola, Ontario. I work for Domtar which operates a pulp and paper mill, steam plant, steam engines, wood yard and research and development lab.

In the past 20 years our effluent system has been totally upgraded. They are constantly monitored and maintained to environmental standards, careful oversight and taking the time to manage complex risks as our lagoons are near the Spanish River.

I have also seen many changes for the betterment of the environment. We recently had an infusion of 28 million for upgrades from the Innovation, Science and Economic Development Canada. This will assist in the reduction of greenhouse emissions, 48,000 tons, which is comparable to 16,000 cars in use. Along with reducing pulp waste and creating a newer types of Fiber technology.

We are in exciting times. As society moves away from single use plastics, paper is a viable source that is able to tackle the development of sustainable alternatives. Our plant employs over 450 member who are unionized and non-union and are able to provide a small community with good jobs for decades to come.

Time to ensure that all pulp and paper mills create the atmosphere that is prosperous not only for the industry but for the environment as well.

Unifor Local 74
Domtar - Espanola, Ontario

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:22:34 PM

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Project: replacement_effluent_treatment_facility_project Comments: I am sending this letter in support of Norther Pulpâ?Ts Effluent treatment facility project. As someone who works in the Pulp and Papers sector for 32 years in the small town of Espanola, Ontario. I work for Domtar which operates a pulp and paper mill, steam plant, steam engines, wood yard and research and development lab. In the past 20 years our effluent system has been totally upgraded. They are constantly monitored and maintained to environmental standards, careful oversight and taking the time to manage complex risks as our lagoons are near the Spanish River. I have also seen many changes for the betterment of the environment. We recently had an infusion of 28 million for upgrades from the Innovation, Science and Economic Development Canada. This will assist in the reduction of greenhouse emissions, 48,000 tons, which is comparable to 16,000 cars in use. Along with reducing pulp waste and creating a newer types of Fiber technology. We are in exciting times. As society moves away from single use plastics, paper is a viable source that is able to tackle the development of sustainable alternatives. Our plant employs over 450 member who are unionized and non-union and are able to provide a small community with good jobs for decades to come. Time to ensure that all pulp and paper mills create the atmosphere that is prosperous not only for the industry but for the environment as well. Name: @gmail.com Address: Municipality: Espanola Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 24

From:
To: Environment Assessment Web Account
Subject: Northern Pulp, the Focus Report, and the state of our health and well-being
Date: November 8, 2019 9:28:55 PM

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To Honourable Gordon Wilson, Minister of the Environment for Nova Scotia.
From former long-time staffer at ,
resident of K'jiputuik at Fergusons Cove, west side Halifax Harbour
Re Northern Pulp, the Focus Report, and the state of our health and well-being

Dear Minister, I hope you have the wisdom to call an end to this mill operation and the constant assault that this mill, regardless of owner, has been inflicting on the environment right from the get-go. This is industry from a former time. At the rate our forests are being depleted currently under licenses with Westfor, there will be no trees anyway.
The sensible decision I want you to come to - because of the science and because of 50+ years of lived experience - is that its time is over. Give Northern Pulp the failing grade they deserve on the focus report. We need ecological forestry, clean air, clean water, a healthy population instead. Put the Province and the province on a sustainable course. Start immediately to adopt environmentally-respectful standards that ensure protection of our marine and our terrestrial environments has priority.
Please do not enable these operators to continue to spew toxins into the air and the water.

best regards,

--

Fergusons Cove, Nova Scotia.

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:31:50 PM

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Project: replacement_effluent_treatment_facility_project Comments: Even if the ETF could be satisfactorily implemented and had been properly researched which it hasnâ?Tt. It doesnâ?Tt resolve the particulate matter issue coming from the stacks. The Mill is outdated and itâ?Ts emissions are a danger to the public. Name: @eastlink.ca Address: Municipality: Westville Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 72 y: 25

From: @tncwireless.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:33:33 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Hon. Gordon Wilson Minister of Environment Nova Scotia Environment PO Box 442 Halifax, NS B3J 2P8 The extensive, scientific, fact-based Focus Report that Northern Pulp submitted and the highlights of their proposed wastewater treatment facility will be industry leading and significantly reduce their environmental footprint. Treated wastewater effluent from Northern Pulp has been running into the strait for over 50 years. The fisheries continue to fish the strait to this day with no environment impact on the fishing. I am retired employee of Northern Pulp and if the mill were to close, not only would it affect my pension, but also my family and the community. Hopefully the Hon. Gordon Wilson, the Minister of Environment will approve the Environmental Assessment. Name: tncwireless.ca Address: Municipality: Merigomish Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 55 y: 24

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:36:05 PM

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Project: replacement_effluent_treatment_facility_project Comments: To whom it may concern, I do not support the replacement effluent treat facility project at the Northern Pulp plant in Pictou. My concern is with Northern Pulp, I am not qualified to comment on the science involved or presented in this project, but I have several qualified friends who have provided you with comments on the science that NP has provided and how deficient NPs science is. My concern is with Northern Pulp and how they have approached this project, they have had ample time to respond in a professional manner and address the issues required to obtain environmental approval for this project but I believe they have wasted this time and done very little to provide a suitable solution to the situation, to the point of pitting neighbors against each other in hopes of victory. Although I am not a fisherman the north shore and its fishery is important to me and I am not prepared to give a deficient corporate citizen like Northern Pulp the authority to destroy it. Name: Email: @eastlink.ca Address: EXT Municipality: Pictou, Subd A Postal-Code: Phone: ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 60 y: 30

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:36:21 PM

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Project: replacement_effluent_treatment_facility_project Comments: Dear Hon. Gordon Wilson I am writing a letter in support of an approval permit for a Class 1 Environmental Assessment for the replacement system for Boat Harbour submitted in a Focus Report by Northern Pulp. I believe the company has put many long hours into this assessment and has done a thorough job making sure all environmental standards have been met. I know that the Boat Harbour setup was not the way to go but back in 1967 environmental standards were not in place like they are today and technology in these areas has changed substantially in the last 50 years. The new owner of Northern Pulp has already done work to this mill over the years he has had ownership to reduce his environmental footprint with technologies such as the new precipitator which has reduced the emissions going into the atmosphere and is now willing to put the money into the new effluent treatment facility. This new facility will treat the effluent on site before ever leaving the mill eliminating the risk of another effluent leak from ever happening again.Northern Pulp has found the best existing technology today for Bleach Kraft Pulp Mills . The owner has also proposed an O2 delignification after the treatment plant is built which will reduce chemical usage along with water consumption reducing the amount of effluent. I believe that the Remediation of Boat Harbour has to happen for not just the First Nations people of Pictou Landing but for all the residence of Pictou Landing but I feel that the government has not given Northern Pulp enough time to complete the entire process for this to happen. At the beginning when the Premier gave the deadline of â?ªJanuary 31, 2020â?¬ there were only 7 studies to apply for an EA but ended up being a total of 28 or more. These studies take time and some of them can only be done in certain seasons. It has come out recently that the company that is to be in charge of the Remediation of Boat Harbour will not be able to start work on the expected date due to del ays. I would like to ask you how it is fair that this company that had the same amount of time to get their ducks in a row is entitled to an extension but Northern Pulp who has taken on all these extra studies that kept coming up throughout this process is not entitled to an extension? Any project whether it be a new school, hospital or effluent treatment facility all have delays that are out of their control. Northern Pulp has had many obstacles whether it be the weather, having to find an alternate route for the pipeline right up to the blocking of their survey boat which Iâ?Tm sure you have most likely seen on the news. I feel that it is only fair that you give the same exception to Northern Pulp as you are to the company in charge of the Remediation. I have lived in Pictou County for my entire life 30 years and feel that the closure of the pulp mill would be detrimental to the county and also the entire province. Throughout my life I have seen the impact that it has had on this county when places like Maritime Steel and Trenton Works had closed and the economy was in a better place than it is today. I believe all the industries involved fisheries, forestries and the pulp mill can coexist. I believe that the EA brought forth in this Focus Report by Northern Pulp will pass all environmental standards and that this County and Province will continue to prosper. Respectfully Name: Email: @hotmail.com Address: Municipality: New Glasgow Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 81 y: 21

From: @live.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:36:21 PM

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Project: replacement_effluent_treatment_facility_project Comments: I strongly agree with the proposed treatment facility project. As a millennial, I worry about the environment and itâ?Ts amenities, but with Northern Pulp I see no harm to the fisheries/fishermen, and no fear of ice scour. I do not believe Northern Pulp acquires the dangers it is thought to have. Name: live.ca Address: Municipality: Pictou Postal-Code: : ### ### - #### email_message: Privacy-Statement: agree x: 60 y: 18

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:36:23 PM

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Project: replacement_effluent_treatment_facility_project Comments: As a contractor for Northern Pulp and currently employing 30 people I support northern pulp. Name: @eastlink.ca Address: Municipality: Great Village Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 33 y: 24

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:39:55 PM

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Project: replacement_effluent_treatment_facility_project Comments: Give an extension Name: @eastlink.ca Address:
Barton Digby County N.S. Municipality: North Range Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 80 y: 37

From:
To: Environment Assessment Web Account
Subject: Save the Mill
Date: November 8, 2019 9:41:32 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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My is a Retiree and worked years at theMill and works there and in year! There is a lot at stake for our family and so many others should the Mill close..

We strongly believe that the Mill and the fishery can work in harmony agter categul rrbiee of yhe focus report and all it's positive findings!

We also know people who work in the Forest Industry who have worked their whole lives and will be devastated to see the Mill close and their livlihood come to an end as they know it!

One thing for sure is that the Fisher men/woman have had their best catches ever along the Northumberland Strait.. Ask them and they will tell you..almost as if bragging!! That being said... How bad can that treated effluluent be that is flowing into the Northumberland Strait be? With the new treatment plant that will be built... (If given the chance will only improve as lobster catches are up under the current system.

We 100% support this Mill. This system is in many other Mills across Canada and has been proven to work! As we understand the Saint John paper Mill has been ordered to put the same new and improved State of the Art system in as well...Something to be said for that!!

Sincerely...

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:43:08 PM

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Project: replacement_effluent_treatment_facility_project Comments: I am confident in the focus report. I have no fear of ice scour, harm to fisheries or habitat, or build up of sediment. We should believe in the science behind it. There is no reason why Northern Pulp and forestry can not continue to coexist with the fisheries as they have for the last 50 years. I support the Replacement Effluent Treatment Facility Project. Name: Email: @gmail.com Address: Municipality: Central West River Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 85 y: 28

From:
To: Environment Assessment Web Account
Subject: Revised submission, Northern Pulp,
Date: November 8, 2019 10:25:58 PM
Attachments: Revised Submission Northern Pulp Nov 8 2019.pdf
What we know about mercury at Abercrombie Point Local News The News.pdf
Nova Scotia has a mercury problem.pdf

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Please replace my earlier submission, sent at 9:38 this evening, with this corrected version.

I apologize for the inconvenience.

November 8, 2019
Minister Gordon Wilson
Nova Scotia Environment

Re: Northern Pulp's Proposed Replacement ETF

Dear Minister Wilson,

I am writing to share my very serious concerns about Northern Pulp's proposed replacement Effluent Treatment Facility, and to ask the Minister to reject this project. Northern Pulp has not fulfilled multiple requirements of the TOR, has again presented information which is incomplete and, in many cases, inaccurate. Serious risks are not addressed, are misrepresented or downplayed.

I live in River John, 30 minutes from the proposed outfall in Caribou Harbour. When I moved to this area, I chose River John because I wanted to live close to the water, but I also wanted to avoid the air pollution closer to the mill. I believe a healthy environment is an essential foundation on which to build healthy lives and a healthy economy. It seems that becomes truer and more essential every day.

I have chosen to focus on these issues in my submission. They are not my only concerns.

1. Black liquour spills may compromise new ETF, leading to release of effluent which would not meet federal or provincial regulations.
2. Risks of Mercury on Adjacent Canso Chemicals site must be fully evaluated before the project can be approved.
3. Northern Pulp has not met the requirements of the TOR in multiple instances.
4. The conclusion that the project will cause no significant residual harm to anything because any negative impacts will be mitigated is not meaningful or credible
5. Northern Pulp non-compliance with Industrial Approval and provincial regulations
6. Barriers to public participation in the EA process
7. Misrepresentation of basic facts

1. **Black liquour spills: The need to determine whether they could compromise the effectiveness of the AST system, resulting in release of effluent into the Northumberland Strait which would not meet federal and/or provincial regulations.**

Given the information provided in Addendum 2.0, there appears to be no argument that significant black liquour losses take place at NPNS. The 2015 Industrial Approval, "requires daily testing and reporting of incidents where COD levels are more than double the benchmark of 1900, "indicating that an incident outside of normal operations has occurred." (Addendum 2.O) "The intention of this IA condition was to drive continuous improvement in black liquor losses

at NPNS." "(KHS Consulting, Addendum 2.0, p. 3). It appears that these "incidents outside of normal operations" continue to occur, according to information in Addendum 2.0.

However, Addendum 2.0 contains no information about the frequency of these incidents, or the levels of COD measured at these times. There is also no information provided on results of the required daily COD test results that are less than two times the 1900 mg/l benchmark, i.e. up to but less than 3800 mg/L.

The issue of black liquor spills is both recognized and unresolved at NPNS. It arises from conditions in the mill itself. KHS states, "… the BHEFT (Boat Harbour Effluent Treatment Facility) provides effective treatment even during upset conditions." Academic literature indicates that the same is not true of the impact of black liquour spills or upset conditions on AST systems. This is not my area of expertise, and I am not going to attempt to interpret the literature. But it is clearly a recognized issue that has been the subject of concern and study.

Before this project is approved, it is necessary to evaluate the potential impacts of these black liquour spills, (aka upset conditions, process interruptions or incidents outside of normal operation) on the operation of the proposed new ETF including the live bacteria that are essential to the effective operation of the AST system. A compromised ETF system could result in the release of untreated, or under-treated effluent that would not meet PPER or provincial regulations and could cause significant and irreversible harm to Caribou Harbour and the Northumberland Strait. This issue has not been discussed at all in the EARD or Focus Report. Although the issue of high levels of COD has been flagged in Addendum 2.0, the section only looks at whether NPNS can reduce COD levels to the levels required by the Industrial Approval. (NPNS does not provide any data to indicate that they can.) But even in the event average annual COD is reduced, that does not rule out the possibility that peak events caused by upset conditions may take place.

Northern Pulp often says that with the new system, no untreated effluent will leave the mill site. That is only true if the new ETF is not compromised, and if any problems with the effectiveness of the system are caught in a very timely way, before effluent leaves the plant on its way to the Northumberland Strait. Prevention, timely identification and response are critical.

Northern Pulp's record in timely identification of problems is poor. Although NPNS's Industrial Approval requires 24/7 flow monitoring which immediately notifies the company of a leak, as recently as October 2018, an effluent pipe leak was not detected by the company but by a neighbor walking their dog. The investigation of the circumstance of that leak to determine why there was no timely identification have not yet been made public. The IA requirement for monitoring and preventive action to avoid effluent pipe leaks was clearly also ineffective.

In the case of black liquour losses, until this time, lack of timely identification of the problem did not compromise the BHETF, at least to the extent that PPER and provincial regulations have continued to be met. (KHS Consulting, Addendum 2.0, p. 3) Addendum 2.0 shows that the prevention of such incidents at NPNS has not yet been achieved, although the issue has been

identified for years. Existing practices at NPNS, which will not change with the introduction of a new ETF.

For whatever reason, the problem is ongoing. There must be a full understanding of how black liquour spills or process interruptions events impact the new AST system, or its components, such as the MMBR system, in order to determine whether the system could be compromised in these circumstances, resulting in potentially undetected release of untreated, or insufficiently treated, effluent into the Strait.

Conclusion 1: In TOR 2.3, NPNS is required to assess the appropriateness of the proposed treatment technology under normal conditions. The issue of black liquor spills is a different, but related issue. Black liquor spills are not normal conditions, but they appear to be common enough at NPNS to require a specific IA condition to address the situation.
Before the Minister can approve this project, there needs to be a complete evaluation of the potential impacts on the effectiveness of the proposed new treatment technology during and after "upset conditions," and into all measures that are needed to provide 100% assurance that untreated or undertreated effluent will not reach the Northumberland Strait for undetermined periods of time. The viability of this system for this company given existing mill equipment and practices is not a settled question. For this reason, among others, I ask the Minister not to approve this project.

2. **Risks of Mercury on Adjacent Canso Chemicals site must be fully evaluated before the project can be approved.**

I raised the issue of potential environmental and health risks from mercury the Canso Chemicals site adjacent to the location of NPNS's proposed new ETF in my earlier response to Northern Pulp's proposal. My concerns were not addressed in the Focus Report. Northern Pulp's sole response to this issue, raised in multiple public comments, is that "Monitoring will be conducted as part of construction. Contingency plans will be in place to address contaminant if identified." ((Appendix 1.1, multiple places.)

This is an unacceptable response to a potentially very serious environmental risk. The proposed construction of the new ETF would be very close to a site known to be highly contaminated with mercury. No evaluation of the present condition of mercury on or near the site has been presented in the original EARD or the Focus Report. There has been no evaluation to determine whether the mercury is present in groundwater that could be disturbed or redirected by construction, or even whether mercury has moved over the past 20 years and is present on the NPNS site. There has been no attempt to address potential risks that could arise from construction or operation of the new facility due to acknowledged mercury contamination in close proximity. Nor has there been any attempt to identify measures that must be taken to minimize risks. The acknowledged presence of large amounts of mercury in bedrock, and in test water wells on the adjacent site should require that this issue be addressed prior to approval of the project.

Key Facts:

- The NPNS proposed replacement ETF is in close proximity to the site of the now-decommissioned Canso Chemicals plant.
- Mercury has seeped into the bedrock on the decommissioned site, but could not be excavated and placed in the landfill because of its depth – eight metres -- and because of the risk of disturbing and spreading the contamination. [1] [2]
- According to the Canso Chemicals Decommissioning Report, "there is potential for it [mercury] to dissolve into groundwater and migrate towards Pictou Harbour" which lies only 700 metres away.
- A diagram of the proposed ETF, on page 77 of the EARD, Section 1-7, shows the clarifiers and the activated sludge basins with depths of seven metres and greater very close to the former Canso Chemicals site.[3]
- Mercury concentrations in test wells on the decommissioned site have exceeded 8 ug/litre, 300 times greater than the CCME freshwater guideline, and 500 times greater than CCME marine environment guideline. [4]
- No monitoring for mercury is being done on the Northern Pulp property that is adjacent to the contamination at the Canso Chemicals site and on the projected path of the mercury plume, according to NSE spokesperson Adele Porier. [5]
- NSE has accepted a site-specific mercury guideline of 60 ug/L. This means NSE would not be notified unless on-site testing showed mercury levels higher than 60 ug/L, [6] – 2000 times higher than the CCME freshwater guideline and 3700 times higher than the CCME marine guideline.
- Results of monitoring done for provincial compliance are not available without a freedom of information request; the public is not entitled to know whether the mercury contamination on the site has changed over the past 20 years.[7]

Queen's University Professor Peter Hodson is a fish toxicologist who has assessed the extent of mercury contamination of fish in the St. Lawrence River at Cornwall. Journalist Joan Baxter discussed the mercury contamination at the Canso Chemicals site and the proposed construction of a new ETF by Northern Pulp close to that site with Professor Hodson.[8] Hodson noted that there are important questions to be answered at the planning stage of a developments when there is known mercury contamination in close proximity. Among these, Hodson pointed to the need to understand how construction

[1] Joan Baxter, Nova Scotia Has a Mercury Problem, April 9, 2019, Halifax Examiner, https://www.halifaxexaminer.ca/province-house/nova-scotia-has-a-mercury-problem/#Contamination%2520at%2520Canso%2520Chemicals, attached
[2] Canso Chemicals Decommissioning Report, submitted by Ecojustice in response to NPNS EARD
[3] Baxter, ibid
[4] NG News, attached
[5] Baxter, ibid
[6] ibid
[7] ibid
[8] ibid

of any new facilities in the area would affect surface penetration of water and groundwater flow rates and directions.[9]

Baxter lists some specific information gaps and questions that Professor Hodson suggested need to be addressed at the planning stage of the NPNS proposed project.

- There was no estimate made of how much residual Hg [mercury] was in soil or bed rock underneath the chlor-alkali cell. Without such an estimate, it is difficult to have any confidence in models predicting future movement of Hg from the site. If the Hg has penetrated deep into fissures in bedrock, and there are deep pathways for groundwater flow, what is the total movement of Hg off-site at all depths, and is any Hg migrating vertically (up or down)?
- The groundwater surveys (flow, Hg concentration) were made within a few years of dismantling and excavating the site. How much has groundwater flow changed in response to these surface disturbances and to subsequent re-vegetation? Is the model still valid?
- The monitoring of Hg in groundwater demonstrated that one sample well (W-4) was particularly contaminated. However, the [Dillon] report included a recommendation that this sampling well be closed (p 49)! This seems counter-intuitive if the intent of long-term monitoring is to track Hg concentrations over time.
- Was a long-term monitoring program implemented and are the results available? Has the database of groundwater flow and Hg concentrations and overall assessment of risks been updated to reflect the two decades of Hg movement since the last studies? Is monitoring well W-4 still sampled? [For unknown reasons, sampling was stopped on well W-4, which showed high levels of mercury contamination.]
- Have surveys been done of soil and groundwater Hg concentrations around the sludge-disposal sites, and are there groundwater wells that are sampled regularly? Even though these sites are described as 'secure,' they can age and start to leak due to frost damage, disturbance by animals, and construction or maintenance activities.[10]

Conclusion 2:

- There is critical baseline information missing on this issue, which could result in significant harm to human health and to the environment. In spite of the documented presence of high levels of mercury in close proximity to the planned construction, Northern Pulp has not conducted, and Nova Scotia Environment has not to date required, any evaluation of the potential risks from mercury from

[9] Ibid, p. 22
[10] Ibid

construction and operation of the proposed new ETF. None of the above questions have been answered.

- The Minister cannot approve the proposed new ETF before this issue is fully examined and the results available for public examination and comment, as part of the decision making process for the proposed new ETF.

3. Many TOR requirements have not been met.

The Terms of Reference for the Focus Report were developed to fill critical gaps in Northern Pulp's EARD, and provide the Minister with information required to determine whether the project could be approved. Northern Pup has not provided the information required by the TOR for most of the points I have reviewed. This is the second opportunity that NPNS has had to provide critical information. They submitted the Focus Report six months earlier than they were required to, yet there continue to be significant information gaps on critical questions.

1. TOR Introduction:
   During the preparation of the Focus Report, it is strongly recommended that NPNS continues to engage with relevant stakeholders and the Mi'kmaq, including Pictou Landing First Nation, and to share relevant studies and reports.
   No studies or reports were shared with the public, even after the Fishermen's working group wrote to Northern Pulp requesting that they share any completed studies and reports. At that point in time, Northern Pulp stated on their website that they were 90% finished with the Focus Report work, and that a number of studies were complete. Northern Pulp did not respond in any way to the request. As a result of Northern Pulp not complying with this "strong recommendation," the public was disadvantaged by having to read ad respond to almost 4000 pages of documentation in 37 days.

2. *TOR 1.1 Provide a response (via a concordance table) to questions and comments raised by the public, Mi'kmaq and government departments, and incorporate these comments in the Focus report where applicable. Comments may be summarized prior to providing the response.*
   Northern Pulp has not fulfilled this requirement. I will provide just one examples. I submitted two questions about ice risks to the marine portion of the pipe. This question was asked many times in the Concordance table. The response given is "Refer to section 3.5 for comments concerning pipeline leak detection and enhanced pipeline protection options." There is no discussion about the marine pipe in section 3.5. The section explicitly excludes the marine portions of the pipe from the options discussed for leak protection.

3. *TOR 2.2: Conduct geotechnical surveys and provide the survey results to confirm viability of the marine portion of the pipeline route. The surveys must determine the potential impacts of ice scour on the pipeline.*
   a)There is still no specific marine pipe route determined. The only specific information presented are the co-ordinates for the start point (which is contradicted by information in another section of the Focus Report saying the exact point has not been determined),

and the end point. Aside from that information, there is a 200m wide corridor which has been surveyed. Northern Pulp has provided no hard information about the location of the marine pipe route. Without this information, the viability of the marine route cannot be determined.

b) The survey information was gathered at one time in one year. Ice scour information from that survey in is described by CSR as coming from the winter of 2018-2019. It is also described as being measured from the top of infill of the scour; thus, it does not represent the full depth of the scour impact.

Evaluation of the survey results does not include the potential risks to the marine pipe from the pressure of ice grounding in an area of 7,000 square metres (70m x 100m) identified in the survey. Standard practices, reflected in the report of Makai Engineering, state that historical data must be considered. Information earlier presented by Stantec, citing the case of an MT&T cable severed at depths of 18 metres, points to the fact that ice evaluation is not always accurate, and that scouring can happen at much greater depths than predicted. This information from Stantec was omitted from the Focus Report. The viability of the marine portion of the pipe cannot be determined on one year's survey data. It must be determined on a worst-case scenario basis. What has been confirmed by the survey is that ice scour and ice grounding is common in the exact area of the proposed marine pipe and that the viability of a marine pipe is highly questionable.

4. *TOR 2.3 Submit data regarding the complete physical and chemical characterization of NPNS's raw wastewater … and TOR 2.4 Submit a complete physical and chemical characterisation of NPNS's expected effluent following treatment by the proposed technology.*

   I was interested to look at this information, as the lack of complete physical and chemical characterization of the raw, and especially the treated wastewater, was a key omission in the original EARD. Knowing the full effluent characterization is critical to being able to evaluate the potential impacts on marine life, the environment and human health. Appendix 2.3 is a document of 541 pages. It has no table of contents. I attempted to find the pages which provided a complete characterization of the treated effluent but could not. I found one section that provided part of the characterization in one place, and another section that provided another part many pages further on. Clearly, I was going to have to spend many hours just looking for the data, then compiling it myself to determine whether it appeared to be complete. I did not have the time to do that, so I cannot comment on whether this requirement was fulfilled. I can comment on the fact that if this information was provided, it was done in a way that was extremely difficult to access. There is no valid reason for the absence of a Table of Contents and well organized, easy to find information on such a critical question.

5. TOR 2.5: *Provide any proposed changes to the pipeline construction methodology and other associated pipeline construction work, related to the potential changes to the*

marine portion of the pipeline route (e.g., infilling, trenching, temporary access roads, excavation, blasting, disposal at sea, and others where applicable).
Northern Pulp has not fulfilled TOR 2.5. None of the above questions have been answered. Appendix 2.5 is an opinion from Makai Ocean Engineering. Makai states, "This report provides an opinion of the **likely** construction methods and design features of the pipeline, **based on the available data and standard practices for marine pipelines**." They further state, **"The exact method used for dredging will be determined by the selected marine contractor based on schedules, costs, and available equipment resources."** (emphasis mine)
There is no plan for what dredging method will be used; options are discussed. There is no plan for how excavated material will be dealt with during construction; options are discussed. There is no plan for how spoils will be dealt with; options are discussed. The existence of spoils is minimized, which is unrealistic given the volume required for a 36" diameter pipe extending for 4 kilometers. There is no discussion about whether disposal at sea will be required. There is no decision about how the trench will be finished, maybe it will be graded, maybe it will be left as is, maybe some armour rock will be used in some places. There is no discussion about how soil with exceedences of arsenic and other contaminants will be handled. No decision made about whether blasting is needed, only the statement that blasting will be "very unlikely." Northern Pulp has not provided definitive answers to any of the questions in TOR 2.5. The requirements of TOR 2.5 have definitely not been met.

6. TOR 3.2 *Provide flow data for Point A*
Northern Pulp states that they do not have accurate flow data for Point A. Their effluent flow estimates are based on flow data at Point C, which means the effluent estimates are not accurate. Northern Pulp has not met this requirement.

7. TOR 3.2 *If the 85,000 m3 cannot be justified based on historical data, identify water reduction projects, or re-evaluate the treatment system design and update the receiving water study accordingly.*
Since the historical data is based on point C, not point A as required, one could assume the numbers cannot be justified. The only water reduction project proposed in Appendix 3.2 is one which will run only in the summer months and is said to reduce water use in those months by 5,000 cubic metres daily. It appears that to meet the limit of 85,000 cubic meters, some water reduction during summer months is necessary, because summer usage has been consistently over 85,000 cubic metres. I find it interesting that Northern Pulp has chosen to use this equipment only to reduce water use for the months in which they would exceed their effluent capacity, rather than choosing to use it to reduce water use year round. It appears that Northern Pulp is not interested in reducing water use beyond the minimum reduction required.

8. TOR 3.5 *Provide the following information regarding the effluent pipeline:*

- *Provide viable options **including the selected option** for leak detection technologies and inspection methodologies, with specific consideration to any portion of the pipeline located in the Town of Pictou's water supply protection area.*
    a) Northern Pulp has provided a number of options, but they have not specified a selected option for leak detection and inspection for the on-land portion of the pipe. They state that the leak detection methodology would be one of three options presented.
    b) Section 3.5 is titled Effluent Pipeline Leak Detection. However, there is no leak detection technology or inspection methods presented for the marine portions of the effluent pipeline. Discussion in the 3.5 refers to "A leak detection system… to monitor for potential leaks **in the overland portion of the route between Pictou and Caribou."** Questions in the Concordance Table relating to the risk of leaks in the marine portion of the pipe receive the response, "Refer to section 3.5 for comments concerning pipeline leak detection and enhanced pipeline protection options." However, the marine portions of the pipeline are explicitly excluded from Section 3.5.

    On both these points, Northern Pulp has not fulfilled the requirements of TOR 3.5.

9. TOR 3.6 *Clarify where the potential releases of waste dangerous goods at the Project site will be directed for treatment and/or disposal. It is important to note that the new treatment facility is not proposed to treat waste dangerous goods based on the information provided in the EARD and requirements of NSE.*

    Section 3.6 answers this question in relation to specific sites where spills might be predictable. However, this does not appear to fully answer the question. From what I have learned from people who have worked at Northern Pulp, it appears that all or most of the drains in the main plant, parking area, and wood yard, lead to the effluent stream. During plant shut downs, drainage or cleaning of mill systems and pipe lines containing many hazardous chemicals go directly into the drains which becomes part of the effluent stream and ends up in Boat Harbour ETF. Oil or gas spills in the parking lot and drains in the wood lot are also directed into the effluent stream and end up in Boat Harbour.

    I assume these would fall into the category of waste dangerous goods referred to in TOR 3.6. It would appear that these sources of waste dangerous goods may not be covered by the "Spill Prevention" measures outlined in Northern Pulp's response to TOR 3.6, as they are not "spills" as such. It is unclear whether effective measures are in place to prevent these materials entering the effluent stream, and potentially compromising the AST system itself, or ending up in the Northumberland Strait. Note: it is concerning to read in the Concordance Table the comment of a NS government department that waste dangerous goods from Northern Pulp have been part of the effluent stream, and sent to the Boat Harbour Effluent Treatment Facility for years, in spite of the fact that it has been recognized that "Northern Pulp is not been in compliance with the Dangerous Goods Management Regulations as the BHETF is not Approved to accept and/or treat dangerous or waste dangerous goods."

10. *TOR 10. 1 Complete an Archaeological Resource Impact Assessment for the marine environment related to the Project.*

The Focus Report contains a summary of work done for the Archeological Resource Impact Assessment. However, Appendix 10.1, Archeological Resource Impact Assessment, does not include the report submitted to CCH is not included, so there the public has not been able to review the information provided to CCH by Northern Pulp to determine its accuracy. Appendix 10.1 contains only a letter from Nova Scotia Communities, Culture and Heritage to Dr. Fred Schwartz of Stantec saying We have received and reviewed your final report … CCH staff finds the report and associated recommendations acceptable as submitted."

11. *TOR 11.1 Complete a Mi'kmaq Ecological Knowledge Study (MEKS) for the Project*
Section 11.1 of the Focus Report states, "A MEKS was completed between May and July 2019 (p. 188) Appendix 11.1 Titled Mi'kmaq Ecological Knowledge Study contains only a letter from Membertou Geomatics Solutions stating that draft sof the report has been submitted to KMKNO for review." The Mi'kmaq Ecological Knowledge Study Report itself is not included in Appendix 11.1. This means the public has not been able to review the information contained in the MEKS.

12. Addendum 1.0 *Provide information regarding whether and when new technology and equipment will be installed at the NPNS pulp mill to improve the effluent quality, including but not limited to the following:*
    - *Will O2 delignification be installed at the NPNS pulp mill?*

NPNS states that O2 delignification will be installed, but gives no firm date. They also state, it "will be managed as a separate project to be undertaken after the ETF project is completed. This project is a significant capital expenditure for the mill and an implementation schedule has not been determined at this time."
Northern Pulp has not answered the "when" part of the question, except to clarify that **it will not be undertaken** as part of the proposed ETF, but after that project is completed. Without a firm when, the question of whether O2 delig will be installed remains an unanswered question. Northern Pulp has not complied with this TOR.

13. *Addendum 2.0 With respect to the effluent discharge parameters:*
    - *Provide data to support assertions that chemical oxygen demand (COD) can be reduced to the proposed limit.*

Northern Pulp provides a table showing COD levels are decreasing, and a list of changes that have contributed to those decreases over a number of years. Besides the table, the Addendum provides only this information: "NPNS has made significant continuous improvements in untreated effluent quality realized in part by in-mill improvements undertaken by Paper Excellence Canada since it purchased the mill in 2011" and lists some of those improvements, including the item, "Continuous Improvement Activities (ongoing)"

No details are provided about any specific plans that would lead to reductions in COD. There is no data to support the assertions. The report that is said to be attached is not attached.

These are the sections of the TOR I have studied. In these 13 areas, with the possible exception of unlocated information about full effluent characterization in Appendix 2.3 , and the possibility that the response provided about waste dangerous goods does cover all the issues mentioned, Northern Pulp has not fulfilled the requirements of the TOR in any of these sections.

Conclusion 3: Due to the many instances where NPNS has not provided the information required under the Terms of Reference, I ask the Minister to reject this project.

4. **The conclusion that the project will cause no significant residual harm to anything because any negative impacts will be mitigated is not meaningful or credible**
   Northern Pulp's ultimate conclusion that no significant residual harm will be done, because any negative impacts will be mitigated is not meaningful or credible. There is no assessment at to what the actual effects over 20 years or more of operation might be. No science is provided to determine the actual harms that might be done; any possible studies of the effects on fish, for example, are put off to a later date. Even then, there is only a commitment to the feasibility of doing a study on the effects of pulp effluent on lobster. There is no science presented to establish that the effects are mitigable, and there are no plans for how any specific effects might be mitigated. Without any substantive information, these claims cannot be given any weight, or can the conclusion that the project will not result in any significant, irreversible harm or adverse effects. On the other hand, there is both credible information and past experience, at Boat Harbour, and at other pulp and paper mills, as well as the results of EEM monitoring, which show that even when meeting PPER regulations, harm is being done by 70% of pulp and paper mills in Canada.

5. **Northern Pulp non-compliance with Industrial Approval and provincial regulations**
   The Focus Report revealed the interesting fact that Northern Pulp is non-compliant with at least one condition of its Industrial Approval and one provincial regulation. The two examples mentioned were that NPNS uses Boat Harbour ETF to dispose of Waste Dangerous Goods, contrary to the Dangerous Goods Management Regulations and that NPNS does not keep flow data for Point A as required by its IA.
   Conclusion 5: This casual approach to IA conditions and provincial regulations, as documented in the Focus Report, should be a warning to the Minister that it would be unwise to deal with all of the issues that have not been answered in this Focus Report by granting an approval with conditions.
   I request that the Minster decisively reject this option.

6. **Barriers to public participation in the EA process**

There have been significant barriers to public participation in the EA process, including at this latest stage. Northern Pulp ignored the strong recommendation of NSE to share information with the public as it was completed. The Focus Report documents were not only lengthy, they were poorly organized which increased the difficulty of finding information and the length of time needed to do so. Appendix 2.3, Characterization of Effluent, a 541-page document with no table of contents, is just one example. There were also numbers of missing documents, some of which have been noted above.

With 4000 pages of information dumped at one time, and an inadequate period of 37 days to digest it, this created addition barriers to public participation and compromised the Environmental Assessment process. .

Conclusion 6: Given the missing documents in the Focus Report, the Minister cannot approve this project.

7. Misrepresentation of basic facts

   I cannot conclude without mentioning how disturbing it has been to see what can only be described as deliberate misrepresentation of basic facts about where fishing takes place, and where fish are present. The EARD and Focus report are not the first times this has happened. At the first Open House more than a year ago, Northern Pulp's consultants claimed there was no fishing in the Pictou Harbour area where the first outfall was planned. intense fishing takes place. They were firmly corrected by fishers, who explained that this is exactly where intensive fishing takes place. Northern Pulp continued to deny that fishing took place in the area where they wanted to place that outfall. Now the proposed outfall is in a new place, and magically, according to Northern Pulp's diagrams, no fishing takes place there either, and fish, rock crab and lobster avoid the area in a 2 km radius of the diffuser.

   Conclusion 7: The misrepresentation of such basic facts should throw into question both the good faith intentions of NPNS, and the credibility of the entire EARD and Focus Report. This behavior speaks to an increased likelihood of significant environmental harms and adverse human health effects if this project is given approval.

CONCLUSION:

If Northern Pulp's proposed replacement ETF would truly do no harm to the waters and the valuable fisheries of the Northumberland Strait, and the people of the area, Northern Pulp would not need to misrepresent where the fisheries exist or where the proposed effluent pipe lies in relation to the marine refuge area. They would provide clear and complete answers to the TOR, and to questions from the public. They would welcome public engagement in the environmental assessment process. They would not need to hold back reports until the last minute, and make critical facts difficult to find in thousands of pages of documents, some without tables of contents.

Northern Pulp's Focus Report is our modern-day version of 1967, when the Chief and councillor from Pictou Landing First Nation were shown water coming from a water

> treatment plant that had not yet begun operating and told, this is an effluent treatment plant, this is what the water going into Boat Harbour will be like. The Focus Report uses many, many words to convince us of the same thing, that the proposed new ETF is benign, just as was done to representatives of Pictou Landing First Nation in 1967.

This community is not likely to be fooled again. I have read a number of submissions written by professionals in many fields, by fishers and community members. Together we have presented you with facts about the waters, the ice, the fisheries, the tides, the chemicals in effluent and much more, to establish that Northern Pulp's assertions are not credible, and that the proposed project will harm the eco-system of Caribou Harbour and beyond, and the fisheries and tourism industries that are vital to our communities and to the province.

The people of this area know the fisheries the tides and the waters of the Northumberland Strait. We not only know them, they sustain us, and we are determined to protect them. Northern Pulp has not proven that this project can be done without significant, long term harm to the environment, and adverse effects to human health. I believe that the information submitted will show clearly that if this project is allowed to proceed, very serious and widespread harm will be done.

Minister Wilson, I ask you to please reject this proposal.

And finally, while I recognize that this decision is not in your hands alone, I ask your government to continue to Honour the Boat Harbour Act. The actions of Northern Pulp in the years since the Boat Harbour Act was passed, and in this Focus Report, should not be rewarded with an extension. Northern Pulp is responsible for their own actions.

Sincerely,

River John, Nova Scotia

Attached:
Nova Scotia has a Mercury Problem, Halifax Examiner
What We know about Mercury, NG News

LEAVE A COMMENT

NOVA SCOTIA HAS A MERCURY PROBLEM

FACILITIES ASSOCIATED WITH NORTHERN PULP MILL'S PROPOSED EFFLUENT PIPE ARE IMMEDIATELY ADJACENT TO A MERCURY-

CONTAMINATED TOXIC WASTE SITE LEFT OVER FROM THE CANSO CHEMICALS OPERATION

APRIL 9, 2019 BY JOAN BAXTER

Cover photo: A Mad Tea-Party by Lewis Carroll with the Hatter, March Hare and Alice.

It turns out that using a lot of mercury, as human beings have done for centuries — in everything from haberdashery to gold production to medicine — wasn't such a great idea after all.

Although this realization came only in the last half of the 20th century, there were signs long before that that mercury was dangerous. The term "mad as a hatter" came from the crippling neurological syndrome that hat-makers suffered after breathing vapours from the mercury nitrate they used to cure felt in the 18th and 19th centuries.

The technical term for the syndrome is erithism mercurialis. But in the 1950s mercury poisoning became known as Minamata disease, named for the bay in Japan where mercury-contaminated wastewater poisoned thousands of people.

After that, the awful truth emerged that the heavy metal, once considered harmless and

extremely useful, actually poses a global threat to human health and the environment.

Mercury is on the Canadian government's list of toxic substances, regulated by the Chemicals Management Plan under the 1999 Canadian Environmental Protection Act.

The list of health effects of mercury poisoning is long and horrific, including degeneration of the nervous system, damage to the immune and digestive systems, lungs, kidneys, skins, and eyes. Even small amounts are a threat to the development of the child in early life and even in utero. Mercury's health effects are "crippling, untreatable and stigmatizing." It often causes death.

Nearly six decades after the Minamata tragedy, the global community finally decided it was time to try to "Make Mercury History" with the Minamata Convention on Mercury, a binding international treaty "to protect human health and the environment from the adverse effects of mercury" by limiting emissions and releases of mercury from human-made sources.

In 2017, Canada ratified the Minamata Convention, which now has 128 signatory countries.

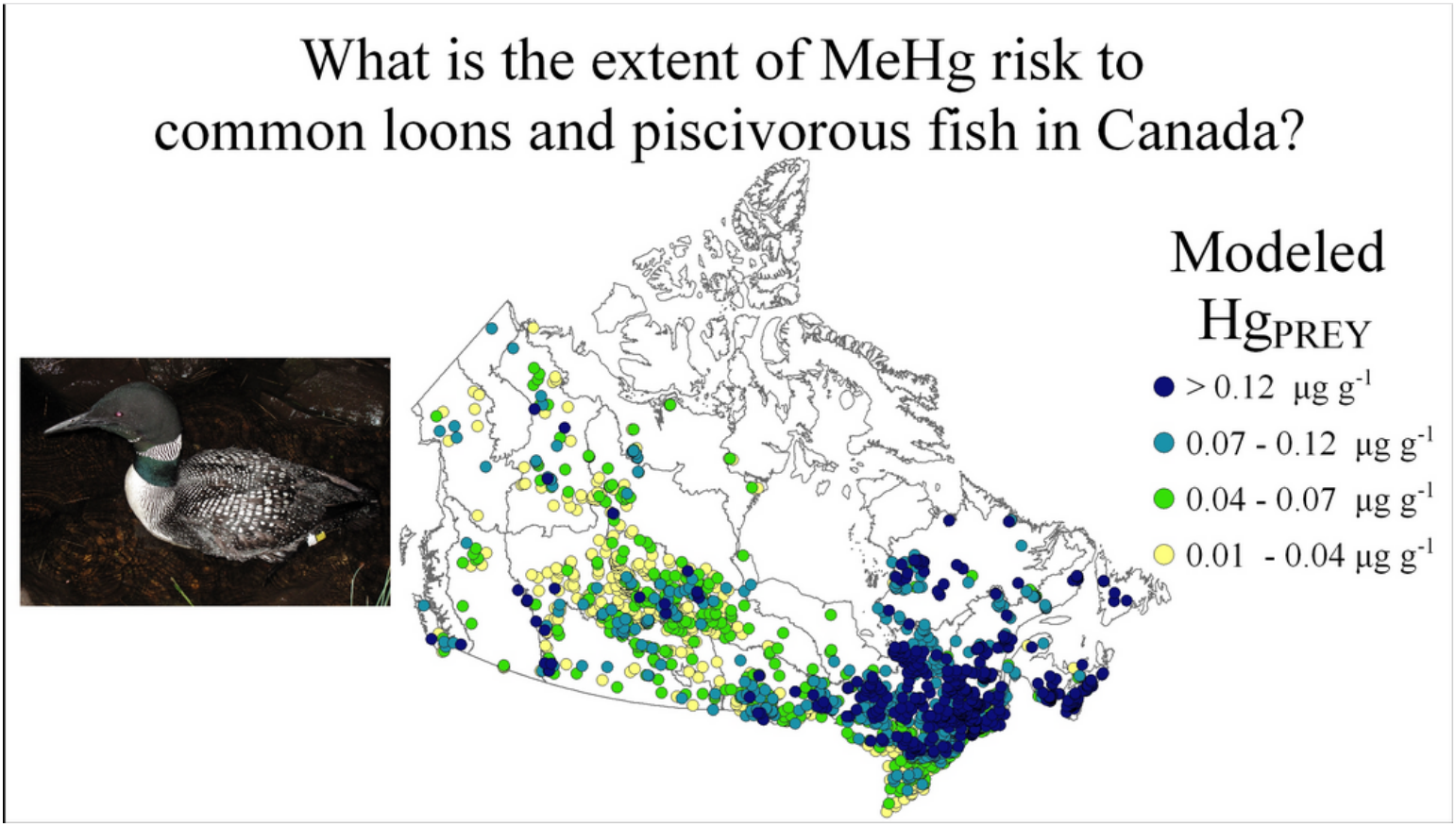
The convention requires signatories to "develop appropriate strategies for identifying and assessing sites contaminated by mercury or mercury compounds," and "adopt guidance on site identification and characterization, engaging the public, human health and environmental risk assessments, options for managing the risks posed by contaminated sites."

Nova Scotia has a particular interest in trying to do these things. The province has some of the highest levels of mercury contamination in Canada, some naturally occurring, others not.

Nova Scotia has a mercury problem

In 2013, scientists from Saint Mary's University – Professor Linda Campbell, David Depew, and Neil Burgess – analysed more than 230,000 records of fish from lakes and rivers across Canada, and developed the first-ever national map of mercury concentrations in the common loon and in fish species that eat other fish. [1]

They found that mercury concentrations increased from the west to the east, which Campbell said raised "an environmental red flag for the Atlantic provinces, our sport fish, and fish-eating birds like the common loon."



The Depew Burgess Campbell mercury map.

Lakes in Nova Scotia tend to be acidic because of the geology, and elemental mercury

is more likely to transform into the extremely toxic methyl mercury in acidic aquatic conditions.

Mercury is particularly dangerous. It doesn't just bioaccumulate, or build up in living tissue, as do other heavy metals such as arsenic, cadmium, chromium, and lead. Rather, mercury *biomagnifies,* which means it increases in concentration as it is consumed by organisms and moves its way up the food chain.

Mercury is found extensively in historic gold mine tailings in the 64 gold mining districts in the province.

Nova Scotia underwent three gold rushes between 1861 and the 1940s, and scientists from the Geological Survey of Canada report that about one ounce of mercury was used to recover each ounce of gold in a process known as "amalgamation." [2]

Given the total reported past gold production of 1.2 million ounces, the federal scientists estimate that between 3.7 and 9.1 tonnes of mercury may have been lost to the tailings or the atmosphere as "a direct result of gold milling in Nova Scotia." They say this is a minimum figure because "gold production at most mines was routinely under-reported to avoid paying royalties to the Province."

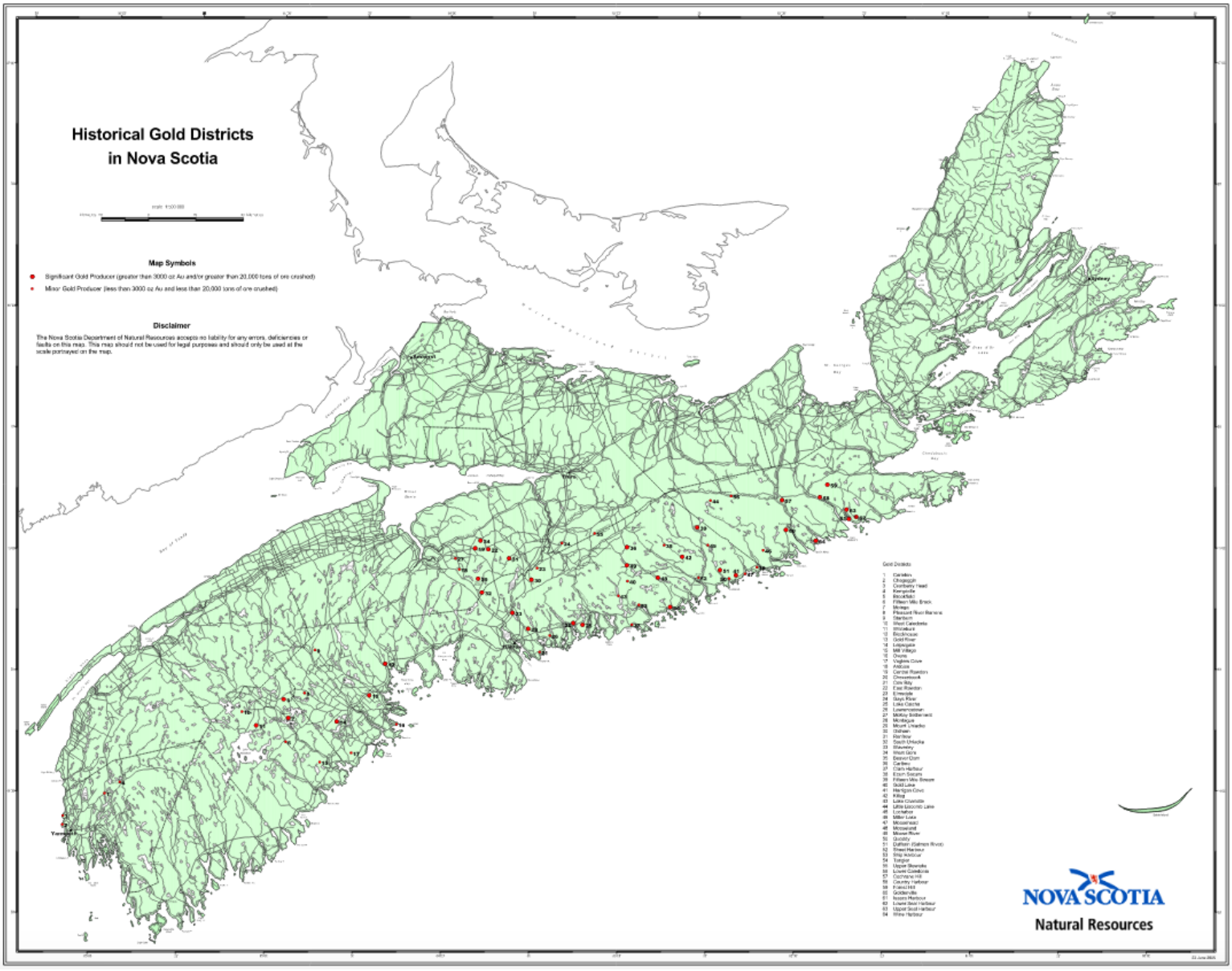


Display at a mining museum in Moose River. Photo: Joan Baxter



A 1937 mine office near Upper Musquodoboit. Photo: Joan Baxter

The mine wastes — tailings laced with mercury, arsenic, and other toxic substances — were generally allowed to run off into rivers, swamps, lakes, and oceans. However, until scientists began looking at legacy mining sites between 2003 and 2006, almost nothing was known about toxic contaminants in aquatic environments in these mining districts, and the risks they posed to ecological and human health.



A map of historic gold mines in Nova Scotia. Click to enlarge.



These are tailings



Tailings often look like a 'fine sand beach' but inland without the water

Photos of mine tailings. Source: Nova Scotia Department of Environment

The Geological Survey of Canada has looked at 14 former gold mines. Linda Campbell's research team from Saint Mary's University has been looking at a few others.

The Saint Mary's researchers have been studying bioaccumulation of mercury in invertebrate species in wetlands around tailings from legacy mines sites. They have found that these key species have the highest concentrations reported for invertebrates in the province, compared with those in wetlands not affected by legacy mining, and with results from other published studies done in Nova Scotia and in New Brunswick.

“This concerns us because aquatic invertebrates are fundamental to ecosystem health,” says Campbell. “[The invertebrates] form the base of a larger food web which leads to sport fish, migratory song birds, bald eagles and even little brown bats.”

“We don’t quite fully understand the ecological and environmental health implications in Nova Scotia,” she adds. “[We] need more resources to better assess the risks and threats from such elevated mercury entering our environments.”

Campbell notes that these elevated mercury concentrations in living aquatic invertebrates around historic gold mine tailings are some of the highest she’s ever seen, including in far-flung places she’s worked such as East Africa, China, and South America.

But human-made sources of mercury in Nova Scotia are not limited to old mining sites or atmospheric pollution. There is also plenty of mercury on the Canso Chemicals property in Pictou County.

Contamination at Canso Chemicals

As the Halifax Examiner reported on March 7, in “The Canso Chemicals mystery – With the chemical plant long gone, why is the company still alive? And what about all that mercury?,” there is mercury contamination on site of a former chlor-alkali plant on the Canso Chemicals property, right beside the Northern Pulp mill and the site where the mill is proposing to construct a new “activated sludge treatment” plant for its effluent.

The Canso Chemicals plant opened in 1970, and for the next 22 years used large amounts of mercury to produce chlorine and caustic soda for the pulping process. According to a Canadian Press report of June 20, 1977, provincial and federal

government officials had been unhappy with high levels of “unaccountable mercury losses” from the Canso Chemicals plant, causing the provincial environment department to order the company to sharply reduce the losses.

“The plant’s annual unaccounted mercury losses have averaged several tons [a year] since reporting to the federal environment department began in 1972. It reached a high of five tons in 1975,” says the CP report.

When the pulping process was changed because of new pulp and paper effluent regulations in Canada, the Pictou County pulp mill switched from chlorine to chloride dioxide for its bleaching process, and the chemical plant was no longer needed. It closed in 1992.

The subsequent decommissioning program lasted eight years. During that time, mercury-contaminated soil and bedrock were excavated to a depth of eight metres, and placed in a “secure landfill” on the property, along with contaminated materials from the cell room, brine basement structure, and the process building after they were demolished. The landfill was designed “to federal hazardous waste disposal guidelines with a double liner system, leak detection and leachate [liquid that may pass through the liner] collection and removal sumps.”

Contaminated “brine sludge” was placed in another landfill nearby.

Then the remediation team discovered there was more mercury deep underground. According to the 2000 “Canso Chemicals Site Decommissioning Final Report” prepared by Dillon Consulting, in 1999 the consultants found that “elemental mercury had migrated into the bedrock below the former cell room,” and formed a mass measuring “18 m wide and 10 m deep [no length was given],” and how much deeper it went was “uncertain.”

According to the report, the underground mercury mass was about five metres below the water table, so it had the potential to dissolve into the groundwater and “migrate towards Pictou Harbour.” Modelling done at the time suggested the migration could take up to two centuries, but there is no mention of testing of that modelling for the site.

The report also states that monitoring wells nearby found mercury levels exceeding Fresh Water Aquatic Life guidelines.

It notes that the mercury in the bedrock could not be excavated, as it was deeper than eight metres. To attempt to do so could have affected remaining buildings (the Canso Chemicals administrative maintenance building remains to this day), and risked “increasing the areal extent and depth of mercury impact due to mercury’s physical properties.”

In other words, they didn’t want to touch the mercury mass lest they cause it to spread outwards and downwards.

So it’s still there.

Is Nova Scotia managing the risks?

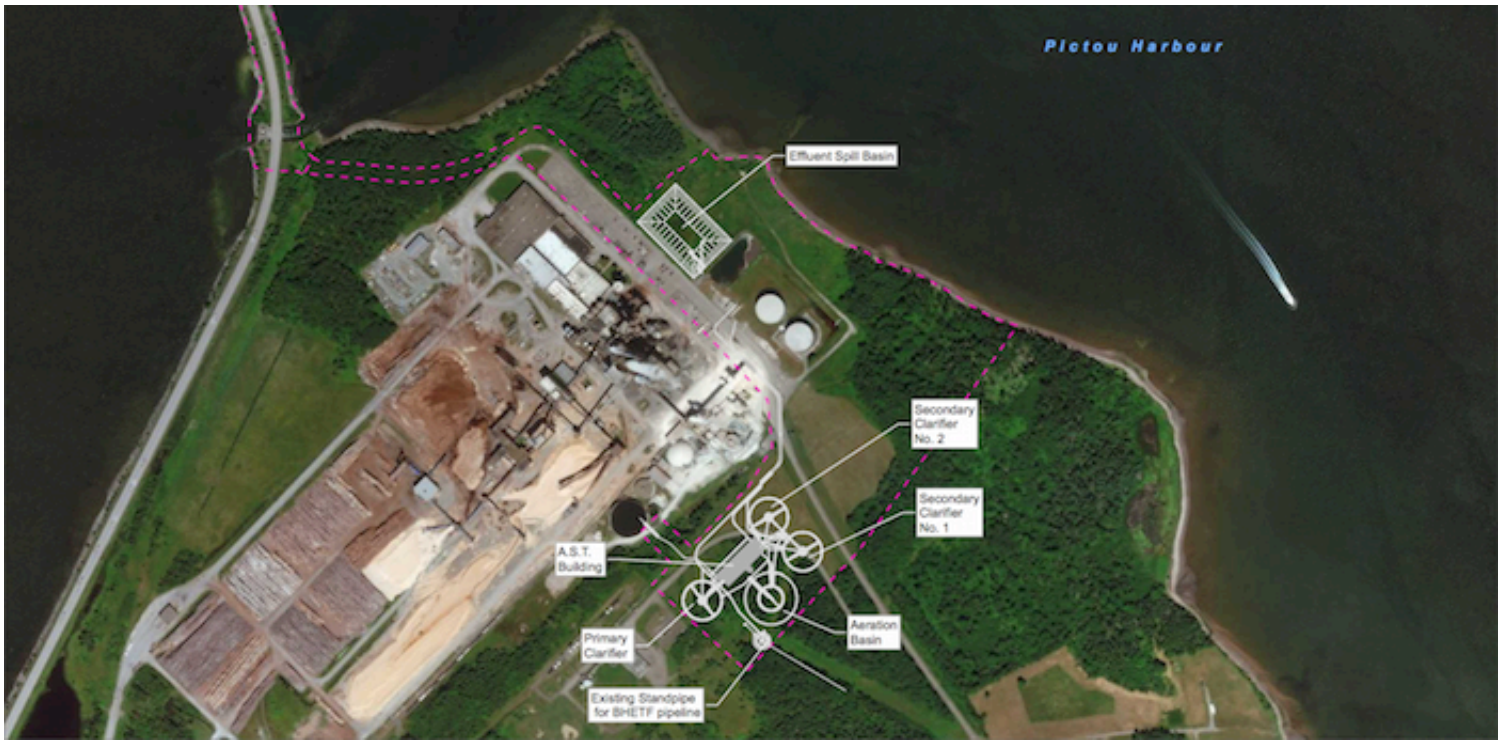
Even from deep underground, mercury poses a threat to those on the surface. The decommissioning report for Canso Chemicals states that mercury monitoring of the site should ensure that mercury vapours from the underground deposits do not migrate “into the air of the current building or any future building placed on-site.”

It stipulated that there should be regular mercury monitoring of the site.

Nova Scotia Environment (NSE) confirmed to me that the monitoring has been going on for 20 years, but before the March 7 Halifax Examiner article on Canso Chemicals was published, had not replied to other questions about the site.

NSE spokesperson, Adèle Poirier, has now provided some answers.

The annual mercury monitoring, she specifies, is done at the secure landfill site where the mercury-contaminated soil, bedrock, and materials from demolished buildings are stored, and at the site of the former buildings.





Upper photo is an aerial shot of the Northern Pulp Mill from the environmental assessment for the proposed effluent pipe, showing the proposed facilities related to the effluent pipe. The lower photo is a Google Earth view of the same location, but with annotations showing the proximity of the mercury contamination (as related in the Dillon Report) on the Canso Chemicals property and the proposed effluent treatment facility; annotations provided by Michael Jensen.

Nova Scotia Environment doesn't do the monitoring itself. Rather, Poirier says:

> The property owners, Canso Chemicals (whose parent company is Olin Corporation) is required to pay for a third party consultant to complete the monitoring and submit it to us.

Poirier adds that NSE requires Canso Chemicals to advise the department if their "monitoring shows that mercury levels exceed the levels established for the site," which are contained in the decommissioning report.

Poirier also provided a copy of the "Certificate of Compliance" issued by Nova Scotia Environment in 2005, as part of the management of contaminated sites in the province. It states that Canso Chemicals agreed to document the site conditions on its property deeds, and that the adjacent landowner (at that time Kimberly-Clark and now Northern Pulp) had been notified of the "site conditions."

The certificate also requires that the future "development and use of the entire Canso Chemicals Limited site is limited to commercial and/or industrial uses (i.e., no residential use or development of the property will be permitted."

Public left in the dark

Results of the monitoring done for provincial compliance are not available without a freedom of information request, so the public is not entitled to know whether the mercury contamination on the site has changed over the past 20 years.

The modelling used by Dillon back in 1999 predicted that the mercury "plume" from the underground mercury mass could take two centuries to reach Pictou Harbour, but there is no evidence that this model has been tested for the site.

Given the extreme risk of mercury in aquatic systems, one might expect the province to be already monitoring Pictou Harbour for mercury. Not so.

According to NSE spokesperson Adele Poirier:

> Monitoring is conducted in the projected path of the plume, however, there is no monitoring in Pictou Harbour because there is no evidence to warrant such monitoring.

Asked whether there is any monitoring for mercury being done on the Northern Pulp property that is adjacent to the contamination at the Canso Chemicals site and on the projected path of the mercury plume, the same spokesperson replied, “No.”

Nor was she able to shed any light on whether the province was concerned about the proximity of the mercury contamination to the site of Northern Pulp’s proposed effluent treatment facility, saying that it is “not appropriate” to comment while the environmental assessment process is underway for the project.

As the Halifax Examiner reported here, the mercury contamination was not even mentioned in the documents that Northern Pulp submitted to Nova Scotia Environment for the environmental assessment of its new treatment facility adjacent to the Canso Chemicals property.

According to Olin Corporation filings to the US Securities and Exchange Commission, as of December 31, 2018, Olin owns only 50% of Canso Chemicals, and Northern Pulp owns the other 50%. Paper Excellence / Northern Pulp has two people on the Canso Chemicals Board. This means that Northern Pulp should have full knowledge about the mercury monitoring that goes on next door to the mill on Abercrombie Point.

Graphics and maps in Northern Pulp’s environmental assessment (registration

document 1-7-1) indicate that the primary clarifier basin will have a water depth of 5.5 metres, and by my estimate, be located between 100 and 150 metres from the underground mercury deposit, and between 50 and 100 metres from the remaining Canso Chemicals building.

This raises some important questions: Has Northern Pulp examined the potential risks of constructing the basin in this area? Is any testing planned, should approval be granted to the project, to ensure there is no mercury contamination in the groundwater in the area where the new treatment facility is proposed?

I asked the Northern Pulp / Paper Excellence Communications Director and Northern Pulp's media contact about this but have not received a reply.

"Thank you for your donation"

Canada has its own egregious history of Minamata disease and environmental racism among the people of the Grassy Narrows and Wabaseemoong First Nations, who live downstream from a paper mill site on the Wabigoon River, near Dryden, Ontario. A 2015 study shows more than 90% of those First Nations populations have symptoms of mercury poisoning.

That issue is far from being resolved; Grassy Narrows First Nation recently protested at a Liberal Party fundraiser in Toronto, demanding that the Trudeau government fulfill promises to fund a specialized mercury treatment facility for their community. Prime Minister Justin Trudeau later had to apologize for a snide "thank you" he offered the First Nation protestor for her "donation" to the fundraiser.

Like the contamination on the Canso Chemicals property beside the Northern Pulp mill

in Nova Scotia, the mercury at the site of the former Reed Paper mill, currently owned by Domtar, was buried on the property decades ago. The mill also dumped its effluent into the Wabigoon River, which in turn contaminated fish with mercury, and led to mercury poisoning among First Nations residents who ate the fish. Because the government of Ontario indemnified the mill in 1979, industry cannot be held responsible for monitoring the mercury contamination.

In 2013, Canada participated in negotiations that led to the Minamata Convention on Mercury, according to Environment and Climate Change Canada (ECCC), and ratified the legally binding treaty in 2017.

Some of the things the convention addresses are “interim storage of mercury and its disposal once it becomes waste, sites contaminated by mercury as well as health issues.”

In its mandatory reporting to United Nations Environment (UNEP) on its compliance with the Minamata Convention, the Government of Canada states:

> Canada has information on individual stocks and sources of mercury or mercury compounds and will continue to have the ability to seek this information in future. Canada’s last mercury-cell chlor-alkali facilities closed between 1990 and 2008, and have all been safely decommissioned. All mercury resulting from the decommissioning of these facilities was sent for appropriate treatment as waste.

And:

> Canada has well-established federal, provincial and territorial programs to identify, assess, remediate and risk manage contaminated sites, including those contaminated by mercury or mercury compounds.

Nevertheless, the federal government's Federal Contaminated Sites Inventory appears to include only federal lands, and the Canso Chemicals property does not appear on the inventory for contaminated sites in Nova Scotia.

As for the convention's Article 17 on "information and exchange," the Canadian government reports to UNEP that:

> Canada provides its citizens with public information awareness and education related to mercury and mercury compounds in numerous ways, most of which are accessible on-line. This information has been and will continue to be disseminated through media interviews, assessments, reports, posters, fish consumption guidelines and / or advisories, public consultations, and journal publications.

Sounds good, doesn't it?

Too good to be true, in fact. I've not had any luck getting any information out of Environment and Climate Change Canada on the mercury contamination at the Canso Chemicals site.

On March 22, 2019, I asked ECCC whether the federal ministry was in any communication with or receiving results from the province about the mercury monitoring, if the contaminated site had been included in the Canadian Mercury Science Assessment, and if monitoring was being done in Pictou Harbour.

I also requested that ECCC link me with someone in the department who could speak to me about mercury and to Canada's "Focal Point for Canada to the Minamata Convention on Mercury." These requests were ignored.

It took ECCC two weeks to send me the following response to the questions about Canso Chemicals and mercury:

> Environment and Climate Change Canada is aware of possible mercury contamination at the site of the former Canso Chemicals plant in Nova Scotia. However, as the plant is not a federal facility or a federal contaminated site, the monitoring and assessment of the site falls under the jurisdiction of the province of Nova Scotia.
>
> Every province and territory has legislation, regulations, guidelines and/or a program in place to govern contaminated sites management. Through these measures, provinces and territories identify, assess, and remediate contaminated sites, including those contaminated with heavy metals such as mercury.

> In 2005, the Government of Canada established the Federal Contaminated Sites Action Plan (FCSAP) to address contaminated sites under the responsibility of the federal government. Under the FCSAP program, contaminated sites are identified and assessed, and remediation or risk management strategies are developed and implemented, where warranted.

Whether that Action Plan includes the Canso Chemicals property and if so, what that means, the ECCC spokesperson and the "multiple teams" that spent two weeks coming up this "complete and fulsome response" to my questions, neglected to answer.

So much for the Canadian government's pledge to UNEP that it "provides its citizens with public information awareness and education related to mercury."

Crucial and unanswered questions

With the limited information I had from government and the Dillon report, I approached Queen's University Professor Peter Hodson, a fish toxicologist who has assessed the extent of mercury contamination of fish in the St. Lawrence River at Cornwall.

Hodson replied that there are indeed important questions that still require answers, particularly at the planning stage of any developments, such as the proposed Northern Pulp effluent treatment facility next to the mercury contamination.

There is the need to understand how construction of any new facilities in the area would affect surface penetration of water and groundwater flow rates and directions. To prevent any changes in groundwater flow that might affect the movement of the underground mercury, new facilities [such as the proposed effluent treatment facility]

should be located well away from upstream or downstream of groundwater flow.

The following are some of the questions that Hodson raises:

1. There was no estimate made of how much residual Hg [mercury] was in soil or bed rock underneath the chlor-alkali cell. Without such an estimate, it is difficult to have any confidence in models predicting future movement of Hg from the site. If the Hg has penetrated deep into fissures in bedrock, and there are deep pathways for groundwater flow, what is the total movement of Hg off-site at all depths, and is any Hg migrating vertically (up or down)?
2. The groundwater surveys (flow, Hg concentration) were made within a few years of dismantling and excavating the site. How much has groundwater flow changed in response to these surface disturbances and to subsequent re-vegetation? Is the model still valid?
3. The monitoring of Hg in groundwater demonstrated that one sample well (W-4) was particularly contaminated. However, the [Dillon] report included a recommendation that this sampling well be closed (p 49)! This seems counter-intuitive if the intent of long-term monitoring is to track Hg concentrations over time.
4. Was a long-term monitoring program implemented and are the results available? Has the database of groundwater flow and Hg concentrations and overall assessment of risks been updated to reflect the two decades of Hg movement since the last studies? Is monitoring well W-4 still sampled?
5. Have surveys been done of soil and groundwater Hg concentrations around the sludge-disposal sites, and are there groundwater wells that are sampled regularly? Even though these sites are described as ‘secure,’ they can age and start to leak due to frost damage, disturbance by animals, and construction or maintenance activities.

I sent Hobson's questions to Nova Scotia Environment, and was told I would need to go through freedom of information for the information.

On its website, Environment and Climate Change Canada reports that as part of its obligations to the Minamata treaty, it would collate and disseminate "valuable information on the presence, fate, transport and effects of mercury in the environment."

After weeks of research, and many questions to federal and provincial environment departments, it looks to me as if neither level of government is keen to live up to its Minamata obligations and disseminate "valuable information on the presence" of mercury on the Canso Chemicals property beside the Northern Pulp mill.

Joan Baxter is author of The Mill: Fifty Years of Pulp and Protest.

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1. David Depew, Neil M Burgess & Linda M Campbell. Spatial patterns of methylmercury risks to common loons and piscivorous fish in Canada. Environmental Science & Technology. DOI: 10.1021/es403534q ↩
2. Parsons, M.B., LeBlanc, K.W.G., Hall, G.E.M., Sangster, A.L., Vaive, J.E., and Pelchat, P., 2012. Environmental geochemistry of tailings, sediments and surface waters collected from 14 historical gold mining districts in Nova Scotia; Geological Survey of Canada, Open File 7150. doi:10.4095/291923 ↩

FILED UNDER: ENVIRONMENT, FEATURED, INVESTIGATION, NEWS, PROVINCE HOUSE
TAGGED WITH: ABERCROMBIE POINT, ADELE POIRIER, CANSO CHEMICALS, DAVID DEPEW, DILLON CONSULTING, DOMTAR, ENVIRONMENT AND CLIMATE CHANGE CANADA (ECCC), ERITHISM MERCURIALIS, FEDERAL CONTAMINATED SITES ACTION PLAN (FCSAP), GOLD MINES, GRASSY NARROWS FIRST NATION, LIBERAL PARTY FUNDRAISER, LINDA M CAMPBELL, MERCURY, MINE TAILINGS, MINIMATA CONVENTION ON MERCURY, MINIMATA DISEASE, NEIL M BURGESS, NORTHERN PULP MILL, NOVA SCOTIA ENVIRONMENT (NSE), OLIN CORPORATION, PAPER EXCELLENCE, PETER HODSON, PICTOU HARBOUR, PRIME MINISTER JUSTIN TRUDEAU, REED PAPER, UNITED NATIONS ENVIRONMENT (UNEP), WABASEEMOONG FIRST NATION, WABIGOON RIVER

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What we know about mercury at Abercrombie Point

Brendan Ahern (brendan.ahern@ngnews.ca)
Published: Jun 05 at 12:29 p.m.
Updated: Jun 06 at 3:48 p.m.

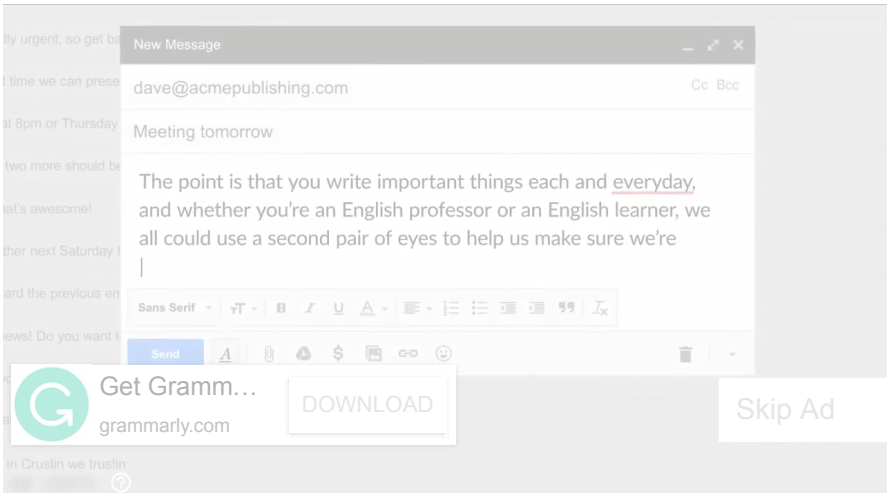


Mercury's density makes it fall through more porous soil until it hits rock bottom, eight metres below the surface and on a down gradient to the harbour 700 metres away - The News - Brendan Ahern

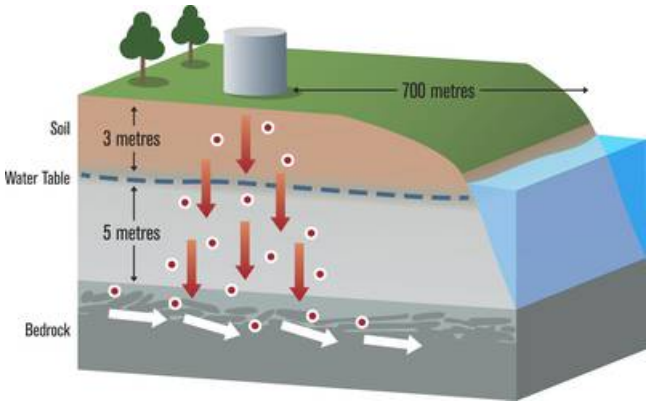
ABERCROMBIE, N.S. — Elemental mercury is slowly moving underneath the Canso Chemicals property at Abercrombie Point and toward Pictou Harbour.

The mercury is on the bedrock, approximately eight meters below the surface of the Canso Chemicals Chloro Alkalai plant where, between 1973 and 1975 mercury seeped into the soil following equipment failiures at the facility. During the remediation of the site, a lot of mercury was excavated and placed in a purpose-built landfill at Abercrombie Point.

ADVERTISEMENT



But unknown amounts of mercury fell to the bedrock where it remains today. Documents obtained by The News through a Freedom of Information request give insight into the levels of mercury that are still in the ground.



Mercury's density makes it fall through more porous soil until it hits rock bottom, eight metres below the surface and on a down gradient to the harbour 700 metres away - The News

Since 1999, Canso Chemicals has been required by the Province of Nova Scotia to sample the groundwater in the area around the contaminated bedrock which the American-owned Canso Chemicals company complies with by paying a third party, Dillon Consulting Ltd., to carry out the actual testing.

"We require them to advise us if their monitoring shows that mercury levels exceed the levels established for the site," said Lisa Jarrett with the Department of Environment in an email to The News.

Many of the wells that are used to take samples were decommissioned in 2013, but six are still monitored.

In total, these wells have been tested 31 times since the monitoring program began.

Samples at an area marked "Operations Area Deep Bedrock Wells" showed mercury concentrations that often exceeded 8 ug / litre of extracted water.

To offer some perspective, the Canadian Council of Ministers of the Environment guideline for mercury in freshwater is .026 ug/l.

The province was quick to point out that this isn't the standard that mercury levels at Abercrombie Point should be compared to, and cited instead the site-specific 60 ug/L threshold set by Dillon Consulting Ltd.

Tony Walker is a professor at Dalhousie University who researches freshwater marine systems and remediation of contaminated sites. He questions the threshold accepted by the province.

"I'm not sure why it is this high, as the guideline for freshwater is 0.026 ug/L," said Walker in an interview.

In a marine environment, like the one where the mercury is headed, the CCME threshold is even lower as .016 ug/L. According to a Dillon Consulting remediation report written in 2000, the mercury at Abercrombie Point will reach Pictou Harbour by the year 2200.

"If it is migrating into a marine environment where there's organic material and biological life in an active fishing industry, then that would merit an investigation."

CCME guidelines are not regulations, and different municipal, provincial and territorial jurisdictions can choose to comply with

them or not.

As for the ranges of mercury concentration in the samples, Walker says that they are more of a reflection of the sampling method than an accurate read on bedrock mercury levels.

"You can have as many wells as you like, but still they're only measuring from specific locations," said Walker. "If you wanted to look more holistically for where the mercury may or may not be then there are techniques used to do it."



From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:43:21 PM

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Project: replacement_effluent_treatment_facility_project Comments: I have been raised here in Pictou co.I saw Boat Harbour poisoned all the marine life die there all the owners of this Pulp mill have never been truthful they have a hold on the N.S. Gov. by way of the Indemnity agreement that holds them harmless for any damage that they do to our land , air waters No corporation should be allowed to play God with our fishing grounds without taking FULL RESPONSIBILITY for what damage they may do. This effluent facillity affects ALL the Fishing Industries in the Provinces along the Gulf Coast. the Province of N.S. have already given Northern Pulp $6 Million toward this effluent pipe . In the Indemnity Agreement it states that the N.S. Gov is held to insuring that they do every thing in their power to make sure that Northern Pulp gets all approvals permits for their operations .Now if Northern Pulp was not Indemnified they would never have decided to play god with our Northumberland Strait ,where they have nothing to fear over th eir actions all this tells me that a Provincial E.A. is in Conflict of Interest that the Federal E.A. is the would be the only honest fair discission . Northern Pulp have publicly mislead the people telling them that closed loop Kraft Bleach Pulp Mill do not exist when they really do exist in the Netherlands.Honestly this Pulp Mill was built with the life span of 25 years now is over twice that age there has been a wall collapse last year unmonitored effluent pipes have ruptured there is Mercury spill on the site that they want to build the effluent facility . I my self believe that the whole Pulp Mill should be run through a whole Federal E.A. as to what mercury contamination is soaked into this plant from previous use of this substance in their Pulp making. This Effulent no matter how much they dillute it it will kill the plankton smaller creatures that are the start of the marine food chain with out them the marine life could not exist. this pipe never past the Federal E.A. when Neena Paper proposed it in 1993 there fore I say that in my opinio n Northern Pulp should be DENIED the N.S. E.A. approval Name: Email: @gmail.com Address: Municipality: New Glasgow Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 57 y: 23

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 9:44:46 PM

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Hello,

I am writing in response to the Northern Pulp Focus Report. I was born in Pictou, Nova Scotia and moved away shortly after graduating high school. My family and I recently moved back to Pictou County. One of things we love most about the Maritimes is being near the ocean.

I strongly feel that the Boat Harbour Act must be upheld and that Northern Pulp must stop piping effluent into Boat Harbour. It is a disgrace to all Nova Scotians that we have allowed this to go on for so long.

Historically the mill has polluted the air and water in this region. The odour in the air is sometimes very strong. This causes headaches and can cause asthmatic symptoms for members of my family.

Keeping this in mind, I cannot support a pipe that will disperse effluent into the Northumberland Strait. Similar treatment facilities in other areas of Canada cause issues with consumption of seafood from the affected areas. Fishing is a major industry here. It is also part of the fabric of the culture of this province and what makes it great. To risk this livelihood by constructing a pipe that has only had a very basic environmental assessment to explore its potential impacts is irresponsible and too risky. There are several areas within the report that state there is no data available, best guess, etc.

Another major concern for me is the proximity of the effluent pipe to a large number of municipal and private wells in the area. If there is a leak this could impact the drinking water of residents.

I strongly reject this assessment and effluent pipe proposal. I hope to call Nova Scotia home for the rest of my life. I hope that this home will have clean air and water.

Thank you for your time.

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To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:46:29 PM

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Project: replacement_effluent_treatment_facility_project Comments: I am writing in support of Northern Pulpâ?Ts Replacement Effluent Treatment Project. This project is about more than just a new effluent treatment facility, with the existing treatment facility legislated to close this project is also about the future operation of the entire Northern Pulp mill. Northern Bleached Kraft Pulp may not be a glamorous product and a pulp mill is certainly no thing of beauty. However, it is a product which is in demand on the world market and can be produced here in Nova Scotia from renewable fiber grown here in Nova Scotia. If we are going to keep young people in our province and perhaps even attract a few new doctors to care for our aging population we need to support our industrial sector and continue to leverage our natural resources responsibly. The economic impact of the Northern Pulp Mill is extremely widespread. The devastating effect a closure would have on direct employees, sawmills and forestry contractors has been well publicized. From a personal perspective I work in the industrial service sector. Northern Pulpâ?Ts mill requires a wide variety of service contractors both in day to day operations and during their maintenance shutdowns. The loss of a major client would be a serious blow to these contractors. Another less publicized aspect is the small woodlot owner. There are many small private woodlot owners in the province who manage their woodlot as and investment or a savings account. Without a pulp mill these woodlots suddenly hold a lot less value. I have read Northern Pulpâ?Ts Focus Report on the new proposed effluent treatment facility. I do not claim to be a technical expert on the subject matter. What I take away from the report is that this new proposed facility is state of the art and treated effluent will exceed the standards of the treated effluent currently being discharged into the Northumberland Strait. As a taxpayer I think it would be irresponsible for the government to deny this application for what will be a net improvement in the environmental impact on the Northumberland Strait. Globally demand for this product and therefore this industry is not going away, somewhere in the world this effluent is going to be discharged. If we can use up to date technology and strict monitoring to minimize the environmental impact while keeping the economic benefits in our province I think that is the responsible thing to do. Name: @gmail.com Address:
Municipality: Kennetcook Postal-Code: Fax: ### ### - ####
email_message: Privacy-Statement: agree x: 61 y: 25

From: @outlook.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:47:34 PM

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Project: replacement_effluent_treatment_facility_project Comments: Greetings, I live in Glace Bay and wanted to send in a letter of support for Northern Pulp. I have great concerns about the possibility of the closure of Northern Pulp if the approval to proceed isnâ?Tt given to this company. Iâ?Tve seen the devasting affects of what happens when your area loses itsâ?T industry. Our population has decreased as families have had to move away and the sad reality that families are living apart just to survive. This doesnâ?Tt even take into consideration the over all affect of the lack of spending in our stores and restaurants. In 2011 Paper excellence purchased this pulp mill. The previous owner lacked investment, development and interest to make sustainable changes to keep the mill and the environment viably stable for the future. Since the purchase, Northern Pulp has invested over 130 million dollars into improvements to protect and improve their environmental foot print in the community. Northern Pulp is prepared to make the investment in a new state of the art effluent treatment facility that is similar to more than 80 other mills of this nature across the country. They have addressed every concern raised in the initial public consultation comments and every question raised to them by the Nova Scotia Environment department. They have answered with facts from experts including scientists and third party experts in the field. They have a plan to move forward and continue investing in improving their environmental footprint. As the Minister of Environment for the province of Nova Scotia I hope you make your decision based the scientific review of the focus report which highlights there is no adverse effects or significant environmental effects which may be caused by this under taking. The forestry sector, as well as many people in this province is counting on the approval of this plan in order to survive. Sincerely, Email: @outlook.com Address: Municipality: Glace Bay Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 68 y: 14

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:48:13 PM

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Project: replacement_effluent_treatment_facility_project Comments: This appears to be a environmentally sound project that will help a industry survive. Project improvements include a better pipe to transport the effluent, improved monitoring systems and the fact that no untreated effluent will leave the mill site. Name: Email: @gmail.com Address: Municipality: Scotsburn Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 45 y: 38

From:
To: Environment Assessment Web Account
Subject: Focus Report Comment
Date: November 8, 2019 9:49:35 PM
Attachments: Focus Report Comment.docx

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From
Nova Scotia Landowners and Forest Fibre Producers Association

We're not qualified to comment on this particular discipline, but we know how to do things. We're fastest-growing FSC group in Canada, ranked third- and fourth in size and growth in North America, on FSC international new standards board in Bonn, winner 2014 Rainforest Alliance Sustainable Standard Setter Award

Northern Pulp says its replacement wastewater facility will meet the world's highest standards of public safety, and the Province says its approval will be determined solely on its scientific merits, not partisan politics.

Our Association, a world leader in innovative sustainable forestry and "the social dynamics to make things happen," accepts both claims at face value, believing in the integrity of our public service and the company.

Our Association has been a strategic partner to keep the mill open because the Boat Harbour Act was a promise to Pictou Landing First Nation that couldn't be kept. It has seriously foreshadowed forestry activity for five years.

Our Association introduced the welfare and future of PLFN as the first priority of the industry strategy. Whatever the outcome, there could be no further abuse of the indigenous community. It proposed a win-win option.

PLFN favours an innovative replacement facility called wetlands engineering, an enclosed system, in a letter to the Environment Minister last March, including the band's commissioned engineering reports. But would NP buy in?

An Association investigation indicated costs were almost the same, and Northern Pulp was enthused by the concept to the point of suggesting a pilot project to determine its efficacy. We spread the word to government and industry.

All the while, Northern Pulp and the Province have been playing out a charade of managing a calamitous government/industry relationship. Environment approval will pipe effluent where half of PLFN's workforce is engaged in the lobster fishery.

None of this is in the public interest. Nowhere in this are we seeing clearly, thinking rationally and acting disinterestedly. Our Association believes there are remnants of the great values that built Nova Scotia but they must be put to work.

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:49:45 PM

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Project: replacement_effluent_treatment_facility_project Comments: Hon. Gordon Wilson Minister of Environment I am writing in support of Northern Pulps Replacement Effluent Treatment Facility Project. The pulp and paper industry is provincially and federally regulated. With advances in science and technology, regulations have evolved over the years to protect the environment. In keeping, Northern Pulp has invested in new technology and improved its processes to meet or exceed environmental standards. Now, with the proposed state-of-the-art wastewater treatment facility, the mills environmental footprint will be significantly improved yet again. The Northumberland Strait has received treated wastewater from the mill for decades and throughout that time, the fishing and forestry industries have co-existed successfully. Third party environmental experts have assessed that no significant impacts are expected on any fisheries or fish habitat as a result of the project. Both can continue to thrive. I have witnessed the devastating impact of mill closures in several Atlantic communities and do not wish to see another. I ask that you approve the EA for Northern Pulps Replacement Effluent Treatment Facility Project. Sincerely, Name: Email: @eastlink.ca Address: Municipality: Pictou Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 24

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:50:43 PM

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Project: replacement_effluent_treatment_facility_project Comments: Hon. Gordon Wilson - This project will reduce the peak summer effluent flow at the mill by approximately 5,000 m3/day below current levels, making the design flow even more conservative. - Northern Pulpâ?Ts energy usage is made up of over 92 renewable energy. - No history of ice scour was found at the planned location of the diffuser port located outside of Caribou Harbor in 20m water. - Nova Scotia Needs Forestry. Northern Pulp grows more than 6,000,000 seedlings every year. I support Northern Pulp fully support this project!! Best Regards, Name: Email: @hotmail.com Address: NS Municipality: St. Andrews Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 54 y: 22

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:51:04 PM

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Project: replacement_effluent_treatment_facility_project Comments: We need northern pulp. There are many people that rely on this place to survive and make a living. Closing the mill will ultimately destroy the economy in Pictou county and many people will leave to look for other employment. If northern pulp has a plan, let them implement it so that boat harbour is cleaned up and also people do not lose their jobs. Name: Email: @hotmail.com Address: Municipality: Westville Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 46 y: 13

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:56:05 PM

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Project: replacement_effluent_treatment_facility_project Comments: number 6 comment. Nova Scotia can not close the pulp mill. The hit to the economy will never be recovered!! Name: @gmail.com Address: Municipality: murray siding Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 75 y: 24

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 9:58:10 PM

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November 8, 2019

Dear Premier Stephen MacNeil and Minister for the Environment Gordon Wilson,

To whom it may concern,

My name is I am concerned about Norther Pulps Effluent Treatment Facility proposal.

I grew up in Scotsburn, Nova Scotia, across the water from the now Northern Pulp.

Most importantly I am a mother of I am a sister, a daughter, and a proud community member.

I have been advised to keep to the science, to the facts. Facts are I am a fisherman. I am not going to debate if my job is more important or brings more value to the province then a Mill employee, or a Log Truck driver, or a Landowner. Fact is, I love my children, this province, and the potential this province holds. Fact, Nova Scotia needs Forestry. Fact, Nova Scotia needs an environmentally responsible partner for Forestry. Fact, science is only a good as the behaviours of those in control of the process. Science assumes a constant, no errors, no break downs, it assumes processes and people will take the proper actions. Fact, errors and choices make turmoil out of science.

I am trained for people, behaviors and leading change. My knowledge is with people, and their behaviours.

I do have science I can put forth for you to review and take into consideration when making future choices for all Nova Scotians.

“The best predictor of future behavior is past behavior” – a quick google search will show the many journals, studies and details of this. There are too many to list. In another tab of Google, a search of Paper Excellence/Asia Pulp and Paper, will show the numerous errors and disregard in respect to the environment and meeting the expectations of the governing bodies (Dept of Environment and other Provincial Bodies). The lack of transparency and involvement with the community members is enough to pause and question “why” and what is this behaviour?

Cost Benefit analysis – this is not science, this is business. Anyone who holds responsibility of a budget, as small as a student loan, a household, a small business, and a large corporate empire would be familiar with this. Is the cost of doing business more then what the business provides? I understand the NS Government is in a very hard situation, that with what ever comes of the “pipe”, there will a cost to NS taxpayers and the province. There’s no winning. Looking at the situation from the perspective of Paper Excellence, it is a business. There is a cost, and they are determining if they are making enough money to pay for the cost and make revenue? A business makes decisions every day of what to action, what to spend money on, what will make the revenue strong. Each decision is made on a cost/benefit. How much revenue can me make until the issue is at a breaking point? How much will it cost? What is the down time? When should the issue be addressed? What are the

consequences? Are those consequences enough to make the action sooner? Are the consequences enough to any action? For Paper Excellence (Asia Pulp and Paper), the consequences are simply dollars in and dollars out. It is a cost of doing business. A business under a contract.

Who in Nova Scotia faces the environmental consequences? This is not the Mill across the water that gets to make the decisions. It's the Sr Leadership, who do not live here, who do not breath our air, drink our water or attend funerals of those who have fought the battle and lost way to soon. Where you work, and gain your employment, does not preclude yourself from these consequences. Fishermen, forestry, mill workers, tourism, trucking, political offices etc. we all are in the same boat for experiencing these consequences.

There are 2 parties who are not exposed to these long term, irreversible consequences. The owners of Northern Pulp (Asia Pulp and Paper) and their customers. If they do not get to operate, they way they see fit, they can take their bat and ball and go elsewhere. Leaving all long-term consequences behind in the dust.

My last and final point, with no science, but humanity. Change is hard, it is different. For decades, the Mill across the water has led the county, and even province in decisions and actions, comparative to a bully. Definition of insanity is doing the same thing over an over. This is the opportunity to make the change, move Nova Scotia forward, be a leader. Ask yourself what's it if for me? What's in it for your grandchildren? The right decisions are hard, that's why they are hard. It is not going to be easy, but let's make the change, lets evolve, lets challenge ourselves in a progressive business that is responsible to all Nova Scotians.

I ask that the "pipe" proposal is declined and challenge industry to step up to the plate to evolve and continually grow the environmentally responsible business, with our renewable resource, Forestry.

However, if the decision for approval of the "pipe" does occur, there are also impactful consequences to actions, and strong enough to make an impact on operational decisions from Asia Pulp and Paper instilled.

I look to our provincial leadership to guide our province in long term environmental sustainability, for us and future generations. I trust that you and your team will see the much-needed change for all Nova Scotians.

Regards,

Mother, Pictou Co Resident & Fisherman

From: @hotmail.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 9:59:38 PM

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Project: replacement_effluent_treatment_facility_project Comments: Because I care Name: @hotmail.ca Address: Mount Uniacke Municipality: mount uniacke Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 74 y: 21

From:
To: Environment Assessment Web Account
Subject: Fwd: Subject: Northern Pulp Proposed New Effluent Pipe.
Date: November 8, 2019 9:59:50 PM

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Subject: Subject: Northern Pulp Proposed New Effluent Pipe.

Please do not risk the fishing, tourism industries of NS, NB and PEI without further study. A Federal EA is needed. There is just too much fresh water waste and not enough known about the effluent exact numbers to move ahead. Respect PLFN. Respect the communities. Understand the risks. Care for sea life, wildlife and human life first. Say NO to the pipe. Protect land, air and sea... We are relying on this Government to do the right thing. Thank you.

From:
To: Environment Assessment Web Account
Subject: Re: Northern Pulp Focus Report
Date: November 8, 2019 10:00:20 PM

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Pictou, NS

November 8, 2019

Nova Scotia Environment
Environmental Assessment Branch
P.O. Box 442
Halifax, NS
B3J 2P8

Re: Focus Report for Replacement Effluent Treatment Facility (ETF) Project for Northern Pulp

I am writing in response to the request for public input about Northern Pulp's Focus Report for the Replacement Effluent Treatment Facility Project. Based upon the information contained in the Focus Report, I remain strongly opposed to Nova Scotia Environment granting approval for this project. The Focus Report submission provided by Northern Pulp does not adequately address the potential environmental risks associated with the project and no substantive mitigation strategies are identified to limit the risks. In my opinion, it would be reckless for Nova Scotia Environment to approve this project at this time.
I continue to have numerous concerns associated with the unknowns around this project and the Focus Report does little to alleviate those concerns. Among the many concerns that remain include the potential disruption of mercury during ETF construction that is ignored in the Focus Report. However, I will constrain my detailed response to focus on just four specific areas of concern – oxygen delignification, the impact assessment on marine fish, the pipe, and air monitoring.

Oxygen Delignification
There is confusing/misleading information presented about the inclusion of oxygen delignification technology. Oxygen delignification is identified as a new technology at the mill in Addendum 1.0 but is stated to be not part of this project. However, the 'future Oxygen Delignification system was considered in the design of the ETF and will be managed as a separate project to be undertaken after the ETF project is completed' (Addendum 1.0, p.2). Does this mean that the effluent modelling was conducted on the assumption that an Oxygen Delignification system would be in place, even though it is clearly intended to come after the ETF is operational (if at all)? If this is the case, the effluent modelling is inaccurate as the O2 delignification system will not be a reality when the proposed ETF begins.

Impact assessment on marine fish

• There are numerous concerns about the information presented in the impact assessment on marine fish that those with experience in the fishing industry ought to be consulted about. A very cursory review of the information presented suggests several issues though:

o Toxicity testing has not been conducted. The response to the Focus Report identifies that it *will be* done, but a timeline is not provided. This seems quite a backward approach. The onus should be on Northern Pulp to establish there will be no harm to marine fish and the robust commercial fishery in the area ***before*** environmental approval is granted. It appears the expectation by Northern Pulp is that environmental approval will be granted and then testing will be done. Under this approach, if the project proves harmful to the fishery, it will be too late.

o There are discrepancies reported about where the effluent will reach background conditions. At one point, the Focus Report states that CCME guidelines will be reached within 100 m of the diffuser, yet background conditions are claimed to be able to be met within 20 m elsewhere in the document, and the astonishing claim that effluent concentration will be within 1% within 2m of the discharge point on p. 200.

o Not only are there concerns about the clarity of where the effluent will reach background conditions, these claims appear highly questionable given data from previous Environment Canada Environmental Effects Monitoring (EEM) results that identified pulp mill effluent hundreds of kilometers from its source.

o Reaching background conditions does not mean that the effluent will not have an effect on a vibrant commercial fishery and the Focus Report makes no real effort to address these effects. Meeting Pulp and Paper Effluent Regulations (PPER) has repeatedly demonstrated through six cycles of EEM that over sixty percent of fish experience sublethal toxic effects from pulp mill effluent. The potential health and economic impacts these effects may have on the fishing industry within the Northumberland Strait must not be ignored in the decision to approve this project.

o Despite suggestions identified in Cycle 6 EEM about how to minimize the harmful effects from pulp mill effluent including incorporating oxygen delignification (https://www.ec.gc.ca/esee-eem/default.asp?lang=En&n=F8764910-1&wbdisable=false#_Toc374692276), it is unclear which of these strategies Northern Pulp aims to include. A proponent genuinely interested in minimizing the impact on the environment and its neighbours would take the advice generated from decades of research to minimize its impact.

o No information about Northern Pulp's past EEM studies have been included. It would have been helpful to compare the known sublethal toxicity from Northern Pulp with the type of treatment utilized today with projected sublethal toxicity from other mills using the newly proposed type of treatment. Instead Northern Pulp chose to withhold information and suggest that sublethal toxicity tests would occur in the future. This is an unacceptable risk for our fishers along the Northumberland Strait.

o As mentioned above, it appears that effluent modelling and the promise of reaching background conditions may have been conducted on the assumption an Oxygen Delignification system will be in place despite the Focus Group clearly identifying that system is not part of this project and no implementation schedule for the O2 delignification project has been defined. This raises concerns about the accuracy of all of the effluent modelling information and its predicted effects presented in the document.

Air monitoring

The focus report acknowledges that several air likely contaminant exceedances (using Ontario

regulations) have been identified from modelling studies. As a result, the focus report identifies several contaminants that *should* be monitored, but this is insufficient. The information provided about air monitoring is problematic because:

• There are questions about the sufficiency of data used to develop the model.

o The model used data from only one comparable mill and there is no accounting for the known variability of sludge characteristics across mills.

o The model employed data from biomass incineration at Northern Pulp, but that sludge was derived from a completely different style of effluent treatment and, therefore, is inappropriate to generalize that current sludge characteristics will remain.

• Despite identifying expected contaminant exceedances, there is no substantial additional abatement strategy identified to prevent the exceedances such as additional filtration within the power boiler stack. The filtration on the power boiler stack has repeatedly failed to keep Northern Pulp's emissions in compliance with Nova Scotia Environment regulations. Combustion of sludge will produce additional contaminants of concern and the report identifies expected exceedances, and yet no solution is offered to control the exceedances with the exception of maintaining equipment and limiting idling. This is unthinkable. How could environmental approval possibly be granted when the proponent acknowledges they predict to exceed contaminant parameters and do nothing proactive about it?

• There is no additional source testing proposed, nor is continuous monitoring of the power boiler stack included as part of the proposal. Given the number of unknowns associated with the sludge, more active and continuous monitoring ought to be part of the plan in order to better understand the contaminants and allow both Northern Pulp and NSE to respond to problems quickly.

• The only reporting to NSE that is suggested is monthly and annual reporting. This timeframe is far too long for timely intervention should problems be reported. By the time NSE receives the data, the public will have been exposed to potential air problems for some time. Given the true characterization of the sludge to be incinerated in unknown and that modelling suggests exceedances of several contaminants, a reporting plan that prevents an immediate response is irresponsible.

• There is no plan suggesting what would be changed should problems be identified. In particular, it was troubling to read that the only action plan appears to be to correct the data, "A final data screening of all measurement data will be performed at the end of the monitoring program to examine overall trends and to identify and correct any suspect data." (Appendix 6.2, p. 24). The focus report makes no mention about what could and would be done to limit emissions.

• Ambient air receptors were sited at nearby residential properties, but only one site within the Town of Pictou was used. The Town of Pictou is one of the more populous areas in the vicinity of the mill and ought to have had more than one receptor, especially in light of the findings that VOCs often exceed criteria when wind direction carried mill emissions toward ambient air monitors (Hoffman et al 2017, https://www.ncbi.nlm.nih.gov/pubmed/28712086).

The pipe

• In my initial response to the Environmental Assessment application I indicated my concern with Northern Pulp's ability to properly monitor the pipe. In my March 8, 2019 submission I wrote, "Northern Pulp has exhibited a poor track record with their current pipe, experiencing a number of breaks and leaks in recent years. Northern Pulp's inability to effectively maintain the integrity of their equipment over time would suggest that the ability of the company to prevent environment damage from effluent pipe breaks in the future is **uncertain** at best, not in keeping with the precautionary principle, and, therefore, too risky a prospect." This concern was not alleviated by the information provided in the Focus Report.

• The information presented about how pipeline leaks will be prevented is too vague to trust and there are no assurances that the company will choose the best available technology.
o Though the Focus Report identifies common types of leak detection systems, it does not provide information about which is the best option and does not specify which type will be used. Instead, it indicates the decision will come later during the detailed design phase (p.62), but the basis of the decision is not identified. (e.g. Will the decision be based upon the best available technology? The best choice for detecting minor leaks? Or the cheapest option?) Once again, this is an example of a backwards approach that assumes a decision can be made in the absence of evidence.
o The only certainty offered in the information presented about leak detection is that there are some technologies that can detect some leaks. However, Northern Pulp does not commit to use any of those technologies. No plan is presented about what will happen in the event a leak is detected. No projections of potential harm are identified. No response times are predicted. No interventions are identified. No commitments are made.
o Additionally concerning is that no automated leak detection system will be installed outside of the land-based portion of the pipe (p. 62). One has to wonder how underwater leaks will be monitored.
• It is further troubling that the Focus Report identifies an ideal scenario of pipe depth, but also admits that the ideal will not be achieved due to cost constraints, "Ideally, the tunnel would breakout as deep as is possible – as close to the required intake and discharge depths as possible – but within cost constraints." (Appendix 2.5, p.47)

In conclusion, I remain strongly opposed to Nova Scotia Environment granting approval for this project. The Focus Report submission provided by Northern Pulp does not adequately address the potential environmental risks associated with the project and no substantive mitigation strategies are identified to limit the risks. In the absence of important information about the true environmental effects of the proposed effluent treatment facility, this project should not be approved.

Sincerely,

Sent from my iPhone

From:
To: Environment Assessment Web Account
Cc: info@friendsofthenorthumberlandstrait.ca
Subject: Northern Pulp 2019 Focus Report Submission
Date: November 8, 2019 10:02:17 PM

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The Hon. Gordon Wilson, Nova Scotia Minister of Environment,

Dear Mr. Minister,
I am a resident of Louisdale, Cape Breton, Nova Scotia, Canada.
I live near the Gulf of St.Lawrence and the Northumberland Strait.
I am writing in response to the Northern Pulp Focus Report.

I am aware that the gulf of St. Lawrence is the world's largest estuary yet one of the most deoxygenating bodies of water on earth. It has several dead anoxic zones where nothing lives anymore. Many endangered marine animal, plant and fish species are suffering and many are on the decline. The health of this body of water and ecosystem are threatened. We have a responsibility to protect and sustain it.
I wish to focus my attention on point #7 of Northern Pulps' focus report in the table of contents, "Fish and Fish Habitat".
In 2007, after years of data collection, the 252 page Northumberland Strait Ecosystem Overview report was delivered by science consulting firm AMED Earth and Environment. The report and ongoing study have highlighted 3 main causes of the deterioration of the Gulf of St. Lawrence/ Northumberland Strait ecosystem. They are nutrient loading, sedimentation and contamination. Northern Pulp is a contributor of contaminants and nutrients, but primarily nutrients which over feed algae and other plants in estuaries causing a bloom that then decays and is consumed by micro-organisms that suck up all the oxygen in the water causing it to become anoxic. These oxygen deprived estuaries are the nurseries for many fish. The area near the proposed 20m. deep diffused outfall of Northern Pulp effluent is a sensitive ecosystem, adjacent to eel grass beds that serve as a nursery for juvenile fish species. It is near lobster spawning ground. The 37 C. effluent will warm already warm waters, warmed by climate change. The color of the water will not let in sunlight and will interfere with spawning and development of juveniles. Nearby, there are main herring spawning grounds. Tides will take this spawn in the effluent. The pipe taking the effluent passes through Cariboo Harbour, the busiest fishing harbour in the Northumberland Strait. More than 70 local boats fish lobster, herring, rock crab and this industry depends on the integrity of the waters and fish habitats. People all over the world depend upon these healthy fish species as a food source, as Nova Scotia fisheries export much of their product. Northern Pulp will now release, as a conservative estimate, 70 million liters of bleached Kraft pulp mill effluent into this area DAILY. Included in this would be 945 kg. of solids every day reaching the saltwater. How can Eco-Metrix, the consulting firm that wrote the focus report for Northern Pulp on Sept.30 2019, conclude that there are no significant residual effects associated with this project on ANY of this fragile ecosystem? Northern Pulp claims that a diffused outfall outside of Cariboo Harbour in the Strait is to have much less

potential effluent impact on the receiving environment (than the existing one) and represents an improvement. How does Northern Pulp know that this is true? The whole of the Gulf of St. Lawrence, Northumberland Strait, Cariboo Harbour is interconnected. Northern Pulp does not have a good history of data collection and transparency in their EEMs which look at fish populations, life forms at the bottom of any water body affected by the effluent and the toxicity of the effluent. A recent report by Dalhousie University researchers, published in late June 2019, has found Northern Pulps' EEM reports and studies (more than 200 govt. reports and 8 peer reviewed articles) provide INADEQUATE DATA. They claim "Selection of species, contaminants of concern and sampling locations were ad hoc and often inconsistent with EEM requirements under Canadian federal PPER."
The new $70 million Oxygen Delignification System is said to improve the quality of the effluent (toxic carcinogenic dioxins and furans, heavy metals, mercury, zinc, chromium) however, because of Northern Pulp's present day bleaching process introduced in the mid 1990s, which uses a process known as ECF, it DOES NOT eliminate these organochlorines, it just reduces them. Despite the new bleaching process, dioxins and furans bioaccumulate in biota (animal and plant life), are highly toxic and persist in the environment.
The solution to this would be to not pump out Northern Pulps mix of toxic effluent waste into any body of water and instead switch to a "Closed Loop" system BCTMP mill with a zero effluent treatment facility using hydrogen peroxide instead of chlorine dioxide in their bleaching process.
Northern Pulp claims the proposed AST (Activated Sludge Treatment) is the best of the 2 possible Kraft mill effluent treatment options. The other one being the system in use now, the Aerate Stabilisation Basin. Why didn't they even mention the above "closed loop" process effluent treatment system? This would be the system that would cause the least adverse, negative effects or least significant environmental effects on the ecosystems involved and the only logical way that the effects of Northern Pulp mill effluent can be mitigated, eliminated, reduced or controlled. It is only this system that will provide healthy fish and fish habitats that will be protected and sustainable.
And also, because Northern Pulp failed to supply proper data and failed to meet PPER- EEM program monitoring requirements regularly since 1992 (for example, the 1st measurement for furan and dioxin in fish wasn't done until 1996 and in that EEM the authors pointed out that 2 forms of the dioxin and furan were never even analysed), I believe that the federal government should have been monitoring it's program (PPER-EEMs) closely for coherence and compliance with it's own laws. And for that reason, I believe there should be a full federal assessment under the auspices of the Canadian Environmental Assessment Act.
I strongly challenge and oppose the proposed Northern Pulp Effluent Treatment Facility as it is presented in the Focus Report.

It is with respect that I submit my comments.

Louisdale, N.S.

Provenance : Courrier pour Windows 10

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 10:02:34 PM

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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

I am writing in today in response to Northern Pulps Focus Report proposing a effluent pipe discharging into Caribou Harbour.

I have lived the majority of my life in Pictou County. I now share this life with

We have built our home right on the Northumberland Straight and enjoy the surrounding environment in all seasons. We are avid beach goers and look forward to swimming in the pristine waters every summer. I cannot fathom that there is a local company that would risk or propose dumping pollution into these waters.

I myself have obtained have worked the majority of my career in the Northern Region of the province, treating primarily the population of the north shore. I treat a large population of patients with various lung disease that range in age and severity. As well as various cancer patients. It is no secret that we have a higher incidence of these diseases here in Pictou County. It is also no surprise that industry affects these statistics. I am appalled that this day in age we have a local company that is proposing to continuing polluting the environment in the way they have done since 1967. Have we not learned anything in 50 years. Look how much medicine has advanced in 50 years!! We are in an environment crisis and the best NP can come up with is to dump their " treated" effluent into the ocean. This is a risk we CANNOT take! The focus report not only lacks scientific knowledge but lacks the guarantee to prevent further damage to our environment!

This company, like the owners of the past have shown they do not want to invest money to improve this out of date mill. They do not want to be sustainable because they have done nothing but act deceitful and untrustworthy. They have turned communities and community members against one another. I feel they have done this to distract us from the reality of what is going on.

I understand that jobs are important here in Nova Scotia but if you choose to risk ruining our environment over this you will loose so much more! This effluent is being dumped in my back yard, literally! Ask yourselves if you would risk dumping it in yours, where your kids play, the air you breath everyday, the water you swim in every summer. Would you approve it then?

There is a solution but it is not approving this project. It is respecting our First Nations community and respecting the boat harbour act. It is cleaning up the mistakes of the past. It is putting our environment first for our future generations and ourselves. It is making sustainable jobs, but not at the risk of others. I ask you to do research about the past and future of this proposed project and the history of NP. I ask you to do the right thing!

Kindest Regards,

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:04:13 PM

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Project: replacement_effluent_treatment_facility_project Comments: I believe that northern pulp has spent a lot of time putting together a plan that would both have a limited effect on the environment and also allow them to be a company that can coexist with other industry. They should be allowed to move forward with this plan Name: Email: @hotmail.com Address: Municipality: New Germany Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 73 y: 24

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:06:42 PM

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Project: replacement_effluent_treatment_facility_project Comments: The Nova Scotia government should not accept the environmentally hazardous proposal of Northern pulp to send huge amounts of pollutants into the Northumberland strait which will destroy the waters,the fish habitat, the lobsters and all other fish species as well as the livelihoods of thousands of fishing family members who live in Pictou County. The Northern Pulp focus report is not truthful, Effluents that will be dicharged continuously into the strait is obviously toxic. No one will buy lobster from Nova Scotia and PEI, markets that have been built up by blood and sweat for generations will be lost forever. Northern Pulp will strip mine our environment and then leave us with the environmental nightmare. We must ensure our future economy for the region is sustainable . Sustainable forestry ,fishery and tourism jobs for our working people must be the future economic path.. The mill workers are not to blame for the decades long pollution They must be paid dignified severances and have job placement rights if the mill is closed. The working people, first nation members and towns people should be united and find solutions in their interest. Name: Email: @gmail.com Address: Municipality: Halifax Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 64 y: 18

From:
To: Environment Assessment Web Account; info@friendsofthenorthumberlandstrait.ca
Subject: Letter Submission
Date: November 8, 2019 10:07:12 PM
Attachments: 8 November 2019.pdf

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Honourable Gordon Wilson, Minister of Environment
Environmental Assessment Branch, Nova Scotia Environment
P.O. Box 442 Halifax, Nova Scotia B3J 2P8

Fishers
River John, Nova Scotia

Honourable Minister Wilson,

As Our current Minister of Environment appointed to represent Nova Scotians in decision making and must determine that an Environmental Assessment Report (EAR) is required following review of the Northern Pulp Nova Scotia Focus Report for the Replacement Effluent Treatment Facility (NPNSFR) submitted October 2, 2019 in accordance with Part IV of the Environment Act by Northern Pulp Nova Scotia Corporation (NPNSC)(NPNSC, 2019) in response to the Terms of Reference For The Preparation Of A Focus Report Regarding the Replacement Effluent Treatment Facility Project Proposed by Northern Pulp Nova Scotia Corporation (TOR) (Nova Scotia Environment, 2019). **We write in support of Friends of the Northumberland Straits' continued efforts to ensure there is no pipe & no extension to the Boat Harbour Act.** The Northumberland Strait (NS) is a synergistic finite body of water which supports life on every coastline it meets at 5 000 years old (Brooke, 2015). The NS is a food source, a tourism spectacle & a recreational wonderland. Coined Canada's Ocean Playground, Nova Scotia has one feature that stands out above all others: The Sea. NPNSC's mill in Abercrombie is an unabiding manmade structure unlike The NS which should subsist throughout time. This balance must be scaled in your consideration of NPNSCs proposed project effects on The NS. Randall has thirty years experience fishing lobster, rock crab, herring & scallops in area 26A1 on The NS. He has always supported solution-focused progress in the area of discussion. Nadine grew up being involved in the fishery and passionate that this environment is a treasure deserving the commitment of Our Government to ensure that The NS is further examined before NPNSCs proposed project is granted your approval (Appendix A). We have no confidence NPNSCs proposed plan could be deemed to be free-from-harm for The NS or the people living in it as we urge you to be responsible at this time. **We insist you order independent, third party EAR to further study The NS before you grant approval of NPNSC's proposed project as we are concerned for how said project will add pollutants where we live & work.**

Honorable Minister Wilson, we raise the following issues for your consideration:

- **Further understanding of the future results of climate change.** We would like further consideration made for the effects of climate change in the area related to (r/t) NPNSC's proposed project. With each passing season that we are fortunate to sail The NS, we are witness to changes in its conditions which are indubitably r/t climate change. Storm surges in the area have intensified greatly as climate events such as hurricanes occur with more strength & frequency. We watch feet of coastline shift or disappear with forceful storms. Researchers state "We also conclude that it is likely that climate warming will cause Atlantic hurricanes in the coming century have higher rainfall rates than present-day hurricanes, and medium confidence that they will be more intense (higher peak winds and lower central pressures) on average. In our view, it is uncertain how the annual number of Atlantic tropical storms will change over the 21st century (Global Fluid Dynamics Laboratory, 2019)." The proposed NPNSC project will cause displacement of land by seawater in a time where we are already trying to understand & lessen the impact of climate change on our shoreline. NPNSC is a repeat offender of environmental harm & we lack confidence in their proposed project. In 2016 NPNSC was certified under the Environmental Offenders Registry & charged under Pollution Prevention provisions of the Fisheries Act (Government of Canada, 2016). They have a proven track record of causing harm to the fishing environment. On occasions where effluent leaks have occured NPNSC grants little freedom of information to the public which is a source of great public concern as " Friends of the Northumberland Strait issued a news release Tuesday saying its membership is frustrated that after more than three months, the province has released no information about the size or cause of the leak last year near Pictou, N.S. (Tutton, 2019)." The public cannot trust NPNSCs communication r/t environmental effects of its operation & public angst related to severe, persistent environmental effects of NPNSCs proposed project must be weighed at this time. An independent EAR examining climate change in The NS is necessary to examine how the proposed project would affect an already fragile environment.
- **NPNSFR Item & Appendices 3 (NPNSC) response to TOR Item 3:Facility Design, Construction & Operation and Maintenance of NPNSC's proposed project (Nova**

Scotia Environment). Insufficient data has been provided by NPNS related to the likelihood of harm or possible examples of malfunction and catastrophic events r/t this proposed project; the controls & consequences of which remain completely unknown. In the event of an environmental disaster r/t NPNSC's proposed project preventative responsibility comes down to the decision you are currently being asked to make. The NS environment & inhabitants deserve the right-of-way when it comes to your decision in response to the project proposed by NPNSC. Honorable Minister Wilson order an EAR to be necessary before NPNSC proceeds with a project that could in any way utilize The NS as a dumping ground. An independent EAR is necessary to ensure the proposed NPNSCs proposed project does not pose a catastrophic risk to The NS.

- **NPNSFR Item & Appendices 7 (NPNSC) response to TOR Item 7: Fish & Fish habitat (Nova Scotia Environment).** The delicate conditions of The NS sustain the commercial fishery that we make a living at. NPNSCs proposed project will have malevolent, contemptible affects as it effectively pollutes a fishing area; a food source & cultural ethos. Fishing industry in the area in the area will endure a negative impact of the pollutants introduced to the NS by NPNSC. There is enough 'bad press' r/t to the quality of lobster caught in the area due to NPNSC operation without these pollutants being released continuously into a fishing area. The NS receives no compensation for the loss of environment related to NPNS's proposed project yet it will take a net loss with the introduction of contaminants into its body. The effects of said proposed project create net-loss, negatively impacting a food source & expunge the natural state of The NS. An independent EAR must be ordered to address TOR Item 7 (Nova Scotia Environment) to ensure NPNSC's proposed project r/t the fishing industry on The NS.
    - **NPNSFR Figure 7.3-3 (NPNSC, p. 130).** Insufficient data r/t buoy locations collected over three days in 2019 as it is common practice to move lobster trawls are daily as you do not catch lobster tomorrow where you caught them today. Where are buoys are located varies day by day, week by week, season by season. The entire marine area encompassed by this map is a fishing area used by the commercial lobster fishery & bouys are located throughout the area that is not indicated for lobster harvest.

- **NPNSFR Figure 7.3-4 (NPNSC, p. 131).** Lobster is harvested in a greater area than indicated by this incomplete and insufficient data.
- **NPNSFR Figure 7.3-5 (NPNSC, p. 132).** "Atlantic mackerel and Atlantic herring are found in the Outer Caribou Harbour/ Northumberland Strait (Figure 7.3-5) at depths of 10 m and greater. The nearest mackerel harvest area is well outside the proposed pipeline footprint and more than 2 km northwest of the proposed diffuser location; however, the proposed pipeline route will interact with the herring fishery (NPNSC, p.132)." The herring fishery in this area is at risk before this proposed interaction with NPNSC. Katie Schleit, a senior fisheries advisor with Oceans North states "We're also facing increasing threats from climate change, particularly in the gulf...The scientific report is showing that fishing levels are generally considered quite high for a stock that's not doing very well(Yarr, 2019)." We ask you to be prudent when considering the effects of NSNPCs proposed project on the herring fishery by ordering an independent EAR before its approval.
- **NPNSFR Table 7.3-2: Summary of Marine Impacts, Mitigation Measures, & Overall Significance (NPNSC, p.142).** We are in disagreement with findings that overall effects of NPNSCs proposed project on water quality/ physical effect r/t the American Lobster (AL) considered to be generally minor, localized and generally reversible & not significant when "changes to water quality due the discharge of treated effluent to the Northumberland Strait at the diffuser including reduced salinity and increased water temperature which may influence reproduction, survival and growth of larval and adult Lobster outfall location (NPNSC, p. 144)." NPNSFR plans for mitigation through "Provision of habitat offsetting, if required (p.144)." What exactly is meant by 'habitat offsetting' of the AL? There are no examples provided by NPNSC r/t habitat offsetting in terms of fishery outcomes. Elucidation of said provisions, effects r/t the AL as industry in the area and possible mediation measure is vital before approval is given to NPNSC's proposed project. AL is a significant resource of The NS and "makes up the largest proportion of the CRA fishery in Caribou Harbour and Pictou Harbour, with all life cycle stages represented within this area (NPNSC, p. 129)."

The Port of Caribou is commonly known to have the largest fishing fleet in Nova Scotia, which is known worldwide for its lobster. The habitat of the AL & the industry it sustains will be directly impacted by NPNSC's proposed project in which "The vertical mixing at the diffuser due to differences in effluent density (i.e. temperature and salinity) will negate interactions of the effluent with the benthic environment and adult Lobster (NPNSC, p. 144)." How are immature lobsters affected by said effects? Further clarification via an independent EAR is necessary r/t mitigation provisions & measures r/t effects of NPNSCs proposed project to the AL.

As Minister of Environment assiduity is necessary in the matters of NPNSCs proposed effluent treatment facility project & honoring the Boat Harbour Act. The severe, persistent environmental effects & concerns of the public of NPNSC's proposed projects outcomes cannot be projected without further examination of The NS via an EAR. Without this study being ordered the project proposed should not be seen through as there is a current lack of understanding of the above issues. We plea with you to order an independent EAR for the at this time.

Many thanks,

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quota-schleit-1.5127344

Appendix

Appendix A Nadine C. MacLellan letter to Minister Miller (8 March 2019)

Honourable Margaret Miller, Minister of Environment
Environmental Assessment Branch, Nova Scotia Environment
P.O. Box 442 Halifax, Nova Scotia B3J 2P8

River John, Nova Scotia

Minister Miller,

I am contacting you in relation to Northern Pulp's Replacement Effluent Treatment Facility Project. I am addressing you as someone who makes their living in the fishing area the Gulf of St. Lawrence. These fishing grounds encompass the area of the southeastern part of Northumberland Strait between Nova Scotia and Prince Edward Island and the western half between Prince Edward Island and Cape Breton. Firstly I would like commend each of the members in my community who are addressing the issue in of Northern Pulp's presence on The Northumberland Strait. I have never publicly expressed my feelings regarding the environmental atrocity that is Northern Pulp but cannot go without taking this opportunity to make this personal appeal to you. My community is often regarded as being divided but many have been brought together by their concern over the treatment of our waters & residents. I could not be prouder to be from Nova Scotia except that our representation is truly failing us by supporting an industry over its own citizens. You have been disregarding the voices of a concerned community. **I urge you to recognize your support of Northern Pulp over the people of this area as the destruction of the cultural heritage of communities along the Northern Shores of Nova Scotia & take commendable action in**

requiring an environmental assessment report (EAR) to be conducted Canadian Environmental Assessment Agency (CEAA). Together with the supported of obedient Provincial Governments the pulp mill operation in our community have a continuous track record of negating our community and neglecting our environment. Nova Scotia's culture was formed by our & continues to develop from the interactions within environment of our scenic coastlines. **I demand you address the environmental effect of Northern Pulp's operation on the culture of Northern Nova Scotia by stepping away from the situation & ordering an EAR of the proposed area from the CEAA before any actions can taken in relation to the proposed pipeline.**

I can attest that the culture contained & surrounding the area of the proposed pipeline is boundless compared to the value of the pulp produced at Northern Pulp in Abercrombie, Nova Scotia. I was raised in a 'fishing family' in Pictou County, Nova Scotia; graduating from in Alma from Regional High School where I received my first formal education on the injustices related to the area's pulp mill through a law class. At the time my peers & I would get inundated with the presence of sulfur and other pollutants in the air as we learned. I continued my studies at learning the significance of social and cultural determinants After attending a lecture on environmental racism I discussed the concept with while he had never heard the terminology before that he was very much aware of its effects on the coastline. the Northumberland Strait was the therapeutic entity that sought me through. I could be dead but I'm a fisherman. The Strait taught me how to transition through life; it gifts me with joy, gratitude & some pride in myself. forced me onto the water each morning & into having a purpose. I will never find the words to describe how pushing off of our wharf, spending the day the day on my water & returning home with bounty healed me. I've never eaten a lobster. As a child I watched my struggle with daily catches that were in the double digits poundwise. Today we benefit from the environmental effects of a warming planet; there is no better feeling knowing you're top boat & I love seeing my floating as we sail in with catches that are ten times what they were in the early 2000s. I know programs in the area are benefiting us too but we as a society must address the environmental conundrum that is the Northumberland Strait. has passed since I first

brought up the environmental racism yet there is significant distress in the area regarding the multitude of issues caused by Northern Pulp's continued operation. has remained a positive example for me by continuously expressing his belief that the conversation regarding these issues must be solution-focused.

As a family I feel like we have done very well by maintaining respectful discussion regarding the operation of Northern Pulp. However I am deeply distressed by the Provincial Government's delinquency in caring for our waters & am now asking you to consider the direct environmental effects on the culture of this area as your personal decision. **I urge you to hand off the responsibilities of an EAR to the CEAA before the situation worsens.**

I make my living on the Northumberland Strait in more than one way. I

meet people from all over the world who are travel to our beautiful shoreline because of the nature of The Northumberland Strait. Hearkening first hand accounts of what Come-From-Aways cull on our shores frames the global perspective on Nova Scotia as a whole. These conversations have defined how fortunate I feel to live & work here; I have a great love for the sea. I assure you that our culture and waters are worth more than pulp. If Northern Pulp continues to operate alongside a submissive provincial government I know the tourism industry this area has worked to build up will collapse with the environment; No one wants to vacation in a cesspool. **The culture here is informed by the environment which will be affected if you permit Northern Pulp to operate without and EAR conducted by the CEAA.**

grown up in homes that our Great-Great-Grandfathers had lived in. We have both acquired knowledge informed by a multi-generational relationship with this environment. has been farming the shoreline of Caribou Harbour since

arriving here from Scotland in the early 1800s. This area is the proposed site of Northern Pulp's pipeline. **I encourage you to think of it as ground zero & your legacy by acknowledging the significant cultural value of the Northumberland Strait in handing off responsibility of an EAR to the CEAA.** The culture of this area is indubitably conjoined with commercial fishing which both of our families sustained themselves from.

continues to fish at has witnessed the coastal transformation of this area over his lifetime. Fishing beside gladdens my heart in ways that I cannot express in words. I fear that I am at the end a line and will be unable to pass on my knowledge and skill set to a future generation because my government doesn't value the very environment it exist within. My experience is quintessential to who I am as a person; part of this experience is how this environment has been altered by the undeniable results of a changing, polluted environment. He recalls bluffs that have eroded, forests that no longer exist & much, much colder waters. I know our commercial fishing operation will be unsustainable if the mill pollutes our beautiful Strait. I am disgusted by the multitudes of wrongdoings by industry & governments alike since the mill began its operation in Abercrombie. **There must be an objective, independent EAR completed by the CEAA of the Northumberland Strait to address the environmental effects of Northern Pulp's operation on the scenic coastline to identifying how these effects will impact the socio-economic conditions on our culture which has significant historic and future value.**

Those of us who live, work & play on The Northumberland Strait can palpate the environmental effects of the unsustainable pulp & paper industry. There is no wonder why. For a short period during the 1970s

regarding his ailments who told he was insane for working there.

untreated waste into Pictou Harbour during early morning

hours. He left his employment knowing that they waited until children were sleeping in their beds to illegally dump toxic effluent. If you think you know what dangers are present in under Our waters you have no sense of the situation whatsoever. **An EAR of the Northumberland Strait must be conducted by the CEAA to determine the environmental effects of pulp production in Abercrombie before any decisions regarding future production in the area. In vivo veritas.**

By conforming to Northern Pulps demands I ensure you that you will be forever regarded as the executioner of a culture. I know this community & you are unprepared for dealing with the consequences of not handing an EAR to the CEAA. **Take action by washing your hands clean of any decision-making by electing the CEAA to do an EAR at the proposed site.** I assure you that otherwise the Provincial Government will overloaded: there will be an impassable, occupied causeway. I believe a reasonable answer to having effluent dumped in my workspace is having it tanked & dumped where those responsible for that work. If you expect this community to live & work in effluent I would expect the same from you. **Order an independent EAR conducted by the CEAA or you will be unleashing an inferno of anguish on this community & our culture beyond anything you could possibly conceive of.**

With some hope,

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Effluent Replacement Project
Date: November 8, 2019 10:08:04 PM
Attachments: Northern Pulp"s Effluent Replacement Project Focus Report Submission [FINAL 2].pdf

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Sent from Mail for Windows 10

November 7, 2019

Honorable Minister Gordon Wilson
Environmental Assessment Branch,
Nova Scotia Environment
P.O. Box 442, Halifax, Nova Scotia
B3J 2P8

RE: Northern Pulp Nova Scotia - Environmental Assessment Focus Report - Replacement Effluent Treatment Facility

Please see the following document in response to the Focus Report of Northern Pulp's Effluent Replacement Project. I am a commercial fisher and harvest lobster, rock crab, and herring from the waters directly surrounding the proposed pipe route and outfall location. I also have a background in structural engineering and have worked on various projects throughout the Maritimes assisting in both the structural design and geotechnical investigation of various structures. This submission will include a combination of site-specific observations and the effects it will have on the structural integrity of the pipe.

I have also attached my previous submission to the Environmental Assessment of Northern Pulp's Effluent Replacement Project. These submissions highlight some major concerns with the underwater portion of the proposed pipe.

Sincerely,

November 7, 2019

RE: Northern Pulp Nova Scotia Focus Report

In previous comments, submitted in response to Northern Pulp's Environmental Assessment, I highlighted concerns of pipe failure due to the presence of ice along the proposed pipe route. The issues raised in that submission have not been addressed by Northern Pulp in the Focus Report. The risk of damage to the marine pipe by ice is critical to determine the viability of the proposed project. TOR 2.2 requires Northern Pulp to "Conduct geotechnical surveys and provide the survey results to confirm viability of the marine portion of the pipeline route. The surveys must determine the potential impacts of ice scour on the pipeline."

My earlier paper explored two possible failure modes due to ice presence: 1) Direct impact causing a ductile failure (high amount of stress over a relatively short time), 2) Cyclical loading causing a brittle failure (stress levels lower than the mechanical strength of the material induced repeatedly over a relatively long time) (Zhang, 2005). The submission detailed the seafloor bottom as observed by fishers to be mostly sandy soft bottom. Possible problems associated with this type of bottom were highlighted including ice scour detection problems due to quick infill and non uniform stresses on the pipe. Figure 1 is a figure taken from the prior submission detailing the presence of large mounds of ice present in a large area southeast of the Caribou lighthouse (or west of Munroe's Island) along the proposed pipeline route in the winter of 2018-2019.



Figure 1: Ice southeast of Caribou lighthouse along proposed pipe route (March 4th, 2019)

Since the Minister's decision in April 2019, a geotechnical survey has been conducted by CSR GeoSurveys Limited (CSR) as part of Northern Pulp's Focus Report. The survey results describe the Caribou corridor "to be dominated by extensive areas of silty sand, sand and sand/gravel." (P.74, Appendix 2.2). In determining the trench depth of buried pipe, CSR states that the scour depth is the single most important parameter and includes that "scours in sand will experience some infill immediately due to lack of sediment cohesion." (P.95, Appendix 2.2). During the survey, if any scours had been infilled the scour measurements were taken from the top of infill (thus not truly depicting how deep the ice had actually scoured). The survey identified a total of 133 ice scours within the Caribou corridor, stating the maximum scour depth measured as 0.4 meters (scour depth minus any infill). Also found in the survey was a large area 70m x 100m (west of Munroe's Island) that indicated ice grounding to a depth of 0.7m. The ice scours found along the pipe route had measured widths ranging from 1m to 6m and lengths ranging from 2m to 260 m.

The new data obtained as part of Northern Pulp's Focus report has verified the soft sandy soil conditions and found extremely alarming rates of ice scouring directly along the proposed route. The report has also confirmed extensive ice grounding located along the shallow area in Figure 1 (Figure 2 of previous submission). Due to the predominately sandy soil along the proposed route, all of the depths of scouring obtained are subject to some degree of error, as the soil quickly infills the scouring. CSR states that all scouring was from the 2018-2019 winter, as can be expected due to quickly changing sandy bottom continuously subject to tidal and wave action. The question is how much infill had taken place from the time the ice left until the survey was completed?

Ice conditions along the proposed route during the winter of 2018-2019 were relatively average or below average with no fisheries or marine activity delayed due to ice. We do not have to look back far to find winters where fishing seasons have been delayed due the extreme ice conditions. In 2015 Lobster Fishing Area (LFA) 26A (which includes Caribou Harbour) was delayed nearly 2 weeks due to ice. Standards of practice for detecting ice scouring in shallow soft bottoms recommend that historical data be taken into account. It is also recommended that survey data be recorded at variant times, as a single data set can easily give a misrepresentation of the ice/seafloor interactions. This begs the question what would the survey have looked like directly after the ice left in 2015?

Figure 2 is one of many figures in CSR's report depicting the ice gouge locations along the proposed route. The blue line shows the proposed pipeline route while the several black lines show ice gouges found by CSR's survey. The figure illustrates a portion of the pipe route where depths are as shallow as 1 meter. This figure along with many others are severally alarming when looking at the possibility of ice impact on the pipe. Considering that founded gouges have measured lengths of up to 260 meters and widths of up to 6 meters, this data is not something to take lightly. If there is any amount of error in forecasting the maximum depth of ice gauging there is a large possibility of ductile pipe failure due to direct impact with catastrophic repercussion to the surrounding marine environment.

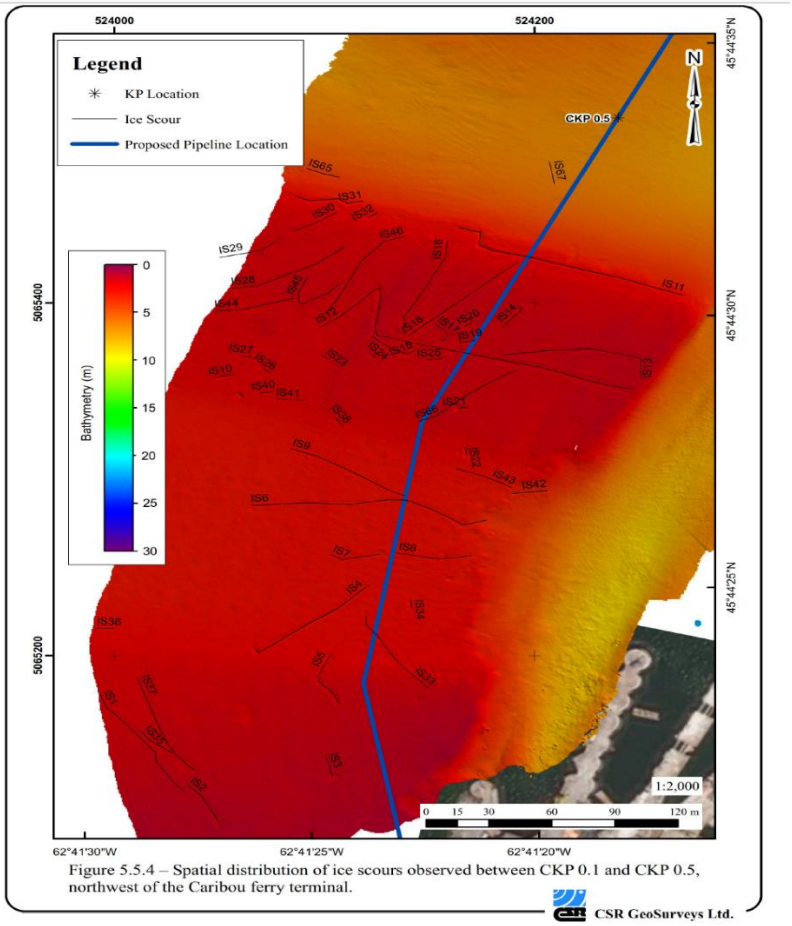


Figure 2: Ice Gouging along a small section of the Proposed Route (P.104, Appendix 2.2)

Equally alarming as the potential for direct impact of ice on the buried pipe is the possibility of a brittle failure of the pipe under the large area found to have ice grounding. The survey found ice grounding to a depth of 0.7m over an area of 7000 square meters. To give a better understanding of the intensity of these ice forces we will do a quick calculation to estimate this section of ice groundings weight. We will use all of the smallest dimension assumptions to ensure that no one thinks we are inflating the values: Given 0.7 meters of ice embedded into the soil and choosing the shallowest depth gives 1 meter of the ice between seafloor elevation and sea level elevation, looking at Figure 1 we will conservatively estimate the mean height of ice mounds at 1m. This gives us approximately 19,000 m^3 of ice, using a density of approximately 900kg/m^3 results in over 17 million kilograms of ice or 37.6 million pounds of ice on an area 70m x 100m. Although this puts into the perspective the intense gravity forces due to ice, the lateral forces created by the ice are far more alarming. During the winter months the Northumberland Strait is filled with ice, as the tide falls each time the water level below all this tightly packed ice decreases creating even higher ice interaction forces. The weakest link in all of this being the shorelines and shallow harbours which see the brunt of these enormous lateral ice forces. This begs the question, if ice cover over a 70 meter by 100-meter sections weighs over 37.6 million pounds, how much force would all of the ice in the Northumberland Strait be able to exert laterally? Now imagine this force

being constantly applied cyclical with every 12-hour tide cycle. This raises major concerns in fatigue stresses developing in the pipe over time. Even if the gouge depths do not reach the pipe depth the ice-soil interaction forces will convert to soil-pipe interaction forces continually being applied in a cyclical manner. If direct impact does not occur causing immediate ductile failure these fatigue stress could eventually lead to a brittle failure of the pipe.

With no leak detection plan in place for the marine portion of the pipe, the failure could go undetected for months or years, seeping effluent in shallow waters where the receiving waters would not have the dilution characteristics necessary to dilute the effluent. Northern Pulp has not addressed the risks from ice grounding. This is a critical omission.

There is too much at stake to fast track the design process of the pipe. A full ice report including historical data and multiple surveys and site visits in winter months must be conducted to ensure the ice effects are modelled properly. Before the Minister can approve the proposed project, clear engineered documents including a leak detection plan for the marine portion of the pipe must be submitted for public review, plans should include a monitoring system with real time data. Failure to do so could lead to the catastrophic structural failure of the pipe due to direct ice impact or cyclic fatigue loadings exceeding allowable limits. Effluent prematurely released in shallow waters due to a pipe break and gone undetected would have irreversible effects on the surrounding marine ecosystems.

The Minister does not have the appropriate baseline information to determine that this project is viable, and cannot approve the project. It is recommended that the Minister call for a full federal environmental assessment. More information is required to ensure that ice presence will not cause a pipe failure, leading to catastrophic repercussions for all marine ecosystems. A real time monitoring program for the marine portion of the pipe should be included in the future design process.

RE: Previous Submission Environmental Assessment

1.0 SEAFLOOR CHARACTERISTICS OF PROPOSED ROUTE

1.1 Effluent Effects Rock Crab Population

Inside Caribou harbour consists mainly of shallow soft sand and mud bottom with portions of broken hard bottom. Such seafloor characteristics create a favourable environment for the rock crab population to flourish. While harvesting rock crab throughout LFA 26A fishers have observed that this inlet presents optimal conditions for juvenile and female rock crabs. If you place traps within the harbour (south/southwest of Munros Island or directly east of the ferry terminal) the majority of the harvested catch appears to consist of small juvenile crab including a high percentage of females. As you move out of the harbour along the proposed pipe route and along the shore east and west the percentage of harvestable rock crab (a rock crab of legal size) within the catch appears to significantly increase. Traps placed further offshore in deeper waters tend to have a catch rate with the majority of the catch consisting of large harvestable crabs with very few undersized crabs. Over the years all of the above has remained consistent and local fishers have concluded that the Caribou harbour acts as a breeding ground and an optimal environment for juvenile rock crab to mature before moving to deeper waters. This raises the major concern of what effect will this effluent have on these juvenile rock crab and the rock crab population as a whole? Not to mention the chain reaction that would occur throughout other species including lobster whose diet consists of a large percentage of rock crab (Fisheries & Oceans Canada, 2013).

1.2 Effects of Site Specifics on Structural Integrity of the Pipe

The marine portion of Northern Pulps pipeline design consists of approximately 4 kilometers of 36” high density polyethylene (HDPE) pipe that will be weighted with concrete ballast and placed in a 3 m trench (providing approximately 2 m of cover to the top of pipe) and will be backfilled with armour stone (Appendix F, Northern Pulp, 2019).

The pipeline location proposed by Northern Pulp presents various challenges that must be addressed to ensure the structural integrity of the pipe. As previously stated, the bottom has been observed by fishers to consist of soft sand and mud bottom with small pockets of hard bottom. With no geotechnical investigation carried out by any of Northern Pulps consultants it is unknown how deep the soft bottom continues. This raises the concern of non-uniform settlement of the soil that will be supporting the pipe. Due to the pipe being placed in a pre-dug trench during the construction phase it is likely that the pipe will experience increased installation deflections due to the trench quickly being filled in with sand due to wave and tidal action, thus creating discrepancies between design pipe elevations and as built pipe elevations. The pipe is also likely to experience increased in-service deflections over time due to the pockets of hard bottom creating a point of solid support while large portions of soft bottom allow for settlement and pipe sag. These deflections will induce increased compressive and tensile bending stresses within the pipe wall resulting in bending strains. The design code aims to limit these strains and the geometric stability of the pipe by setting ring deflection limits of 7.5%. As deflections increase beyond this point

geometric stability is eventually lost and the crown of the pipe will begin to flatten and eventually reverse leading to reverse curvature collapse of the pipe Figure 1 shows observed pipe deformation patterns that lead to failure due to increased pipe deflections (Plastic Pipe Institute, 2014).

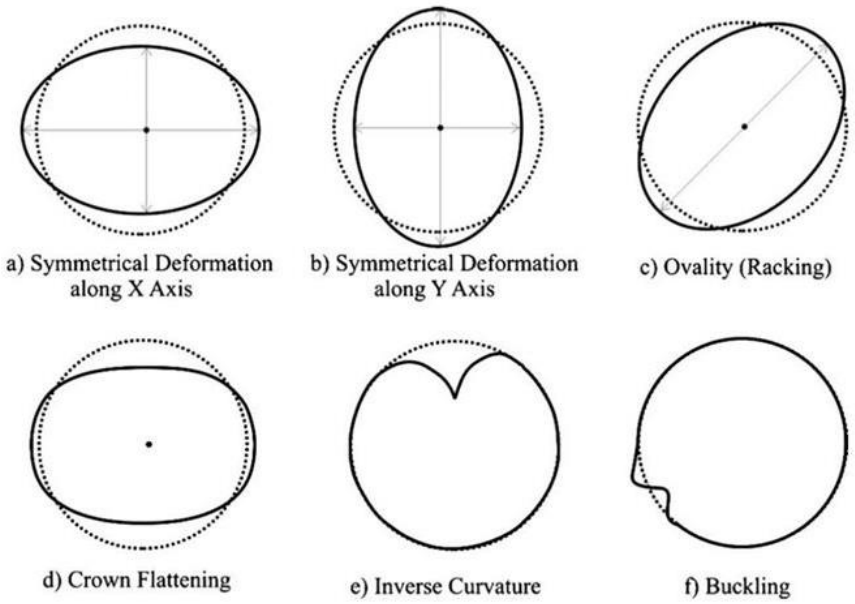


Figure 1: Observed deformations of installed HDPE pipelines (Motahari & Abolmaali, 2010)

Figure 1 is from a study published in the Journal of Transportation Engineers of the American Society of Civil Engineers (ASCE). The study included structural monitoring with video and laser surveillance of over 15,000ft (96 pipelines) of buried HDPE pipe across the USA. It was concluded that the majority of pipelines had actual deformations in excess of design code limits (Motahari & Abolmaali, 2010). This study gives great insight into the possible repercussions of not accurately modeling induced strains in buried HDPE pipes.

Due to the cyclical nature of the tidal forces and wave action these induced stresses combined with ice loads over time could present fatigue stress issues. Although HDPE pipes are extremely flexible making them well suited to bend and adhere to the seafloor, cyclical loading has the potential to cause failure if the site-specific loadings on the pipe are not properly addressed. "One of the causes for failures of HDPE pipes is fatigue which is the result of pipes being subjected to cyclic loading, such as internal pressure, weight loads or external loadings on buried pipes, which generate stress in different directions: circumferential, longitudinal and radial." (P. 600, Djebli et al., 2014). To accurately determine these site-specific loads, various data is required including accurate geotechnical site investigation with borehole results, hydrographic site surveys including bottom type/depths, potential ice scours, and site observations of ice conditions. It should be noted that none of these are present in Northern Pulp's submission.

Of all the loads the pipe will experience, ice loads present that largest risk to the structural integrity of the pipe. Potential failure of the pipe due to ice could occur from one of two mechanisms: 1) Direct impact causing a ductile failure (high amount of stress over a relatively short time), 2)

Cyclical loading causing a brittle failure (stress levels lower than the mechanical strength of the material induced repeatitly over a relatively long time) (Zhang, 2005). Brittle failure due to ice impact could occur if any of the following project tasks are neglected: complete a site survey of ice conditions, complete a hydrographic survey depicting any potential ice scours, bury pipe at an adequate distance to account for extreme ice event. Although Northern Pulp shows a pipe buried with cover of approximately 2 meters, they have not completed any of the pre-design field work required to ensure that the pipe is not at risk of failure. When determining extreme ice scouring events, it is also recommended that ice scour surveys be carried out more than once, spaced out over time to gain an accurate depiction of the ice and seafloor interaction (C-Core, 2004). Grounding models such as the one created for a tunnel project crossing the Strait of Belle Isle, Newfoundland can also be carried out to gain insight into ice activity in a given region (C-Core, 2004). The soft soil and shallow design depth of the pipe (approximately 2 meters) also poses concerns for ice and seafloor interaction. If large ice accumulation was present and gouged the seafloor to the unknown depths of the soft bottom there would be no evidence of such gouges once the ice had melted as the sand would infill the gouges within a couple tide cycles. Figure 2 and Figure 3 are a photo's taken March 4th, 2019 from the Caribou light house, the PEI ferry can be seen docked in the background.



Figure 2: Ice southeast of Caribou lighthouse along proposed pipe route (March 4th, 2019)

This photo shows extensive ice directly over the proposed pipe route. Locations where water depths are as shallow as 1 meter have ice piles of 3-4-meter heights above sea level. It is not unlikely to conclude from these photos alone that potential for ice impact at a depth of 2m below seafloor bottom in a soft bottom is a very real possibility that could lead to a ductile failure resulting

in the catastrophic event of premature released effluent into the Caribou harbour. Figure 3 shows more ice further north along proposed pipe route.



Figure 3: Ice east of Caribou lighthouse along proposed pipe route (March 4th, 2019)

now retired, fished the waters surrounding the proposed pipe location for 55 years. Along with other species fished lobsters along the shores of Caribou Island. He recalls one winter when ice conditions were at their peak, one of his most lucrative lobster spots was completely wiped out by the ice. North of Black Point the bottom consisted of dense hard bottom with drastic elevation changes in the bottom including a large trench where lobsters could always be found. The following spring the rock bottom had been completely changed and the trench had been filled in.

a long-time fishermen and a commercial diver in the area for 25 years have also seen the power of the ice in the area. One spring could not seem to get his traps boarded as they were tangled on something on the bottom. When dove to retrieve them a navigational marker buoy from PEI was found drove into the rock bottom by the ice.

3.0 RECIEVEING WATER STUDY

Events that would be catastrophic to the marine ecosystems include: 1) Structural failure of the pipe causing effluent to be released prematurely of the discharge location. 2) Errors in the receiving water study including tides, water flow, mixing characteristics at discharge location, lack of consideration for climate change effects will have on mixing characteristics.

The shallow soft bottom that extends south of the Caribou lighthouse combined with Munroe's Island extruding westward creates a bottleneck effect for the water currents. This bottleneck effect is also accelerated by the water moving in from deep waters to shallow waters on a rising tide. These physical characteristics create accelerated tides and wave action, across the proposed location. These conditions combined with a prevailing north wind can cause water to swell into the harbour and hold waters in the harbour longer on a rising tide this gives the harbour very poor flushing characteristics. If there were a failure in the pipe at a location prior to the diffusers there would be no chance of meeting the dilution standards. The same could be said about the diffuser location if there is any variability in the water/mixing properties that were used in the receiving water study. Although computer modelling can give great insight into complex problems performing thousands of iterations and time steps in the matter of seconds, the results are only as good as the variables that were entered into the model. When dealing with a project with environmental consequences as catastrophic as this, each variable of tidal data, water depths, salinity, mixing characteristics etc. must be observed and calculated in a timely manner to ensure the level of confidence of the model is extremely high.

In near field portion of the receiving water study Stantec states "No historical water quality data are available for Northumberland Strait around the CH-B location. Data from the neighbouring Pictou Road (Stantec, 2017) located about 6 km southeast were used." (Stantec, 2018). While in the far field portion of the study they simply extended the boundaries of the previous model created for the previous outfall location in the original study that was completed for Pictou Harbour (Stantec, 2017). I will not attempt to touch on the technical data within the receiving waters study as I do not have the educational background to do so. I will however pose the following questions: Has adequate field investigations been carried out to ensure the results of these models are correct? Is stating there was no historical data thus we used data from our previously studied location sufficient? Should actual water sampling have been carried out at the actual location? Is this project being fast tracked? The study concludes that "The effluent discharged at the CH-B location is predicted to be dispersed and transported predominantly with offshore currents in the northwest and southeast directions. The effluent intrusion into Caribou Harbour is predicted to be minimum." (P.27 Stantec 2018). With what level of confidence can they make this statement while some data was simply pulled from the original location of Pictou Harbour? Have they modelled the bottleneck effect that all fishermen are aware of?

4.0 CONCLUSIONS & RECOMMMENDATIONS

Due to the lack of detail presented concerning site-specific data of various elements of the project, the minister must request an environmental assessment report. The report should include a geotechnical investigation, hydrographic survey and further investigations detailing ice presence. Pipe deformation issues should be addressed and a study must be conducted to ensure that direct ice impact will not occur. A detailed tidal study should be carried out to ensure that the effluent will not intrude into Caribou harbour severely effecting the marine ecosystem.

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Sutherland, B. (2019, March 1). Ice effects on the seafloor around Caribou harbor observed over years of fishing [Personal interview].

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 10:10:28 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is and I've lived in Pictou for the last 32 years and I'm concerned about Northern Pulp's Effluent Treatment Facility Proposal.

I believe that Northern Pulp's plan to pump up to 85 million litres (31 Billion Litres per year) of effluent into the Northumberland Strait is a bad idea. I do not believe the Northumberland Strait and its marine life, which is already under a lot of stress, can withstand this incredible influx of effluent.

In addition to what it would do to the marine environment, I worry about the potential risk that this poses to our fisheries. The livelihood of our fishers is being threatened by both the make up of the effluent as well as the temperature. I do not believe the province would have even considered a proposal from Northern Pulp if that proposal was one that would put the Michelin plant next door at risk. I don't see how this is different.

In addition, Northern Pulp's pipe route raised a lot of concerns for me with their EA submission and seeing that they are sticking with the same basic pipe route as outlined in their focus report does nothing to alleviate those concerns.

I do not trust Northern Pulp's ability to monitor a pipe line and I don't trust their leak monitoring detection system that was mentioned in the focus report does enough to protect the Town of Pictou's water. A new route should have been chosen. The focus report talks about 'compensation' should problems be unavoidable. 'Compensation' does little for me, my young children and partner if we can't trust the water that We drink, cook with and bathe in. Northern Pulp were supposed to have a leak monitoring system on their current pipe but the massive raw effluent leak from October 2018 was not discovered by Northern Pulp, it was discovered by someone walking in the woods.

Northern Pulp's findings in their earlier EA submission found that their were no concerns. The need for the focus report was in part due to Northern Pulp not doing the proper work on species at risk, migratory birds, marine surveys, land surveys or water course surveys. I do not trust any of the new conclusions that they've come to because they demonstrated that they were just going to say that everything was fine anyway. The focus report also pointed out that present conditions are putting a strain on migratory birds. Adding more stress does not help that.

The marine portion of the pipe won't have any leak detection system. If there were a leak during that stretch we would not know it. Munroe's Island is supposed to be a protected area. I don't see how this project can be approved if there isn't a system to prevent a catastrophic event in that area.

I beg of you for the safety, health, and well being of not only my family, but my community where I was born and raised and chose to raise my family in, that you take serious consideration to the above.

Thanks,

Sent from my iPhone

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:12:26 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am in support of approving Northern Pulps Enviromental assesessment to allow them to replace the existing effluent treatment facility with a start of the art effluent treatment facility including a pipeline to the new outfall location Name: @hotmail.com Address: Municipality: Truro Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 62 y: 36

From: @outlook.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:12:58 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Hello, As a young girl turning 16 growing up in Nova Scotia I want the government to protect our province to make sure my generation, my kids and their kids have a safe livable province to sustain a future in. I care about the environment, my friends and their families. I have taken sometime to research the proposed Northern Pulp effluent treatment project everyone seems to be talking about and I believe we must go forward with this project. I want to get my education and establish a career in Nova Scotia but I am afraid if this project is not approved my future in this province will be grim. We will lose 2.1 billion dollars of tax revenues annually and this will hurt everyone including the services we rely on and will deter business from wanting to set up shop in our province. If this happens I see no future here. The environmental tests included in the report has provided hundreds of pages of results detailing clear, hard facts. I want the government to approved this project based on science and facts not on emotions and hear say. I urge you to approve this to help provide a future for my generation and future generations. We can have good green jobs in forestry with the right protections in place. Please approve this project. Sincerely, @outlook.com Address: Municipality: Afton Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 52 y: 28

From:
To: Environment Assessment Web Account
Cc: info@friendsofthenorthumberlandstraight.ca
Subject: Northern Pulp Focus Report
Date: November 8, 2019 10:13:10 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Fellow Nova Scotians:
I am writing this to ask that those involved including the Minister and the Premier please leave their POLITICAL agendas and strategies outside the door as they begin these deliberations.

Please come to the table as a Nova Scotian with children, grand children and great-grandchildren who will have to deal with the results of these decisions for many, many years to come. These are people who would still like to use our beaches and enjoy the healthy seafood that we currently have.

I am old enough to remember when the beaches started to be spoiled - I went to the United Church Camp when I was a child, however, when our children went to the same camp they were no longer able to swim at the beach. In the beginning I didn't understand - I was very naive - it was the overflow from Boat Harbour making its way down the shore. We want the area to come back environmentally not be further impacted by unhealthy choices.

I have never been a proponent of Norther Pulp closing, however, they need to become a responsible business partner within Pictou County, Nova Scotia and Canada. There are environmentally responsible ways to continue without continuing to impact our environment, the water, land and air and subsequently the people.

Years ago, when the all the mines closed people wondered what people would do in Pictou County - that was a long time ago and Pictou County still thrives.

If Northern Pulp chooses not to be responsible then they should be left to themselves and the Government of Nova Scotia should back away from being their co-partner.

Unfortunately, it seems that our government and Norther Pulp think that the citizens can be overpowered with reports that are inadequate and drastically missing pertinent facts and measurements. I am totally overwhelmed to think that Northern Pulp and our government expect us to believe that all things being equal that effluent and added water coming out of the pipe will be clear and without pollutants within feet of the pipe. Where are the actual measurements of everything in the effluent?

- What would be the actual contents of the effluent (every single thing no matter how much or how little).
- How much effluent would be leaving the factory compared to how much is arriving at the end of the pipe (currently leaks are only found when others find them not Northern Pulp)
- How much water would be added to the effluent each day?
- What is the temperature of the effluent as it would reach the ocean water?

- Is the flow of the water adequate to move the effluent?

This is about the changes that are being requested. All their statement should be substantiated by an objective third party that is not aligned with the government.

What about the quality of the air in our county? We were in Pictou Thursday evening this week and the air pollution was so stick it was sickening. I don't hear anything about making this better than it currently is - I thought this was already being addressed.

In closing, I would ask that

1. you order a Full Blown environmental assessment
2. you take the responsibility of caring for our environment very seriously and judiciously.
3. as you consider the application - think if you would want yourself or your family - children and grandchildren would want to live and inhabit the areas directly adjacent to where the effluent will be passing underneath you to the water that you and your family swim in and eat the seafish from it. Will there continue to be good water to swim in and edible seafood from the area. Is this a place you will want your family and pets being around. There is a large population of people who live on the seashore. It is important for all residents to have their properties continue to appreciate not depreciate because of pollution along the shore.

Thank you very much for your time and I ask that you please take all the pros and cons into consideration before making any decisions.

What You Can Do - unknown

When you see little in the streets
And the air smells of pollution
When you fell like it's all piling up
Remember there is a solution.

There's something each of us can do
To keep the rivers clean
To keep fresh the air we breathe
And keep the forest green.

Help clean a beach
Or recycle bottles and cans
Learn about the problems we face
And help others understand.

It doesn't have to be a lot
If we each just do our share
So take time out on Earth Day
To show the Earth you care.

Ultimately, we need to look after our small part of the planet - let us do that together in a responsible and caring manner (for both people and planet).

Sincerely,

Westville, NS

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:14:16 PM

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Project: replacement_effluent_treatment_facility_project Comments: I am writing to voice my concerns about the replacement ellflutent treatment project for Northern Pulp. As a former resident of Pictou County, I seen the many effects of having a pulp mill in the area. I am very concerned that the proposed pipeline or an extension of the existing treatment facility would be a huge detriment to the health and well being of the residents of that area. At a time in our society where we are concerned about the environment, we need to be careful what we allow to be dumped into our water and soil. The effects of clear cutting our forests must also be taken into consideration when evaluating this issue. Northern Pulp has had more than enough time to study this issue and decide how to properly treat the effluent that is produced. We have world class technology available to us, and the best that they can come up with is dump it in the strait. Not acceptable. Thank you Email: @gmail.com Address: Municipality: Belmont Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 67 y: 39

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:24:07 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am a firm believer that laws should be created on the strength of the evidence in support of them. Making laws based on belief systems and feelings and forcing other people to live with those laws is unreasonable. The decision whether, or not to approve Northern Pulpâ?Ts proposed effluent treatment facility requires evidence and facts to guide that decision. To that end much study has been done and much evidence provided in Norther Pulpâ?Ts focus report. Third party experts have concluded in that focus report that there will be little or no impact on water quality, fisheries or fish habitat in the Northumberland Strait. Forestry on public lands in Nova Scotia is going through a transition towards an ecological forestry model based on the findings in the Leahy Report and the hard work of some foresters at the Department of Lands and Forestry. Without getting into the details If people want their Public Forest Lands managed to preserve and restore the Acadian Forest that encompasses so much of Mainland Nova Scotia in any significant way, you canâ?Tt do that without a strong pulp market. Give Northern Pulp the approval and the time they need to replace the current effluent treatment facility with the more modern, more advanced system they are proposing. And then close and cleanup the Boat Harbour Facility. Name: @eastlink.ca Address: Municipality: Lyons Brook Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 21

From:
To: Environment Assessment Web Account
Subject: NORTHERN PULP PROPOSAL FEEDBACK
Date: November 8, 2019 10:24:34 PM
Attachments: NPNS Submission.docx

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Consulting firm AMEC released the "Boat Harbour Return to Tidal Re-evaluation Final Report" in April, 2010. The report compared environmental data from Northern Pulp Nova Scotia (NPNS) with other pulp mills in Canada. Surveyed mills were assigned a percentile rank – the higher the percentile, the worse the mill's environmental performance for the parameter measured.

NPNS ranked in the 100th percentile for three parameters: average (fresh water) flow, average chemical oxygen demand (COD) and average (effluent) colour. Furthermore, NPNS ranked in the 95th percentile for average phosphorus.

Further analysis of the data reveals that:

- NPNS's average water flow measure was 60% higher than the median Canadian mill.
- NPNS's average COD measure was 204% higher than the median Canadian mill.
- NPNS's average (effluent) colour measure was 364% higher than the median Canadian mill.
- NPNS's average phosphorus measure was 138% higher than the median Canadian mill.

It's striking that none of the measures is remotely close to the median. NPNS's results weren't just bad, they were horrendous. With environmental performance like this, why should I believe that NPNS's proposal for a new effluent treatment facility will adequately address the numerous environmental concerns that exist?

Premier Stephen McNeil contributed an op-ed article that appeared in the Sep. 26 edition of the Chronicle-Herald. In roughly 650 words, Premier McNeil referred no fewer than five times to the need for NPNS's proposal and the Nova Scotia Department of Environment's assessment to be "science-based". Premier McNeil also stated that the final decision must be based on "science and reason" and that feedback from the public focus on "science and environmental impacts".

Let me be frank – the "science" is in the data in the AMEC report referenced at the beginning of this letter.

I also work for a manufacturing company. The company I work for takes its environmental responsibility very seriously; indeed, respect for the environment is one of the main principles in the company charter. The company I work for undergoes regular environmental audits. Fortunately, we tend to score well on the audits, precisely because our reputation depends in part on how well we live up to our corporate values.

No company that considers itself a good corporate citizen would purchase a facility with an environmental record like that of NPNS. No company that considers itself a good corporate citizen would continue to operate with measures like those above without taking major steps to address them.

Sincerely,

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:25:31 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I have been aware of the Boat Harbour travesty since the early 1970s. I understand the history with the mill and Pictou Landing First Nation. I recognize the jobs that are at stake and the role of Northern Pulp in the provinces forest industry. I am opposed to extending the deadline for the pulp effluent plan. The company has failed to meet its obligations by drawing up an acceptable plan within the ample time frame it had and there have been too many broken promises over the years. It is time to put this right and to stop using Boat Harbour/Asek as a sewer. I would support a plan to help the industry deal with a temporary closure until a sound effluent solution is in place that is scientifically validated and sound forestry practices have been implemented as per the Lahey report as long as the solution does not include continuing to use Boat Harbour to treat mill effluent after the January 2020 deadline. Yours sincerely I have sent this same message by email as well. On the evening of Nov 8, before what I understand to be the deadline for responses. Name: @eastlink.ca Address: Municipality: Halifax Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 56 y: 18

From: @LIVE.CA
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:26:21 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I believe that Northern Pulps proposed treatment plan will deliver improved water quality, compared to the current boat harbour system.It will move the process away from our communities and have minimal impact on the marine environment. The proposed outfall would have minimal effect on the fishing industry.The data supports that this project will improve the marine environment along the coast and Pictou Harbour. The focus report has done a indepth review of the situation and what is required.Northern Pulps has made many improvements to its environmental impact,since purchasing the mill. The mills emissions are much lower then average.This mills water emission are tested and monitored much more them most mills. The current boat harbour system is currently tested by provincial and federal authoritys and meets all standards.The Proposed system will only improve its performance. Nova Scotia needs industry.Nova Scotia needs industry willing to invest in good technology,and our communities.The world needs our resources,and the product produced in by Northern pulp is in high demand. I believe it is much better for our environment to process our resources here, with our standards,then to ship raw material to be processed substandard in another part of the world. The environmental consequences of the mill shutting down and the exports of our raw materials should not be ignored. I truly believe northern pulp is making the best proposal to lessen its environmental impact. I also believe that having this mill in our area is a great benefit to our community.By producing a world class product,it supports many families and business. The economic impact is very hard to measure.But I am sure Indirectly all of us benefit, by its tax base funding education,health and social programs. Name: @LIVE.CA Address: Municipality: Westville Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 66 y: 26

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:27:03 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: The Focus Report on Northern Pulps proposed effluent treatment facility, is a very informative and detailed document. Every appendix further adds to how safe discharged effluent from a new facility will be. I didnt believe that there could be anything else to study after reading the original Environmental Assessment Application, but this Focus Report has even more great information that further rests any concerns with constructing a new Effluent Treatment Plant. My family depends on income from both the fishing and the forestry industries. This is a crucial point in the history of Nova Scotians who depend on the forests and the Northumberland Strait for their livelihoods. My family cannot afford to lose either industry, and neither can the province of Nova Scotia. The government of Nova Scotia cannot risk losing the entire forestry industry because of uninformed fear. Northern Pulp has gone above and beyond on their research for this project. The people who are for this project want the treated effluent that enters the Northumberland Strait to be the best quality, period. The Strait is everyones to enjoy, and no one wants the fishers livelihoods to ever be in jeopardy. Everyone knows a fisher, or someone tied to the fishery, much like everyone knows someone who works in, or is tied to the forestry sector. The Focus Report was concise in detailing each point of concern that was asked by the public, in the Environmental Assessment Application. Upon reviewing the Focus Report, my own questions were answered. Questions like: whats the temperature difference at the point of discharge? How can the effluent affect marine life? What happens to the effluent when it leaves the pipe? Will a pipe put the town of Pictous watershed at risk? What is the salinity at the end of the pipe? I was pleased to read that the new outfall location, with a much stronger current and much deeper water will allow for excellent mixing, having the effluent meet most background conditions at 5 meters, as found in the Impact Assessment Marine Fish. Other appendices of interest were Impacts and Mitigation, Characterization, Spill Basin, Effluent Pipeline Leak Detection, and the Receiving Water Study. After careful examination of both the Environmental Assessment Application and the Focus Report, I believe that the science is sound, and it is safe for Northern Pulp to proceed with the construction of their state-of-the-art Effluent Treatment Facility. Thank you for the opportunity to comment on this project proposal. Name: Email: @gmail.com Address: Municipality: NEW GLASGOW Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 86 y: 19

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:31:47 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: This is crazy. Stick to your guns and do not let this happen - please. I dont want people to lose jobs but when we dont have an Earth jobs wont matter anyway. We need to start looking at the big picture. Name: @hotmail.com Address: Municipality: Lakeside Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 80 y: 29

From:
To: Environment Assessment Web Account
Subject: Northern pulp
Date: November 8, 2019 10:33:15 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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No pipe,no more lies
Sent from my iPhone

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:33:39 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: My name is and I live in the Kentville area . Iâ?Tve Ben logging for my entire adult life and I see first hand everyday how the Forestery industry needs Northern Pulp. Without this mill my family will have to change our hole life. Keep this mill open .. Name: Email: @gmail.com Address: Municipality: Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 85 y: 27

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:36:20 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Northern Pulps approach is well thought out and put together. It has appropriate safety factors and checks built into the process. It should be reviewed and corroborated by multiple engineering and environmental consultants selected by government regulators and community stakeholders. This can work for all parties and will work if we can move forward and have a conversation driven by science, and realistic social/economic implications to the community band province. Name: Email: @gmail.com Address: Granton Road Municipality: New Glasgow Postal-Code: : ### ### - #### email_message: Privacy-Statement: agree x: 43 y: 14

From:
To: Environment Assessment Web Account
Subject: Norther Pulp"s Focus Report Submission
Date: November 8, 2019 10:36:21 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Hi,

I come from a place called Big Island in Pictou County. It's beautiful and almost fully surrounded by water. I've spent most of my childhood in that water, my uncle and grandfather also fished in that water. That water which is the Northumberland Strait is part of my upbringing. I have a connection and a strong sense of well being when I'm near it, looking at it or my favourite...swimming in it. Now if you're not from Pictou County then maybe you've enjoyed some of the shorelines surrounding Nova Scotia. I actually moved away to farm out west for a few years...only my draw back to the water took me back to the Maritimes(it's a real thing) and I now have a farm that sits on the waters of the Northumberland Strait.

I have a problem with the science-based focus report. The trouble I have is that Northern Pulp was well aware of the Boat Harbour Act deadline yet sat idle in not preparing properly and letting time pass and then asking the Province for an extension thinking that it was a guarantee as it had happened in the past. I'm not sure if that was their plan but it does look that way. Multiple leaks even undetected by the company itself should be reason enough not to trust the new plan let alone it's failing stack tests (which are in place for a reason).

Now this focus report that was submitted definitely has lots of red flags most of which won't be realized before the 30 day comment period as it would take the average person to read 80 some pages per day. Lots of unknowns and "may" s. **If it says "may" then that also means that it MAY NOT!!! That isn't science, that is the unknown.** The problem with Northern Pulp submitting this science-based report is that you don't know the other side of this so called science. They get to candy pick as I call it the information they want to share. Like surveying the water but just in the summer. Really? The waters are ever changing and winter is no different except you also have ice!

In the news on Sept. 26, 2019 Stephen McNeil stated:
" I want to stress that any decision will reflect a commitment to a cleaner environment- a commitment already evident in the transition to renewable forms of power generation, in the delivery of energy-efficient programs to homes and businesses through Efficiency Nova Scotia, and in the effort to consult Nova Scotia on and updated Environmental Goals and Sustainable Prosperity Act which establishes clear objectives for the next decade.
Ultimately, any decisions on Northern Pulp will reflect the spirit of this Act. This means

weighing economic interests and environmental impacts in a way that respects both and neglects neither. For this government, environmental integrity and economic growth must be connected hand- in-hand, not fist-to-fist."

Now I have looked at this Environmental Goals and Sustainable Prosperity Act (EGSPA) and it states that the legislation is being replace with the Sustainable Development Goals Act and which was introduced in the legislature on October 23, 2019. The EGSPA stated that "the acts objectives were to become a world leader by having one of the cleanest and most sustainable environments by 2020." I wonder if this new act which is replacing it shares the same objective?? Northern Pulp's focus report by their definition is science-based but have they missed the mark by not striving to do better and be a better steward?

Now when I look at Northern Pulp's website:
It states " As part of our overall business plan, we pledge to enrich the well-being of the rural communities in which we operate." Well that would be the obvious thing wouldn't it. But I didn't hear any mention of how the actual Pulp Mill is environmentally sustainable or that it is a leader or even wants to be a leader with regards to being an environmental Steward. The only place that it referred to being sustainable was when it referred to Forestry and Woodland. For example under Forestry is stated that " Northern Pulp's customers from all around the world **demand** a product sourced from environmentally responsible forest management."

So here's the question... what if the province demanded that Northern Pulp become an environmental leader and steward and accept nothing less(which is putting a pipe in the strait as a solution to a long over due problem) What's wrong with asking a huge Pulp and Paper conglomerate Paper Excellence to step up and do what's right. What makes it OK to let them get away with providing some jobs and then not investing in the provinces health and well being and by that I do not mean throwing some money to a community health facility etc.. All they keep reminding everyone is of the economic contribution. If they were really concerned with Nova Scotia and protecting the environment they would see that band-aiding is not a solution. The EGSPA wanted Nova Scotia to become cleaner and more sustainable. I can't see how this Northern Pulp, this Focus Report or Environmental Assessment even remotely steers in that direction. They are satisfied using outdated processing and claiming that they can't change their process fits that objective. They can change. They just don't want to. Why would they? They are allowed to claim the " we provide good paying jobs" slogan. It's old and outdated just like the mill.
Below I share an article published in The Globe and Mail back in September 13, 2013. Is it a coincidence? In my opinion it's not.

According to Statistics Canada, the Pictou area has the seventh highest rate of cancer per 100,000 residents of the country's 106 health regions. Most of

the regions ahead of Pictou on the list, like Nunavut and northern Quebec, are so vast and sparsely populated that even a single incidence of cancer can skew the data. The area around Saint John, N.B., which also has a pulp mill, is the only region with a sizable population that has higher cancer rates than Pictou.

Take a look at the link I have shared below. I really mean read it. It's for a Pulp and Paper company not far form Nova Scotia. It's in New York! Now there is a fine example of Environmental Stewardship and being a Sustainable Paper Company. They even produce some of the brightest paper products(98 brightness) with elemental Chlorine-free pulp. Well isn't that something. Now if we could have a Pulp mill in following with this mentality it would bring back the ole Nova Scotia proud moment. It's just not a proud moment anymore. Anytime you mention you're from Pictou County, everyone already knows about the old mill and it's pollution.

Finch Paper website:
By integrating sustainable forestry practices, green power generation, and elemental chlorine-free pulp and paper production, Finch is a leader in high-quality, environmentally responsible paper markets.

Environmental Stewardship - Sustainable Paper Company | Environmentally Friendly Paper| Finch Paper — Finch Paper, LLC

Finch Paper is 100-percent Boiler MACT compliant.Two-thirds of the energy Finch Paper uses is made on-site with renewable biomass and zero-emission hydroelectric. Finch Paper achieved a 10% energy reduction (per ton) in the last two years, and through a strategic partnership with National Grid, we have increased pulp production with reduced energy use.

www.finchpaper.com

Anyway I hope you do actually read this. I was going to put in all of my focus report findings but I know there will be plenty of those submissions and I thought I'd speak from my heart. I'm no scientist just a girl from a small island who used to wonder why the water looked funny sometimes at the shore and why we couldn't eat the shellfish in the harbour and why it always stank going to Pictou. I only hope that the people making the decisions look at more than just jobs. **People loose jobs... that happens...we can't loose our environment...there is only one!**

Sincerely,

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:37:26 PM

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Project: replacement_effluent_treatment_facility_project Comments: As a young Civil Engineer, just beginning my career, I support this project to sustain and create jobs in rural Nova Scotia. This project has been thoroughly engineered and reviewed to meet the highest environmental standards in the world. I urge the Nova Scotia Environment Minister to approve of this project as it is in the best interest of all members of our community. Name: @gmail.com Address: Municipality: New Glasgow Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 39 y: 22

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:41:41 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Greetings, I have concerns about the possibility of the closure of Northern Pulp if the approval to proceed isnâ? Tt given to this company and the devasting affects of what could happen to the community. In 2011 Paper excellence purchased this pulp mill. The previous owner lacked investment, development and interest to make sustainable changes to keep the mill and the environment viably stable for the future. Since the purchase, Northern Pulp has invested over 130 million dollars into improvements to protect and improve their environmental foot print in the community. Northern Pulp is prepared to make the investment in a new state of the art effluent treatment facility that is similar to more than 80 other mills of this nature across the country. They have addressed every concern raised in the initial public consultation comments and every question raised to them by the Nova Scotia Environment department. They have answered with facts from experts including scientists and third party experts in the field. They have a plan to move forward and continue investing in improving their environmental footprint. As the Minister of Environment for the province of Nova Scotia I hope you make your decision based the scientific review of the focus report which highlights there is no adverse effects or significant environmental effects which may be caused by this under taking. The forestry sector, as well as many people in this province is counting on the approval of this plan in order to survive. Sincerely, Email: @hotmail.com Address: Municipality: Glace Bay Postal-Code: Phone: ### ### - #### Fax: ### ### - #### email_message: Privacy-Statement: agree x: 68 y: 28

From:
To: Environment Assessment Web Account
Subject: Response to the focus report for Northern Pulp
Date: November 8, 2019 10:41:52 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Response to the Focus Report for Northern Pulp

Please acknowledge receipt of this e-mail to: @eastlink.ca

To: Gordon Wilson, Minister of the Environment

From: Pictou, Nova Scotia

Response to the Focus Report for Northern Pulp

In I moved to the town of Pictou from the Ottawa area. I live close to the water directly across from Northern Pulp. I am and have been a member of the Clean up the Pictou County Pulp Mill since . I have attended all the Northern Pulp open houses, read extensively about the Mill and done everything I can to educate myself about this matter.

In my initial response to the EA filed by Northern Pulp one of the major concerns I expressed was the pipe route and lack of a reliable leak detection system. The focus report has not calmed my concerns. In fact, Northern Pulp has ignored concerns submitted by local citizens and the town of Pictou concerning the pipe route.

My concerns are:

1. The pipe route over the watershed that the town of Pictou uses for their drinking water. In the submission for the EA Mayor Jim Ryan of Pictou has been clear that this is not acceptable to the town. Northern Pulp has not listened and has done nothing to change the pipeline route to avoid the watersheds that Pictou and Caribou potable water comes from.

2. In her reply to Northern Pulp's EA, the previous Minister of the Environment, Margaret Miller noted that the pipe should be double walled when going through the watershed for drinking water. Again, this does not calm my fear. In the submission for the town of Pictou for the EA Mayor Ryan noted that any leaks and contamination along Highway 106 could also affect our watersheds.

3. Our watershed is a protected area which means just that. It is not acceptable for Northern Pulp to mitigate risk. Any risk to our drinking water source being contaminated by "treated effluent" must be completely eliminated. Therefore Northern Pulp must be denied access to our watershed sources for potable water as well as the route along Highway 106.

4. The lengthy time is takes the Department of Environment to investigate a pipe leak is also a factor here. Over a year has gone by since the most recent leak on October 21, 2018 at Indian Cross on Pictou Landing. This was the 6th leak on the property owned by . None of the leaks here or elsewhere were detected by Northern Pulp. They were all reported by private citizens. A condition of the most

recent Industrial Approval was to have a leak detection system in place. It either was not done or it failed. Results of the leak and fines have still not been announced. Imagine if there was an effluent leak in to our source for drinking water. A boil water advisory would not eliminate all the toxins in the effluent. Residents would have to buy water for a year or more until the results of an investigation by the Department of Environment told us what contaminants had gone in to our drinking water. It may be that we could not use this water source again.

5. There is no leak detection system proposed for the underwater portion of the pipe in to the Northumberland Strait. This is very troublesome. In my EA submission comments I proposed cameras both on the land and in the water. We know that the frequency and intensity of storms will continue to increase due to climate change. The proposal uses current conditions for pipe burial but does not project far enough in to the future to account for rapid climate change.

6. The facts do not back up Northern Pulp's assertion that no fish will be harmed by the daily outpouring of hot fresh water equivalent to the daily water use of the entire city of Halifax. The pipe and diffuser are located in fishing grounds for lobster, lobster larvae, a rock crab nursery and the only breeding grounds left for herring in the Northumberland Strait. We know that a FOI request from
for the Fishermen, revealed that Northern Pulp admitted the processed effluent going in to the pipe would not be as good a quality as what is released now.

7. Also of concern is the fact that the extensive oxygenation currently done in Boat Harbour will not be carried over in to the new effluent treatment facility.

Therefore, combining my points 6 and 7 would mean the effluent would consist of hot fresh water lacking oxygen content with pulp fibre and more toxins then what are in the current processed effluent. Fresh or hot water will instantly kill larvae. Hot water or even warm water 4 degrees higher than the surrounding water lacks oxygen. During the winter this area of water is frozen. In warmer weather the tides go back and forth. Allowing Northern Pulp to proceed with this project will create a large dead zone.

8. Northern Pulp has claimed in their advertising that the effluent has already been going in to the Northumberland Strait for over 50 years. This statement is very deceptive. The tide pattern clearly shows that the effluent hugs the shore and then goes in to Pictou Harbour.

9. Northern Pulp has a terrible environmental record. Since being paid millions of dollars to take over the Mill from Neenah Paper in 2011 they have consistently shown

that they do nothing unless forced to by the Nova Scotia Department of Environment. In an earlier submission to you on the EA I summarized all the violations and Ministerial Directives and Orders. In Ontario the provincial government has their own inspectors. A company does not hire outside inspectors and know when they will be testing.

10. You do not know the daily impact that Northern Pulp has had on the residents in Pictou unless you have lived here. When I moved here in 2011, I wrongly assumed that like Ontario there would be stringent guidelines for air and water pollution that would be enforced in a timely fashion with heavy fines. With the knowledge I now have of the Mill operation, I would never have moved here and will not continue to live here if the Mill continues to operate.

11. I also want you to be aware of the tremendous support that Pictou Landing First Nation has for the closure of Boat Harbour on January 31, 2020. Northern Pulp knew they had 5 years to come up with an alternative to Boat Harbour. It is totally their responsibility that they will not meet the deadline. Under no circumstances shouldPremier McNeil grant an extension.

In summary, we know the Northumberland Strait is a fragile environment which is already under stress. We cannot risk further pollution of the ocean or the air. We are not prepared to sacrifice our fishing industry, our tourist industry, beautiful beaches, drinking water supply and human health.

In conclusion, I am asking the Minister of the Environment, Gordon Wilson, to deny the request for the New Effluent Treatment Facility proposed by Northern Pulp.

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:44:50 PM

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Project: replacement_effluent_treatment_facility_project Comments: This project must be rejected and Northern Pulp must be shut down. The ecological harm to our land and waters has gone on for far too long. Also, the people of Boat Harbour First Nation have been subject to a disgusting level of environmental racism for decades. It must stop. Do the right thing NS government! Name: @hotmail.com Address: Municipality: CROUSETOWN Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 50 y: 18

From:
To: ea@ns.gov.ca; Environment Assessment Web Account
Subject: northern pulp focus report public comments
Date: November 8, 2019 10:46:16 PM
Attachments: letter to NSDOE.docx

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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please find attached my letter of response to northern pulp's focus report

November 8, 2019

Gordon Wilson

Honourable minister of environment

I am a commercial fisherman from Pictou, I fish from Caribou Harbour, the area where Northern Pulp are proposing to pump 90 million litres of toxic effluent daily. The thought of pumping this effluent into the Northumberland Strait in this day and age is completely absurd. The proposed pipe is not going to fix the disaster created in Boat Harbour; it is simply moving the problem to a new location, Caribou Harbour, another very shallow and fragile area.

The thought of putting an entire billion dollar industry at risk (risking our Canadian Brand), is simply not acceptable. Remember what happened to the beef industry with the mad cow scare, all it took was one and it completely shut down an industry overnight. We as fishermen take conservation and protection of our industry (resource) very serious. We have season (lobster: May-June, herring: Sept.-Oct., etc.), we have size restrictions on traps, nets, minimum carapace sizes, quotas, etc. which we are consulted on.

Northern Pulp had 5 years to come up with a plan to replace Boat Harbour and what they did come up with is not something new, but rather a plan that was rejected more than once in the past, and the waited until the last minute to put the proposal forward, then submitted an application for approval that was far from complete with no real studies and answers and then completed a focus report in 6 months. I am not a scientist nor do I pretend to be, but I can read and understand that a lot of those key points can’t be studied completely in that time frame and it is clear to see that there are too many things that are unsure and unproven as to what the effects the effluent will have on our fishery, tourism, local beaches, etc. they have no definite yes or no answers.

In the focus report submitted by Northern Pulp they show diagrams with false information. They show the outfall location and say there is no fishing activity in the area. I sail across this area every day when fishing and there is gear located less than ¼ mile throughout the lobster season and less than that during the crab season. Just this last herring season we loaded 1.5 miles from this location and have seen fish closer than that. The location for the outfall is the narrow channel where the PEI ferry travels and shallows up very quickly on both sides. This location is just outside Caribou Harbour where the tide flows in and out twice daily with an average of approximately 5.5 feet. The harbour is very shallow and chemicals and solids would accumulate and not flush from the harbour, especially when there are storms which hold the tide at higher levels.

I am a fourth generation fisherman with 30 years in this industry with my son now fishing by my side who is looking at his future in the industry that we all grew up in, not only looking for a good future for himself in this industry, but also for his children. This is not a job to those of us who do this; this is our livelihood at stake.

This proposal cannot and should not be approved.

Fisherman – Caribou Harbour

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:46:19 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I would NOT extend the timeline for the treatment facility. The Northern Pulp has to be forced to do whats right. From the beginning of the dumping in Boat Harbor they promised to make sure they had a safe treatment facility in place. They did not comply. Now they had 5 years, no facility is in play, but more promises IF they have more time. Companies need to be held to stricter standards and given less bailouts of taxpayers money. Why is it fair for this company to poison the air, the water and the land? Why is it fair that a person dying of cancer due to the contamination have to bail out the Share holders of the very company that has the power to prevent this? Its not. Im not sorry if a CEO has to sell their summer home on the lake. Im not sorry a Shareholder is not getting a brand new car this year because the pinch is on for them to do what they had more than the 5 yrs to do. I am sorry that someone is dying who has one home, no car and barely surviving will no doubt bear the costs. Much steeper than money. Name: @gmail.com Address: Municipality: Lake Echo Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 60 y: 11

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:46:38 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: The project makes sense and should be approved Name: @hotmail.com Address: Municipality: Liverpool ns Postal-Code: Fax: Contest_emp@freemanlumber.com email_message: Privacy-Statement: agree x: 70 y: 23

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:48:25 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Northern pipe has had enough time to make the changes necessary to stop polluting the waters. Itâ?Ts time to end environmental racism. Itâ?Ts time to stop putting the best interests of corporations over the best interests of our province because â?ojobsâ? . The fishery is arguably a more important and lucrative industry than pulp. The issue of climate change in our province is a complicated and many faceted one. All the issues are interconnected. Not only is this company dumping pollutants into our water, not only is this company trampling on the rights of our indigenous people, it is also providing incentive to cut down our forests at an unsustainable rate. Northern Pulp has had years to make a different plan, to work within the parameters set forth by various governments, and they have failed to plan ahead or make any changes. Instead of finding real solutions, they have counted down the clock by asking for extensions. This company has zero credibility. They have disrespected the tax paying citizens of this province by taking hand outs, flouting the rules, and trampling on the natural environment. No one wants to see Nova Scotians lose jobs. But if we continue destroying our province for â?ojobs at any costâ? there will be nothing left. I do not support this plan. I do not endorse Northern Pulp. I want the firm January deadline to remain in place. Northern Pulp must stop dumping effluent into the water. Period. Name: @hotmail.com Address: Crousetown NS Municipality: Crousetown Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 71 y: 21

From:
To: Environment Assessment Web Account
Subject: Northern Pulp"s Focus Report
Date: November 8, 2019 10:51:48 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is and I've lived in New Glasgow for the last 9 years and I'm concerned about Northern Pulp's Effluent Treatment Facility Proposal.

Premier Stephen McNeil stated that it would be wrong to move one disaster into a new location when he referenced Northern Pulp's ETF proposal. Of course that wasn't a statement on whether Northern Pulp's project was a disaster, simply that it would be wrong for the province to approve a project that could be characterized as creating a new disaster.

Mr. McNeil also rightfully stated many times over that the company was given 5 years to come up with a plan and that was more than enough time. Not only did the 5 year plan give ample time to Northern Pulp but this wasn't an 'arbitrary date' picked out of thin air. The Jan 31, 2020 Boat Harbour closure date in the Boat Harbour Act also falls on the last day of Northern Pulp's current Industrial Approval.

Northern Pulp was slow to get moving on their attempt to complete the project. When they filed their EARD in February, they stated that they would need an extension 'until they built their ETF or they would have to shut down'.

That ask is for an indefinite extension as Northern Pulp's plan to build an ETF that pumps effluent described by their own technical engineer as being worse than what comes out of Boat Harbour, would set up the risk to move the disaster that is Boat Harbour and make it the disaster in the Northumberland Strait.

They cannot be given an extension. That would break the deal that was made in good faith and written into law between the PLFN and the province that saved Northern Pulp from having to close in 2014. They also cannot be given an extension because they don't have a sound plan for a new ETF so it may never be built. Northern Pulp cannot be given an indefinite extension.

Northern Pulp have been given ample opportunity over their time owning the mill to ensure it runs properly. At some point you have to admit it can't be done.

Please reject Northern Pulp's proposal.

Thanks,

New Glasgow, Nova Scotia

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:52:40 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: company employees 35 full time jobs We work mainly for private land owners Most of our cuts are selective and this produces a lot of pulp. This province will cripple rural communities with out a market for this product. Paper exc. has acknowledged provided a solution and funding to a 50 year old problem they inherited. It is hard to understand how we cant support industry which provides security to thousands of families and funds a major provincial deficit. Time to weave through the regulations is a small investment for a very big return Name: @ns.sympatico.ca Address: Municipality: NEWROSS Postal-Code: Fax: email_message: Privacy-Statement: agree x: 59 y: 20

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 10:54:30 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,
My name is and my We lived in Merigomish Pictou County for the last 35 years and I'm concerned about Northern Pulp's Effluent Treatment Facility Proposal.)

I believe that Northern Pulp's plan to pump up to 85 million litres (31 Billion Litres per year) of effluent into the Northumberland Strait is a bad idea. I do not believe the Northumberland Strait and its marine life, which is already under a lot of stress, can withstand this incredible influx of effluent.

In addition to what it would do to the marine environment, I worry about the potential risk that this poses to our fisheries. We fish lobsters and just to point out that when they dredge at the wharf each spring, they are not allowed to put that dredge back in the ocean, even though they just scooped it out, so why is it Northern Pulp can do this.The livelihood of our fishers is being threatened by both the make up of the effluent as well as the temperature. I do not believe the province would have even considered a proposal from Northern Pulp if that proposal was one that would put the Michelin plant next door at risk. I don't see how this is different.

Thanks,

From: @hotmail.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:57:12 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I am 100 for the new treatment facility. I am confident in the studies done. With no significant impact on fisheries and fish habitats, no history of ice scour and the ocean water quality meeting Canadian marine guidelines it shouldnâ?Tt be a debate. Why jeopardize an entire forestry industry on a environmentally safe project proposed by a company who inherited boat harbour. It seems to me that with first the precipitator and now the proposed state of the art, industry leading facility for treating effluent we should embrace the opportunity. An opportunity for an improved and environmental safe coexistence between Northern Pulp, forestry and fisheries. Letâ?Ts get this done!! Name: @hotmail.ca Address: Municipality: Central West River Postal-Code: Phone: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 62 y: 25

From: @northernpulp.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 10:57:21 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: After taking the time to review the environmental assessment and focus report submitted by Northern Pulp, the existing, as well as projected effluent discharge quality appears to be average for Canadian Kraft pulp mills. The discharge quality is well within the existing PPER and based on the projected updated regulations, will meet those as well. Perhaps most importantly, the focus report has identified no significant adverse effects with respect to atmosphere, freshwater, and marine environments. With no significant environmental effects identified, there is no reason why this project should no be permitted to move forward Name: Email: @northernpulp.com Address: Municipality: New Glasgow Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 49 y: 26

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:02:29 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I have a resident of Nova Scotia for 73 years. I have seen many changes in our province with regards to our forestry industry. With regards to the Boat Harbour replacement treatment facility, Im wondering if consideration has been given to updating and modernizing this facility instead of a new pipe and no treatment of effluent before its release into the ocean. I am not confident in the lack of treatment by a pipe dumping unknown waste into our oceans. This company/facility has a long history of misuse of our provinces resources, mainly the lack of disregard they show towards our forests and the rate of clear cutting that they are involved in. They have shown disregard towards our forests and oceans. The slow regeneration of our forests, and the red spruce tree in particular, mimics the loss of cod stocks and the collapse of the fishery in Newfoundland. Our lumber industry is in peril because of this. In closing, I am opposed to a new facility that includes a new pipe or new dump site for the continued operation of this mill. Name: @ns.sympatico.ca Address: Municipality: Bass River NS Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 67 y: 23

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:05:40 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I do not belong to a special interest group but would like my voice to be heard. I have grown tired of the negativity that is present in Nova Scotia when it comes to industry and productivity. The utilization of our natural resources is well regulated in the province. When change is necessary it requires collaboration and commitment by all parties involved. I live in rural Nova Scotia where forestry is the main source of employment. I would urge all parties involved in the replacement of the effluent treatment facility to continue moving forward. The economic situation in this province relies very heavily on the HRM region. The work showcased in this focus report offers no reason not to support this important industry that is present across the entire province. Logic suggests that it is in the best interest of all residents of Nova Scotia to provide Northern Pulp with the opportunity to further enhance their operation while striving to meet or exceed environmental requirements. This would also allow them to provide support to an industry that many rural communities and families depend on. In closing that I offer my support to this project and would like to thank you for acknowledging my concerns regarding this important decision. Name: @ns.sympatico.ca Address: Municipality: Upper Musquodoboit Postal-Code: Fax: ### ### - #### email_message: Privacy-Statement: agree x: 48 y: 20

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:08:14 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: As a forestry worker I want the Minister to approve the environmental assessment. As third party environmental experts have concluded the water quality will meet Canadian marine guidelines. The water tempeature within 5 meters of the diffuser will be less 1 degree of ocean water. Also they have assessed no signifigant impact on any fishery or fish habitat. They have also selected a thicker than required pipe with automated leak detection system through Pictou watershed area. Name: Email: @hotmail.com Address: Municipality: Scotsburn Postal-Code: B0K1R0 Phone: ### ### - #### Fax: ### ### - #### email_message: x: 32 y: 25

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:09:51 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: The time has come. It is overdue! We ALL KNOW the damage we have done to our planet that we MUST stop completely change our direction...immediately! The NS government promised its citizens that Northern Pulp would be held accountable forced to cease their destruction of land, air, water. And the NS government MUST live UP to that promise END THIS NOW! Right now!! Nothing else matters. Name: Email: @gmail.com Address: Municipality: Lunenburg Postal-Code:

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:12:04 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: Dear Minister, The forestry and fishing industry have co-existed for the fifty plus years that the pulp mill has been in operation, with the effluent flowing to the Northumberland Strait. I am very pleased to see Boat Harbour is going to cease to be the treatment facility and be returned to its natural state. I ask that if the scientific evidence provided by the consultants who are building the treatment plant shows that the effluent leaving the treatment facility will not be a detriment to the fishing grounds, then the project should receive approval. There are thousands of families that depend on the forestry sector in Nova Scotia to survive, and Northern Pulp plays an integral part in the economy of Nova Scotia. Thank you for your time. Name: Email: @hotmail.com Address: Municipality: Stellarton Postal-Code:

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:14:02 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: When is it time for the madness to stop? I plead with government do its part to stop the continued pollution in the air and waters in and around the province most notably in Pictou County. It has gone on long enough! We see what the destruction of the Amazon Rainforests is doing to the air we need to breathe Well the destruction of all our forests contributes to the Climate change as well We need our forests like we need clean air and clean waters Help us become a leading environmental leader with protecting Our Land Sea and Air!!! Name: Email: @eastlink.ca Address: Municipality: Scotsburn Postal-Code:

From: ∂hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:17:07 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: I support the Northern Pulp focuse report and its findings. The science based studies conducted for the report show that the project will allow the facilities effluent to meet our exceed the Canadian marine guidelines. The proposed treatment facility is based on proven technology currently in use at other similar facilities. Name: Email: @hotmail.com Address: Municipality: Postal-Code:

From: _____@ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:18:23 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: It is time to do the right thing For workers, for Nova Scotians, For tax payers, for businesses and the forestry sector. The environment and the first nation can be respected and should be respected. There is no reason based on the science in the report we cannot have a sustainable forestry sector that includes Northern Pulp while respecting and protecting community interests including the people who live there. Approve this project and make this facility a model others want to strive to have in their communities. Thank you, Name: Email: @ns.sympatico.ca Address: Municipality: Afton Postal-Code:

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:23:29 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Has a university student I feel there is a better way that we can look at this problem. Instead of taking away a industry that wants to look after our environment. We need to work these companys instead of punishing them. The government needs to help these companies by providing recourses such has options to help make a more sustainable company. Companys can not change on a dime they need time and recourses to change and Northern Pulp did not have a fair chance or enough time. I firmly believe they are not trying to hurt the environment, because why would the people that work for these companies want to harm the environment that provides them a job. I believe we are at point that instead of punishing a company we need to work together and help build a more strong stable and sustainable Nova Scotia and punishing companys such has northern pulp is not going to solve anything besides hurt people. This is why I stand with Northern Pulp Name: Email: @gmail.com Address: Municipality: New Germany Postal-Code:

From:
To: Environment Assessment Web Account
Cc: info@friendsofthenorthumberlandstrait.ca
Subject: Northern Pulp"s Effluent Treatment Facility Proposal
Date: November 8, 2019 11:24:51 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister for the Environment Gordon Wilson,

My name is and I've lived in Antigonish County for over 40 years. My son, daughter-in-law and two grandsons live in Pictou County. I am very concerned about Northern Pulp's Effluent Treatment Facility Proposal.

I believe that Northern Pulp's plan to pump up to 85 million litres (31 Billion Litres per year) of effluent into the Northumberland Strait is a bad idea. I do not believe the Northumberland Strait and its marine life, which is already under a lot of stress, can withstand this incredible influx of effluent.

In addition to what it would do to the marine environment, I worry about the potential risk that this poses to our fisheries. The livelihood of our fishers is being threatened by both the make up of the effluent as well as the temperature.

Oceans absorb CO2 from the atmosphere and the colder the seawater, the more effective the process.

Premier Stephen McNeil stated that it would be wrong to move one disaster into a new location when he referenced Northern Pulp's ETF proposal. Of course that wasn't a statement on whether Northern Pulp's project was a disaster, simply that it would be wrong for the province to approve a project that could be characterized as creating a new disaster.

Mr. McNeil also rightfully stated many times over that the company was given 5 years to come up with a plan and that was more than enough time. Not only did the 5 year plan give ample time to Northern Pulp but this wasn't an 'arbitrary date' picked out of thin air. The Jan 31, 2020 Boat Harbour closure date in the Boat Harbour Act also falls on the last day of Northern Pulp's current Industrial Approval.

Northern Pulp were slow to get moving on their attempt to complete the project. When they filed their EARD in February, they stated that they would need an extension 'until they built their ETF or they would have to shut down'.

That ask is for an indefinite extension as Northern Pulp's plan to build an ETF that pumps effluent described by their own technical engineer as being worse than what comes out of Boat Harbour, would set up the risk to move the disaster that is Boat Harbour and make it the disaster in the Northumberland Strait.

They cannot be given an extension. That would break the deal that was made in good faith and written into law between the PLFN and the province that saved Northern Pulp from

having to close in 2014. They also cannot be given an extension because they don't have a sound plan for a new ETF so it may never be built. Northern Pulp cannot be given an indefinite extension.

Northern Pulp have been given ample opportunity over their time owning the mill to ensure it runs properly. At some point you have to admit it can't be done.

It's time for NS to find new ways to use the forests, other than for biomass and pulp. Let's use our tax dollars to have those in the forestry industry supported to grow new mixed forests to sequester carbon and be grown and harvested for uses that are good for our environment. Climate change is here. Let's be smarter.

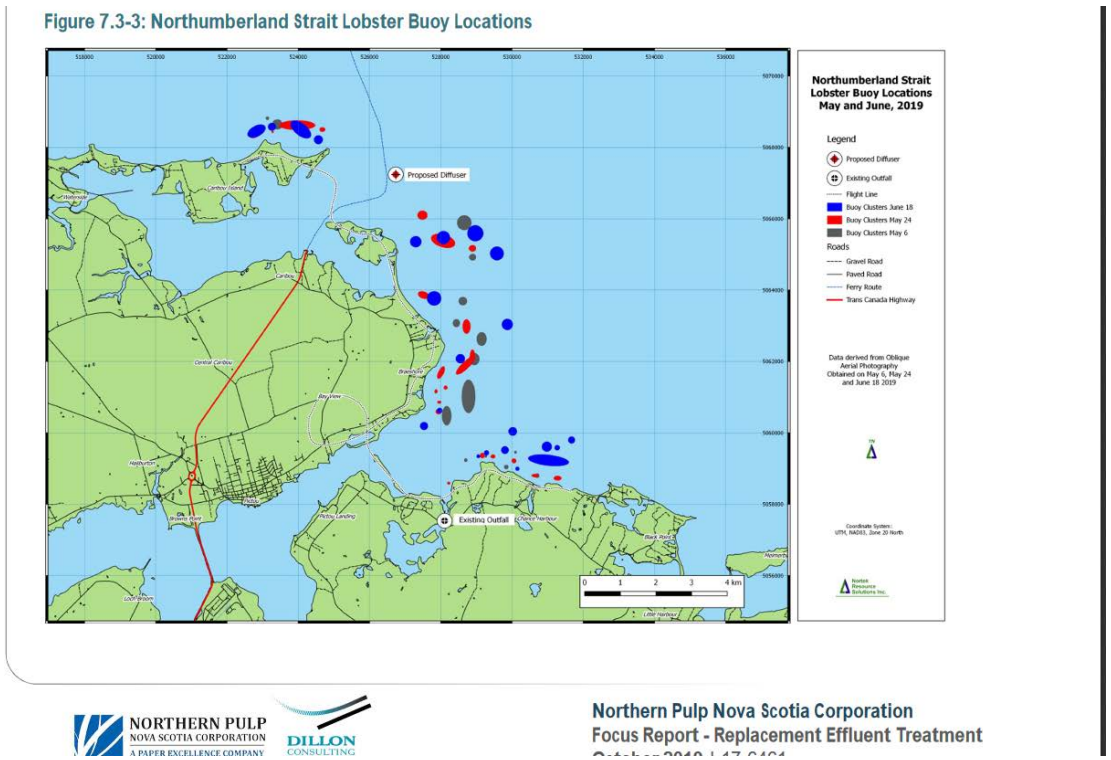
Finally, I want to emphasize that I stand with the Mi'kmaq of Pictou Harbour First Nation. The effluent must stop on January 31, 2020. No extension. We are all treaty people. It time for us to honour our committments.

From: [redacted]
To: Environment Assessment Web Account
Cc: [redacted]
Subject: proposed effluent treatment faculity
Date: November 8, 2019 11:26:08 PM
Attachments: img-1.png
img-2.png
img-3.png

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Northern Pulp focus report

As a fisher in the Caribou area this is a picture of all the spots that I have for my lobster traps in my fishing career. I have also fished rockcrab and herring in these areas also. As you can see the big yellow plus sign in the picture this is proposed outfall location. You can see there is lots of lobster fishing in this area un like the picture in the focus report see photo attached below .



As you can see in the legend the dotted line is the flight path.It makes me wonder how they could not have seen a bouy clusters around the proposed diffuser location? When they seen them elsewhere. That area would have bouys on the days of the flights and the boats doing the core samples and the surveys of Caribou harbour would have seen them also.

Also in the marine impact assessment part of the focus report appendix 7.3 pg100 it states that shellfish effects are not reversible.Lobsters and crabs eat these things so i wonder what the effects on crabs and lobsters will be?Well on

> Local and regional fisheries resource users have raised concerns over potential toxicological effects on fisheries resource use as the result of the proposed discharge of effluent. The primary concerns are related to the potential effects of the new discharge on larval lobster and herring, both locally important species.
>
> To address these concerns, NPNS will continue to investigate the feasibility of performing toxicity testing to determine both potential acute and sublethal effects on immature stages of lobster and herring. Standardized toxicity testing protocols are not available for lobster and herring; however, custom tests have been developed that can be completed using larval lobster and herring embryos. The tests will include Stage I-IV larval lobster and include a live-dead (acute) assessment of the various stages, as well as the assessment of sublethal effects on moulting time and growth. Herring tests on embryos would be similar in that they would assess acute toxicity to eggs, as well as the growth post-hatch for a number of days.

pg 109 of the same report it says see below

Phase / Interaction / Component/ Class	Group	Indicator(s)	Potential Effect	Proposed Mitigation	Residual Effect	Residual Significance after Mitigation					Overall Significance	Likelihood
						Value of Group or Indicator	Magnitude / Geographic Extent	Duration	Frequency	Reversibility		
Marine Shellfish	Shellfish	Sea Scallop, Soft-Shell, Bar, Razor Clams, Blue Mussel, Oyster, Quahaug	Physical – direct mortality, disturbance to benthic habitat due to the staging, excavation, pipe placement and material backfilling, potential habitat overprinting associated with land-marine pipeline connection, increased sedimentation and potential change to sediment quality.	• Work will be staged and incorporate fisheries timing windows to avoid sensitive life stages. • Work during the construction phase will be scheduled to the extent practical to avoid periods of adverse weather or spring tides to reduce turbidity and sedimentation. • Duration of in-water work will be managed to the shortest time that is practical. • An ESCP will be developed for the site that reduces the risk of sedimentation to the marine environment and additional mitigation measures identified as applicable. • Provision of habitat offsetting, if required.	With implementation of mitigation measures, as proposed including those to reduce turbidity and sedimentation and potential compensation through No Net Loss Plans and/or equivalent offsetting resource productivity will be maintained.	Regionally important species' and resources to commercial, recreational and Indigenous fisheries, harvested in the RAA.	Effects are considered to be minor and encompass a small area (confined to the pipeline corridor and diffuser area).	Medium-term: effects are specific to the period of construction and or decommissioning or short periods of maintenance as required throughout the life of the project.	Effect is expected to be continuous through construction, operation / maintenance and decommissioning of the project.	Effect is irreversible with respect to the potential loss of shellfish along the corridor and diffuser area.	Overall effects are considered to be generally minor, localized and not reversible and may require compensation.	Effect will occur
						Level III	Level I	Level II	Level II	Level III	Not Significant	

There are approximately 70 boats that fish out of Caribou harbour.Lets say on average 25000 pounds of lobster per boat per season, that works out to 1,750,000 pounds of lobster per season (low estimate) you would think that alone would be enough to make it "feasible for npns"to do toxicity tests if they really cared.Thats not counting the money from the herring and rock crab and scallop fisheries.Also Caribou harbour is a major nursery for juvenile rock crab so they also would be affected by the effluent since they stay in the harbour till adulthood.

As you can see the page of bouy clusters is just one example where npns hand picked information so that it would seem that there is no fishing activity in the area, when in fact there is lots of fishing activity in the area.People swim, dig clams, quahogs pick oysters fish mackeral smelts and sea bass in the harbour. The cormorants are lined up all along Munroes island point to get their share of the small fish that live in the harbour.If the effluent is pumped into the strait it will flow back into the harbour.Not Good

This proposed plan to pump the effluent into the strait is a terrible idea as Dillon Consulting has said numerous times it will be worse then whats going into Boat harbour now.

4th Generation Fisherman
Caribou

From: _____@hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:29:07 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Dear Minister, my name is and I would like to express my concerns for a planned ETF and pipe dumping effluent into the Northumberland Strait. I was born in New Glasgow but never spent much time living here as, we are a military family and lived all over Canada. Our family was back home here in Pictou County and as children, we cherished the memories made here in the summers. Spending long summer days along the shore on Pictou Island at my folks cottage, the very best of memories!! As i grew up and was old enough to help fisherman with traps, I started a passion. A career in the Navy, diving in all parts of this planet, I saw first hand many polluted waters. The water in the strait off the Island is like nowhere else. Pristine clean, salt water, teeming with life!! After the Navy, I fished with my brother in law and other fisherman. We fished lobster, rock crab, herring and scallops. We also caught mackerel. Many fishers have made this a way of life for ma ny generations. I have 2 daughters now and 2 grand daughters as well. I am truely blessed to be so lucky to enjoy time with them along the shore in the summers. The Strait has so much to offer the people of Nova Scotia. It makes absolutely no sense to me why our government would allow a foreign company to act so recklessly in our waters and environment is very concerning to me. It is disgusting to me what the politicians and CEOs from Northern Pulp and all the previous owners have done. The lies and deceit to hide the truth or exceed limits with no regard for the environment are baffling to me. I dont believe there is any public trust in the way the mill has always done business. The public is good and sick of it and from it!! It is unbelievable what man will do for money!! #nopipe
Name: Email: @hotmail.com Address:
Municipality: . Postal-Code:

From: _____

To: Environment Assessment Web Account

Subject: Replacement Effluent Treatment Facility Project

Date: November 8, 2019 11:30:22 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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To The Minister of the Environment for Nova Scotia,

You have a very important job to do in deciding if this project will have significant environmental
effects and if they can be mitigated. I am concerned that the risks to human health, tourism and
sustainable fishing may have been **underestimated** in the focus report in spite of all the detail provided.

An example of something inaccurate or misleading in the focus report is the absence of lobster buoys around the diffuser area on the 3 days the observations were made. According to locals this is not an accurate reflection of lobster fishing in that area.

Another example is the implication in the focus report that the diffuser does not fall within one nautical mile of the scallop buffer zone. This is simply untrue.

Northumberland Trait is a **finite body of water**; it is not the same as putting effluent (containing heavy metals and other toxins) into the ocean (although I would probably object to that as well, in spite of the greater capacity for dilution.)

In conclusion, I ask you to reject this project as there is insufficient information to show that this project will not have a **deleterious effect on the unique ecosystem** of the Northumberland Strait which is the livlihood of thousands of Maritime fishers, including First Nation communities, as well as supporting an important tourism industry.

Finally, since I have unfortunately not been able to read the many pages of the focus report in the time provided, I ask you, Mr Minister, if the **role of climate change**, and how it might interact with the project and impact consultant predictions has been considered?

Respectfully yours,

Avondale, NS

From:	Environment
To:	Environment Assessment Web Account
Subject:	Proposed Project Comments
Date:	November 8, 2019 11:30:42 PM

Project: replacement_effluent_treatment_facility_project Comments: I support the Northern Pulp focuse report and its findings. The science based studies conducted for the report show that the project will allow the facilities effluent to meet our exceed the Canadian marine guidelines. The proposed treatment facility is based on proven technology currently in use at other similar facilities. Name: Email: Address: Municipality: trenton Postal-Code:

From: @dal.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:31:31 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: As a PhD Biologist, I examined the evidence presented in the NP Focus Report and found it lacking in several respects. In my opinion, the Report has inadequately characterized the environmental impacts of pumping effluent into the Strait. Pumping water that is less saline and warmer will likely have detrimental effects on lobster, especially their larvae. The toxins in the water, concentrations of which the Report acknowledges cannot be known at this time, will effect marine life and the health of the fisheries. The Report calls it a typical kraft paper mill Table 0.0-1 but fails to place it into the context of a highly sensitive area. For instance, the Report does not indicate where those other mills are located, what effects are they having on their environment, and how sensitive their sites are in comparison to Northern Pulpâ?Ts. The Report failed to take into account climate change, which is rapidly and unpredictably changing the characteristics and functioning of nearshore marine environments, including changes in currents, water temperatures, and oxygen levels, all of which will affect effluent behaviour as well as marine life. The Focus Report has underestimated the risks to the local economy, especially fisheries and tourism, but also all of the spin-offs from them. Furthermore, tourism, which is already being impacted by the mill has great potential for growth without the mill. Lastly, the Report has greatly overstated the importance of the mill in the forest economy of NS. It is only a â?~cornerstoneâ?T to the extent that the province has made it as such. It would be more beneficial to support restructuring of the Nova Scotia forest industry than to subsidize this mill and encourage over harvesting of the forests that is required to support it. Loss of the mill would allow ecological forestry, which the province has agreed to adopt, to proceed. I urge you to reject the proposal. Name: Email: @dal.ca Address: Municipality: Lawrencetown Postal-Code:

Project Comments

Please note:

All comments received from the public consultation will be posted on the department's website for public viewing. In the case of an individual, the address, email and contact information will be removed before being placed on the website.



Select a Project:

Replacement Effluent Treatment Facility Project

Comments:

This water treatment plant is a positive move for the Mill and Pictou Residents
I agree with Northern Pulps planned treatment plant.

Name:

Email:

Address:

City / Town:

Antigonish

Postal Code:

B0H 1A0

Phone Number:

Fax Number:

Please note: By submitting your comments, you are consenting to the posting of your comments on the department's website.

☑ Yes, I agree

Project Comments

Please note:

All comments received from the public consultation will be posted on the department's website for public viewing. In the case of an individual, the address, email and contact information will be removed before being placed on the website.

Select a Project:

Replacement Effluent Treatment Facility Project



Comments:

I agree & support the planned Project for the Northern Pulp Plant This Company is moving forward to make this Mill Cleaner

Name:

Email:

Address:

City / Town:

Antigonish

Postal Code:

B0H 1A0

Phone Number:

Fax Number:

Please note: By submitting your comments, you are consenting to the posting of your comments on the department's website.

☑ Yes, I agree

Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, N.S.
B3J 2P8

N.S. ENVIRONMENT
ENVIRONMENT
ASSESSMENT BRANCH
NOV 08 2019
RECEIVED

ATT'N: Honorable Gordon Wilson
Minister of environment

Dear Sir:

I am a — year old Male who has Worked in forestry (Northern Pulp) approximately . years. Our family has lived in a small fishing/farming Community since birth

I have experienced the lows (labour strikes app. 15 Months in total and their negative effect on our area) and the highs (Expansion announcements, system upgrades on boilers, Withdrawal of Chlorine Usage, New precipitator etc.)

the past few weeks I have been reading as much as possible the Wastewater Treatment facility project focus report submitted by Northern Pulp to your government and I would now like to share My thoughts With your government.

In the past year, I have had many Conversations with friends and neighbours Who are Concerned about the project. Many, I believe, are Mis-informed about the facts and Understanding of the proposal for the new treatment Facility and are naturally Concerned. Some did not know that there are More Fishermen (lobster) in the area of discharge now than in the new proposed area of discharge and that the Water Quality of the new discharge Will Meet Canadian Standards and that

Third party environmental experts say this project will have no significant impact on the fishing industry.

Also, the pipe for the proposed new pipeline will have ½" wall thickness larger than specified and an an automated leak detection system will be installed in the Watershed area of Pictou.

I feel the successful operation of Northern Pulp in our province is very significant and will list some of the benefactors I have experienced:

- Mill employees / Woodlands operations
- Transports / couriers
- Railroad shipping
- Container "
- ~~transport~~ Exterior Contractors
- Raw Material Suppliers - Chemicals, Oxygen Natural Gas, Propane Lubricants, Diesel Gasoline, etc.
- Parts suppliers
- telephones / N.S. Power
- Equipment Suppliers - Forklifts, Cranes, Loaders dozers, trucks
- Hotels/Motels
- Governments - taxes / inspectors / Services

In Conclusion, Mr. Minister Wilson, I am asking that you and your department will favourly approve this Environmental Assessment Focus report which will provide Environmental Protection and Continued economic growth for our province.
Thank you for the opportunity of public submission.

Yours Truly

From:
To: Environment Assessment Web Account
Subject: Reject Northern Pulp ETF Replacement proposal
Date: November 8, 2019 11:32:45 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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It is an alarming state of provincial government affairs when the general public have to rapidly become armchair scientists in order to secure protection for Nova Scotia's valuable natural resources! The science is already there and very well documented within each of our own local NS departments so I am not certain why that information would have to come from outside sources of consulting firms being paid for services rendered by proponents? Of course, those consulting firms will make any project sound like everything will be idealistic!

I urge the Nova Scotia Environment Minister to reject Northern Pulp's proposal to disperse effluent wastewater into the local marine waters of the Northumberland Strait.

I would urge the minister and his environment department staff to reference Canadian Water Quality Guidelines for the Protection of Aquatic Life and the effects of marine debris. Wood wastes from pulp milling is listed as a "settleable matter which physically alters the suitability of bottom habitats" . Furthermore, these guidelines state "no residues or other solids should be introduced (directly or indirectly through human activities) that may, alone or in combination with other substances, cause any solid, sludge or emulsion to be deposited on the bottom intertidal zone or shorelines of marine and estuarine areas. The natural rate of deposition and characteristics of marine and estuarine settleable sediments and other settleable solids should not be altered." (CCME1996)

Common sense would dictate that with climate protective measures being introduced and implemented worldwide, now is the time for government leaders at all levels to begin to close doors on old practices in order to open new windows for environmentally responsible economic opportunities.

Respectfully,

ster County

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:40:01 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: With regards to itâ?Ts proposed State-of-the-Art Replacement Effluent Treatment Facility, Northern Pulp has complied with all aspects of the Environmental Assessment and additional Focus Report. As with any industrial project, Ministerial approval is bound by the Environmental regulations in force at the time, and should be based on science and fact. Considering that an independent third party report has confirmed that construction and operation of the new facility will have minimal to no effect on the environment, and will meet or exceed current and future environmental regulations, I believe that it is the Ministerâ?Ts duty to approve the Environmental Assessment. Name: Email: @gmail.com Address: Municipality: Doctors Brook Postal-Code:

21

From: @physiofunction.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:42:35 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: replacement_effluent_treatment_facility_project Comments: Dear Mr. Environment Minister, I am a taxpayer of NS and concerned about the future of Pictou Co.. My family is in Pictou Co and this county has the highest rate of cancer in NS. My father worked close to NS Pulp and has cancer. We have a family cottage close to Caribou and I am concerned about the future of swimming in the Northlumberland Strait.I have great memories as a child and as a parent that have had a lot of fun swimming and boating in these waters. I hope my future generations will be able to have the same enjoyment. Growing up in Pictou Co, I have smelled Northern Pulps pungent smell and wonder how can that be good for our lungs. My sister works in Pictou and can not open her windows due to the horrible smell. How is it possible that the residents of Pictou currently have to endure the particles that come from Northern Pulp that land on their homes and cars? With Northern Pulps new plan they want to add MORE particles into the air with burning the sledge. Is the NS Govt going to consi der the health and recreational enjoyment of people that live and vacation in Pictou Co, or simply ignore them to keep Northern Pulp happy? Pictou Co has the potential to be very active in tourism but this will not flourish when the air smells and people do not want to stay and be outside ending the scenery. The new proposed route to carry the effluent away from Northern Pulp involves going beside and over the watershed area for the Town of Pictou. Why would anyone risk pollution of a towns water supply in the present days of 2020s. Allowing this risk would be very archaic. I enjoy eating seafood: fish caught from the rivers of Pictou Co and shellfish from off Caribou. As I see climate change occurring floods/fires/droughts and the waters the Northlumberland Strait warming over the past few years, I am concerned about the bacteria that exist with warmer water and the safety of eating shellfish as recently noted off BC coast. So I do not think it would be prudent to allow 80-90 million L of warm water to constantly flow into Caribou waters, not even considering the actual composition of extra abnormal chemical particles that will also be deposited into the Caribou waters from Northern pulps exudate.What about the safety of the fish caught in these waters that is exported around the world. Do we keep jobs at Northern Pulp instead of the fisherman jobs and risk the health of people all over the world? Mr MacNeil has travelled to China numerous times in during his time as premier to promote Seafood from NS -I dont think he would want to jeopardize t his resource. I hope our government is truly concerned about the future of the oceans, marine and wildlife, and health of its people. Northern Pulp has posters distributed in Pictou Co to preserve our forestry which I think is very misleading. We do need to maintain our forests and this does provide jobs, We DO NOT NEED TO DEFOREST OUR LAND to make jobs as Northern Pulp does. Kudos to the Pictou Landing First Nations that have fought Northern Pulp over the years to stand up for their rights and have been successfully awarded costs by the courts. I would be very disappointed if the NS Govt gives an extension to Northern Pulp and disregards the people of Pictou Landing.The Government says it is involved in Truth and Reconciliation, I look forward to see them keeping their word. My last concern is Northern Pulps poor record in detecting leaks that have frequently occurred in the current Boat Harbour treatment system and also the high level of abnormal pollutants from the precipitator. Their track record is not good. Why did they not have a conclusive report sent to the NS Govt in

March and thus required more time to do their work and diligence? How many chances do we give them and why as tax payers are we paying. Lets stand up and correct the errors of previous governments since the 1960s. Enough is enough. Throwing more money at bad is not the answer. Understanding the conflict of interest of our provincial govt is in, do the correct thing and ask for a proper federal environmental assessment to better assess all the risks that are identified and present or simply say no to Northern Pulp for an extension. Another 10 years of harm may not be reversible as in the proposed 250 million or more Boat Harbour cleanup. Thanks for the opportunity to express my concerns re: the future of life in Pictou Co.PLEASE provide/facilitate a healthy longterm future without the imminent risk of distresspollution in an environment.Use money to think outside the box to find new jobs for the current employees and associated workers of Northern Pulp instead of keeping a bad system working.SAY NO TO THE PIPE! Name: Email: @physiofunction.ca Address: Municipality: Dartmouth, NS Postal-Code:

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report
Date: November 8, 2019 11:45:47 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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To the Minister of Environment

I'm writing in response to the focus report submitted by Northern Pulp, a bleach kraft mill.
Out of the many things I would like to cover, the one thing that stood out to me is page 170 on the report. This page shows a picture of buoy clusters, dated when seen. I can say this picture is very false and shows the lack of truth Northern Pulp put into their report.
I am a commercial fisherman among 14 other fishers and First Nations fishers who set 280 traps each , 56 trawls of 5 traps . We fish from Mackenzice shoal (east of Pictou harbour) along the shore to the Caribou ferry channel , as well as, the proposed effluent wastewater discharge point . This area is covered in traps from May 1 till June 30. This is where we 15 commercial fishermen make our living and feed our families . We employ 45-60 people on these 15 boats.
As a graduate of Holland College (Renewable Resources management) and Strait Area Campus (Forestry Resources) and 20 years fishing on the Northumberland Strait , I am 100% positive this proposed effluent wastewater pipe will have a negative impact on the quality and quantity of shellfish ,fish and the habitats they dwell in.
Effluent from a Pulp mill using bleaching is a toxic substance under the Canadian Environment Act.

Thank you

Sent from my iPhone

From:
To: Environment Assessment Web Account
Subject: Northern Pulps Focas Report
Date: November 8, 2019 11:46:02 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier Stephen McNeil and Minister of the Environment Gordon Wilson;

We are writing to you regarding Northern Pulps Focus Report for their proposed Effluent Treatment Facility. We live along the West River about 15 km from the pulp mill and we have family living along the shore in Central Caribou, close to Northern Pulps proposed route for an effluent pipe going into Caribou Harbour.

Last March we submitted a response to Northern Pulps Replacement ETF Project application with two major concerns. Number one was their plan to burn sludge from the new facility in their 50+ year old power boiler which has failed emission limit tests in the past, most recently this summer. This same concern was raised by the Town of Pictou as seen in Northern Pulps Concordance Table. In reading from page 25 of Appendix 1.1 of this table under Human Health Evaluation, Northern Pulps Response to this concern is that “EcoMetrix has started the HHRA and estimates completion in the spring of 2020”. This immediately raises a red flag if the Department of the Environment accepts Northern Pulps application. Once they are given permission to build the ETF there will be no turning back even if EcoMatrix identifies a further risk to human health. Our government has the responsibility to protect citizens from such risks and can be held to account if they fail to do so. To give this project the go ahead without receiving this information from Northern Pulp would certainly be troubling as it could result in even more serious health risks to the residents of Pictou County from air emissions more dangerous than what we currently have to endure.

The second concern that we raised in our March email referred to the large amount of solids (4 tons as mentioned on pg.84 table 5.6-1 of their EA) that will be pumped into the Northumberland Straight daily. We refer to a letter regarding these solids, written by Dr. Robert MacNeil from Sydney and published in the Truro News on Oct. 24th 2019. Dr. MacNeil studied marine biology and worked for the Department of Fisheries covering a district from Caribou to Pleasant Bay. He states that “The wood fines from the discharge have drifted east and west of the mill for many kilometres. The wood fines, which constitute the bulk of the solid discharge, provide a flotation system to ensure a wide dispersal of the toxins, furans and other toxic substances along the coast. “He goes on to say; “I have read Northern Pulps proposed plan to send effluent into the Northumberland Strait, and in essence, what happens is that those same wastes, currently produced and delivered to Boat Harbour, will now be delivered farther offshore. This would ensure that those same contaminates and poisons are dispersed over a wider area of our coastline, poisoning a different marine ecosystem”.

Imagine what that will do to the beaches at Caribou Park and Munroe’s Island and to the beach where our grandchildren play.

These are just a few of our concerns with Northern Pulps Focus Report. For these reasons: 1. The incomplete HHRE to address the burning of sludge in an antiquated power boiler and 2. The inevitable widespread dispersal of contaminates onto our coastline, we ask that you reject Northern Pulps Application for a New Effluent Treatment Facility.

Respectfully;

From:
To: Environment Assessment Web Account
Subject: Replacement Effluent Treatment Facility project- Northern Pulp Focus report
Date: November 8, 2019 11:48:51 PM
Attachments: Focus Report Comments_20191108.pdf

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Hon. Gordon Wilson
Minister of Environment
Nova Scotia Environment
PO Box 442
Halifax, Nova Scotia
B3J 2P8

RE: Replacement Effluent Treatment Facility Project – Focus Report

Dear Hon. Gordon Wilson:

As a person who has worked in the forest industry for over 40 years, including the past 33 for Northern Pulp and its predecessor companies it might be expected that this submission would include a bias. The reality is, I fundamentally believe in the need for continuous improvement and stewardship of the environment including leaving a legacy for future generations that we can be proud of. It is a delicate balance of environment versus economy and both are critically important.

I appreciate your department's stewardship & regulatory role in protecting Nova Scotia's environment as well as government's responsibility to balance protection of environment versus the economy. Co-existence is possible and is required if Nova Scotia is going to continue to be beautiful, desired place for people to live and call it their home.

I have taken the time to review the focus report and understand some key scientific findings contained within it. My high level general comments are that Northern Pulp has made significant environmental improvements over the past 8 years and this environmental project would be another step in significantly reducing their environmental footprint.

Some of the findings that strongly aligned with my principles and my decision to believe this project is very good legacy for our future generations are:

- The decision based on due diligence (science data) to change the original pipeline route from Pictou road location to Caribou harbor. This may have delayed the whole process and cost more money but it was the right decision for the long term.

- No ice scour found at greater than 9 m outside Caribou Harbour. Water depth at diffuser is 20 meters.

- Outfall area is pre-dominantly sand with some gravel. Sandy areas surrounding the outfall show significant sand ripples (up to 0.5 m in height) that indicate high currents are present in the area that will provide good effluent mixing.

- Untreated effluent from Northern Pulp was tested for more than 250 different parameters and was found to be similar in quality to other kraft mills.

- The selected Veolia BAS™ effluent treatment system is an appropriate state-of-the art technology to treat the effluent.

- Effluent from the new system will meet current regulations in every province in Canada as well as the more stringent federal pulp and paper limits being proposed.

- The new treatment system is designed to handle 85,000 m^3/day of effluent when the average use 65,000 m^3/day. This system is further enhanced by the industry best practise use of a spill basin which was added to the project to minimize upsets in effluent quality.

- Extra protective measures taken within the watershed area. The pipeline is intentionally over-designed with a 0.5" thicker High-density Polyethylene (HDPE) pipe. The engineering evaluation recommended a 2.118" pipe and Northern has decided to use a 2.667". In addition a state-of-the-art automated leak detection system will be installed.

- In the receiving water studies, field data collected near the outfall shows the current is much stronger than predicted in the previous receiving water study.

- The updated model has three times higher dilution ratios than the previous model and can easily meet the CCME (Canadian Council Ministers of the Environment) guidelines for mixing zones.

- Winter ice cover is not a concern as the model found very little difference in effluent dilution ratios between ice cover and open water conditions

- Stantec Consulting used widely accepted programs that were appropriate for this modelling application. The model predicts more than 100 times dilution in less than 2 m from the outfall (1% treated effluent, 99% seawater). Current federal regulations do not require EEM (Environmental Effects Monitoring) studies to be completed if effluent concentrations are less than 1% within 200 m of the outfall. This is significant environmental improvement over the current system.

- Both the existing and future effluent outfalls are located in the Northumberland Strait. The future outfall has less potential environmental impact than the existing outfall due to a considerable improvement in mixing conditions.

- Effluent temperature will be less than 1°C above background water temperature less than 2 m from the outfall and will not warm up the Northumberland Strait. Heat will be lost to the atmosphere through waves and not build up in the waters of the Strait.

- Beyond a zone of 2 meters diameter around the outfall diffuser, water quality will be at background conditions which limits exposure of marine animals in this small area.
- Overall, there is no significant impact of treated effluent on marine species.

- There will be minor impacts on marine species and habitat due to construction, but they will be localized and generally “reversible” which means habitat and population will re-establish naturally.

In summary, I believe the scientific facts and data support this project being approved and allowing Northern Pulp to reduce their environmental footprint.

From:
To: Environment Assessment Web Account
Subject: Response to the Focus Report on Northern Pulp's Proposed Replacement Effluent Treatment Facility Project
Date: November 8, 2019 11:50:34 PM

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The splashing of my flailing arms and feet did not help as much as my life jacket, and with both I still managed a full gulp of seawater, while I learnt to swim in the Northumberland Straight. Dear Minister of Environment, I swam in these waters everyday, rain or shine, and my hope is that one day my children can safely do the same. I was raised on these shores. I have farmed along these shores. I have given tours along these shores. I am completing research along these shores. I am friends with fishermen and I am better friends with foresters. I do not approve of NPNS's undeniably poor track record. If managed differently, I may have faith in them. I support First Nation communities and their people – it is time we make a solid stance for support and above all respect the promise to them. I support the fishermen and women who depend on a clean ocean environment to supply us with seafood that tests safe for human consumption. I value our oceans, forests, and connecting humans closer to nature. Unfortunately, this project does not meet my values. Therefore, I recommend this project be rejected. As one lone reader amongst thousands of pages, with a duration of 30 days, it is unrealistic I can offer a comprehensive response citing scientific papers although I would very much like to. I have read the project files and additional information without planning to respond, but to instead educate myself. However, after diving into considerable depth, I have decided to voice my opinion. Which as you have already read, is to reject Northern Pulp's proposed project.

From:	@tncweb.ca
To:	Environment Assessment Web Account
Cc:	@tncweb.ca
Subject:	Northern Pulp Lip Service
Date:	November 8, 2019 11:51:06 PM
Attachments:	Figure 7.3.3.png Feasability.png Toxicity.png
Importance:	High

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Northern Pulp focus report

As a fisher in the Caribou area this is a picture of all the spots that I have for my lobster traps in my fishing career. I have also fished rock crab and herring in these areas also. As you can see the big yellow plus sign in the picture this is the proposed outfall location. You can see there is lots of lobster fishing in this area unlike the picture in the focus report.
see photo attached labelled **"outfall".**

As you can see in the legend the dotted line is the flight path. See the attachment labelled "**Figure 7.3.3**" It makes me wonder how they could not have seen bouy clusters around the proposed diffuser location? When they had seen them elsewhere. That area would have bouys on the days of the flights and the boats doing the core samples and the surveys of Caribou Harbour would have seen them also.

Also in the marine impact assessment part of the focus report appendix 7.3 pg100 it states that shellfish effects are not reversible.Lobsters and crabs eat these things so i wonder what the effects on crabs and lobsters will be? Well on pg 109 of the same report it says see below. See attachment "**Toxicity**"

There are approximately 70 boats that fish out of Caribou harbour. Lets say on average 25000 pounds of lobster per boat per season, that works out to 1,750,000 pounds of lobster per season (low estimate) you would think that alone would be enough to make it "feasible for NPNS" to do toxicity tests if they really cared. That's not counting the money from the herring and rock crab and scallop fisheries. Also Caribou harbour is a major nursery for juvenile rock crab so they also would be affected by the effluent since they stay in the harbour till adulthood. See attachment labelled "**Feasibility**".

As you can see the page of bouy clusters is just one example where NPNS hand picked information so that it would seem that there is no fishing activity in the area, when in fact there is lots of fishing activity in the area. People swim, dig clams, quahogs pick oysters fish mackeral, smelts and sea bass in the Harbour. The cormorants are lined up all along Munroe's Island point to get their share of the small fish that live in the Harbour. If the effluent is pumped into the strait it will flow back into the Harbour. Not Good!

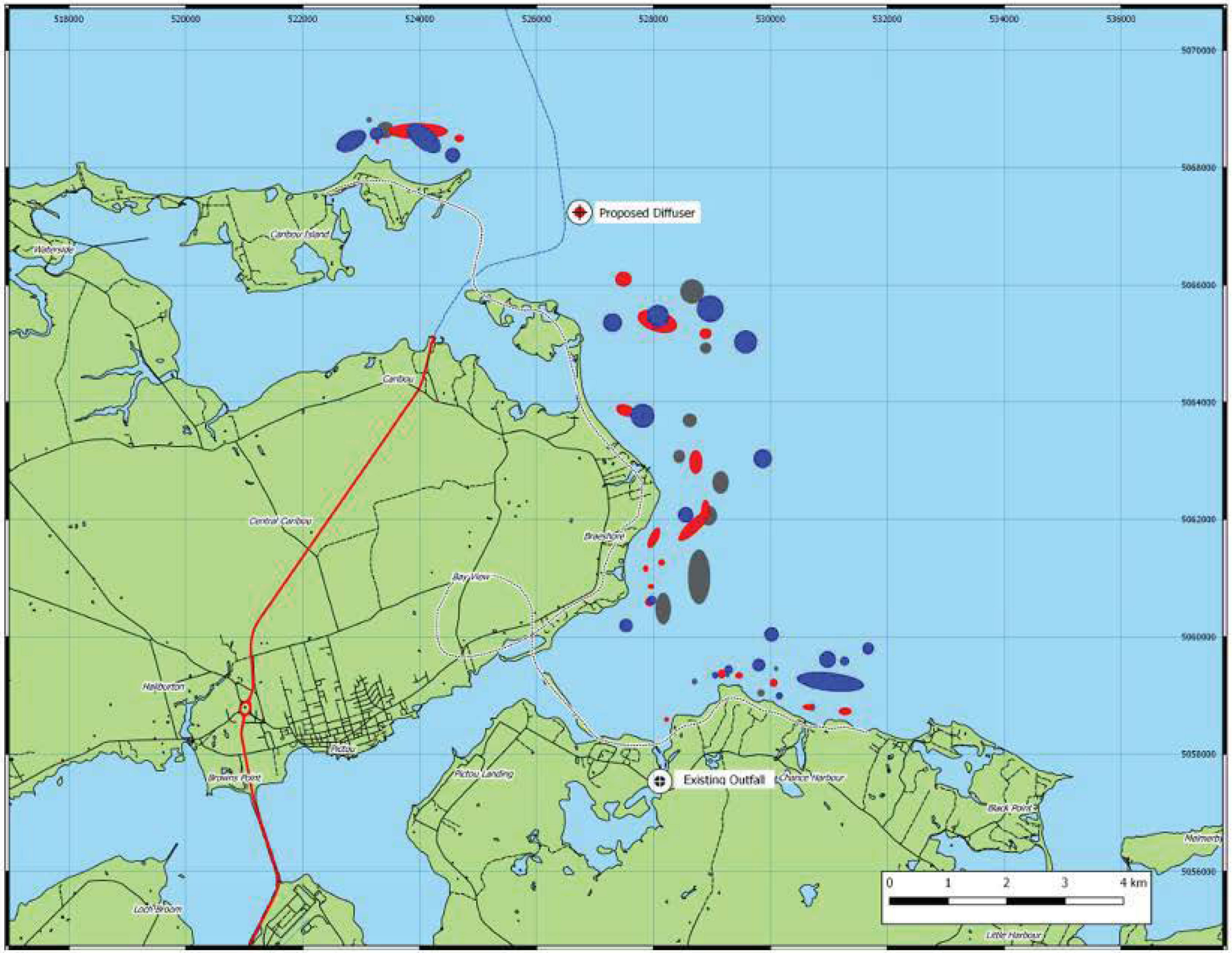
This proposed plan to pump the effluent into the strait is a terrible idea; as Dillon Consulting has said numerous times it will be worse then whats going into Boat Harbour now.

4th Generation Fisherman
Caribou

Local and regional fisheries resource users have raised concerns over potential toxicological effects on fisheries resource use as the result of the proposed discharge of effluent. The primary concerns are related to the potential effects of the new discharge on larval lobster and herring, both locally important species.

To address these concerns, NPNS will continue to investigate the feasibility of performing toxicity testing to determine both potential acute and sublethal effects on immature stages of lobster and herring. Standardized toxicity testing protocols are not available for lobster and herring; however, custom tests have been developed that can be completed using larval lobster and herring embryos. The tests will include Stage I-IV larval lobster and include a live-dead (acute) assessment of the various stages, as well as the assessment of sublethal effects on moulting time and growth. Herring tests on embryos would be similar in that they would assess acute toxicity to eggs, as well as the growth post-hatch for a number of days.

Figure 7.3-3: Northumberland Strait Lobster Buoy Locations



Northumberland Strait Lobster Buoy Locations May and June, 2019

Legend

- Proposed Diffuser
- Existing Outfall
- Flight Line
- Buoy Clusters June 18
- Buoy Clusters May 24
- Buoy Clusters May 6

Roads

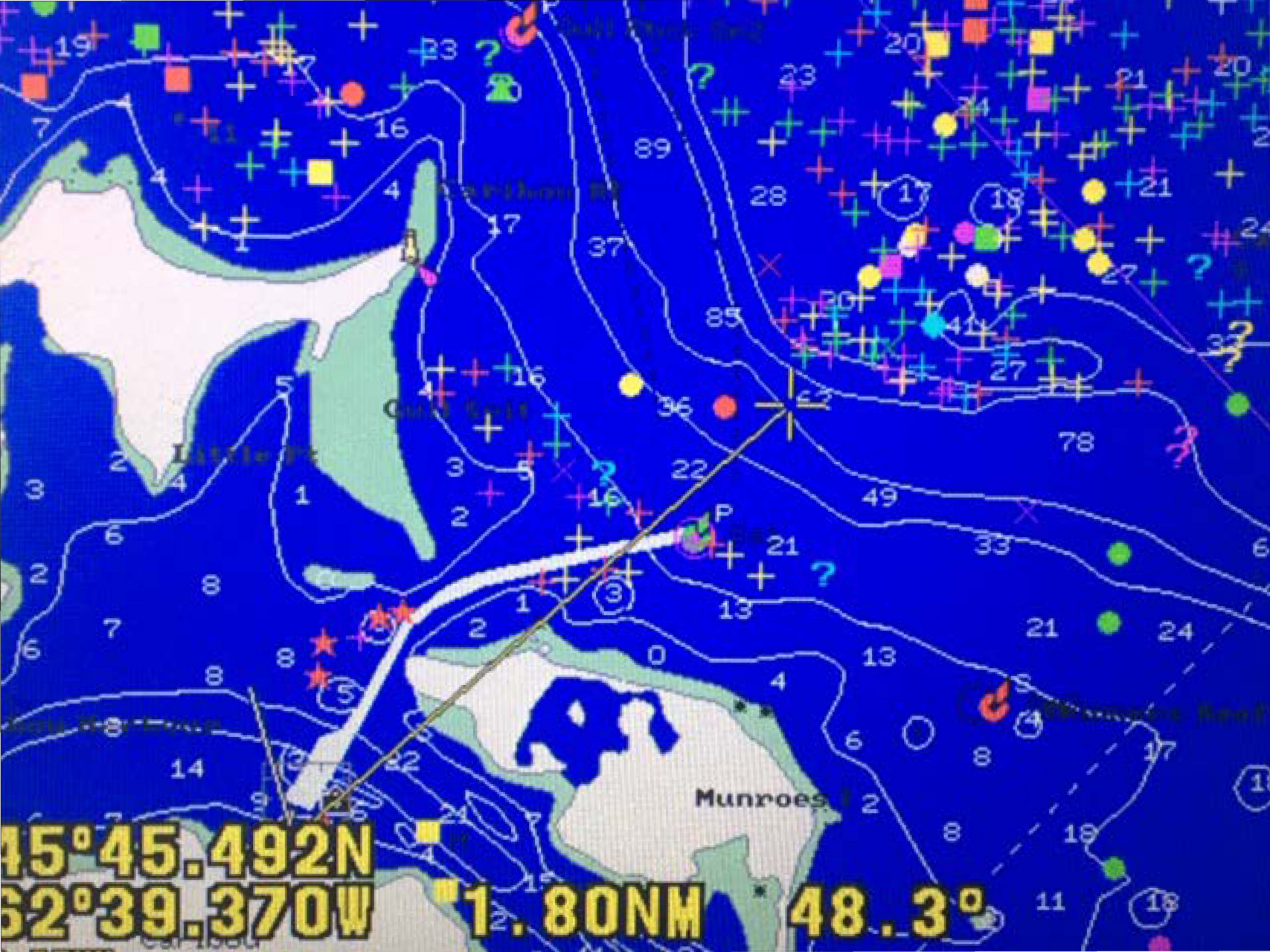
- Gravel Road
- Paved Road
- Ferry Route
- Trans Canada Highway

Data derived from Oblique Aerial Photography Obtained on May 6, May 24 and June 18 2019

TN

Coordinate System: UTM, NAD83, Zone 20 North

Norlek Resource Solutions Inc.


Munroes I
45°45.492N
62°39.370W
1.80NM
48.3°

Phase / Interaction / Component/ Class	Group	Indicator(s)	Potential Effect	Proposed Mitigation	Residual Effect	Residual Significance after Mitigation					Overall Significance	Likelihood
						Value of Group or Indicator	Magnitude / Geographic Extent	Duration	Frequency	Reversibility		
Marine Shellfish	Shellfish	Sea Scallop, Soft-Shell, Bar, Razor Clams, Blue Mussel, Oyster, Quahaug	**Physical** – direct mortality, disturbance to benthic habitat due to the staging, excavation, pipe placement and material backfilling, potential habitat overprinting associated with land-marine pipeline connection, increased sedimentation and potential change to sediment quality.	• Work will be staged and incorporate fisheries timing windows to avoid sensitive life stages. • Work during the construction phase will be scheduled to the extent practical to avoid periods of adverse weather or spring tides to reduce turbidity and sedimentation. • Duration of in-water work will be managed to the shortest time that is practical. • An ESCP will be developed for the site that reduces the risk of sedimentation to the marine environment and additional mitigation measures identified as applicable. • Provision of habitat offsetting, if required.	With implementation of mitigation measures, as proposed including those to reduce turbidity and sedimentation and potential compensation through No Net Loss Plans and/or equivalent offsetting resource productivity will be maintained.	Regionally important species' and resources to commercial, recreational and Indigenous fisheries, harvested in the RAA.	Effects are considered to be minor and encompass a small area (confined to the pipeline corridor and diffuser area).	Medium-term: effects are specific to the period of construction and or decommissioning or short periods of maintenance as required throughout the life of the project.	Effect is expected to be continuous through construction, operation / maintenance and decommissioning of the project.	Effect is irreversible with respect to the potential loss of shellfish along the corridor and diffuser area.	Overall effects are considered to be generally minor, localized and not reversible and may require compensation.	Effect will occur
						Level III	Level I	Level II	Level II	Level III	Not Significant	

From:
To: Environment Assessment Web Account
Subject: CPAWSNS public submission: Effluent treatment project Focus report
Date: November 8, 2019 11:51:07 PM
Attachments: Northern Pulp Focus Report_CPAWS submission_November 8, 2019_FINAL.pdf

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Dear Minister Gordon Wilson

Please find attached the public submission from the Nova Scotia Chapter of the Canadian Parks and Wilderness Society (CPAWS-NS) for the environmental assessment review of the "Replacement Effluent Treatment Facility Project" Focus Report.

Thank you

www.cpaws.org
twitter: @NSwilderness

CANADIAN PARKS AND WILDERNESS SOCIETY
NOVA SCOTIA CHAPTER

Canadian Parks and Wilderness Society
Nova Scotia Chapter
P.O. Box 51086 Rockingham Ridge
Halifax, Nova Scotia
B3M 4R8

Re: Public comments for "Replacement Effluent Treatment Facility Project" Focus Report

November 8, 2019

Dear Minister Gordon Wilson:

The Nova Scotia Chapter of the Canadian Parks and Wilderness Society (CPAWS-NS) is pleased to provide written comments for the public review of the "Replacement Effluent Treatment Facility Project" Focus Report submitted by Northern Pulp Nova Scotia Corporation.

For the previous round of public consultation, CPAWS-NS focused specifically on potential environmental impacts on wetlands. We identified substantial deficiencies in the content provided by the Proponent and called on the Minister of Environment to require additional information be provided. We were pleased that Nova Scotia Environment concurred with our assessment that there was insufficient information.

The Terms of Reference for the Focus Report provided by Nova Scotia Environment requires the Proponent to undertake a comprehensive wetland baseline survey in order to address the deficiencies in the Environmental Assessment Registration Documents. The Terms of Reference for the Focus Report, dealing specifically with wetlands, state the following:

> *5.1 Complete a wetland baseline survey along the proposed re-aligned effluent pipeline route (if wetlands are expected to be altered).*

CPAWS-NS has reviewed the information provided in the Focus Report dealing with wetlands. This includes information provided about potential impacts on the wetlands, as well as proposed mitigation measures. Unfortunately, once again, we are underwhelmed by the information provided by the Proponent for wetlands. Our concerns are several fold.

5 days in the field is NOT a baseline survey

According to the information provided by the Proponent, only five days of fieldwork was undertaken for the wetland baseline survey. These dates are May 28th, June 4th, 5th, 18th, and July 30th.

> *"Wetland field surveys along the proposed re-aligned effluent pipeline route were conducted on May 28th, June 4th, June 5th, June 18th and July 30th, 2019."* (Page 7, Section 5.1.2, Wetland Baseline Survey appendix)

In total, 19 different wetlands were identified within the pipeline route, including several different types of wetlands. Upon assessing the "Wetland Delineation Data Sheets" provided by the field researchers in Appendix A5.1-A, however, it's clear that the majority of the wetlands within the pipeline route were actually assessed on only one day, July 30th. On that day, 15 wetlands were assessed. It does not appear from these data sheets that any given wetland was assessed more than once. Assuming a 15 hour work day, at best, only 1 hour was spent in each wetland on that day, on average. Assuming a 7.5 hour work day, that number drops to only a half hour in each wetland, on average, maybe less depending upon travel times between the wetlands being sampled. This is a shockingly insufficient amount of time to carry out actual fieldwork for a baseline wetland study, especially for a proposed Undertaking that has serious environmental ramifications. This baseline wetland survey falls far short of the expectations described by the Minister in the Terms of Reference for the Focus Report.

The baseline wetland survey presented by the Proponent is not actually a baseline wetland survey. It's merely a description of the wetlands that occur within the study area, based upon a very quick reconnaissance field visit. I was expecting to see a baseline wetland study that included information collected throughout the field season, for a minimum of at least one year. It is not unreasonable to expect that the wetland baseline study would include detailed hydrological information for each wetland, stratigraphic profiles, vegetation transects and quadrat sampling, and detailed plant community maps, as well as information about hydroseral development. It should be clear from the baseline study how each wetland varies through time, how they respond to different disturbance pressures, how the ecosystems are connected with each other, and which environmental variables determine plant community composition and distribution. Instead, all we get is a plant species list, with no real quantitative information about the wetland communities.

Potential damages to wetlands are NOT described

The information provided by the Proponent describing potential impacts on wetland ecosystems is woefully inadequate. The Focus Report does not provide sufficient information about how the pipeline will potentially damage the wetlands, or how that damage can be properly mitigated or avoided. There is no discussion in the wetland baseline survey about the release of carbon through disturbance to wetlands, or how the pipeline might alter plant communities, hydrologic functions, wildlife movements, or carbon sequestration potential. All that's really provided is a brief description of each wetland based upon a very quick field assessment (19 wetlands surveyed in 5 days).

Without this sort of basic information, it is not possible for the Minister of Environment to formulate a reasonable conclusion about potential impacts on the wetlands from the

proposed Undertaking. If you don't have a proper baseline to determine potential impacts, it is impossible to determine appropriate mitigations.

The Proponent acknowledges that wetlands will be altered as a result of this project, thus triggering the requirement for compensation, yet does not describe the nature and magnitude of these disturbances, their severity, or permanency.

> *"It is anticipated that wetland compensation will be required for proposed wetland alterations.*" Pg 107 Focus Report

The Nova Scotia wetland policy has a clear requirement to avoid damages to wetlands, then mitigate, and then compensate. By stating that compensation is required, the Proponent appears to be acknowledging that the proposed undertaking will result in disturbances that can be neither avoided, nor mitigated. Yet, there is a paltry amount of information included in the Focus Report that attempts to quantify these damages.

The Proponent seems to acknowledge that they cannot quantify those potential damages/alterations to the wetlands for the Focus Report, stating that they will make that determination after the wetlands have been damaged. They do not, or cannot, state what is the nature of the wetland compensation, or how much will be required. That is unacceptable.

> "*The degree of disturbance in wetlands adjacent to the proposed project footprint area will be assessed prior to and subsequent to construction activities. The condition of the disturbed portions of wetlands will be compared to the conditions of any undisturbed portions of the same wetlands located adjacent to the pipeline footprint….The results of this comparison will be used to measure the effectiveness and efficiency of mitigation measures and to assist in the determination and maintenance of wetland function*." (Pg. 107, Focus Report).

The Proponent MUST determine the potential environmental impacts of the proposed Undertaking on wetland ecosystems for the actual environmental review process, NOT after environmental approvals are received. The Proponent seems to not have determined the full extent of the damages to the wetlands that will occur, and instead, is proposing some sort of experiment to be conducted as the wetlands are being damaged, in order to make that determination.

Additionally, one could argue that a wetland that has been damaged by a pipeline CANNOT also serve as an effective benchmark for measuring disturbance levels. Wetland ecosystems are highly inter-connected. Damaging one part of a wetland with a pipeline will likely damage other parts of the same wetland, even outside of the disturbance footprint of the pipeline itself. Despite this, the Proponent seems to be arguing that these disturbed wetlands are also the non-disturbed baseline for measuring disturbance. That's ridiculous. There is no clear methodology here for understanding the impacts of the proposed pipeline on those wetlands. The Minister cannot, in good conscious, reach a reasonable conclusion about impacts on wetlands based on the little evidence that has been presented.

Only a tiny portion of the overall wetlands have been examined

The Proponent has not assessed the entirety of the wetlands that are to be damaged or altered by the proposed Undertaking. Only the portions within the footprint of the pipeline corridor have been assessed.

> "*Consequently, for many of the wetlands within the proposed re-alignment pipeline route, only a small fraction was available for 'on-the-ground' assessment due to property access restrictions*." (Page 1; Section 5.1.1 Wetland baseline survey appendix)

Wetlands are not isolated ecosystems. Damages occurring in one corner of a wetland will impact other portions of the same wetland. To undertake a wetland baseline study, yet only look at a "small fraction" of those same wetlands is a major deficiency in this research. Thus, the plant species lists that are provided for each wetland are NOT actually plant species lists for those wetlands. Rather, they are plant species lists for a "small fraction" of those wetlands. What occurs within the remaining areas of the same wetlands? The Proponent has not presented that information, so it's reasonable to conclude that they don't know.

The Proponent also acknowledges other challenges as well.

> "*To further compound constraint, the influence of the immediately adjacent Highway 106, and associated ditching, served to hinder the description of a wetlands more natural condition, often limiting observations to the disturbed conditions present along the roadside*". (Page 1; Section 5.1.1 Wetland baseline survey appendix).

If the Proponent had undertaken a proper wetland assessment, including using core transects, the pre-disturbed condition of the wetland could be ascertained. They chose not to do these more detailed analyses, and instead, restricted their fieldwork only to what appears to be a few hours per wetland. The Minister requested a baseline study for wetlands and the Proponent has essentially failed to provide this.

What is the final pipeline route, anyway?

The pipeline route contained in the Focus Report is not the same pipeline route that is contained in the previous Environmental Assessment Registration documents. It was moved from one side of the highway to the other. Will the pipeline route move again? Possibly.

A letter from Nova Scotia Department of Transportation and Infrastructure Renewal, dated September 27, 2019, states the following

> "*This letter confirms that Nova Scotia Department of Transportation and Infrastructure Renewal (TIR) is continuing to hold talks with Northern Pulp regarding a possible pipeline route to the mill's proposed new Effluent Treatment Facility. It is anticipated these talks will continue this fall.*" (Signed Mark S. Peachey, P. Eng., Executive Director, Maintenance and Operations, TIR (First page, Appendix 2.1, On-Land Pipeline Info))

This letter from the Nova Scotia government to the Proponent clearly states that negotiations are on-going to determine the location of the pipeline route. It's absolutely astounding that the Proponent has submitted this Focus Report without knowing where the final pipeline route will be located. This means that the Baseline Wetland Survey presented by the Proponent may not even be valid if the pipeline route changes again.

Conclusion

The Proponent has failed to provide an adequate Wetland Baseline Survey that allows the Minister to properly predict adverse effects or environmental effects related to the proposed Undertaking. This is a violation of the Terms of Reference presented to the Proponent by the Minister for the Focus Report. The Minister cannot approve this project with the information provided. Huge gaps in the wetland assessment remain.

Recommendations

1) The proposed Undertaking should be referred to a full environmental assessment, requiring the completion of an Environmental Assessment Report and referral to the environmental assessment board.

2) The Nova Scotia government should voluntarily request a Federal Environmental Assessment be completed by Impact Assessment Agency of Canada for this proposed Undertaking.

***

Thank you for the opportunity to provide these written comments on behalf of the Nova Scotia Chapter of the Canadian Parks and Wilderness Society.

Sincerely,

CPAWS Nova Scotia

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:54:21 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: For the first time in my life since being told I had to deploy, I am terrified! I signed up to protect a great country that I was proud to live in. How can I be proud to live in a place that is willing to put the health and safety of our children at such risk, all for a few dollars?? How can I be proud to live in a province that isnt willing to break the cycle and truly stand up for whats right? Why sit and wait any longer? I couldnt care less what color you are or where you are from, we all deserve the best!! What you are about to decide is going to echo far and wide. Choose wisely. The only thing that matters is the future that we are leaving for our children and hopefully their children, if they are still healthy enough to even have kids themselves! What is that worth to you all? The damage that will be done will be devastating! I cant imagine what the people are going through right now with facing the loss of their jobs. My heart goes out to them! They deserve t he best support that we can give them if they are facing the loss of their livelihood. We have the chance right now to make a real difference! Retrain these people so that they can help us further protect our beautiful province and show the world that we really do care. Show the world how resourceful the Maritimes really can be when faced with a challenge like this! We can find new ways and resources to help support that sector of the Maritime economy. Help them grow and evolve in this ever changing world we live in. Prove to the people that when they are faced with a devastating loss that they still count! They still matter. Show the world that we can put greed aside and do the right thing! Be a responsible adult, make the hard choice and do the right thing. We definitely cant please everyone, but as far as Im concerned, the only ones who matter here are the future generations that may have to bear the fallout. Lets start taking care of each other instead of tearing each oth er apart! We all matter! We are all worth it! We are Canadian. Name: Email: @hotmail.com Address: . Municipality: Hubley Postal-Code:

From:
To: Environment Assessment Web Account
Subject: Important
Date: November 8, 2019 11:55:11 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please do not allow a new pipe to dump in the strait. Thank you.

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:57:40 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I absolutely support Northern Pulpâ?Ts replacement effluent treatment facility project. Factual evidence through studies, surveys and investigations convey logical analysis Northern Pulp has adopted and willingness to implement a project to ensure all of Nova Scotiaâ?Ts natural resources and ecosystems will ne environmentally sustainable. We cannot let years of ignorance and greed from past owners and governments jeopardize the future of Nova Scotian families and industries directly and indirectly related to Northern Pulp. Nova Scotia needs the forest industry and the fishing industry and Northern Pulp will support and help both co-exist. Name: Email: @gmail.com Address:
Municipality: Central West River Postal-Code:

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: November 8, 2019 11:58:01 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: replacement_effluent_treatment_facility_project Comments: I am in support of approving Northern Pulpâ?Ts environmental assessment to allow them to replace the existing effluent treatment facility with a state-of-the-art effluent treatment facility including a pipeline to the new outfall location. 1 The focus report provides scientific evidence of improved environmental impact on the quality of effluent waste water disposed into the Northumberland Strait compared to current dispersement. 2 The studies indicate that scour of the seabed from ice keels is unlikely to cause damage at the new outfall location no ice scour found at 9 m depth outside of Caribou Harbour. Burial of the pipeline will further mitigate ice scour concerns. Name: Email: @gmail.com Address: Municipality: Salmon River Postal-Code:

From:
To: Environment Assessment Web Account
Subject: Northern Pulp Focus Report Response
Date: November 8, 2019 11:58:32 PM
Attachments: image001.png
ECELAW 2019 11 08 Nov Final Letter to EAC re Northern Pulp Focus Report and TOR - Final Version.pdf
Pulp and Paper Effluent Regulation Notes EAC ECELAW.pdf
EAC March 2019 Submission to NS EA for Northern Pulp Pipe Project.pdf
Irving Pulp and Paper"s Pollution Prevention Strategy.pdf
Ecology Action Centre Northern Pulp Focus Report Response Nov 8 2019.pdf

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** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Hello,

Please find attached the Ecology Action Centre's letter in response to the Northern Pulp Focus Report, along with the following attachments:

- Letter from East Coast Environmental Law;
- Summary document – Pulp and Paper Effluent Regulations;
- EAC's submission from March 2019; and
- A promotional brochure for an Irving mill.

Thank you.

ECOLOGY ACTION CENTRE
2705 Fern Lane, Halifax, Nova Scotia, B3K 4L3

coastal@ecologyaction.ca
www.sealevelrise.ca
Ecology Action Centre
Become an **EAC Member** | Follow us on **Facebook** & **Twitter**

Ecology Action Centre

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

November 8, 2019

VIA EMAIL EA@novascotia.ca

Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, NS, B3J 2P8

Re: Northern Pulp Nova Scotia Corporation's Focus Report - Replacement Effluent Treatment Facility Project

This letter is submitted on behalf of the Ecology Action Centre (EAC), an environmental charity working since 1971 at the local, provincial, national and international level to build a healthier and more sustainable world. EAC's vision is a society in Nova Scotia that respects and protects nature and provides environmentally and economically sustainable solutions for its citizens. The authors of this submission are subject matter experts in terrestrial, coastal and marine conservation issues. Additionally, EAC has retained the services of East Coast Environmental Law and has consulted with experts in other specialties related to the environmental impacts of this proposal. We submit this letter as our response to Northern Pulp Nova Scotia Corporation's (NPNS) Focus Report, which was made public by Nova Scotia Environment on Thursday, October 3, 2019.

OUR POSITION

The Minister must reject the NPNS proposal as outlined in their Environmental Assessment Registration Document (EARD) and expanded upon in their Focus Report for four reasons:

1. There is irrefutable scientific evidence that this mill's proposed operations will have *major adverse effects on marine, coastal and terrestrial ecosystems that cannot be avoided or mitigated, and will cause significant harm to human health in the region*. Dumping inadequately treated toxic effluent in the ocean will cause lasting harm in the vicinity of the pipe and far beyond. Adding the burning of sludge to the current boiler will worsen air emissions from a system that is already regularly exceeding air emission limits. As outlined in the Environment Act, the Minister must reject an undertaking because of the likelihood that it will cause adverse effects or environmental effects that cannot be mitigated.

2. NPNS has *failed to fulfill the requirements of the Focus Report as set out in the Terms of Reference*. Please see the attached letter from East Coast Environmental Law, which outlines many of NPNS's shortcomings in meeting those requirements.

3. Due to errors, omissions and the use of inappropriate environmental protection standards, detection limits and modeling tools throughout the Focus Report, *critical gaps still exist in the information provided which was to enable understanding of the full range of impacts of this project on human and ecological values*. NPNS's incomplete Focus Report consists of studies which are not of adequate quality in several areas, false statements and misleading information, and data which appears to be skewed with frequent use of inappropriate detection limits. NPNS's use of unacceptably low, outdated industry standards and regulations for a project with a potential 50-100 year life span, while touting them as 'environmental protection', puts the long-term ecosystem health of the Northumberland Strait at too great a risk to proceed. Put simply, the Focus Report lacks credibility.

4. Throughout the Focus report, NPNS refers to abstract future monitoring notions and undetermined methodologies for crucial aspects of the ETF design as well as making faint references to possible technology solutions which may or may not be implemented after completion of the replacement ETF project. NPNS had an obligation to have these uncertainties resolved and to commit to defined methodologies for each aspect of the design as well as committing to solutions to reduce effluent toxicity (such as an Oxygen Delignification) before provide submitting this proposal. The Minister does not have the necessary information required in these yet-to-be-determined areas to be able to determine just how much harm the plan will cause to the environment.

For these reasons, NPNS has not met their obligation and the Minister must reject this proposal. At the very least, we believe that this project should be subject to a full environmental assessment report.

As the province embarks upon the complex and extremely expensive remediation of Boat Harbour (A'se'k), which has been devoid of life for more than five decades due to pollution from this pulp mill, the knowledge that similar remediation will be impossible in the fragile marine ecosystem of the Northumberland Strait makes this project unfathomable. In this letter, we will describe our key concerns about the adverse environmental impacts and other considerations, building on our initial submission (see attached) in response to the NPNS EARD. First, we begin by identifying the broader global environmental context which reflects the already compromised ecosystems which will be adversely impacted by this undertaking.

ENVIRONMENTAL CONTEXT

According to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), ecosystems across most of the globe are now significantly altered by multiple human stressors, with the majority of indicators of biodiversity and ecosystem functioning showing rapid decline[1]. Approximately 25 percent of species in assessed animal and plant groups are threatened and may face extinction if the drivers of biodiversity loss cannot be mitigated[1]. In the marine environment, sixty-six percent of the ocean area is

[1] Díaz, S., Settele, J., Brondízio, E., Ngo, H., & Guèze, M. Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.

experiencing increasing cumulative impacts[1]. As recently highlighted by the Intergovernmental Panel on Climate Change (IPCC) Special Report on the Oceans and Cryosphere in a Changing Climate, climate change is the most pervasive stressor in the oceans, with anthropogenic greenhouse gas emissions driving global ocean warming, acidification, de-oxygenation and sea level rise[2]. Human activities such as land- and sea-based pollution, overexploitation of harvested species, and coastal development combine with the effects of climate change, and each other, to further degrade biodiversity and ecosystems[1,2]. In Atlantic Canada, Fisheries and Oceans Canada reports that one quarter of commercial fish stocks are below healthy population levels[3]. At the same time, important coastal habitats like eelgrass meadows[4] and salt marshes[5] have declined or are at risk of decline from stressors such as agricultural run-off, land use changes and invasive species. The Gulf of St. Lawrence, in particular, is heavily stressed due to the combined effects of pollution, species overexploitation, climate change, invasive species and eutrophication[6].

The degraded state of the oceans, both globally and in Atlantic Canada, is the result of many decades of short-sighted decision-making in which we have failed to rigorously evaluate human activities in the broader context of marine environmental health and effectively mitigate adverse effects, particularly long-term cumulative effects. *The best and most current science is telling us loudly and clearly that this approach to doing business is no longer viable*. It is imperative that we prioritize building resilience back into our oceans to support human well-being, including sustainable industries that depend on healthy coastal and marine ecosystems, and mitigate the effects of climate change[2]. As Hans-Otto Pörtner, Co-Chair of IPCC Working Group II, stated: "Reducing other pressures such as pollution will further help marine life deal with changes in their environment, while enabling a more resilient ocean."[7]

KEY CONCERNS

The NPNS EARD and Focus Report raise numerous concerns about the adverse effects on marine, coastal and terrestrial ecosystems and the harm that will be caused to human health. NPNS's registration document solicited an overwhelming number of concerns raised by different government departments, non-governmental organizations and the public. Upon review of the Focus Report, the EAC's concerns include, but are not limited to:

- Composition, toxicity and impacts of effluent on the marine environment
- Increased toxicity and volume of already harmful air emissions by additional burning of sludge in the mill's power boiler

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[2] IPCC, 2019: Summary for Policymakers. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.- O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, M. Nicolai, A. Okem, J. Petzold, B. Rama, N. Weyer (eds.)]. In press.

[3] https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/status-major-fish-stocks.html

[4] Murphy GEP, Wong MC, Lotze HK (2019) A human impact metric for coastal ecosystems with application to seagrass beds in Atlantic Canada. FACETS 4: 210-237.

[5] https://novascotia.ca/nse/wetland/historic-wetland-loss-ns.asp.

[6] Benoît, H. P., Gagné, J. A., Savenkoff, C., Ouellet, P., and Bourassa M.-N. (eds.). 2012. State-of- the-Ocean Report for the Gulf of St. Lawrence Integrated Management (GOSLIM) Area. Can. Manuscr. Rep. Fish. Aquat. Sci. 2986: viii + 73 pp.

[7] https://www.ipcc.ch/2019/09/25/srocc-press-release/

- Inadequate ETF Design to reduce harm
- Impact of the pipe construction on terrestrial and marine environment
- Potential of pipe leaks and risk of contamination of soil, wetlands, Pictou watershed and marine environment
- Indigenous opposition

Effluent

NPNS's proposed effluent characterization will be at least as toxic as the current effluent
Focus Report table 2.4-3 shows Effluent Loading Comparison between 2018 Point C Treated Effluent Loading and Veolia Expected Loading. From the information that NPNS has provided in this table, it is clear that the effluent quality will not be improved by this new ETF design, which is logical as this design does not allow the effluent to cool and experience the 'polishing' effects of the NPNS's current system. The current system enables more of the effluent's toxins and Total Suspended Solids (TSS) to settle into the 'receiving waters' of Boat Harbour.

It is important to note that a toxin is a toxic compound regardless of whether it is below the level of detection used in analysis. NPNS's information, with its varied and inconsistent toxicity detection limits, disregards the cumulative impact of discharging toxins in large volumes of effluent over an extended period of time. Additionally, the information provided in the Effluent Characterization information does not allow for a full determination of actual toxicity to be made. In the Baseline Marine Study, the lab uses a notably lower detection rate for total dioxins and furans than the rate used in the analysis of the effluent. Laboratories with sufficiently sensitive instruments are able to use maximum and minimum detection levels and analyze between that range. Detection limits are not the same as guidelines used to protect human life and marine life. The data reported in this Focus Report appears to be from instruments that are not sufficiently sensitive and are not detecting toxins at appropriate toxicity levels; therefore the information does not enable evidence-based decision making.

NPNS's effluent contains TSS that consist of lignin, cellulose, sodium sulphide and sodium hydroxide. The amount of these solids generated by the mill (anticipated at more than 4,000 kg/day) is problematic for NPNS and has led to the proposal to add to the mill's air emissions by burning sludge in the power boiler in an effort to reduce their volume. Even with the proposed burning of a portion of those solids, a considerable amount will remain and be discharged into the Strait. Discharging this proposed volume of insoluble fibres, with diffusion to a wide area and with limited ability to monitor impact has the potential to cause significant adverse impact by creating anoxia in the underlying sediment and impacting light attenuation. On Page 102 of the Focus Report, NPNS states that TSS are 'largely organic and biodegradable'. This is an absolutely false statement. The cellulose fibres are refractory, meaning that they will not decompose well in seawater, a fact that is mentioned elsewhere in the Focus Report.

NPNS's effluent is toxic to marine life. According to Environment and Climate Change Canada's proposal to modernize pulp and paper effluent regulations (PPER), "studies required by the PPER have shown that effluents from 70% of pulp and paper mills are impacting fish and/or fish habitat, and that the impacts at 55%

of these mills pose a high risk to the environment"[8]. As such, there is clear evidence of adverse pulp and paper effluent impacts on marine life, and the burden of proof should be on the proponent to rigorously demonstrate the lack of impact of their project on fish, fish habitat, and the broader marine environment.

While we appreciate that the PPER are currently being modernized, the 50-year history of the PPER is illustrative of a regulatory model that is fundamentally ineffective at achieving its goal. The enabling statute, the *Fisheries Act*, has two stated purposes:

(a) the proper management and control of fisheries; and
(b) the conservation and protection of fish and fish habitat, including by preventing pollution.[9]

Clearly, the PPER fall within the second purpose of the Act and yet they have repeatedly failed to meet that purpose (see [10] and a summary of the history of PPER as it relates to protection of fish and fish habitat in Canada [attached]). The proposal to modernize the PPER include addition of a few key considerations: COD, nitrogen, phosphorus, temperature and pH. However, the Regulations will not likely be fully implemented for 6 or 7 years. The modernized PPER also will not regulate a host of other harmful substances that may be found in effluent including AOX compounds, phenols, toluene, chloroform, cadmium, PAH, dioxins and furans, as examples. Nor do the modernized PPER give due consideration to cumulative effects or the long-term effects to ecosystem health (see 'Environmental Context'). Finally, the toxicity testing under the 1992 PPER will remain the same. Only the LC-50 test for acute lethality is and will be required. For this test, an effluent is considered acutely lethal if the treated effluent at 100% concentration kills more than 50% of the rainbow trout exposed to it during a 96-hour period.

Given the importance of fisheries (e.g. lobster, herring) to the local economy, livelihoods and cultures on the Northumberland Strait, meeting these modernized minimum standards is not enough. Committing to monitoring these effects through future EEM programs, as is often the tactic throughout the Focus Report, is also not enough. Given the necessary investment and the anticipated 50+ year life of the proposed system, forecasting and exceeding regulatory requirements is the only responsible choice.

NPNS' benthic habitat surveys are woefully inadequate. The benthic habitat surveys described in the Focus Report were extremely basic and the methods (video sampling) were inadequate for robust characterization of benthic communities (e.g. identification of marine algae). More intensive grab sampling or SCUBA surveys should have been conducted. Furthermore, it is extremely concerning that NPNS only conducted video surveys in the immediate vicinity of the proposed pipeline route and diffuser area. They did not conduct surveys in areas where the effluent is likely to flow. How can NPNS possibly conclude that "effluent sediment will not have a significant impact on the marine benthic environment" (Focus Report p. 102) when they haven't investigated the areas where sediment will eventually settle? TSS will indeed eventually settle out on

[8]https://www.canada.ca/en/environment-climate-change/services/managing-pollution/effluent-regulations-fisheries-act/consultation-modernization-pulp-paper-effluent-regulations/detailed-proposal-consultation-may-2019.html

[9] An Act to Amend the Fisheries Act, Statutes of Canada 2019, Chapter 14 (assented to 21 June 2019), s. 2.1.

[10] Environment Canada, Environmental Effects Monitoring Program, 6th National Assessment of Environmental Effects Monitoring Data from Pulp and Paper Mills Subject to the Pulp and Paper Effluent Regulations (April 2014). Accessed on-line at: http://publications.gc.ca/collections/collection_2014/ec/En14-84-2014-eng.pdf.

the bottom and could affect foundational plant life and sessile invertebrates in particular. In addition, TSS increase turbidity in the water column and, along with the dark colour of the effluent, reduce light availability to the sea bottom. This is a major potential impact on benthic habitats due to the sensitivity of many foundational marine plants to light limitation. Yet, this has not been considered.

Dumping effluent into the Northumberland Strait may exacerbate eutrophication and de-oxygenation. The volume of nutrients that will be pumped into the Strait by NPNS is significant. In particular, at a time when the Gulf of St. Lawrence is rapidly losing oxygen[6,11] and many estuaries around Prince Edward Island are experiencing anoxic events on a near annual basis[12], adding more nitrogen to the region's waters will exacerbate an already severe problem. Business as usual cannot continue.

The temperature of the effluent dumped into the Northumberland Strait will disrupt local marine life. The average water temperatures of the Northumberland Strait are 1°C in winter and 16.8°C in summer. Temperature is among the most significant environmental factors affecting the emergence of marine life, metabolic processes, and patterns of movement. For this reason, appropriate measures are needed to minimize changes in sea temperature caused by effluent. For example, the average maximum temperature limit for emissions in Maine is 29.4°C, and the average maximum temperature limit for U.S. states setting the emission limit is 29.5°C. According to NPNS, the temperature of the effluent released into the Northumberland Strait will reach between 25°C and 37°C, and may exceed modernized PPER limits during summer. We note that the Focus Report includes modeling that suggests that the temperature difference between the effluent and ambient water will be minimal at 2 m from the diffuser. Unfortunately, we do not have the capacity to evaluate this conclusion given the short comment period. However, we do have concerns about the influence of the temperature difference on the marine community around the diffuser area.

Dumping effluent into a protected area in the Northumberland Strait will directly undermine its conservation objectives. Given the degraded state of the Gulf of St. Lawrence[6], efforts have been made to set aside some areas for protection in order to rebuild ecosystem resilience. This includes the Scallop Buffer Zone within Scallop Fishing Area 24. This Marine Refuge, established under the *Fisheries Act*, was designated to protect juvenile American lobster and their habitat from physical disturbance of the seabed associated with scallop dragging. The proposed pipeline would dump directly into this protected area and is in direct conflict with its conservation objectives. Through potential impacts on benthic plants and sea-bottom habitats, this could put the local lobster fishery at risk while also negatively affecting other benthic species like winter flounder, which has experienced stock declines due to high natural mortality[13]. It simply makes no sense to do this.

Environmental remediation of the ocean is not possible

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[11] Claret M, Galbraith ED, Palter JB, Bianchi D, Fennel K, Gilbert D, Dunne JP (2018) Rapid coastal deoxygenation due to ocean circulation shift in the northwest Atlantic. Nat Clim Chang 8: 868-872.

[12] Bugden, G., Jiang, Y., van den Heuvel, M.R., Vandermeulen, H., MacQuarrie, K.T.B., Crane, C.J. and B.G. Raymond. 2014. Nitrogen Loading Criteria for Estuaries in Prince Edward Island. Can. Tech. Rep. Fish. Aquat. Sci. 3066: vii + 43 p.

[13] Surette, T., and Rolland, N. 2019. Assessment of the Winter Flounder (Pseudopleuronectes americanus) stock of the southern Gulf of St. Lawrence (NAFO Div. 4T) to 2016 and advice for the May 2017 to May 2022 fisheries. DFO Can. Sci. Advis. Sec. Res. Doc. 2019/026. x+94p.

In addition to the six concerns outlined above about the adverse effects of discharging a massive volume of toxic effluent into the Northumberland Strait, EAC is also deeply concerned because there cannot be a clean-up effort to undo or repair the damage once this effluent is discharged into the marine environment. The diffuser will ensure that adverse effects will be far-reaching and NPNS's plan to determine changes by monitoring will not allow a proactive response to mitigate these devastating impacts.

Air Emissions

NPNS's toxic air emissions will cause harm. In EAC's previous submission, concerns were raised about the chemicals and particulate matter to be released by the mill. The added impact of burning chemically laden toxic sludge in the mill's power boiler on top of the mill's already harmful emissions present a significant health risk. EAC's previously raised concerns have not been adequately addressed. Additionally, NPNS has failed to provide adequate information for the Minister to make an informed decision about the mill's air emissions. In this case, NPNS's consultant did not choose the appropriate air emissions modeling software for its computerized (theoretical) air pollution displacement modelling. The consultant used AERMOD which should not be used where a) there are nearby human populations in close proximity and b) there are large water bodies nearby. AERMOD ignores or underestimates these parameters, predicting a very high elevation and distant dispersion and settlement pattern for the emissions coming from the mill. AERMOD does not adequately take into account the atmospheric effects of the nearby large water bodies - Pictou Harbour and the Northumberland Strait. Water acts to condense and bring down the pollution plumes emitting from the seven smokestacks and vents at the mill. This is why the Town of Pictou, directly across the harbour, is frequently bathed in the pollution plume. The modelling software which the consultants should have used for this proposal is called CALPUFF as this software takes into account both proximity to population centres and the effects of nearby large water bodies. Without analysis using the proper modelling software, NPNS has not met this requirement of the Terms of Reference.

ETF Design

NPNS's ETF Design is in no way a 'state-of-the-art wastewater treatment facility'
The mill at Abercrombie Point is a very old, highly polluting (both air emissions and effluent) and has never been substantially upgraded by any of its five different owners in over five decades of continuous use. It is one of the most polluting mills in North America. The mills' current owner, Northern Pulp Nova Scotia Corporation, claims on page xxxix of the Focus Report that the proposal is for a 'state-of-the-art wastewater treatment facility' and suggests throughout the Focus Report that analysis predicts non-detectable amounts of environmental pollutants but this claim is neither credible nor possible. Modern mills of similar type and older mills which have had substantial upgrades both produce far less pollution than NPNS's Pictou County mill. The mill had been permitted to operate with non-functioning emissions controls on their recovery boiler for many years, and the mill continues to do so with the power boiler, lime kiln, smelt recovery stack and high level vent. Despite commissioning a report regarding Oxygen Delignification in 2017, NPNS has not made any commitment to add this effective pollution mitigation system to its operations and continues to defer on such a commitment in the Focus Report, despite the fact that the system would significantly improve the effluent composition. Additional brief exploration suggestions that installation of centrifugal hydrocyclones could

dramatically reduce the amount of Total Suspended Solids discharged into the marine environment, but NPNS does not appear to have considered that option.

To meaningfully reduce the organic and chemical pollution from a pulp mill, it is not adequate to 'clean' the effluent at the very end of the chemical pulping process. The mill needs to modernize and optimize the internal process during the production phase (i.e. in the recovery boiler) before sending it to a secondary effluent treatment system like the one proposed by NPNS. Optimization options such as brown stock washing and screening, reverse osmosis systems, chlorine-free bleaching systems and fail-safe systems have not been included in this proposal. Attached to this submission is a promotional brochure from the Irving Mill in Saint John which provides direct comparison to a mill which has done many of these internal process upgrades.

NPNS cannot credibly state that this proposal is for a 'state-of-the-art wastewater treatment facility' using the ETF Design they have provided.

Impact of the Pipe

Construction, maintenance and operation of the pipe will damage sensitive marine habitats like seagrass meadows and algae beds. Seagrasses like Nova Scotia's eelgrass are foundation species that generate valuable ecosystem services. They support coastal food webs and commercial fisheries (i.e. through creation of nursery habitat for species like lobster), buffer shorelines from storm surge and erosion, improve water quality, and capture and store carbon. However, seagrasses are facing a global crisis and are being lost at an accelerating rate around the world[14,15]. The NPNS registration document states that "there is evidence that eelgrass beds play an important role in the spawning and rearing of white hake in the Northumberland Strait area (AMEC 2007). Eelgrass beds have been in decline over the past several years in the Northumberland Strait, and Atlantic Canada in general (Hanson 2004). An eelgrass bed in Caribou was sampled and losses of 8.7% and 23.6% were recorded in 2001 and 2002, respectively (AMEC 2007)." In addition, "The Northumberland Strait Ecosystem Overview Report Technical Workshop on Biota (2006) identified the following key issues with respect to marine plants in the Northumberland Strait: (1) excessive growth of some species (i.e., *Furcellaria*); (2) disappearance of kelp beds in some areas; (3) disappearance of Irish moss; (4) declining health and range of eelgrass beds; and (5) presence of anoxic areas."

As the Focus Report (section 7.0) states: "Changes in the sediment quality from dredging activities may cause increased TSS and increase sedimentation in other areas which can impact life stages of all marine life in the area." Construction of the proposed NPNS pipeline may therefore damage eelgrass meadows and other sensitive benthic habitats in shallow coastal areas outside the immediate vicinity of the pipe, and leaks and spills during operation could also have serious detrimental impacts. While it may be argued that the footprint of this individual project will be small, this kind of narrow thinking is exactly what has led to degraded coastal ecosystems around the world and why the oceans are currently experiencing death by a thousand cuts.

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[14] Orth RJ, Carruthers TJB, Dennison WC, Duarte CM, Fourqurean JW, Heck Jr. KL, Hughes AR, Kendrick GA, Kenworthy WJ, Olyarnik S, Short FT, Waycott M, Williams SL (2006) A global crisis for seagrass ecosystems. BioSciece 56: 987-996.

[15] Waycott M, Duarte CM, Carruthers TJB, Orth RJ, Dennison WC, Olyarnik S, Calladine A, Fourqurean JW, Heck Jr. KL, Hughes AR, Kendrick GA, Kenworthy WJ, Short FT, Williams SL (2009) Accelerating loss of seagrass across the globe threatens coastal ecosystems. Proc Nat Acad Sci 106: 12377-12381.

Construction, maintenance and operation of the pipe will damage coastal/tidal wetlands.
On Page 100 of the Focus Report, NPNS admits that there will be adverse impacts on wetlands: "It is expected that the vast majority of the land-based portion of the effluent pipeline, including the short section on NPNS property, will utilize trench and bury methodology for effluent line installation. It is anticipated that both wetland compensation and watercourse alteration permits will be required for construction." Yet NPNS provides no information about the scope of the impact and the methodology for the pipeline installation is left undetermined. The Wetland Baseline Study also does not meet the required quality to provide a sufficient baseline of information, with limited field studies for the 19 impacted wetland sites.

Coastal wetlands such as salt marshes (and sub-tidal vegetated habitats like seagrass meadows and kelp forests) play an important role in fighting climate change by sequestering carbon and enhancing ecosystem resilience[16]. The international scientific community is clear in its support for protecting these 'natural carbon sinks' as an effective component of climate change mitigation strategies[2,14]. However, the NPNS Focus Report makes no mention of climate change and does not consider the impact of its proposal on these sensitive 'blue carbon' habitats in the Northumberland Strait. Again, this type of narrow, short-term thinking reflects a business-as-usual approach that is no longer viable.

This region of Nova Scotia does not have abundant coastal wetlands, placing greater importance on the vibrant coastal wetlands being considered for this pipe's pathway. As described on the NS Environment Wetlands website, 'wetlands perform many important functions and services in our landscape such as, improving water quality, controlling floods, recharging groundwater, protecting coastal infrastructure and providing critical habitat for rare and endangered species. Wetlands are also among the most productive and diverse of all the ecosystems on earth, so the loss of wetlands can mean the loss of species or local populations of fish, wildlife and plants that depend on them for habitat or food. Because many of Nova Scotia's wetlands have already been lost due to various human activities (e.g. over half of all original salt marsh habitat has been converted to other uses), wetlands that remain take on a heightened level of importance.'

Due to the crucial nature of these tidal wetlands and the missing information about the scope of adverse impacts, the methodology for pipeline installation and the inadequate quality of the wetland baseline study, the Minister does not have sufficient information to make a decision about adverse impacts to wetlands.

Potential Leaks and Contamination

NPNS provides extremely limited information about a proposed leak detection system which is stated to be effective in detecting leaks as small as 60 L/hr and which is not included in the marine portion of the pipe. The marine portion of the pipe requires a leak detection system as this section of pipe may be even more subject to potential leaks from the impact of ice scour then the terrestrial section of pipe. With the proposed leak detection system, chronic small leaks will not be detected and could go on for extended periods. The localized

[16] Mcleod E, Chmura GL, Bouillon S, Salm R, Björk M, Duarte CM, Lovelock CE, Schlesinger WH, Silliman BR (2011) A blueprint for blue carbon: toward an improved understanding of the role of vegetated coastal habitats in sequestering CO_2. Front Ecol Environ 9: 552-560.

impacts of such leaks on the Pictou water supply, the important wetland areas, the marine environment and the soil will have significant adverse environmental impacts.

Indigenous Opposition

The EAC supports Chief Andrea Paul of Pictou Landing First Nation in her unequivocal opposition to NPNS's proposal to discharge effluent into the Northumberland Strait. Pictou Landing First Nation deserves to have clean land, water and air. NPNS states that this proposal will allow 'community healing and rebuilding' but that is not possible when the community is in opposition with NPNS's plan. Nova Scotia's government must keep their promise to Pictou Landing First Nation by honouring the Boat Harbour Act and saying no to a plan which will cause new and greater damage.

The EAC supports the Mi'kmaq.

CONCLUSION

Northern Pulp Nova Scotia Corporation has proven over the past several years that they are prepared to operate the mill in a manner that has attributed to two known effluent leaks and repeated air emission violations. Throughout their proposal, NPNS uses unacceptably low, outdated industry standards and regulations for a project with a potential 50-100 year life span, while touting them as 'environmental protection'. Putting this proposal forward as a 'state-of-the-art effluent treatment facility' is a grievous insult to the Minister of Environment, the taxpaying citizens of Nova Scotia and especially to the Pictou Landing First Nation and the community members of Pictou County.

The Ecology Action Centre requests that the Minister of Environment reject the NPNS proposal as outlined in their Environmental Assessment Registration Document (EARD) and expanded upon in their Focus Report. NPNS's proposal will have major adverse effects on marine, coastal and terrestrial ecosystems that cannot be avoided or mitigated, and will cause significant harm to human health in the region. NPNS has failed to fulfill the requirements of the Focus Report as set out in the Terms of Reference, as outlined in the attached letter from East Coast Environmental Law. The information provided in the Focus report contains errors, inconsistencies, misleading information and undetermined methodologies and as such, NPNS has not successfully provided the necessary information to enable the Minister to understand the full range of impacts on human and ecological values.

Respectfully submitted,

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08 November 2019

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Re: Northern Pulp Replacement Effluent Facility Environmental Assessment Focus Repot

The following represents the East Coast Environmental Law Association's review on behalf of the Ecology Action Centre of the Northern Pulp Nova Scotia Corporation's Focus Report for its proposed Replacement Effluent Facility Project.

The purpose of this review is to determine whether the Focus Report meets the requirements of the Terms of Reference ("TOR") and will meet the criteria set out in the *Environment Act* and its regulations regarding the environmental assessment.

1. Overview

On 07 February 2019, the Northern Pulp Nova Scotia Corporation ("Northern Pulp" or "NPNS") registered its proposed Replacement Effluent Treatment Facility Project ("Effluent Facility") with Nova Scotia Environment ("NSE") for an environmental assessment ("EA") under the Nova Scotia *Environment Act* and its *Environmental Assessment Regulations*.

On 29 March 2019, the Nova Scotia Minister of Environment (the "Minister"), informed Northern Pulp that a review of its Registration Document for its proposed Effluent Facility had been completed. The Minister determined that, pursuant to section 13(1)(c) of the *Environmental Assessment Regulations*, a focus report was required to better understand the potential for adverse effects or significant environmental effects of the project.

During the review period for Northern Pulp's project registration document, a large number of public comments were submitted to the Minister. A number of concerns related to adverse effects or significant environmental effects from the project were raised in these comments, including (but not limited to) impacts to fish and fish habitat, concerns about the facility's design, concerns about the use of, and impact to, water resources, impacts from air emissions and noise, impacts on flora, fauna and human health, impacts on local archaeological sites, and the impacts on Mi'kmaq land uses and rights.

Then Minister Margaret Miller identified an initial list of key information gaps, which she outlined in her letter to Northern Pulp. These identified gaps in information were further expanded on by the EA Administrator in a Terms of Reference (the "TOR") for the Focus Report. Northern Pulp was given up to one year to submit its Focus Report.

Northern Pulp submitted its Focus Report to NSE on 02 October 2019 and it was released for a public comment period. The public was provided until 08 November 2019 to comment on the Focus Report. Once the comment period ends, the Administrator has 25 days to summarize public comments received and provide these along with a recommendation respecting the approval or rejection of the project to the Minister. The Minister then has 14 days to make a final decision. The Minister's options include:

1. Approval of the project subject to terms and conditions and other approvals;
2. Requiring an Environmental Assessment Report;
3. Referring all or part of the assessment to alternative dispute resolution; or
4. Rejecting the proposed project.

2. Summary of Findings

The Terms of Reference sets out what must be included in Northern Pulp's Focus Report. All impact assessment, mitigation and impact conclusions that are outlined in the initial Environmental Assessment Registration Document must be updated to reflect the requirements in the TOR. The TOR identified 11 key categories where more information was necessary for the Minister to make a decision, as follows:

1. Public, Mi'kmaq and Government Engagement
2. Project Description
3. Facility Design, Construction & Operation, and Maintenance
4. Marine Water and Marine Sediment
5. Fresh Water Resources
6. Air Quality
7. Fish and Fish Habitat
8. Flora and Fauna
9. Human Health
10. Archaeology
11. Indigenous People's Use of Land and Resources

We conclude that Northern Pulp has failed to fulfil multiple requirements of the TOR. The Minister must reject the project or require an environmental assessment report. It is our finding that Northern Pulp failed to fulfil 15/35 of the TOR requirements. We were unable to determine whether Northern Pulp adequately fulfilled 9/35 of the TOR requirements.

The table that follows is a summary of our findings:

Table 1: Summary of whether Focus Report met requirements of Terms of Reference

Category	Requirement	Requirement Met (Y/N)	Notes
1.Public, Mi'kmaq and Government Engagement	1.1 Provide a response (via a concordance table) to questions and comments raised by the public, Mi'kmaq and government departments, and incorporate these comments in the Focus Report where applicable. Comments may be summarized prior to providing the response.	**NO**	Northern Pulp did not provide responses to comments other than to reference the Focus Report.
	1.2 Provide a plan to share future reports and/or studies relevant to this Project with the public and the Mi'kmaq such as the Pictou Landing First Nation, including but not limited to the future Environmental Effects Monitoring results for the new effluent treatment facility.	**NO**	Northern Pulp did not create a plan, only an engagement strategy for the initial environmental assessment. Its strategy did not include Environmental Effects Monitoring.
2. Project Description	2.1 Provide the following information regarding the on-land portion of the effluent pipeline: • a re-alignment route for the effluent pipeline, given Department of Transportation and Infrastructure Renewal does not permit the pipeline to be placed in the shoulder of Highway 106; • maps and/or drawings of the new pipeline location; • a list of properties (ie., Premises Identification number or PID) that will intersect with the new pipeline alignment.	**NO**	The realigned route remains on the ROW of Highway 106. Maps and drawings of the new pipeline route were included (Figure 2.1-1). A list of properties was provided (Table 2.1-1).
	2.2 Conduct geotechnical surveys and provide the survey results to confirm viability of the marine portion of the pipeline route. The surveys must determine the potential impacts of ice scour on the pipeline.	**NO**	While geotechnical survey was completed, viability was not confirmed.

	2.3 Submit data regarding the complete physical and chemical characterization of NPNS' raw wastewater (ie., influent at Point A for the Project), to support the assessment of the appropriateness of the proposed treatment technology. The influent characterization results must be compared against the proposed treatment technology specifications.	**NO**	While characterization of physical and chemical composition of raw wastewater is provided, the characterization does not appear to be complete; nor does it provide information on how wastewater will meet regulations found in CEPA.
	2.4 Submit a complete physical and chemical characterization of NPNS's expected effluent following treatment by the proposed technology. To assess the efficacy of the proposed treatment technology, the following must be included: • Data from laboratory trials on NPNS's raw wastewater that were conducted at Veolia/AnoxKaldnes in Lund, Sweden in May 2018; • Modelling results using the raw wastewater parameters and quality; • A comparison of the effluent characterization results from the laboratory trials and modelling work, against appropriate regulations and/or guidelines.	**NO**	Data from laboratory trials was included (Appendix 2.4). Modeling results data was included (Appendix 2.4). Effluent characterization was not compared against appropriate (relevant) CEPA regulations for pulp and paper effluent (*Pulp and Paper Mill Defoamer and Wood Chip Regulations* and *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations*)
	2.5 Provide any proposed changes to the pipeline construction methodology and other associated pipeline construction work, related to the potential changes to the marine portion of the pipeline route (e.g., infilling, trenching, temporary access roads,	**YES**	Changes to construction will result in larger volumes of soil being excavated and an anticipated 7-fold increase

	excavation, blasting, disposal at sea, and others where applicable).		in the scheduled timeline from original timelines for excavation. This will result in greater impacts on the marine environment.
3. Facility Design, Construction & Operation, and Maintenance	3.1 Submit treatment technology specifications (e.g., optimal performance range of the technology) and an assessment of the efficacy of the proposed treatment technology for use at the NPNS facility, to the satisfaction of NSE. For example, peak effluent temperature is proposed to be above the generally accepted range of temperatures to achieve optimal biological treatment. Explain how the proposed higher than optimal treatment temperature would affect the treatment performance.	**NO**	Northern Pulp has not indicated how proposed temperature levels would meet proposed changes (additions) in the *Pulp and Paper Effluent Regulations*.
	3.2 Provide effluent flow data to support the proposed peak treatment capacity of 85,000 m3 maximum flow of effluent per day. At a minimum, data from 2017 and 2018 is required. Provide flow data for Point A, clarify source of the effluent flow volumes given in the EARD, and provide other relevant data and information to support the proposed treatment system design. If the 85,000 m3 cannot be justified based on historical data, identify water reduction projects, or re-evaluate the treatment system design and update the receiving water study accordingly.	**NO**	Flow data from Point A is not provided.
	3.3 Effluent discharge parameters must be updated (where necessary) based upon the results of the effluent characterization in Section 2.4 and relevant additional studies. Refer also to Addendum item 2.0	**YES**	Updates were provided.
	3.4 Provide the following information regarding the spill basin: • Submit information to assess the sizing and appropriateness of the design of the spill basin. The EARD indicates a retention time of 10-13 hours at a design	**YES**	The information was provided.

	capacity of 35,000 m3. The basis of this design has not been provided. If flows exceed 85,000m3 per day on a consistent basis (e.g., during summer months), confirm that there will be sufficient recovery time in the treatment system to empty the basin before the additional volume is required; • Explain where the overflow will be directed in the event of unforeseen scenarios (e.g., power outage).		
	3.5 Provide the following information regarding the effluent pipeline: • Provide viable options including the selected option for leak detection technologies and inspection methodologies, with specific consideration to any portion of the pipeline located in the Town of Pictou's water supply protection area; • Provide viable options including the selected option for the enhanced pipeline protection, such as trench lining and justify how the chosen option is an adequate option for secondary containment. Be sure to address any potential changes in flow regimes, especially within the Town of Pictou's water supply protection area, due to the installation of the pipeline and secondary containment. If different options are provided for different areas of the proposed re-aligned pipeline route, the locations for each option must be identified.	**NO**	Northern Pulp does not provide options for the marine component of the pipeline.
	3.6 Clarify where the potential releases of waste dangerous goods at the Project site will be directed for treatment and/or disposal. It is important to note that the new treatment facility is not proposed to treat waste dangerous goods based on the information provided in the EARD and requirements of NSE.	**YES**	Information included.

4. Marine Water and Sediment	4.1 Conduct baseline studies for the marine environment (such as marine water quality and marine sediment) in the vicinity of proposed marine outfall location.	**YES**	Baseline study included.
	4.2 Update the receiving water study to model for all potential contaminants of concern in the receiving environment (based on the results of the effluent characterization and/or other relevant studies such as Human Health Risk Assessment). Baseline water quality data for Caribou harbour must be applied to this study. Refer also to Addendum 3.0.	**YES**	The Receiving water study was updated.
	4.3 Provide results of sediment transport modelling work to understand the impacts of potential accumulation of sediment within near field and far field model areas. This should include chemical and physical characterization of the solids proposed to be discharged by NPNS as well as a discussion of how these solids will interact with the marine sediments and what the potential impact will be on the marine environment as a result.	**YES**	Results were provided. However; see above for comments on characterization.
5. Fresh water resources	5.1 Complete a wetland baseline survey along the proposed re-aligned effluent pipeline route (if wetlands are expected to be altered).	**NOT CLEAR**	The wetland survey was done; however, see above on comments on re-aligned effluent pipeline. This requirement is contingent on another component of the TOR, which is not completed. Note that in the Dillion Report (Appendix 5.1, p. 1) it states that "only a small fraction [of the wetlands] was available for 'on-the-

			ground- assessment due to property access restrictions".
	5.2 Provide monitoring methodologies for areas with significant risk of pipeline leaks or spills (e.g., two areas where the pipeline crosses the Source Water Protection Delineated Boundary for the Town of Pictou wellfields; below water table; important wetlands; watercourse crossings; etc.).	**NO**	A number of monitoring methodologies are not complete, including monitoring for the example areas.
6. Air Quality	6.1 Provide a revised inventory of all potential air contaminants to be emitted from the proposed project, including but not limited to, speciated volatile organic compounds, semi-volatile organic compounds, reduced Sulphur compounds, polyaromatic hydrocarbons and metals.	**NO**	Despite providing a revised inventory, it appears that not "all" potential air contaminants were included. It is also recommended that the applicability of sections 67 and 68 of the Nova Scotia *Environment Act* be considered.
	6.2 Update the air dispersion modelling for the pulp mill facility for all potential air contaminants of concern related to the Project.	**NOT CLEAR**	See above in comments addressing 6.1.
	6.3 Complete an updated ambient air monitoring plan for the Project site based on the air dispersion modelling results. This plan must include the potential air contaminants to be monitored and proposed air monitoring location(s).	**YES**	An updated ambient air monitoring plan was submitted.
7. Fish and Fish Habitat	7.1 Conduct fish and fish habitat baseline surveys for the freshwater environment, to the satisfaction of Fisheries and Oceans Canada.	**NOT CLEAR**	The fish and fish habitat baseline surveys for the freshwater environment were provided.

			Neither the Focus Report nor Appendix 7.1 offers insight into what will satisfy Fisheries and Oceans Canada, or whether these criteria were pre-determined.
	7.2 Conduct fish habitat baseline surveys for the marine environment, to the satisfaction of Fisheries and Oceans Canada.	**NOT CLEAR**	The fish and fish habitat baseline surveys for the marine environment were provided. Neither the Focus Report nor Appendix 7.2 offers insight into what will satisfy Fisheries and Oceans Canada, or whether these criteria were pre-determined.
	7.3 Conduct additional impact assessment of treated effluent on representative key marine fish species important for commercial, recreational and Aboriginal fisheries. This must be based upon updated information, additional studies and/or an understanding of expected movement of contaminants. Assessment methodology must first be agreed upon by NSE in consultation with relevant federal departments.	**NOT CLEAR**	Note that there is no indication that the assessment methodology used for this impact assessment corresponds or meets the requirements of NSE. This is a gap in information. Without a clear indication to that effect, it is impossible to determine

			whether this TOR requirement was met.
	7.4 Submit an updated Environmental Effects Monitoring (EEM) program based on the results of various relevant baseline studies and an updated receiving water study. Refer also to Addendum item 4.0	**NO**	Northern Pulp did not submit an updated EEM.
	7.5 Clarify what contingency measures will be in place to mitigate potential impacts (e.g., thermal shock to fish) due to potential large and rapid fluctuations in water temperature in the winter at the diffuser location during low production or maintenance shut down periods.	**YES**	Contingency measures were discussed.
8. Flora and Fauna	8.1 Complete a plant baseline survey along the proposed re-aligned effluent pipeline route.	**NOT CLEAR**	Revised plant baseline survey was completed; however, the proposed pipeline route remains essentially unchanged and runs along the Highway 106 TIR Right-of-way.
	8.2 Complete a migratory bird survey along the re-aligned pipeline route.	**NOT CLEAR**	Revised migratory bird survey was completed; however, the proposed pipeline route remains essentially unchanged and runs along the Highway 106 TIR Right-of-way.
	8.3 Complete a bird baseline survey for common nighthawk (Chordeiles minor), double crested cormorants (Phalacrocorax auratus), owls, and raptors and raptor nests, for the entire project area which includes the re-aligned pipeline route.	**NOT CLEAR**	Requested bird baseline surveys were completed; however, the proposed pipeline route remains essentially unchanged and

			runs along the Highway 106 TIR Right-of-way.
	8.4 Complete a herptile survey for the Project area which includes the re-aligned pipeline route.	**NOT CLEAR**	Herptile survey was completed; however, the proposed pipeline route remains essentially unchanged and runs along the Highway 106 TIR Right-of-way. It is recommended that a precautionary approach be taken in this respect; further analysis and study is required to determine Northern Pulp's ability to comply with statutory requirements with respect to two identified species at risk potentially within pipeline route or area.
9. Human Health	9.1 Complete baseline studies for fish and shellfish tissue (via chemical analysis) of representative key marine species important for commercial, recreational and Aboriginal fisheries in the vicinity of the proposed effluent pipeline and diffuser location.	**NO**	Data collection for studies is on-going.
	9.2 Commence a Human Health Risk Assessment (HHRA) to assess potential project-related impacts on human health. The risk assessment must consider human consumption of fish and other seafood, consumption of potentially contaminated drinking	**NO**	The HHRA was not completed and is not anticipated to be completed until spring 2020.

	water, exposure to recreational water and sediment, outdoor air inhalation, and any other potential exposure pathways. The analysis must inform the identification of contaminants of concern and updating of the receiving water study.		
10. Archeology	10.1 Complete an Archaeological Resource Impact Assessment for the marine environment related to the Project.	**YES**	An Archaeological Resource Impact Assessment was completed.
	10.2 Complete shovel testing for areas in the terrestrial environment that are identified to have elevated or medium potential of archaeological resources, to confirm the presence or absence of these resources.	**YES**	The shovel testing was completed.
11. Mi'kmaq Ecological Knowledge Study	11.1 Complete a Mi'kmaq Ecological Knowledge Study (MEKS) for the Project.	**NO**	The process of producing a MEKS includes a review by the Kwilmu'kw Maw-klusuaqn Negotiation Office ("KMKNO") to ensure consistency with its EKS Protocol. While Northern Pulp indicated the completion of this process, the KMKNO had not yet completed its review.

3. Discussion of the Terms of Reference

3.1 Public, Mi'kmaq and Government Engagement

Northern Pulp was required to provide a response to questions and comments raised by the public, Mi'kmaq and government departments ("public comments") and to incorporate these comments into the Focus Report. Northern Pulp created a Concordance Table for public comments it received and attached it as Appendix 1.1 to the Focus Report. The Concordance Table has four columns: comments grouped into issues related to Valued Environmental Components ("VECs"), summaries of concerns, the source of concerns, and response comments.

A summary review of the concordance table reveals that the majority of Northern Pulps responses are in the form of references to the Focus Report. In fact, in the concordance table, the phrase "refer to section X" occurs a total of 809 times as Northern Pulp's response. In other parts of the concordance table, Northern Pulp states that a particular concern will be addressed in the future; for example, on page 3 of 40 of the government comments, it responds to multiple concerns surrounding the atmospheric environment by stating that the concerns "will be addressed in the IA and with discussion with NSE".

Many of the responses from Northern Pulp are not adequate responses for the purposes of the *Environment Act,* the *Environmental Assessment Regulations* and the environmental assessment process. The public expects, and Northern Pulp is obligated to provide, actual responses to their concerns, detailing how adverse effects or environmental effects would be prevented or mitigated by Northern Pulp.

The objectives of public participation in an environmental assessment are rooted in fair process and the democratic process. Legislatures across Canada, both provincially and federally, have incorporated public participation into their environmental assessment processes because public engagement is an important part of living and participating in a democratic society. Imbedded in the environmental assessment process is the recognition that the larger and longer lasting the impacts of a project, the more capacity must be provided to the public to have their concerns heard AND addressed. This recognition of fair process in administrative decision-making, such as the environmental assessment process, has been acknowledged and protected by the courts.

Section 2 of the Nova Scotia *Environment Act* sets out the purposes of the Act, and includes (emphasis added):

> *(h) providing access to information and facilitating effective public participation in the formulation of decisions affecting the environment, including opportunities to participate in the review of legislation, regulations and policies and the provision of access to information affecting the environment;*

Effective public participation requires more than soliciting public comments; it requires engagement and response. The public has highlighted concerns and asked Northern Pulp how their concerns will be addressed. Northern Pulp must provide an adequate answer. Providing blanket statements (809 times) to the numerous concerns expressed by the public is not effective public participation and does not provide access to information relevant to mitigation efforts for the adverse effects or environmental effects of the proposed effluent treatment facility that were identified by Mi'kmaq, the general public and government.

Northern Pulp was also required to provide a plan to share future reports or relevant studies with the Public and Mi'kmaq, including future Environmental Effects Monitoring results.

Northern Pulp developed a "Stakeholder Engagement Plan" ("SEP") which is found in Appendix 1.2; there, it is described as an engagement guide. The Focus Report states that "[a]s key reports are prepared for each phase of the project, they will be provided to the appropriate stakeholders and rights holders". This statement does not meet the criteria of the TOR, which requires a plan to share future reports or relevant studies with the Public and Mi'kmaq.

Table 1.2- 1, found in the Focus Report, is a summary of the documents that Northern Pulp has shared and with whom. There are three categories of "stakeholders" or "rights holders" – Pictou Landing First Nation, Federal Government and NSE. There is no category for "public". The Focus Report states that "moving forward, reports will be similarly shared with stakeholders and rights holders".[1] The purpose of Northern Pulp's engagement guide is described in section 1.1:

> *"This SEP serves as a guide to engagement during the environmental assessment stage. This version of the SEP is an initial guide to engagement and will need to be revised following project approval to inform ongoing stakeholder engagement through the various stages of the ETF project development, construction, operation and closure/rehabilitation"*

Section 3.0 of the SEP identifies all the stakeholders, divided into three groups: internal/external, government, and civic, business leaders and others. The general public, including members of Pictou county, communities, etc. are not identified as stakeholders. Indigenous communities other than PLFN are also not identified. Despite the TOR requiring the inclusion of a plan to share Environmental Effects Monitoring ("EEM") results, EEM is not mentioned at all in the SEP.

Northern Pulp failed to fulfil both requirements for public engagement as set out in the TOR. It failed to respond to public comments and did not prepare an engagement plan as required.

3.2 Project Description

Northern Pulp was required to provide the following information regarding the on-land portion of the effluent pipeline:

[1] Focus Report, p. 11.

- a re-alignment route for the effluent pipeline, given Department of Transportation and Infrastructure Renewal does not permit the pipeline to be placed in the shoulder of Highway 106;
- maps and/or drawings of the new pipeline location;
- a list of properties (ie., Premises Identification number or PID) that will intersect with the new pipeline alignment.

Despite the explicit and clear statement that the Nova Scotia Department of Transportation and Infrastructure Renewal ("TIR") does not permit the pipeline to be placed in the shoulder of Highway 106, Northern Pulp states the following in its Focus Report (emphasis added):

- "Approximately 8.7km of the on-land proposed pipeline is proposed to be installed in the TIR ROW (right of way) between Pictou and Caribou"
- "Land-based installation outside of NPNS property will occur predominantly within the existing NSTIR's ROW adjacent to and paralleling provincial Highway 106"
- "The on-land pipeline will be placed at the eastern most edge of the Highway 106 ROW for the majority of the route".[2]

The description of the effluent pipe route in Northern Pulp's registration document closely mirrors the descriptions of its new route found in the Focus Report (see table 2 below).

Table 2 – Comparison of Focus Report with Registration Document for Pipeline Route

Focus Report **[section 2.2 – page 13-14]**	**Registration Document** **[section 5.2.3.1 – page 47-48]**
The pipeline begins at the ETF pump station at the NPNS facility. The pipeline will run on NPNS property until it meets and enters Pictou Harbour. The pipeline is submerged across Pictou Harbour, aligned immediately to the east of the Pictou Causeway until it meets the north bank of Pictou Harbour. On the north side of Pictou Harbour, it enters NSTIR's Highway 106 (Trans-Canada Highway, also known as Jubilee Highway) ROW and follows Highway 106 north to Caribou, NS, mostly on the eastern side of the Highway 106 ROW. The pipeline will be installed generally parallel to Highway 106, along the outermost eastern portion of the NSTIR ROW. It will be situated	The pipeline will begin on land at a pump station where treated effluent from the secondary clarifiers at the ETF is pumped into the pipeline. Pumping will be required to overcome static pressure exerted on the pipeline to achieve proper dispersion of the treated effluent at the outfall. Pumping will also be required to overcome forces of gravity in order for treated effluent to reach the outfall. This facility will operate in a similar manner to municipal pumping stations. The land-based pipeline portion extending from NPNS property to the edge of shore at Caribou Harbour, will be approximately 11.4 km in length. The pipeline will be buried for

[2] Focus Report, p 13.14.

predominantly on the east side until it reaches Caribou. At this point, the pipeline will cross under Highway 106 to the west side and enter the marine environment at Caribou Harbour to the north, and to the west of the Northumberland Ferries marine terminal building and parking area. The exact location where the pipeline will enter the marine environment will be determined in consultation with the marine designer, the land-based designer, the construction contractor, and Northumberland Ferries Limited in an effort to reduce impact on ferry operations. Construction of the on-land portion of the treated effluent pipeline will require an approximate working area width of 10 m. Along Highway 106, the pipe will be generally installed in undeveloped and unmaintained areas. The pipe will be located outside the existing road shoulder but within the ROW, and specific details of the location will be determined in agreement with NSTIR.	the majority of the route. Based on the proposed design there will be one area where the pipeline will be exposed to cross the spillway of the Pictou Causeway, where it will be suspended and attached to the exterior of the bridge due to limited roadway width. The exposed area will be protected from damage by existing guide rails. For approximately the first kilometer of the pipeline, the pipe will be located on NPNS property. The pipeline then moves across NPNS property and enters NSTIR's Highway 106 (Trans-Canada Highway, also known as Jubilee Highway) ROW at the northwest corner of NPNS property. The pipeline then follows Highway 106 north to Caribou. The pipeline will be installed generally parallel to Highway 106, within the outer portion of the developed road shoulder. It will be situated on the south side until it reaches the Pictou roundabout. Utilizing horizontal directional drilling (HDD) or other boring method to avoid traffic and roadway disturbance, it will be constructed under the roundabout crossing to the north side of the road and continuing there for the remaining extent of the land-based por□on. HDD or other boring methods, or open cut crossing methods will be used for pipeline crossings of local public roads and driveways as required. The pipeline will stay within disturbed portions of NSTIR's road right-of-way (Highway 106) until it reaches Caribou Harbour and enters the marine environment, immediately to the west of the Northumberland Ferries marine terminal building and parking areas.

Northern Pulp has not identified an alternative route as required by the TOR, with respect to the primary issue – that TIR will not allow the pipe to be built along the right-of-way along Highway 106.

Northern Pulp has indicated in the Focus Report that "conversations between NPNS and TIR regarding installation of the pipeline within the right-of-way (ROW) are ongoing". A letter from TIR is attached as Appendix 2.1.[3] It is noteworthy to highlight that the letter from TIR, while indicating that discussions with regard to the pipeline route are on-going, does not indicate that these discussions are with respect to the right-of-way. Considering that construction of any pipeline is within TIR jurisdiction, this is misleading.

Northern Pulp has included a single map of the proposed altered pipeline route and included information about all properties along the proposed route. Considering the misleading information and failure to meet the previous terms of the TOR, we cannot comment on whether all the properties have been identified.

Northern Pulp was also required to conduct geotechnical surveys and provide the survey results to confirm viability of the marine portion of the pipeline route. The surveys must also determine the potential impacts of ice scour on the pipeline.

The purpose of the geotechnical surveys required by this TOR is to confirm viability of the marine portion of the pipeline route – that is, the physical pipeline itself must actually be a viable construction project, and this must be confirmed by the surveys. While a geotechnical survey was completed, the Focus Report does not positively or explicitly confirm the viability of the proposed pipeline, nor does it offer any statement of an expert's opinion to that effect.

Furthermore, the Focus Report identifies two possible complications: 1) "there were some restrictions in portions of the survey near the shorelines due to the shallow water in these areas" and 2) "the depth to bedrock is not known and may be encountered during the pipeline installation".[4] This may lead to areas in which dredging is limited due to the sub-bottom geology. These issues are not dealt with in the Focus Report.

The geotechnical survey report ("GSR") summary also highlighted these issues. The GSR discussed the difficulty with mapping nearshore sections of the route and interpreting the sub-bottom geology.[5] Additionally, the GSR identified three main areas along the proposed Caribou Harbour pipeline route where dredging activities might be constrained – dredging being the method used to reach the planned trench depth of 3 meters.[6]

[3] Focus Report, p. 13.
[4] Focus Report, p. 20 and 21.
[5] Geotechnical Survey Report, Appendix 2.2 of Focus Report, p. 120.
[6] Geotechnical Survey Report, Appendix 2.2 of Focus Report, p. 121.

Finally, the GSR made a number of recommendations for work to be considered in further supporting the engineering, design and installation of the proposed pipeline that indicate more work is required before viability can be confirmed.[7]

As part of this aspect of the TOR, Northern Pulp was also required to submit data regarding the complete physical and chemical characterization of the raw wastewater to support its assessment of the appropriateness of the proposed treatment technology.

Northern Pulp notes in its Focus Report that the bleaching process used to remove residual lignin from the pulp, in a step generally referred to as "delignification", used chlorine dioxide (ClO2) as the bleaching chemical in a process known as Elemental Chlorine Free ("ECF") bleaching.[8] The Focus Report notes that "several studies" have reported that replacement of older systems with the ECF process has resulted in the virtual elimination of detectable amounts of dioxins and furans.

The proposed replacement effluent facility will use an Activated Sludge Treatment ("AST") process involving aeration and recirculation of bacterial population back into the intake of the system. The Focus Report suggests that this process results in effluent that meets the *Pulp and Paper Effluent Regulations* under the *Fisheries Act*, which set out limits on amounts of TSS and BOD that can be released from mills and prohibit the release of effluents that cause harm to fish.[9]

However, under the *Canadian Environmental Protection Act* ("CEPA"), the *Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* (SOR/92-267) require that all pulp and paper mills produce effluent in which there are no measurable quantities of dioxins and furans. Table 2.3-1 of the Focus Report provides a summary of the NPNS's current sampling of untreated effluent (Point A) and indicates that no sampling of dioxins or furans occurred.[10] Table 2.3-3 of the Focus Report provides the laboratory analytical results summary, and does not include any indication of the level of dioxins or furans at Point A (the untreated effluent).[11]

Furthermore, the KSH Consulting Report used to facilitate the Focus Report summary findings found that results for dioxins and furans, indicated in the form of total toxic equivalency ("TEQ") at Point C are in line with TEQ of raw water or Caribou Harbour samples. It concludes that the results demonstrate effectiveness of the PPERs in achieving virtual elimination of dioxins and furans in the effluent.[12] However, there is no indication of how the levels present compare to regulatory requirements under CEPA, using the approved (required) methods for testing for measurable amounts found in those regulations. In fact, Table 1-11 of that KSH report shows

[7] Geotechnical Survey Report, Appendix 2.2 of Focus Report, p. 123.
[8] Focus Report, p. 25.
[9] Focus Report, p. 46.
[10] Focus Report, p. 27.
[11] Focus Report, p. 30.
[12] Appendix 2.3 – KSH Consulting Report, p. 32.

detected levels at Point A and Point C of some forms of dioxins and furans.[13] The KSH report then provides its conclusion that:

> *The analysis shows that because of their potential impact on the receiving waters and despite no direct indication that these effects have been observed in the environment, some compounds should be considered for further scrutiny, either as part of future testing or as part of more long-term investigations, such as the Environmental Effects Monitoring (EEM) program or Human Health Risk Assessment (HHRA)"*.

The components of effluent that warrant further study include dioxins and furans.[14]

Therefore, considering the legal requirements under CEPA and the regulations, the non-inclusion of the levels of dioxins and furans at Point A (the current untreated effluent) leads to the conclusion that the physical and chemical characterization of the raw wastewater (at Point A for the Project) is not complete. Additionally, there are indications that the proposed effluent treatment process is not appropriate, given the identified need for additional studies related to dioxins and furans and indications that regulatory requirements would not be met.

Finally, Appendix 2.3 has a full Raw and Treated Effluent Characterization report conducted for this Focus Report that supposedly provides the complete physical and chemical characterization of expected effluent following treatment. Its objective is to answer the question: *What are the expected list of contaminants that may be generated specifically by the new NPNS Effluent Treatment Facility*? It appears to us that the appropriateness of the proposed treatment technology was not part of the work done.

Northern Pulp was also required to submit a complete physical and chemical characterization of NSPN's expected effluent following treatment by the proposed technology, including:

- Data from laboratory trials on NPNS's raw wastewater that were conducted at Veolia/AnoxKaldnes in Lund, Sweden in May 2018; ·
- Modelling results using the raw wastewater parameters and quality; ·
- A comparison of the effluent characterization results from the laboratory trials and modelling work, against appropriate regulations and/or guidelines.

In undertaking this component of the TOR, Northern Pulp states that a comparison of the untreated (Point A) and treated (Point C) effluent components against published effluent composition data from other Canadian jurisdictions indicates that the mill's effluent is similar to effluent from other bleached kraft mills using similar technology. Northern Pulp notes that the proposed replacement ETF will provide performance comparable to other mills, and furthermore, that the current and proposed ETF will have comparable performance. It concludes

[13] KSH Consulting Report, p. 31.
[14] KSH Consulting Report, p. 33-34.

that the data collected from Point C can be used to accurately represent what effluent from the replacement ETF will resemble.[15]

The comparison of effluent characterization results from both laboratory trials and modelling work against appropriate regulations or guidelines was incomplete. Table 2.4-2 of the Focus Report sets out the comparison.[16] The characterization data used was BOD and TSS from the Veolia expected performance data against the PPER (1992 – current) and the First Draft of the Modernization of the PPER, released in May 2019, as well as provincial limits on BOD and TSS. There is no comparison against other appropriate regulations, including against those created under CEPA (see: *Pulp and Paper Mill Defoamer and Wood Chip Regulations* and *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations*). Furthermore, while there are regulatory daily maximums for both BOD and TSS in regulations provided, the data provided for the comparison did not include daily maximums, and instead, looked only at monthly averages. No comparison with any guidelines was provided.

Northern Pulp was required to provide any proposed changes to the pipeline construction methodology and other associated pipeline construction work, related to the potential changes to the marine portion of the pipeline route.

Note that Table 2.5-1 shows a summary of the changes to construction; this includes many changes that were made as a result of the marine geotechnical survey. This includes an estimated increase of 6,500 cubic meters of soil per kilometer in excavated volume of soil from dredging.[17] There is also an anticipated change in the excavation rate of 300-500 cubic meters per hour and 3-4 day per kilometer timeline to a rate of 60-120 cubic meters per hour and a timeline of at least 21 days per kilometer. These are large increases (it is a 7-times increases in the time taken) and will have an impact on the length of time required for excavation. This will have an impact on the marine environment that is much greater than originally anticipated and highlights the need for further evaluation.

3.3 Facility Design, Construction & Operation and Maintenance

Northern Pulp was required to submit treatment technology specifications and an assessment of the efficacy of the proposed treatment technology for use at the NPNS facility, to the satisfaction of NSE. The TOR provides, as an example of the type of assessment required, that the peak effluent temperature is proposed to be above generally accepted range of temperatures to achieve optimal biological treatment; it asks Northern Pulp to explain how the proposed higher temperatures would affect the temperature performance.

[15] Focus Report, p. 32-33.
[16] Focus Report, p. 37.
[17] Table begins at p. 40 of the Focus Report.

This TOR requirement likely came about as a result of comments from the NSE Inspection, Compliance and Enforcement Division and Industrial management Unit, which had a concern that temperatures would be above 25-35 degrees Celsius; more specifically, NSE was concerned about the ability of the ETF to meet and not exceed effluent limits.[18]

Neither the Focus Report, nor the KSH Consulting Report found in Appendix 3.1, discuss in any manner the reason that peak effluent temperatures are above generally accepted range of temperatures. In fact, there is no discussion whatsoever of the generally accepted range of temperatures of effluent. Likewise, there is no discussion of the "optimum treatability" temperatures of the proposed effluent technology.[19] Northern Pulp has also failed to indicate how it plans to comply with changes in the PPER, since ECCC has proposed to limit temperature of effluent to 35 degrees C daily and 40 degrees C monthly.

Finally, it is not clear that an explanation of how the proposed higher temperatures would affect treatment performance. In the Focus Report, Northern Pulp acknowledges that the rate of biological reaction will increase with temperature to a maximum value of around 35.5 degrees Celsius for most aerobic effluent systems, and that temperatures above 39 degrees will result in a decreased oxidation rate for mesophilic organisms.[20] Since oxidation is the process used to remove organic material from the wastewater, the reduced oxidation rates found at the higher than normal temperatures seem counterintuitive to the purposes of the process. This is not reconciled within the Focus Report. Northern Pulps statement that "with increasing effluent temperature, bacterial activity increases" is misleading because the bacterial activity appears to level off at a certain temperature and then decline.[21]

As part of the TOR for facility design, Northern Pulp was also required to provide effluent flow data to support proposed peak treatment capacity of 85,000 m3 maximum flow of effluent per day, with a minimum of 2017 and 2018 data required.

Part of this TOR requirement is the provision of flow data from Point A of the current effluent plant; however, the Focus Report states that there is an "absence of accurate Point A data".[22] The Report in Appendix 3.2 confirms that "flow is not measured at Point A".[23] Northern Pulp's statement that "A design of 85,000 m3/day is appropriate and well supported by the operating data of the last three years" is not accurate; no operating data for Point A is provided and so all calculations for flowrate are approximations of the actual flowrate at Point A. No reason is provided for not providing data for Point A, other than in the Report as follows:

[18] Focus Report, Appendix 1.1, Concordance Table p. 9/40 – Government comments.
[19] Refer to government submissions in Registration Documentation, p. 255.
[20] Focus Report, p. 46.
[21] Focus Report, p. 47.
[22] Focus Report, p. 49.
[23] Focus Report, Appendix 3.2, p. 3.

Flow is measured using a doppler-type system at the effluent feed pumps at the mill, but this measurement is for indication purposes only, as its accuracy is not sufficient for either data analysis or regulatory purposes.[24]

The Report also notes that: "Effluent flow exceeded 85,000 m3/day one day in 2016 and not at all in both 2017 and 2018"; yet, the Table showing historic flowrates (in monthly averages and expressed in m3/day) indicate two separate instances where flowrate was above: in July 2017 and in August 2017. Furthermore, there are two instances where the flow rate is above 84,000 m3/day, including in July and August 2018.[25] Considering that flowrates are expressed as monthly averages, it is difficult to reconcile the fact that averages consist of figures both below and above that average. It is likely that flowrate went above the 85,000 m3/day more than once.

Northern Pulp is required to provide the following information regarding the effluent pipeline:

- Viable options for leak detection technologies and inspection methodologies, with specific consideration of the Pictou water supply protection area
- Viable options for the enhanced pipeline projection, including justification for how the chosen option is an adequate option for secondary containment

Northern Pulp identifies several possible leak detection technologies it might use; however, the Focus Report does not provide for any leak detection technology to be deployed for the marine component of the effluent pipeline.[26] The Focus Report also does not provide specific consideration of the Pictou water supply protection area with respect to leak detection technologies and inspection.

3.4 Marine Water and Marine Sediment

Northern Pulp is required to update the receiving water study to model for all potential contaminants of concern in the receiving environment.

In the Receiving Water Study ("RWS"), the Focus Report states that for near-field modeling, a three-dimensional software model was used to assess "regulatory mixing zones" resulting from continuous source discharges. The "mixing zone" for the purposes of this study was defined as per the Canadian Council of Ministers of the Environment (CCME, 2003) as "an area contiguous with a point source (effluent) where the effluent mixes with ambient water and where concentrations of some substances may not comply with Water Quality Guidelines or objectives".[27] The objective of the modelling was to confirm ambient water quality

[24] Focus Report, Appendix 3.2, p. 3.
[25] Focus Report, Appendix 3.2, p.4.
[26] Focus Report, p. 62: pipeline [see specifically, p. 62, PDF 102 – re "leak detection system…will be installed…in the overland portion…of the route between Pictou and Caribou…"; and: "Automated leak detection will not be installed in the rest of the fused HDPE pipeline outside of this land-based section".[26]
[27] Focus Report, p. 85.

concentrations or established water quality guidelines were met at the edge of the mixing zone (100m).

There are several issues with this approach. First, the CCME is a forum of federal and provincial Ministers to discuss common issues related to environmental issues of national and international concern. The guidelines created within this forum are only that – guidelines; they do not form part of the legal framework that would ultimately guide the proposed effluent discharge. Second, there is no "mixing zone" or "regulatory mixing zone" created under provincial or federal legislation for the purposes of the proposed effluent pipeline and outlet.

Under the *Fisheries Act* and the *Canadian Environmental Protection Act* and their regulations, the release of substances into the marine environment (the "receiving environment" in this case) occurs at the point where the substance is released, not the edge of a 100m mixing zone. Therefore, the effluent released from the proposed pipeline must meet all regulatory requirements at the moment that the effluent exits the pipe at the diffuser.

3.5 Fresh Water Resources

Northern Pulp was required to provide monitoring methodologies for areas with significant risk of pipeline leaks or spills.

Appendix 5.2 of the Focus Report is left intentionally blank and refers to the corresponding section of the Focus Report. The TOR identifies several issues to be addressed, including: the two areas where the pipeline crosses Source Water Protection Delineated Boundaries for Town of Pictou wellfields, below water table, wetlands, water crossings. It leaves open the possibility of others.

The Focus Report is vague on the methodologies it will use to monitor impacts from the pipeline. A surface water monitoring program will be "developed".[28] A Construction Monitoring Program will be "developed".[29] The current NPNS monitoring program will continue to be used to monitor groundwater and it will "develop a surface water monitoring program".[30]

With respect to wetlands, the Focus Report identifies that future monitoring will be conducted to assess success of wetland compensation that it anticipates. It also states that the degree of disturbance in wetlands adjacent to the proposed project will be "assessed" prior to and subsequent to construction activities. It proposed to assess disturbed portions of wetlands with undisturbed portions of the same wetland – this assumes that impacts on part of a wetland do not affect other parts of that same wetland. Assessment criteria are included.

[28] Focus Report, p. 106.
[29] Focus Report, p. 106.
[30] Focus Report, p 106-07.

This TOR requirement is not fulfilled. The two pages of "methodologies", with no attached appendix. Other than the limited description of wetlands monitoring, within the narrow scope of compensation, no other methodologies are provided. The Focus Report simply identifies that future monitoring will be developed. This is not a methodology.

Considering the ordinary or common meaning of the word "methodology", a statement to the effect that a study will be "developed" is not sufficient to meet that definition. Methodology means the body or system of practices, rules, principles that will be used to develop and undertake the study. For example, the Collins English Dictionary (online) defines methodology as "a system of methods and principles for doing something, for example for teaching or for carrying out research".[31]

The Focus Report states that "leak detection technologies and inspection methodologies are addressed in other sections of this report";[32] however, relevant sections of the report (assuming section 3.5 – Leak Detection Technologies) does not provide methodologies. That section also does not address specific areas with significant risk of pipeline leaks or spills, such as the identified areas explicitly set out in section 5.2 of the TOR.

Finally, it is important to note that there are other areas that will be faced with "significant risk of pipeline leaks or spills", not least the marine components of the pipeline. While the TOR provides specific examples of areas facing these significant risks, the requirement relates to all areas that face significant risk.

3.6 Air Quality

Northern Pulp was required to provide a revised inventory of all potential air contaminants to be emitted from the proposed project, including but not limited to, speciated volatile organic compounds, semi-volatile organic compounds, reduced Sulphur compounds, polyaromatic hydrocarbons and metals. Furthermore, Northern Pulp is required to update the air dispersion modelling for the pulp mill facility for all potential contaminants of concern related to the Project.

Northern Pulp creates its inventory based on the selection of contaminants as indicated in section 6.1 of the TOR; it appears then, that the inventory (found in Appendix 6.2) is not of all potential contaminants. The Focus Report states that:

> *The air contaminants considered in the development of the revised inventory for the project included CACs, metals, PAHs, VOCs, reduced Sulphur compounds, dioxins and furans and terpenes, as per Section 6.1 of the Terms of Reference for the Focus Report and through further communication with NSE.*[33]

[31] See: https://www.collinsdictionary.com/dictionary/english/methodology
[32] Focus Report, p. 106.
[33] Focus Report, p. 109.

It should be noted that section 6.1 of the TOR explicitly lists the substances to be included in the inventory but does not limit Northern Pulp to those substances for the purposes of the TOR requirement. There is no indication of the substance of communications with NSE; however, the NSE Air Quality Unit had provided comments, provided in the concordance table, that Northern Pulp "should have identified the full air emissions inventory for the facility and modeled all potential air contaminants of concern, as a result of the proposed project".[34]

Moreover, the following is a more detailed description of the process to develop the inventory, as found in Appendix 6.1 of the Focus Report (emphasis added):

> *The air contaminants considered in the development of the revised inventory for the Project included criteria air contaminants (CACs), metals, polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), reduced Sulphur compounds, dioxins and furans and terpenes, as per Section 6.1 of the Terms of Reference (NSE 2019b) and further communication with NSE (S. Vervaet, personal communication, July 12, 2019). The considered list was refined using published literature focused on the pulp and paper industry, including the National Council for Air Stream Improvement Inc.'s (NCASI) Handbook of Substance-Specific Information for National Pollutant Release Inventory Reporting (NPRI) for Pulp and Paper Mills (NCASI 2007) and those presented as being released from pulp and paper mills in Ontario's Technical Standards to Manage Air Pollution (Appendix 4-A) (MECP 2018a). Of the refined contaminant list, those included in the revised emission inventory, and therefore assessed through modelling, were identified based on site-specific data, data obtained from Kraft mills with similar operations (e.g. AST ETF and co-combustion of biosludge and biomass – mills included Howe Sound and Crofton), and published literature specific to the Project operations, as per the following considerations[…].*[35]

Therefore, the inventory of contaminants was refined twice. First, the full list of identified contaminants was refined using publishing literature; second, this refined list was further refined using additional criteria or "considerations". It should be noted that this does not meet the requirement that "all potential contaminants" be included in the inventory. In fact, an inventory is generally considered a complete list. For example, the Collins English Dictionary (online) defines inventory as "a written list of all the objectives in a particular place".[36]

It is noted in the Focus Report that the contaminants that are part of the updated and expanded air dispersion modelling are not currently regulated under the *Air Quality Regulations* created under the *Environment Act*. However, section 67 of the *Environment Act* is explicit that (emphasis added):

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[34] Focus Report, Appendix 1.1, Concordance Table, p. 2.
[35] Focus Report, Appendix 6.1, Stantec, "Expanded Air Dispersion Modelling Study", p. *v*.
[36] See: https://www.collinsdictionary.com/dictionary/english/inventory

> *(1) No person shall knowingly release or permit the release into the environment of a substance in an amount, concentration or level or at a rate of release that causes or may cause an adverse effect, unless authorized by an approval or the regulations.*
>
> *(2) No person shall release or permit the release into the environment of a substance in an amount, concentration or level or at a rate of release that causes or may cause an adverse effect, unless authorized by an approval or the regulations.*

Substances within this context include any solid, liquid or gas. Therefore, although some contaminants are explicitly regulated in the *Air Quality Regulations*, any potential substance released from the proposed effluent facility that causes or may cause an adverse effect will be the focus of provisions under the law and should have been included in the inventory.

3.7 Fish and Fish Habitat

Northern Pulp is required to submit an updated Environmental Effects Monitoring ("EEM") program based on the results of various relevant baseline studies and an updated receiving water study. As part of this TOR requirement, Northern Pulp must also refer to Addendum 4.0, which states that several field studies and monitoring are "likely to be required as part of an EEM program regulated under the PPER for the project if it is approved". This includes biological monitoring studies covering a benthic invertebrate community study, fish population study, and dioxin and furan levels in fish.

Northern Pulp did not submit an updated EEM program. The accompanying Appendix 7.4 is Schedule IV.1 of the *Pulp and Paper Effluent Regulations*. It is noted in the Focus Report that:

> *The proposed EEM investigations related to the NPNS Caribou Harbour outfall relocation was provided by EcoMetrix Incorporated as part of the original EARD (Appendix G of the EARD)(EcoMetrix, 2018a) and remains relatively unchanged based on the various baseline studies and the updated RWS.*[37]

While the FR suggests that the EEM is "relatively unchanged", it does not provide further details on what parts were changed, or how so. An EEM proposed program was submitted in the EARD (Appendix G).

The requirement for an EEM is set out in the *Pulp and Paper Effluent Regulations* created under the *Fisheries Act*, as follows:

> *28 (1) The owner or operator of a mill shall conduct environmental effects monitoring studies of the potential effects of effluent on the fish population, on fish tissue and on the benthic invertebrate community.*

[37] Focus Report p. 148.

(2) Environmental effects monitoring studies consist of the sublethal toxicity testing referred to in section 29 and the biological monitoring studies referred to in section 30.

(3) The studies shall be performed and their results recorded, interpreted and reported in accordance with generally accepted standards of good scientific practice at the time that the studies are performed.

The Focus Report states that there are provisions in the PPER that removes the requirements for specific study components of the EEM program based on the dilution of effluent, as follows:

- If the effluent concentration is less than 1% at a distance of 250m, no fish community study is required; and
- If the effluent concentration is less than 1% at a distance of 100 from the discharge, no benthic invertebrate community study is required.[38]

Northern Pulp refers to the 3D modeling in the local study area and suggests because it indicates that dilution of the effluent will occur to less than 1% at approximately 20m from the discharge location, neither a fish community nor benthic community study is required.[39] Northern Pulp goes on to state that predictions of effluent dilution will need to be confirmed as part of the first EEM study. Finally, the Focus Report states that some fish and benthic studies are still warranted as part of the EA follow-up and monitoring program and that "it is intended that they will be completed by a third party consultant for the current project".[40]

The requirements for biological monitoring studies are set out in more detail in Schedule IV.1 of the PPER:

3 Biological monitoring studies consist of

(a) a study respecting the fish population, if the concentration of effluent in the exposure area is greater than 1% in the area located within 250 m of a point of deposit of the effluent in water;

(b) a study respecting fish tissue if:

(i) since the submission of the most recent interpretive report, the effluent contained a measurable concentration of 2,3,7,8-TCDD or of 2,3,7,8-TCDF, within the meaning of the Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations, or

[38] Focus Report, p. 150.
[39] Focus Report, p. 150.
[40] Focus Report, p. 150.

(ii) an effect on fish tissue was reported in the most re- cent interpretive report; and

(c) a study respecting the benthic invertebrate community, if the concentration of effluent in the exposure area is greater than 1% in the area located within 100 m of a point of deposit of the effluent in water.

As noted in Addendum 4.0, Northern Pulp is likely to be required as part of an EEM program regulated under the PPER for the project if it is approved to include a benthic invertebrate community study and fish population study. This likely refers to the PPER modernization efforts currently under way by Environment and Climate Change Canada ("ECCC"). As part of that modernization, ECCC is considering adding critical effect sizes (CES) as criteria for determining when investigation studies are required. CES are based on the size of effects on fish or fish habitat.[41]

3.8 Flora and Fauna

Northern Pulp is required to complete a number of baseline surveys along the proposed re-aligned effluent pipeline route, including:

- Plant baseline survey;
- Migratory bird survey;
- Bird baseline surveys for the Common Nighthawk, Double-crested Cormorants, owls, and raptors and raptor nests for the entire project area; and
- Herptile survey

Note that potential turtle habitat was identified; there may be species at risk under the provincial *Endangered Species Act*. The ETF was identified as being within range of two species identified in the Herptile Survey as being species at risk or endangered species: wood turtle and snapping turtle.[42] It is recommended that further analysis and study is required to determine Northern Pulp's ability to comply with statutory requirements with respect to these species.

3.9 Human Health

Northern Pulp was required to complete baseline studies for fish and shellfish tissue of representative key marine species important for commercial, recreational and Aboriginal fisheries in the vicinity of the proposed effluent pipeline and diffuser location.

[41] See: Environment and Climate Change Canada, "Proposed Modernization of the Pulp and Paper Effluent Regulations – Consultation Document" (September 2017), p. 3-4.
[42] See Focus Report, Appendix 8.4, Herptile Study, p. 1.

Additionally, Northern Pulp was required to commence a Human Health Risk Assessment ("HHRA") to assess potential project related impacts on human health. The HHRA must include human consumption of fish and other seafood, consumption of potentially contaminated drinking water, exposure to recreational water and sediment, outdoor air inhalation, and any other potential exposure pathways. The analysis must inform the identification of contaminants of concern and updating of the RWS.

Northern Pulp has not completed the HHRA; it is ongoing and is not anticipated for completion until the spring of 2020.[43] Furthermore, Northern Pulp appears not to have finished collecting data on key representative species, since it has plans to conduct additional rounds of tissue collection prior to construction targeting additional shellfish (scallop, blue mussel and oyster), and locally relevant fish (such as Atlantic striped bass, Atlantic mackerel and Atlantic herring).[44]

3.10 Archeology

Northern Pulp was required to complete an Archaeological Resource Impact Assessment ("ARIA") for the marine environment related to the project. While it appears that the ARIA was meant to be included in Appendix 10.1, that appendix only has a letter from the Nova Scotia Department of Communities, Culture and Heritage indicated the ARIA was completed. It is our recommendation that the ARIA be provided for public comment.

3.11 Indigenous Peoples' use of land and resources

Northern Pulp was required to complete a Mi'kmaq Ecological Knowledge Study (MKES) for the project.

The process of producing a MEKS includes a review by the Kwilmu'kw Maw-klusuaqn Negotiation Office ("KMKNO") to ensure consistency with its EKS Protocol. While Northern Pulp indicated the completion of this process, the KMKNO had not yet completed its review.

Similar to the lack of completion of the HHRA, this requirement is started but not completed. Given that Northern Pulp has a statutorily granted period of one year to complete its Focus Report and given that it may also be granted an extension of that period by the Minister, it is not clear why these components were not completed prior to submission. No explanation is offered.

Sincerely,

[43] Focus Report, p. 165.
[44] Focus Report, p. 165-66.

East Coast Environmental Law

The Role of the Pulp and Paper Effluent Regulations in the long-term protection of fish and fish habitat.

1.0 Introduction

The Pulp and Paper Effluent Regulations (PPER) allow pulp and paper companies to release deleterious substances into water frequented by fish. Such a release would otherwise violate subsection 36(3) of the *Fisheries Act.*

> **36(3)** Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

However, subsection 36(4) of the Fisheries Act permits certain deposits if they are in accordance with regulations.

> **36(4)** No person contravenes subsection (3) by depositing or permitting the deposit in any water or place of **(b)** a deleterious substance of a class and under conditions — which may include conditions with respect to quantity or concentration — authorized under regulations made under subsection (5) applicable to that water or place or to any work or undertaking or class of works or undertakings;

The authority to make these regulations sits with the Governor in Council (Cabinet), the details of which can be found in subsection 36(5) of the Act.

2.0 Brief History of the PPER

The first Pulp and Paper Effluent Regulations were passed in 1971. The Regulations were created in response to evidence that pulp and paper effluent was causing dissolved oxygen depletion in marine environments and releasing substances that were toxic to fish. The 1971 Regulations set limits on total suspended solids (TSS), biological oxygen demanding (BOD) matter and effluent that was acutely toxic to fish. Owing to the high cost of installing effluent treatment systems, the 1971 PPER applied only to new mills and in some instances mills that were expanded or altered.[1]

By the late 1980s, Environment Canada had determined that the 1971 Regulations had not yielded all of the desired effluent quality improvements that were initially sought through the Regulations. [2]

> "In 1985, about 25% of mills were meeting the requirement for effluents to be non-acutely lethal to Rainbow Trout."[3]

The Government amended the PPER in 1992. The changes in 1992 included application of the Regulations to all mills and off-site treatment facilities and a requirement that all effluent not

be acutely toxic to rainbow trout. Older mills required upgrades to meet the 1992 Regulations so existing mills were given until 1996 to come into compliance with the Regulations.[4] By 1996, the Regulations had been in place for 14 years and the regulator had clear knowledge that the 1971 Regulations were not effective for 11 years.

Following the full implementation of the 1992 Regulations, the rate of compliance improved and discharges of TSS and BOD improved significantly. Between 1987 and 1996, total discharges of TSS and BOD matter to water decreased by approximately 60% and 90%, respectively. Most of these improvements took place because the Regulations applied to all mills and many mills added secondary biological treatment systems.[5]

3.0 The Impact of Environmental Effects Monitoring

The 1992 Regulations also added requirements for Environmental Effects Monitoring (EEM). During the period 1992 to 2010, the Regulations were amended to enhance requirements for EEM.

Environmental Effects Monitoring Protocol Evolution

Cycle	Years	Requirements
1	1992 – 1996	EEM study results used as initial data but not used to assess effects.
2	1996 – 2000	EEM studies to assess effects.
3	2000 – 2004	EEM studies to assess and confirm effects, and assess magnitude and extent of effects.
4	2004 – 2007	EEM studies to assess and confirm effects, and assess magnitude and extent of effects. Investigation of Cause (IOC) studies
5	2007 – 2010	EEM studies to assess and confirm effects, and assess magnitude and extent of effects. IOC and Investigation of Solution (IOS) studies.
6	2010-2013	Requirement to conduct a fish test was removed by the 2008 PPER amendments.

As a result of the evolution of the EEM, the data revealed that despite the increase in compliance with the Regulations post-1992 and the reduction in TSS and BOD, effluent was continuing to cause unacceptable environmental harm.

3.1 Sublethal Toxicity

As part of the EEM protocol each mill had to measure the sublethal toxicity of its final effluent discharge 2 x each year (summer and winter). Analysis of this data showed that mill effluent toxicity decreased between 1992 and 1996 (the year the 1992 Regulations were fully applied) and then generally remained constant. Between 1996 and 2010, 50% of the tests showed

sublethal toxicity.[6] In cycle 6 of the EEM testing (2010-2013) showed an increase in sublethal toxicity to 63% of all effluent tests.[7]

3.2 Biological Monitoring

Analysis of EEM biological monitoring studies over the same period revealed mill effluents were causing effects on fish (increase liver size, decrease gonad size) and fish habitat (benthic invertebrate communities) and in rare instances causing elevated levels of dioxins and furans in fish tissue.[8] In Cycle 2, ten mills were required to analyze fish tissue for dioxins and furans and 6 of those had levels of dioxins and furans in fish tissue that exceeded Health Canada guidelines for fish consumption.[9]

In cycle 6 of the EEM testing 11 mills conducted 9 biological monitoring studies for different purposes. In 7 of the 9 studies effects on fish or fish habitat were observed or confirmed.[10]

The results of the 6 EEM study cycles have shown that approximately 70% of the mills confirmed an effect for at least one of the effect indicators, with approximately 45% of mills confirming effects relating to eutrophication and 20% confirming a reduced gonad size effect.

4. Modernizing the PPER

It took 20 years for the EEM protocol to evolve to a point where the regulator (ECCC) could deem that the 1992 Regulations were not effective at preventing harm to fish and fish habitat.

In 2017, 4 years after the results for cycle 6 of the EEM and 5 years after the 2012 Status Report that clearly identified regulatory failure, engagement on the modernization of the 1992 PPER began. Two years later, in May 2019, Environment and Climate Change Canada released the Modernization of the *Pulp and Paper Effluent Regulations* – Detailed Proposal.

The proposal to amend the PPER includes increasing the effluent intensity factors for biochemical oxygen demand (BOD), suspended solids (SS), and adding an intensity factor for chemical oxygen demand (COD). The proposal will also add effluent concentration limits for nitrogen and phosphorus and limits for temperature and pH.[11] The final version of the revised PPER is planned for 2021.[12]

Graphic evidence provided by ECCC indicates that operating mills have, for the most part, been meeting the 1992 PPER requirements for BOD and TSS.[13] However, despite general compliance and nearly 50 years of regulation, pulp and paper effluent continues to cause dissolved oxygen depletion in marine environments and continues to release substances that are toxic to fish. Presuming the modernized regulations come into force in 2021,one can anticipate that there will be a transition period of 4 years for operating mills, meaning full compliance could be expected by approximately 2025.

[1] Environment Canada, Environmental Stewardship Branch, Status Report on the Pulp and Paper Effluent Regulations (June 2012) at page 2, on-line at: http://publications.gc.ca/collections/collection_2012/ec/En14-66-2012-eng.pdf
[2] *Ibid.*
[3] *Ibid* at 4.
[4] *Ibid* at 5.
[5] *Ibid* at 11.
[6] *Ibid* at 18.
[7] Environment Canada, Environmental Effects Monitoring Program, 6th National Assessment of Environmental Effects Monitoring Data from Pulp and Paper Mills Subject to the Pulp and Paper Effluent Regulations (April 2014) at page 5, on-line at: http://publications.gc.ca/collections/collection_2014/ec/En14-84-2014-eng.pdf
[8] Supra Note 1 at 18.
[9] SHERRY L. WALKER,* KATHLEEN HEDLEY AND EDWARD PORTER, Pulp and Paper Environmental Effects Monitoring in Canada: An Overview, *Water Qual. Res. J. Canada, 2002 Volume 37, No. 1, 7–19* at page 14, on-line at https://www.cawq.ca/journal/temp/article/151.pdf
[10] Supra Note 7 at 9.
[11] Environment and Climate Change Canada, Modernization of the Pulp and Paper Effluent Regulations, Details Proposal (May 2019).
[12] Environment and Climate Change Canada, Forest Products and Fisheries Act Division, Presentation on the Modernization of the Pulp and Paper Effluent Regulations, Detailed Proposals, August 15, 2019 on-line at https://drive.google.com/drive/folders/1tpZlB4bv_8T0UeQUwp3olh91qEVIxn7x
[13] Environment and Climate Change Canada, Forest Products and Fisheries Act Division, PPER Modernization Graphs, on-line at https://drive.google.com/drive/folders/1R3DOdRQPcvriSrZ5I8yz9oH1S1ZzBFbE

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March 9, 2019

Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, NS, B3J 2P8

Re: Northern Pulp Nova Scotia Corporation's Replacement Effluent Treatment Facility Project

This letter is submitted on behalf of the Ecology Action Centre (EAC), an environmental charity working since 1971 at the local, provincial, national and international level to build a healthier and more sustainable world. Our vision is 'a society in Nova Scotia that respects and protects nature and provides environmentally and economically sustainable solutions for its citizens'. The EAC works to catalyze change through policy advocacy, community development and awareness building. And, when required, we serve as a watchdog for our environment.

In that capacity, we respectfully request that the Minister reject Northern Pulp Nova Scotia Corporation (NPNS)'s proposal as outlined in their registration document under Section 34(1)(f) of the Environment Act "because of the likelihood that it will cause adverse effects or environmental effects that cannot be mitigated". We also cite that there are a number of areas in the registration document where crucial information is lacking or unknown, triggering Section 34(1)(a-c) requiring additional information and focus reports. We also cite Section 2(b)(ii) "the precautionary principle will be used in decision-making so that where there are threats of serious or irreversible damage, the lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation."

Despite its impressive volume, NPNS's registration document is very poor and fails to provide necessary information about key elements of their plan, including and importantly - the content of the substances they wish to pump in large volumes into the Northumberland Strait and the potential impacts that it undoubtedly will have on marine life and air quality. The registration document seems designed to obfuscate essential details, downplay them or intentionally omit them altogether. It essentially says there will be no impact of any kind. This is simply not credible. In Table E.1.1-1: Summary of the Significance of Project-Related Residual Environmental Effects Predicted. Every row and column of the table contains 'NS' which represents 'No Significant Residual Environmental Effects Predicted', including water quality, fish and fish habitat, surface and groundwater and the entire 'Accidents, Malfunctions and Unplanned Events' column. It is inconceivable that after NPNS's lengthy history of leaks, ruptures, over-limit emissions and other unplanned events that these predictions could be put forward credibly in a registration document for environmental assessment of this proposed effluent treatment facility.

NPNS has not done its due diligence to fully determine the potential impacts of their proposed project. It is the duty of Nova Scotia Environment to apply a rigorous standard of environmental protection when assessing risk and we do not feel that NPNS has provided sufficient information within their registration document to enable the province to complete the assessment. In light of this, the only acceptable decision is to reject the proponent's proposal for this effluent treatment facility. The potential for damage to our land, water and air from this proposed effluent treatment system is far too great for the province to grant approval.

The EAC's concerns about this proposed effluent treatment facility are numerous. Despite the very limited time available under this 'Class 1 undertaking' environmental assessment process (30 days) to review the proponent's registration document (1,586 pages spread over 17 documents), this letter outlines our primary concerns, which are:

- Use of an insufficient standard for effluent;
- The potential impact on the marine environment from the massive volume of effluent with its undetermined chemical and physical composition;
- Cumulative impacts and the fragility of the ecosystem of the Northumberland Strait;
- The risks associated with the effluent pipe and its pathway;
- Air pollution from burning waste sludge;
- Socio-economic impacts on fisheries and other sectors; and
- Indigenous opposition
- Lack of serious consideration of alternatives

Insufficient Standard for Effluent

NPNS had a responsibility to develop a solution that enables their operations to continue in Nova Scotia while preventing harm to the environment and the wider community. Rather than identifying an innovative solution which does these things, it is clear that NPNS's objective is simply to meet the minimum Pulp and Paper Effluent Regulations (PPER). The federal regulations are very old and are currently undergoing a major overhaul. NPNS will be required to comply with the updated PPER once the new standards are complete and accordingly, it is irresponsible for their effluent goals to just meet the existing standard. And this statement assumes that their effluent would meet the current standard, something that NPNS cannot guarantee since they cannot say what will be in their effluent until the new system is operational.

A key reasoning behind the proposed modifications to current PPER has been the ongoing degradation of fish habitat by most mills, even when in regulatory compliance. The PPER are primarily designed to prevent effluents that cause acute lethality to fish from entering nearby waterways (pg. 357) and do not deal with long-term cumulative effects or ecosystem impacts. Furthermore, according to Caroline Blais, the Director of the Forest Product and *Fisheries Act* Division at Environment and Climate Change Canada (ECCC), 70% of pulp and paper mills abiding by today's PPER have still shown deleterious impact on fish or fish habitat. A 2016 EcoMetrix study also found enlarged gonads and livers in fish tested near the current Boat Harbour effluent treatment facility's outfall location, despite the fact that Northern Pulp has routinely passed the acute lethality testing. Director Blais, in presentation for the Prince Edward Island Standing Committee on Agriculture and Fisheries in February 2019, described widening the scope of deleterious substances that may call for regulation and "reviewing the regulatory limits for existing and new substances," as central to the government's PPER modification effort. This process will also seek to develop new regulations to treat nutrient inputs, which to date have not been addressed in PPER legislation. NPNS's proposal has not adequately addressed how the company intends to meet new and more stringent effluent regulations that the federal government is working towards.

Simply meeting the PPER is a tremendously low bar to set in environmental protection and is no guarantee that harm to the environment and ecosystem will not occur, only that outdated regulatory maximums of permissible harm might be reached. This is unacceptable, particularly since NPNS cannot even identify what will be in the effluent - a major red flag that this undertaking carries unacceptable levels of risk of impact to the environment and the legitimate interests of other stakeholders. Nova Scotia Environment clearly stated to NPNS that their EA must go beyond the parameters in the Federal PPER. Their proposal as outlined in the

registration document does not do that. Aiming to achieve the lowest possible standard after decades of causing significant environmental damage to the natural world and communities surrounding the mill is simply not enough.

Effluent Content and Potential Impacts on the Marine Environment

The volume and toxicity of the liquid waste produced at the NPNS mill is significant. Boat Harbour provides incontrovertible evidence of the impact of the effluent to the current "receiving waters" - the area is devoid of life. Redirecting the effluent into the Northumberland Strait and the lower Gulf of St. Lawrence will certainly be detrimental to the health and productivity of the new "receiving waters". But unlike Boat Harbour, where most of the damage to date has been contained (and will cost taxpayers hundreds of millions to clean up), the potential damage to the Northumberland Strait will not be easily contained and will be impossible to clean up.

The Northumberland Strait is a relatively shallow area with slow moving currents far from the open sea. This makes it a very low "flushing" system. It takes approximately a year for the water to fully exchange. Northern Pulp's own reports say that on top of 60 to 80 million liters of liquid effluent they also anticipate releasing up to four tons of suspended solids in their waste water each day. In addition to that it is important to note that every drain, toilet and sink inside the mill is attached to the effluent disposal system meaning that in addition to human waste every oil or chemical spill inside the plant ends up in their effluent system. Test results in the current receiving waters (Boat Harbour) show the presence of dioxins, furans, chlorinated compounds, halogenated organic compounds and traces of heavy metals. These substances are known to have serious negative impacts to aquatic and other life. In addition to the chemicals and solids produced in the pulping process the new effluent treatment system "will require several chemical inputs, including urea, phosphorus, sodium hydroxide, sulfuric acid and an anti-foam agent to support its process." (pg. 46). So these too would be sent out into the Northumberland Strait. With so many deleterious inputs it's no wonder NPNS doesn't know what will be in their own effluent stream.

Dioxins and Furans

Research from other pulp and paper mills can provide insight on the potential risks to the marine environment associated with some of the products referenced in NPNS's project proposal. In British Columbia's Howe Sound, the Port Mellon and Woodfibre bleach kraft pulp mills contaminated the local waters so badly that several fisheries had to be shut down in the 1980s. This was due in large part to the dioxins and furans released as a byproduct of the chlorine bleaching process, the same process used by NPNS. Dioxins and furans are toxic, carcinogenic and bioaccumulative pollutants, posing a significant threat to marine species and human health via ingested seafood or otherwise. These compounds have been linked to cancer and diabetes, among other serious conditions.

In 1992, national Pulp and Paper Effluent Regulations (PPER) were put in place to mitigate harmful impacts to fish habitat, and the marine life at Howe Sound slowly began to recover. But while the dioxin and furan content in the Sound's commercial fish and crab species have been reduced by 95% or more since that time, in three of eight Dungeness crab samples collected near the Port Mellon mill in 2012, the dioxin and furan content still exceeded Health Canada's safe-consumption criteria. Federal advisories to limit crab consumption remain in effect in the area to this day. The same results also held for testing done on Dungeness crab near the Woodfibre mill, despite the fact that Woodfibre was in a relatively good "flushing" position at the mouth of the Squamish River, up until the facility's closure in 2006.

NPNS's registration document, in Section 1-7, states that "Dioxins and furans in [Northern Pulp's] effluent have virtually been eliminated since the conversion to chlorine dioxide bleaching in 1998. NPNS has never exceeded the limits as per the Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations." But we know that during NPNS's 2014 spill, on sacred burial grounds at the Pictou First Nation (PFN), proved that

at least five distinct dioxin or furan compounds were indeed still present in the mill's effluent, sixteen years after that conversion to chlorine dioxide bleaching. One of the dioxins was detected more than a kilometre down the beach from the spill site. ECCC regulations stipulate that dioxin and furan content must be non-detectable in pulp mill effluent. In addition, NPNS was found exceeding the daily release allowance for suspended solids by almost double the legal limit. Ultimately, the mill was fined $225,000 for the incident. Today, NPNS refuses to release the full suite of information on the components of the effluent they would see released into Northumberland Strait under their new proposal, and claims that the risk of contamination to marine habitat is "Not Significant". This is simply not credible.

In an attempt to explain this lack of transparency, the NPNS registration document states, "At this time, effluent chemistry characteristics (including the specific substances present in treated effluent and their anticipated concentrations) will not be known with certainty **until the project is operational**" (pg. 489). An expectation that NS Environment would grant approval to this project without provision of full details of the content of this effluent to be discharged into the Northumberland Strait should be extremely suspect, particularly given the company's track record of non-compliance. This includes not only the regulatory disregard displayed during the 2014 PFN spill, but also another spill by the Mackenzie Pulp Mill Corporation, owned by Paper Excellence (NPNS's parent company). In this case, Mackenzie Pulp was fined $900,000 and added to the Canadian Environmental Offenders Registry for violating the *Fisheries Act* by neglecting to properly treat the effluent spilled into British Columbia's Williston Lake on two occasions in 2014 and 2016. Paper Excellence has proven in spill scenarios in both Nova Scotia and British Columbia that their standard of care is simply not high enough for Maritime citizens to entrust this company to operate within the bounds of legality, let alone safety, in the Northumberland Strait.

Additionally, it is important to consider the cumulative effects of adding the toxins from NPNS's effluent into the proposed discharge area. In 2002, a study conducted on Nova Scotia's North Shore tested mussels for leukemia. At a site just 500 metres from the current Boat Harbour Treatment Facility outfall location, 30% of the tested mussels were infected. At a distance of one kilometre, 23% of the tested mussels showed signs of leukemia. In contrast, 56% of tested mussels in Pictou Harbour showed leukemia - a higher rate because of the dumping of untreated sewage at the time. Conversely, mussels tested in Merigomish Harbour did not show any effects of leukemia. In the end, the scientific team pinned the results on both municipal and industrial waste products. With the proposed level of effluent expected to be released into the Strait under NPNS's new plan, we may risk a future in which continued inputs render the local area entirely unusable for shellfish aquaculture or shellfish harvest altogether.

Total Suspended Solids (TSS) and Cellulose Fibers

NPNS public relations messaging from NPNS says that the new effluent treatment facility will be better than the existing one at Boat Harbour. However, this is not credible because Boat Harbour currently allows all the solids and the worst toxic elements to settle out and for the fluid to cool, often called "polishing off", as it is held for approximately a month before its release into the Northumberland Strait. The new effluent system will attempt to "treat" and cool the effluent in a matter of hours before it is released directly into the marine environment. In private documents and in recent media interviews, NPNS executives have admitted that the effluent is likely to be no better - and could potentially be worse - than what now flows into the Boat Harbour basin (Point C).

Total Suspended Solids (TSS) largely consists of cellulose fibers. Although the document states that 85 to 95% of the lignin, cellulose, sodium sulphide and sodium hydroxide will be removed from the sludge via biological activity in treatment, there is no information provided about the 5-15% which survives treatment - the cellulose. Cellulose fibers are refractory, meaning that they don't degrade quickly or decompose well in water, especially seawater. The registration document provides, in section 5.2.2.9 on Effluent Quality, that the effluent annual average flow will have an anticipated TSS concentration of 48 mg/l of effluent which equates to

a total 3053 kg of TSS per day, i.e., a full dump truck load each day in equivalent tonnage. These fibers have the potential to settle into a deep hole or depression, smothering the bottom and causing anoxia in the underlying sediment. The document hints at this on page 347: "The discharge of effluent containing elevated levels of TSS could also cause a change in sediment quality near the diffuser due to the settlement of suspended sediment, which could cause a change in sediment characteristics such as sand and silt size fractions and/or a change in chemical composition of sediments". The TSS could very likely spread beyond the area near the diffuser due to the buoyant nature of effluent and the likelihood that the effluent plume will reach the surface of the marine water column. This is the very same TSS, known to be harmful to marine life, that NPNS was found to be pumping at a rate of double the daily legal limit into Boat Harbour during the company's 2014 spill on First Nations land.

The insoluble nature of these fibers, the proposed volume of TSS discharge, the potentially wide area of impact and the inability to observe and monitor the effluent stream make this incredibly risky and appear to guarantee a significant impact on the marine environment.

Cumulative Effects: Long Term risk in a Fragile Ecosystem

The Gulf of St. Lawrence is already one of the most highly-stressed marine ecosystems on earth. In a recent study published in the journal Nature Climate Change indicates that the Gulf of St. Lawrence is showing a dramatic decline in oxygen.

A separate study done by DFO and University du Quebec entitled "Man-Made Environmental Changes in the Southern Gulf of St. Lawrence, and their Possible Impact on Inshore Fisheries" states: "Major sources of stress on the Gulf of St. Lawrence ecosystem include climatic changes on one hand and human-induced interferences such as physical modification, pollution and harvesting on the other hand. There are indications that these changes have significant impact on the oceanography, ecology and fisheries of the Gulf. The potential danger to the fishery includes physical, biological and chemical contamination."

This is research that should be covered in effective cumulative effects assessment processes examining marine environments. Northern Pulp's Cumulative Effects research presents a marine "Regional Assessment Area" between Pictou Harbour and Charlottetown to the north, spanning approximately 60 kilometres in an east-west direction. The proponents claim that the majority of the disruption to ocean habitat is likely to take place during the project's construction phase, when the seafloor is to be dredged and laid with a rocky substrate to lay the pipeline and keep it place over the long-term. As for the operations phase, during which the pipe will dump its tens of million litres of treated effluent into the Strait, the report suggest that all concerns related to the quality of the water will dissipate within five metres of the discharge location.

The report claims that "given the likely lack of spatial overlap at this location, significant cumulative residual environmental effects to water quality or sediment quality as a result of treated effluent discharge are not likely." But several studies, as well as ECCC expert testimony before the Prince Edward Island Standing Committee on Agriculture and Fisheries referenced above, tell us that pulp and paper effluent *is* known to be harmful to fish and fish habitat in the majority of tested circumstances. In essence, the substance that Northern Pulp would inject into the Northumberland Strait *would*, undoubtedly, pose a threat to aquatic life - and the assessment document says as much - *but suggests that*, because of dilutive power of the ocean, no great harm should occur in this instance. This simply is not true and this type of outdated Industrial Age thinking, suggesting that, because the ocean is big, it should be able to absorb our waste forever, is the same thinking that now sees the entire planet awash with plastic waste.

In a Northumberland Strait context, the cumulative impacts of over 25 billion liters of toxic effluent flowing into the water every year in perpetuity are potentially catastrophic. The NPNS registration document clearly shows that there will be very little, if any, positive change in wastewater quality with the proposed effluent treatment system and information revealed through the FOIPOP requested showed NPNS suggesting that the effluent could in fact be worse. With a myriad of chemical and nutrient inputs from municipal wastewater systems, industrial operations and agricultural runoff, among others, this is no time to augment present threats to marine life by adding a continuous, high volume stream of toxic pollution into a shallow, low flowing section of the ecosystem. We need our governments and our commercial industries to work together to reduce the inputs already entering into the Strait, and we need to put plans in place to start restoring this natural Maritime treasure, as has been called for by federal studies. If we don't, we are at significant risk of creating contaminated marine habitats and unfishable dead zones in the future.

Pipeline Pathway

The effluent pipeline will go over Pictou Harbour, attached to the causeway across Highway 106 and then in a trench through the Town of Pictou's water supply area, putting both at risk in the event of a pipeline breach or spill. Similarly, the potential for pipeline failure at Caribou Harbour is considerable. These are unacceptable risks.

Air Pollution

In the plan outlined in NPNS's registration document, toxic sludge will be collected early in the effluent treatment process and will then be burned in the NPNS power boiler. Chemicals from this process, including Polycyclic Aromatic Hydrocarbons, Volatile Organic Compounds, sulphur and chlorinated compounds, benzine, cadmium, as well as fine particulate matter will be released. The NPNS registration document speaks virtuously about displacing unspecified amounts of fossil fuels by collecting and burning chemically-laden sludge from the pulping process. It states the sludge will have a 40% moisture content. This will provide no fuel (heat) value and will likely require as much or more fossil fuel to burn. Much worse is the fact that it will actually make the mill's already terrible air emissions problems even worse by burning this toxic sludge in the mill's power boiler which has no precipitator and reportedly malfunctioning/non-functioning scrubbers to "clean" the Sulphur, VOCs and other chemical compounds, and carcinogenic fine particulate matter (PM10 and PM 2.5). The NPNS registration document indicates incineration of up to 20 tonnes of chemically laden sludge per day in the power boiler. The power boiler is very old and has repeatedly failed stack emissions tests. This is a significant public health risk and yet another compelling reason to reject this proposal. Although the provincial Class 1 Environmental Assessment does not specifically require the proponent to conduct a human health risk assessment (HHRA) study, such a study should be ordered by the minister under Environment Act Section 34(1)c or b.

The NPNS registration document acknowledges that there will be additional pollutants released by burning the sludge in the power boiler and that these airborne pollutants will land on nearby "receptors" (e.g. people, animals, land, water, etc.):

"Emissions of combustion gases, particulate matter, and possibly odour from the replacement ETF during operation and maintenance could result in air contaminants that could disperse in the atmosphere to off-site receptors. Additionally, since the project will include the combustion of sludge generated in the replacement ETF for energy recovery and odour control, emissions from the combustion of such sludge in the power boiler during operation and maintenance could disperse from mill stacks to off-site receptors." (Pg. 142)

Air quality testing has been incredibly lax in and around the NPNS mill. A new, robust independent air quality monitoring program should be required of NPNS by the Minister. This should include continuous stack emissions monitoring and multiple remote sensors. This data should be made available to the public in a continuous, real-time feed over the internet.

A sample of some of NPNS's recent air pollution violations:

- In 2014 the mill reported the release of 1,290 tonnes of fine particulate matter — the equivalent of 13 Irving St. John pulp mills in one location.
- Air emissions exceeded limits 4 times in a two year span - March and September 2015, June and December 2016.
- NSE investigation in 2017 as mill exceeded air contaminant emissions limits by nearly 50 per cent in June.
- The mill exceeded emissions 3 years in a row (2015, 2016 and 2017) despite the purchase and instillation of a new electrostatic precipitator on the recovery boiler stack.

Socio-Economic Impacts

Risk to Fisheries and Aquaculture

Despite NPNS's claim that the project proposal's impact on marine life will not be significant, the company's Receiving Waters Study, prepared by Stantec in August of 2017, states, "Among the four potential outfall locations … the [chosen] outfall location provides the *smallest potential long-term cumulative effects* on the fishery and socio-economic environments, and therefore is considered the better outfall location for the discharge of the treated wastewater from the mill." (Conclusion 2.4) Here we see suggestion that NPNS is well aware that the fishery will be adversely impacted in the long term, despite public claims to the contrary. The potential impacts to fish, bivalves, crustaceans, fish habitat and critical spawning areas are outlined above. While the deleterious short term impacts of NPNS's proposed effluent treatment facility on fisheries may be limited to a relatively small area, the long-term effects could still be significant. The Lobster Fishing Area 26A, stretching east-west from Pugwash to Port Hastings and north of Souris, PEI, supports more than 700 licenses at 300 traps per license. This is a marine area worth upwards of $40 million on fisheries alone. The Northumberland Fishermen's Association notes in a position letter that the Strait is one of the "most lucrative habitat and spawning grounds for lobster, crab, scallop, herring, mackerel and groundfish" in the Gulf. Each haul is significant to the fishermen that live and work there and, as such, the long term effects on the larger fishery should be more carefully considered.

Northern Pulp has demonstrated a clear unwillingness to do the work necessary to address these concerns in their environmental assessment registration document; particularly those concerns of the lobster fishermen in the region. NPNS's consultants at Dillon Consulting even went so far as to prompt Northern Pulp via letter in February of 2018, noting the importance of further research on lobster at all of the animal's life developmental stages: "… Conducting research on lobster larvae, and potential alternative to pipe discharge into the Strait needs to be completed to demonstrate to regulators that these were properly considered and stakeholder concerns are being addressed as much as reasonably possible."

In spite of this recommendation, NPNS did not conduct any studies or provide any information on potential impacts over the various life stages of the most important commercial marine species in the Canadian Atlantic, simply dismissing the issue by saying, "It was the conclusion that it is highly unlikely that there will be serious

impact on lobster or lobster larvae given the limited area of potential impact." The assessment goes on to admit that marine studies "have been hampered by both seasonal constraints and by physical opposition and obstruction... The existing environmental conditions and associated potential environmental effects of the project therefore have been defined based on existing available information." Again, we see a standard of care set far too low, in the face of significant risks and potential consequences.

Maritimers and Maritime fishermen have told NS Environment and NPNS loud and clear that this is a risk they are not willing to have foisted upon them; that the social and economic value of the region's fisheries are simply too great. Fishing unions and associations alike have since called, for a federal environmental assessment. At a broader scale, the economic value of Atlantic Canadian seafood production is immense. Fisheries and aquaculture products account for upwards of $3 billion to the Atlantic economy, with more than 15,000 licensed fishing boats and more than 500 aquaculture outfits. The Northumberland Strait is major component of that system, and the Southern Gulf of St. Lawrence has been one of the most productive lobster regions in the country. Today, there are some 700 fishing licenses. The legitimate concerns of the Northumberland Strait fishermen, and Canadian fishermen more broadly, need to accepted and respected.

Reputational Risk to Nova Scotia Seafood Brand

Nova Scotia has an international reputation for producing high-quality seafood from "cold, clean and pristine northern waters". This is particularly true for our shellfish - lobster, scallops and oysters. The reputational risk to the industry if any harvested species becomes contaminated with pollutants is significant - particularly in emerging markets in China and southeast Asia where demand from an expanding middle class is dependent on the "clean and pristine" brand. In this regard it is instructive to recall that the discovery of a single reported case of BSE or mad cow disease in 2003 led to an immediate worldwide ban on all Canadian beef imports which lasted for years and cost the industry billions of dollars in lost sales. Imagine what one contaminated lobster could do the Canadian lobster industry's access to foreign markets. Even the idea of seafood produced in polluted waters could be enough to shut down or seriously curtail demand in sensitive markets like China. This is a serious financial risk that Nova Scotia cannot afford to take.

EAC supports the fishermen.

Tourism Industry

The tourism industry in Nova Scotia is worth $2.7 Billion and growing, creating 40,000 jobs and producing $300 million in taxes. At a regional level, tourism revenue in the Northumberland Shore Region of Nova Scotia is 7.8% of the total tourism revenues translating to $210.6 Million and over 3,200 jobs, generating about $24M in tax revenues. This sector of the economy could be much greater but is hampered by the presence of the NPNS mill.

Tourism operators have reported the length of stay in the Town of Pictou has declined from 2010, an average of 3.3 days to 2017 at 2.5 days. Tourism Operators explain the decline in visitor stays is a direct result of the air and water pollution emanating from the NPNS mill. Allowing the mill to release its effluent into the Northumberland Strait and to increase its harmful air emissions by burning large quantities of toxic sludge will only make things worse for this industry. Tourism operators in western Cape Breton (Inverness County), along the south coast of PEI and the New Brunswick coastline of the Northumberland Strait are all at risk of impacts from the proposed discharge of large volumes of effluent into the marine environment.

EAC supports the tourism operators.

Indigenous opposition

It is important to note that all of the Mi'kmaq Chiefs in the three Maritime Provinces are opposed to piping the NPNS mill's effluent into the Northumberland Strait. Chief Terry Paul identified the mill's proposal for a new effluent treatment plant as the top issue raised by Mi'kmaq leaders in their annual meeting with Provincial Cabinet in December 2017. "The first consideration is the environment" he said. "We want to ensure that whatever is done to mitigate the effluent there isn't detrimental to the fishery". He stated clearly that the chiefs cannot support the NPNS effluent pipe plan. Chief Andrea Paul of Pictou Landing First Nation has been unequivocal in stating her communities firm opposition to the proposed new effluent treatment system. "The effluent discharge is in the Northumberland Strait and for that we are opposing it" she said in July 2018. "We do not want this pipe in our waters. We need to protect our resources. All of us have an inherent duty to do that".

EAC supports the Mi'kmaq.

Unwillingness to Explore Alternatives

The pulp mill in Pictou County has a long history of putting Nova Scotia's environment and citizens at risk. Despite five years to find a suitable alternative to the Boat Harbour treatment facility and taking the opportunity to improve their environmental performance, NPNS simply offers one single option: to pollute a different area, this time spreading the potential impact much further. The registration document has been carefully tailored to reach the NPNS's preferred outcome of pumping the effluent into the sea. In preparing the document the consultants, appear to have relied almost exclusively on information provided by NPNS. There is no evidence of serious independent analysis of the options, assumptions or conclusions in the report. The Ecology Action Centre strongly disagrees and believes that NPNS could do much to 1) reduce the toxicity of their effluent by improving internal process inside the mill and 2) negate the need to dispose of their effluent into the environment at all by modifying their production process (i.e. eliminate chemical bleaching) and installing a closed-loop system.

It is clear from NPNS's registration document that the scope of exploration of alternative options was deliberately narrow and entirely restricted to finding an alternative dumping site for the effluent. All other options to reduce or eliminate the mills liquid pollution output are summarily dismissed early in the registration document, abandoning any further consideration or research for better options. On its project website, NPNS confirms this: "At the onset of the design phase a closed loop (zero effluent) treatment alternative was immediately ruled out as it is not an option for Northern Pulp. A closed loop system does not exist anywhere in the world for an elemental chlorine free (ECF) bleached kraft pulp mill. The concept is not technically or economically achievable." This is consistent with NPNS's long-held public position that only a pipeline into the Northumberland Strait will work. NPNS says the technology does not exist to close their loop. They are lying by omission.

NPNS could install and run a closed-loop system if it simply changed its production process and stopped bleaching their semi-finished kraft pulp product prior to shipping it to their Asian parent company. The result would be a light brown fiber product rather than a bright-white one. If the parent company wished to bleach some or all of the kraft pulp during its subsequent product production processes (making tissue, napkins, diapers, etc.) they could easily do so at their end. Another workable alternative would be to retool the NPNS mill to use peroxide and ozone instead of chlorine dioxide to whiten their kraft pulp and thus become a Totally Chlorine Free (TCF) mill.

The truth is NPNS could change its process and install a closed loop system but they have chosen not to. They admit as much in their registration document (Project Alternative 3: Change the NPNS Mill Type and Make a

Closed Loop System, Pgs. 25-26), stating the reason for not doing so is that it is “market prohibitive”, not that it is technically impossible. Their justification for not doing so is cost: “NPNS would not remain competitive due to high wood and electricity costs” and that “NPNS must continue to operate by producing NBSK to be economically viable”. They admitted that “Production of a different type of pulp can allow operation using closed loop systems.” But that “NPNS would not be economically viable with a different product”. Although NPNS says changing their product process is “not economically viable”, they provide no proof for these claim.

Notwithstanding their refusal to seriously consider altering their process and implementing a closed loop system, before the NPNS mill starts pumping their effluent anywhere they should first be required to improve the inside performance of their very old mill in order to significantly improve the quality of the effluent before it is sent for secondary treatment. In industry parlance this is called “tightening up the loops” inside the mill prior to the effluent treatment process. The mill employs very old (1960s era) technology. There are three specific areas that need to be modernized before sending effluent into a secondary treatment system, regardless of where the effluent is subsequently dumped. They are: #1 Optimize brown stock washing, #2 Install an oxygen delignification system in the bleaching plant and #3 Implement fail-safe systems to ensure against process upsets into the effluent treatment system. Process upsets can come from overflows of brown stock, bleach and/or black liquor.

It’s important to point out that with regard to #2, NPNS has previously said they would be installing an oxygen delignification system which would result in a 30 to 40% reduction in chlorine dioxide bleaching chemicals and thus much “cleaner” effluent. That oxygen delignification system is now missing from NPNS's registration document.

It’s also important to highlight why NPNS should be required to build in effective fail-safe systems to minimize and contain process upsets whereby the system becomes overloaded with pulping chemicals and shuts down the biological activated sludge (BAS) treatment process. In brief: NPNS has a history of frequent process upsets with its current effluent treatment system in Boat Harbour. When this happens the biological agents (bacteria, fungi and protozoa) that are used to consume organic pollution from the effluent prior to release are killed and the process stops working. In the Boat Harbour lagoon, the untreated effluent can be contained at an early stage while the system is re-inoculated with replacement biological agents so treatment can be resumed. This can take several days. In the event of black liquor or other chemical spills into the proposed new effluent treatment system, the biological agents will be killed and the system will stop functioning as it’s supposed to. In the registration document, NPNS says it plans to build a 35 million liter raw effluent spill basin that, assuming optimum conditions, will be sufficient to contain 10 to 13 hours of effluent diversion in the event of process upsets (pg. 42). That means only half a day’s worth of effluent can be contained while they try to fix the problem. But process upsets often take much longer to fix than half a day. Therefore the risk of potentially large volumes of untreated effluent by-passing the new effluent treatment system and flowing directly out into the marine environment is very high as their proposed spill basin will be too small to contain effluent volumes greater than half a day’s output while NPNS works to restore the biological agents to sufficient levels to function again.

NPNS has repeatedly minimized serious concerns about their effluent treatment plan. Vague assurances through the registration document with phrases such as ‘no significant residual environmental effect predicted’ are simply not credible, particularly in light of the vast evidence of ecosystem destruction committed at Boat Harbour. With an effluent leak only months ago in October 2018, which was discovered by a citizen walking in the vicinity of the mill, and another in June 2014 that released 47 million litres before detection, public trust is at an all-time low. Attribution of pollution in the Northumberland Strait will be challenging, ensuring that the province of Nova Scotia will have a very difficult time seeking remediation for damages. Fastidious monitoring will be required to intervene as quickly as possible and ideally this monitoring would be administered by an independent body to ensure compliance.

Conclusion

The Ecology Action Centre strongly recommends that the Minister of Environment reject NPNS's effluent treatment facility proposal as outlined in their registration document. The document fails to provide the Province with the required information to assure itself and all Nova Scotians that their proposed effluent treatment facility would be safe for the community or the environment. All evidence points to the fact that this effluent treatment facility will cause at least as much pollution as the levels at Boat Harbour, if not more, and this time the pollution will be spread over a far greater area with even less ability to contain and repair that damage in the future. It is also clear that the burning of large amounts of toxic sludge in the power boiler will make the mill's already terrible air emissions even worse. The claims by NPNS that there will be no impact of any kind is not credible and they have failed to provide evidence that this even possible. It is unconscionable of NPNS to ask, nay, demand that Nova Scotian's accept all the risks and harms so an ancient, highly-polluting pulp mill can continue operating for a few more years.

NPNS has shown a consistent sense of entitlement, often operating outside of the rules and boundaries which exist to protect our environment. NPNS even made a request to begin building elements of its proposed new effluent treatment system in mid-2018, well before submitting its proposal for environmental assessment. The sheer audacity of this request demonstrates a corporation that fully expects Nova Scotia to continue to bend to their wishes, regardless of the impacts. Now that we are within a year of the January 31, 2020 shut down date for the Boat Harbour effluent treatment system, the corporation has requested an extension to continue polluting Boat Harbour, citing a lack of time to get an alternative in place. Complying with this request would require repealing that legislation and would be an unforgivable violation of the faith of the Pictou Landing First Nations community and to every other Nova Scotian who is counting down the days until January 31, 2020.

It is time for this province to stop operating with a methodology of privatizing our shared natural resources for private profit while socializing the enormous risks and costs. Nova Scotian taxpayers will long be paying for the damage that has already been done by the pulp mill at Abercrombie Point in Pictou County. The investment to create the new pipe, a piece of infrastructure which will cost an enormous amount and likely to be charged again to the taxpayer, is making a commitment to allow this mill to continue discharging toxic effluent into our environment for many years to come. That is unacceptable. The Minister should reject this project outright. Failing that the Minister must, at the very least, order focus reports in a number of areas where information is lacking, including the composition of the effluent, baseline studies on lobsters and other marine species, baseline benthic surveys of the bottom of Caribou Bay, plans for air pollution controls and monitoring, etc. The minister should also order the mill to upgrade its internal processes and equipment to reduce its already substantial air and water pollution levels regardless of if or where they might send their effluent. But at the end of the day the Minister must not make a bad situation worse by allowing another place to be fouled and one that can never be cleaned up.

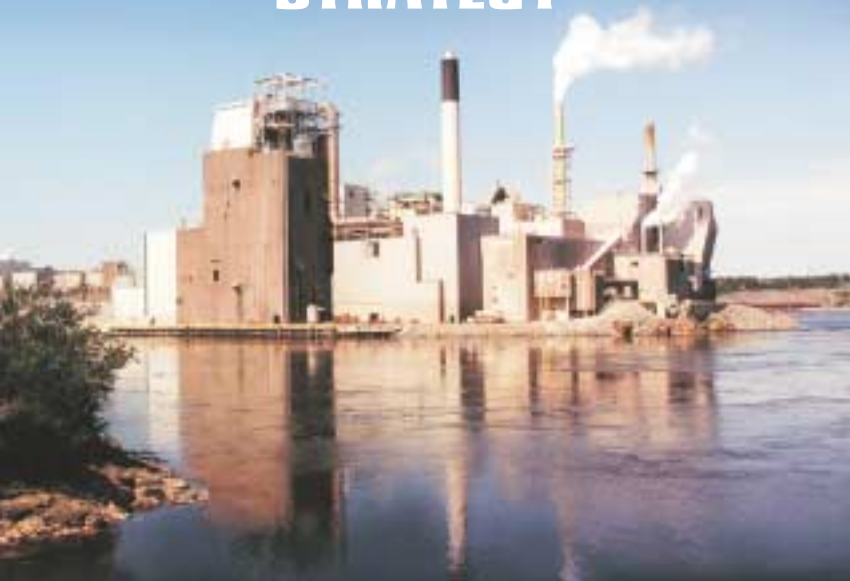
In closing we cite Premier Stephen McNeil's wise words at the annual meeting of Nova Scotia Cabinet and Mi'kmaq Chiefs on December 14th, 2017 in Millbrook: "*It has never been our government's intention and never will be our government's intention to clean up one environmental problem and move it somewhere else*."

And that is the right answer. No pipe.

Respectfully submitted,

Wilderness Coordinator
Coastal Coordinator
Marine Conservation Officer

IRVING PULP & PAPER'S
POLLUTION PREVENTION STRATEGY



An Alternate Route to Environmental Compliance

IRVING



THE CHALLENGE

Pollution Prevention is the use of processes, practices, materials, products and energy that avoid or minimize the creation of pollutants and waste and reduce the overall risk to human health or the environment. ***— Environment Canada Mission Statement, 1995***

New Options For Environmental Compliance

To meet government regulations most mills went with a conventional secondary treatment lagoon. Treating pollution after it has exited the mill pipe has been the standard technology enabling mills to meet regulations with limited costs. Faced with local opposition to a lagoon, Irving Pulp & Paper underwent a complete Environmental Impact Assessment. Following this assessment and after researching other options, the mill decided to go in an unprecedented direction. Irving Pulp & Paper launched a pollution *prevention* strategy that would see them meet regulations by recovering, reducing and reusing pulp-making materials. Irving Pulp & Paper would break new ground in the industry by preventing pollution at the source, inside the mill, before it exited the pipe. This approach was complementary to the Environment Canada initiative for Pollution Prevention.

The Strategy

Irving Pulp & Paper planned their pollution prevention strategy around the best available technologies of the day. At the time of design there were not enough known technologies to take them all the way to environmental compliance, but they believed that with the rate of technological advancement and the ongoing research, new technology would evolve by the time the known technologies were in place.



1. Objectives Of The Strategy



Condensate Stripping Column

- Remove, reuse and recycle chemicals and other pulp-making materials.
- Modernize technology to improve efficiency, cost-competitiveness and environmental performance.
- Address community concerns against a conventional secondary treatment lagoon.
- Minimize mill outflow.

2. Implementing Best Available Technologies - Highlights

- Improved Brown Stock Washing - Recovers more used chemicals and unusable wood components.
- Closed Brown Stock Screening – Decreases outflow volume from the mill by recovering dirty process wash water that contains used chemicals and unusable wood components.
- Elemental Chlorine Free Bleaching – Replaces former process with more environmentally responsible bleaching agents.
- Condensate Stripping Column – Removes wood alcohol for incineration allowing the cleaned water to be reused.



Elemental Chlorine Free Bleaching

Improved Brown Stock Washing



PIONEERING CHANGE



Oxygen Delignification

3. Oxygen Delignification

- Decreases amount of chemicals needed in bleaching process by removing unusable wood products.
- Unusable wood products are incinerated and generate heat for the mill.



Reverse Osmosis

4. Reverse Osmosis

- Filters products from water by using specialized membranes under high pressure. This allows increased recycling and reuse of filtered water.
- Awarded patent for unique application of well-known technology.
- Removes compounds largely responsible for endocrine disruption in fish.

A WORLD 1ST

210 specialized membranes on 5' x 10" spools remove 10 - 15 gallons of concentrated filtrate per minute.





Reverse Osmosis

5. Moving Bed Bioreactor

- Consumes wood alcohols from the largest contributor to the mill's outflow.
- A unique application for the biological system. It had never been used before in the kraft pulping industry in this application.
- This system was the final technology needed to bring the mill into environmental compliance with all the federal regulations.

Moving Bed Bioreactor
3.5 million plastic carriers house bacteria that consume wood alcohol from the largest contributor to the mill's outflow.



6. Environmental Performance Review

- Pioneered advances in pollution prevention technologies in our industry.



- Non-traditional approach to meeting environmental regulations and community concerns.
- Irving Pulp & Paper has discovered new technological application that eliminates their potential for endocrine disruption at Reversing Falls. The University of New Brunswick in Saint John is working in cooperation with Environment Canada to research some of the compounds responsible for endocrine disruption that are removed by Irving Pulp & Paper's reverse osmosis system. Endocrine disruption is an emerging global issue with implications for both humans and wildlife.
- Involved mill employees and experts in the industry to reach significant environmental and scientific milestone.
- Patented applications of new technologies for export potential to pulp mills around the world.

THE NEXT CHAPTER

1. Seek out additional opportunities to further improve our environmental performance.
2. Continue publicizing our progress and results within the industry and academic community.
3. Communicate with the public and interested stakeholders on new industry advances and ongoing progress.









REFLECTIONS

"Implementing this pollution prevention program was an important and innovative step. Many of the technologies are new in their application to the pulp and paper industry, providing greater options to the industry in how they deal with their wastes. The reduction in endocrine disrupters was an unexpected and positive environmental benefit."

- John Clarke, Head of Pollution Control with Environment Canada, Atlantic Region

"Pollution Prevention is a new option the industry has that they didn't have five years ago. This is a technology the company can export."

- Wally Vrooman, President Vrooman Environmental Inc.

"Irving Pulp & Paper is further ahead on the endocrine disrupter issue than probably every other mill in Canada."

- Dr. Deborah MacLatchy, University of New Brunswick Saint John Campus

"When you look at the chemistry of the effluent produced in the pulp making process and what you have to get rid of, you know there's a way either by recycling, reusing or removing elements. We just had to find it."

- Wayne Sprague, Irving Pulp & Paper employee

"Throughout this project there was an excitement and a pride — amongst all of the employees — that we were pioneering new applications of new technologies for export potential to pulp mills around the world."

- Jim Brewster, Production Manager, Irving Pulp & Paper

"This environmental achievement is a tremendous tribute to the teamwork, determination and skills of the men and women at Irving Pulp & Paper. No other mill in the world has done what they have accomplished."

- Jim Irving, President, J.D. Irving, Limited

"In addressing community concerns, a real scientific advancement has been achieved for the industry."

– Willa Mavis, Innkeeper, Inn on the Cove, Saint John, NB

CONTACT US



For more information on Irving Pulp & Paper's innovative approach to pollution prevention, please contact:

Environmental Coordinator

Phone:
(506) 633 - 6925

E-mail:
environmental@irvingpulp.com

Tours are available for individuals and groups.

Please contact Irving Pulp & Paper's Human Resources Department for more information or to set up a tour.
Phone: (506) 635 – 7735



IRVING

IRVING PULP & PAPER

From:
To: Environment Assessment Web Account; Environment Assessment Web Account;
Subject: Northern Pulp Focus Report
Date: November 8, 2019 11:59:11 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Please reject Northern Pulps proposal to dump millions of litres of treated effluent into the Northumberland straight daily. Northern Pulp doesn't even know the contents of the effluent so how can we make informed decisions on releasing it into the straight. A full federal assessment needs to be done to examine the impacts this could have on such a wide range of people in our community and beyond.

I live on Caribou Harbour, and enjoy the shallow harbour waters with my wife and daughters all summer. To think that there could be such a large volume of effluent discharged into such a shallow protected area in such close proximity to us is very concerning. The potential threat to our waters, our fisheries, tourism and numerous others needs to be taken into consideration. A federal environmental assessment needs to be done!

Central Caribou, NS

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From:	Environment
To:	Environment Assessment Web Account
Subject:	Proposed Project Comments
Date:	November 8, 2019 11:59:18 PM

Project: replacement_effluent_treatment_facility_project Comments: I have live in the Pictou area all my life. I grew up in the town of Pictou for the first 20 years of my life and now live in Central Caribou on the shore of Caribou Harbour with my husband and daughters, years old. The mill has been something we have always had to put up with. For example the horrible smell and heavy sulphuric air blowing in your windows or holding your breath every time you cross the causeway or while your hosting school soccer provincials at the Pictou Academy trying to explain to visiting teams to just ignore the smell while playing soccer. Telling them the thick hazy air was just the â?omillâ? . I feel so stupid. Now that I am an educated adult and nurse. I am shocked that the mill has been able to function under the conditions of what it is doing to its surrounding communities and environment. What has been happening in Boat Harbour is unacceptable and the trust in the millâ?Ts continuing ignorance to peopleâ?Ts best interest s is also unacceptable for the future of ourselves, our children and our Eco Systems. So as I read Northern Pulpâ?Ts EA and Focus Report and documents I have a huge concern for the new pipe proposal. How do I know that the government is going to protect us from this toxic effluent solution that is being pump into Boat Harbour presently and now the mill wants to pump it on to our private beach on Caribou Harbour. I have issues with â?o The millâ? stating that the Effluent outfall is cleaner and safer. How do they know? They donâ?Tt have the actual new system running so they can preform proper testing and effects to it Eco System. We have evidence of what it does to the Eco System. Go to Boat Harbour! I feel this is 2020 and â?oThe Millâ? has gotten away with this Environment Disaster way to long and it has to e stopped not helped and continued. There is other options for them. For example close the system and leave Canadaâ?Ts Ocean Playgroung better then ever to our Children and futher generations. Name: Email: Address: Municipality: Central Caribou Postal-Code:

From: Minister, Env
To: Environment Assessment Web Account
Subject: FW: Northern Pulp - Effluent Treatment
Date: November 12, 2019 12:11:39 PM

From: @shaw.ca>
Sent: November 8, 2019 1:12 PM
To: Premier <PREMIER@novascotia.ca>
Cc: Minister, Env <Minister.Environment@novascotia.ca>
Subject: Re: Northern Pulp - Effluent Treatment

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Premier McNeil and Minister Wilson:

I was born in Nova Scotia and was raised in Braeshore, a community situated just outside of the Town of Pictou. In addition to being raised and educated there, I also was employed as a lobster fisherman for a number of years, and fished from the Caribou Fisherman's Wharf. I left home to join the RCMP and have returned to the Pictou area countless times over the years to visit family and friends and the area which I have always considered *home.* My family have been residents of Pictou for several generations.

My disappointment and sadness at the negative environmental impact of the Pulp Mill cannot be overstated. I can find no reason to trust the commitments, proposals or promises made by Northern Pulp. The potential and probable devastation that may result from the planned dispersal of effluent into the Northumberland Strait should dictate that the most significant and in depth environmental assessment be completed PRIOR to any consideration of their effluent treatment proposals.

I believe it is the responsibility as Premier, and that of your Minister of Environment, to insist that a Federal Level II assessment be completed prior to considering any proposal dealing with effluent treatment by Northern Pulp. This is

not just a Province of Nova Scotia issue or concern. The waters, the marine environment and the health and existence of the species therein are of concern to all Canadians. The health and quality of life of the people who live and work in the area are also of critical importance. I believe it is incumbent upon you to take every step available to fully evaluate any and all risks associated with the proposal to pipe effluent into the Strait. A Level I assessment does not meet that standard.

I implore you to insist on a Level II Assessment and to resist any suggestion that there be an extension to the use of Boat Harbour for treatment of effluent.

West Kelowna, BC

From: Minister, Env
To: Environment Assessment Web Account
Subject: FW: Input on Northern Pulp plan to pump effluent into the Northumberland Strait
Date: November 12, 2019 12:03:01 PM

Andrea Fairclough

Executive Secretary to the Minister & Deputy Minister
Nova Scotia Environment
1894 Barrington St. 18th Floor
PO BOX 442
Halifax, NS B3J 2P8
Phone: (902) 424-3736
Andrea.fairclough@novascotia.ca

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From: @gmail.com>
Sent: November 8, 2019 11:59 PM
To: Minister, Env <Minister.Environment@novascotia.ca>
Subject: Input on Northern Pulp plan to pump effluent into the Northumberland Strait

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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The Honourable Gordon Wilson
Minister of the Environment

I am pleased that the Premier is determined to proceed with the closure of Boat Harbour in January 2020 as promised. The poisoning of Boat Harbour with toxic effluent from the pulp mill in Pictou has been a disgrace from the beginning, accompanied as it was by lies to the indigenous leaders about the [horrific] consequences of allowing the effluent to be disposed of next to their lands and in their traditional fishing grounds and followed by a litany of broken promises and more lies. The dire results to the inhabitants of Pictou Landing First Nations as well as to citizens of Pictou and the surrounding areas of the water, land, and air pollution that followed are well-known and documented.

HOWEVER, the ending of the polluting of Boat Harbour should not be accompanied by the beginning

of the degradation of the Northumberland Strait by piping effluent into its waters at a risk of destroying the invaluable local fisheries and tourism industries and doing untold ecological damage. There are many more jobs at stake here than those involved with the mill, not to mention property values all along the Strait.

It is not worth taking ANY risk with our beautiful and economically important waters of the Northumberland Strait. Begin now to plan for a just transition for mill and forestry workers and begin a new day of sustainable development in NS that you can be proud of and remembered for for many generations.

Yes to closing Boat Harbour.
NO to pumping effluent into our waters!

Amherst Shore,

From:	Minister, Env
To:	Environment Assessment Web Account
Subject:	FW: Northern Pulp effluent treatment proposal
Date:	November 12, 2019 12:03:33 PM

From: @eastlink.ca
Sent: November 8, 2019 10:22 PM
To: Minister, Env <Minister.Environment@novascotia.ca>
Subject: Northern Pulp effluent treatment proposal

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Environment Minister Gordon Wilson:

I have been aware of the Boat Harbour travesty since the early 1970's. I understand the history with the mill and Pictou Landing First Nation. I r ecognize the jobs that are at stake and the role of Northern Pulp in the province's forest industry.

I am opposed to extending the deadline for the pulp effluent plan. The company has failed to meet its obligations by drawing up an acceptable plan within the ample time frame it had and there have been too many broken promises over the years. It is time to put this right and to stop using Boat Harbour/A'se'k as a sewer.

I would support a plan to help the industry deal with a temporary closure until a sound effluent solution is in place that is scientifically validated and sound forestry practices have been implemented as per the Lahey report; as long as the solution does not include continuing to use Boat Harbour to treat mill effluent after the January 2020 deadline.

Yours sincerely

Halifax, NS B3L 1R6

Sent from Outlook

I am experimenting with my email. My eastlink & outlook emails both work for now.

From: Minister, Env
To: Environment Assessment Web Account
Subject: FW: Nova Scotia environmental responsibility fading away.
Date: November 12, 2019 12:04:09 PM

-----Original Message-----
From: @bellaliant.net>
Sent: November 8, 2019 9:12 PM
To: Minister, Env <Minister.Environment@novascotia.ca>
Subject: Nova Scotia environmental responsibility fading away.

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The Honourable Gorden Wilson
Minister of the Environment

Dear Minister Wilson,

It is hard to believe that, in these times of climate and environmental crisis, there is a chance that you could not be aware of the immense risks involved if you approve the plan of Northern Pulp to run toxic wastes into the Northumberland Strait. I urge you, I beg you, to refuse this request from Northern Pipe. You are the person responsible for the protection of the health and safety of the environment and your constituents. Please - do not allow the pumping of the waste into the Northumberland Strait!

Respectfully,

Mahone Bay, NS

From: Minister, Env
To: Environment Assessment Web Account
Subject: FW: Northern Pulp effluent
Date: November 12, 2019 12:05:06 PM

-----Original Message-----
From: @eastlink.ca>
Sent: November 8, 2019 5:03 PM
To: Minister, Env <Minister.Environment@novascotia.ca>
Subject: Northern Pulp effluent

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Minister Wilson,

I'm writing you and the NS government to oppose Northern Pulp's plan to pump effluent into the Northumberland Strait. I wish to see an end to this unhealthy and unsupportable practice.

Thank vou.

Halifax, NS

From:
To: Minister, Env
Subject: Concern Northern Pulp
Date: November 8, 2019 3:57:01 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens. Our people have suffered long enough on their homeland.

Sincerely,

Eskasoni Fish & Wildlife Commission
4115 Shore Road.
Eskasoni, NS, B1W 1M4
Tel 902-379-2624
Fax 902-379-2248

From:
To: Minister, Env
Subject: Opposition to Northern Pulp
Date: November 8, 2019 3:40:42 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Honourable Minister Gordon Wilson,
I am writing to express my opposition to Northern Pulp's plan to pump effluent into the Northumberland Strait.
Thank vou for your consideration.

From:	Minister, Env
To:	Environment Assessment Web Account
Subject:	FW:
Date:	November 12, 2019 12:06:17 PM

From: @gmail.com>
Sent: November 8, 2019 4:04 PM
To: Minister, Env <Minister.Environment@novascotia.ca>
Subject:

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Gordon Wilson,

I am writing with concern regarding the Northern Pulp and Paper Mill. I oppose the Northern Pulp's plan to dump effluent into the Northumberland Strait.

I wish that greed was not the baseline for all decisions being made within the government.

Please make the right choices for our environment.

Regards,

From:
To: Minister, Env
Subject: Comments on Northern Pulp Focus Report
Date: November 8, 2019 3:01:16 PM
Attachments: BRN3C2AF46228E4_0000003580.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Name: ___ _____

Address:__ _____

E-mail:___ _____

Signature: _____

RE: Northern Pulp Environmental Assessment Focus Report

Attention: Hon. Gordon Wilson, Minister of Environment

As an employee / family member of Scotsburn Lumber Ltd. Our mill has been running successfully since we restarted operations in 2012. We currently operate on a two shift basis and process about 90+ MMBF per year. Our operation is vitally dependant on Northern Pulp. Currently, 65% of the studwood we process ends up either as sawmill chips, hogfuel or sawdust and shavings. We sell the product we make at Scotsburn throughout Canada and the United States. If we have no market for our residual products then we will be in a very dire situation. Our industry is very interconnected where each section is critically dependant on the other for material for success. The loss of the largest pulpmill in the province that currently purchases over 90% of the sawmill chips would be a devastating blow to our industry..... one that would be difficult if not impossible to overcome. The vast majority of studwood that our sawmill uses comes from private land in Nova Scotia. If there is little or no market for studwood and pulpwood in the province then the 60,000+ landowners will be negatively impacted by this decision.

We have had the opportunity to review the Focus Report for the new Environmental Treatment Facility (ETF). It is my understanding that this facility will be world class that will meet and exceed all Provincial and Federal environmental regulations. The current Boat Harbour ETF through benchmarking by 3rd party experts shows that Northern Pulp is currently operating as an average to above average facility when compared to like facilities throughout Canada. The new facility will be an improvement on this.

I trust that the science presented through the Focus Report will allow the future construction of a new ETF for Northern Pulp. I know that the Forestry and Fishing sector has co-existed for the last 50+ years and both have had long term success. I see in the focus report that fishermen are setting traps close to the outfall of Boat Harbour. If there was truly an impact on fishing I know that this would not occur. The Focus Report was prepared by 3rd party experts and show data that indicate no significant adverse environmental impacts have been predicted for this projects construction or future operation.

We all want Boat Harbour restored to its natural state. We need the government of N.S. to keep the commitment to clean up this area, at the same time allow Northern Pulp the time to construct their new ETF facility before clean up begins. Failure to do so will cause irreparable damage to the forest industry as a whole in N.S.

Name: _ _____

Address:_ _____

E-mail:__ _____

Signature: __ _____

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From:
To: Minister, Env
Subject: Comments on Northern Pulp Focus Report
Date: November 8, 2019 2:10:15 PM
Attachments: BRN3C2AF46228E4_0000003575.pdf

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Thank you for your time and consideration with this matter.

Name: _____

Address:_____

E-mail:_____

Signature: _____

RE: Northern Pulp Environmental Assessment Focus Report

Attention: Hon. Iain Rankin, Minister NS Department of Lands & Forestry

I am in support of the approval for new Effluent Treatment Facility (ETF) for Northern Pulp. My job, my family, and rural Nova Scotia depend on it. The existing Boat Harbour ETF should remain open until such a time that the new facility is constructed. This existing provincial facility currently meets or exceeds all Provincial and Federal guidelines outlined by the corresponding Environment Departments. This was shown in the Focus Report in the benchmarking section. Once the construction of a new ETF is completed then the subsequent clean up of Boat Harbour can commence. It is my understanding through media and government reports that the cleanup of Boat Harbour can't start until a Federal EA is completed (which is project to be 24+ months to complete). This will allow for the subsequent construction of a new world class ETF which will allow our provincial forest industry to continue to thrive in the future.

The Focus Report data allows me to see that fishing has coexisted in the Northumberland Strait for 50+ years. Currently, lobster fishermen are setting traps in the existing outfall from the Boat Harbour facility. Obviously, if there was a negative impact on the fishery they would not be setting their traps at that location. The new ETF will be an improvement on the current situation.

To close Boat Harbour without having an existing facility operating would permanently collapse the forest industry in Nova Scotia. This would negatively impact thousands of people directly and indirectly employed in the forest industry and would devastate tens of thousands of private land-owners in N.S. The implementation of government initiatives such as the Lahey report will be impossible without a market for low grade pulpwood and will cause the closure of several sawmills throughout N.S.

The proposed facility will be an improvement over the existing situation where all effluent leaving the site will be treated. The pipe being used is well above industry standard and the new outfall location will be far superior to the existing situation. There are currently other similar pulp mills in the province that have existing ETF outfalls into the ocean. Numerous 3rd party expertises have concluded that the ETF indicates that there will be no significant environmental impact for the project's construction or future operation.

Forestry is a renewable resource that everyone in N.S. uses each and every day in their daily activities one way or another. We have the forests, science and expertise in our favour. Do not allow that vocal minority to jeopardize that.

Name: _____

Address:_ _____

E-mail:___ _____

Signature: _____

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E-mail:___ _____

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Name: _

Address:

E-mail:___

Signature

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From:
To: Minister, Env
Subject: Northern Pulp & Paper Mill
Date: November 8, 2019 3:11:43 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Gordon Wilson,

I am writing with concern regarding the Northern Pulp and Paper Mill. I oppose the Northern Pulp's plan to dump effluent into the Northumberland Strait.
I hope that your department is gathering all the necessary environmental information and research to measure the effects this will have on the local land, air and water. This is very serious and should be top priority. We should be protecting our natural resources not polluting them. Why as a province are we investing in a business that produces pollutants on such a large scale?

You have the power to stop such an act, you are our representative for the environment, this needs to stop.

I hope you take the right measures to help this community and work with local resources such as the Ecology Action Centre.
I will watching this decision closely and please take my points under consideration.

Regards,

@gmail.com

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 10:19:36 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Dear Minister Wilson,
My parents bought a piece of land and built a cottage on a bluff on Caribou Island in the late 1960 s. Being from Montreal we could not believe that such a piece of paradise was ours.

When my parents died this was their legacy left to their children.

What will your legacy be?

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Caribou Island

Sent from my iPhone

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 9:15:38 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

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Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely, Bedford, N.S.

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 8:11:55 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson, I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife. Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens. Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 6:04:41 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson, I am writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia
Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment.

I must ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on your constituents. Our health is at risk, as is the resilience of land, air and sea.

This project will create human health risks. Additional, it has potential to damage Nova Scotia's tourism and fishery sectors and will definitely damage the ecosystems in this region. Specifically, endangered species protected by law that are living in essential wetlands, coastal and marine ecosystems and other diverse wildlife. If you allow this effluent to enter our ecosystem, I do not doubt that damages will be payable by the provincial government, not by Northern Pulp.

Please make the right decision and reject this dangerous project. There are no longer any economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Lorneville, NS

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 4:25:47 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

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Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

Halifax, NS

Sent from my iPad

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 4:21:06 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

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Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 4:02:36 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

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Sincerelv.

From:
To: Minister, Env
Subject: Say No to Northern Pulp
Date: November 8, 2019 2:36:23 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

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Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 2:09:13 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I'm writing to express my concerns during the public response period for the Focus Report of the Northern Pulp Nova Scotia Corporation Effluent Treatment Facility proposal being considered under provincial environmental assessment. I would like to ask you to reject this proposal in its entirety due to the serious negative environmental effects the project will have on the land, air and sea. This project will create human health risks, will damage Nova Scotia's tourism and fishery sectors and will damage the ecosystems in this region – which include vibrant wetlands, coastal and marine ecosystems and diverse wildlife.

Please make the right decision and reject this dangerous project. There are no longer economic arguments which can support the damage this project would do to our environment and our citizens.

Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 1:58:28 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

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Sincerely,

From:
To: Minister, Env
Subject: Say no to Northern Pulp
Date: November 8, 2019 1:57:49 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

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Sincerely,

From:	Minister, Env
To:	Environment Assessment Web Account
Subject:	FW: Boat Harbour Closure
Date:	November 12, 2019 1:00:14 PM

From: @yahoo.com>
Sent: November 8, 2019 1:14 PM
To: Minister, Env <Minister.Environment@novascotia.ca>
Subject: Boat Harbour Closure

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Hon. Wilson.
I am a resident of Pictou County who has put up with Nrothern Pulp's (and their predecessor's) fumes and water pollution for many years. I was pleased when the MacNeil government finally drew a line in the sand and said: no more using Boat Harbour for your effluent". As you know the deadline to close Boat Harbour is Jan.31, 2020.
I am very worried that the government will give this aging mill an extension on this deadline. My husband has MS, I have asthma and we have a mentally challenged son. Although we don't know for sure that any of these things are caused by the mill, we know that our county has a high rate of cancer and MS compared to other Canadian communities. We are asking you to stop this atrocity and close that mill down. The fumes are so bad this week, we can hardly breathe and our eyes water when we shop in Pictou. We moved further away from the plant, but still feel it's effects and even smell the fumes here, 20 km away.
There can be no pipe in our beautiful straight! Do not let this company convince you otherwise. Close Boat Harbour and shut that place down.

NS

Sent from Yahoo Mail for iPhone

MacIsaac Clarke & Duffy
Barristers and Solicitors

November 6th, 2019



Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, NS, B3J 2P8
Fax: (902) 424-6925

EA@novascotia.ca

Honourable Gordon Wilson
Department of Environment
1894 Barrington Street, Suite 1800
P.O. Box 442
Halifax, NS
B3J 2P8

Minister.Environment@novascotia.ca

Re: Environmental Assessment - Northern Pulp Nova Scotia Corporation Replacement Effluent Treatment Facility Project, Pictou County, Nova Scotia

Dear Sir or Madam and Minister Wilson:

Please be advised we continue to represent the Harbour Authority of Caribou (hereafter "the Authority"), Pictou County, Nova Scotia.

Located at the mouth of Caribou Harbour, the Authority operates the busiest fishing port in Northern Nova Scotia. It is a hub of fishing activity from April to early December. It is accessed via the 106 branch of the Trans-Canada Highway and is adjacent to the Northumberland Ferries terminal. The facility managed by the Authority is the 'heart' of the commercial fishing industry in northern mainland Nova Scotia. It is also the site of Northern Pulp Nova Scotia's (NPNS) proposed marine effluent pipeline and effluent outfall.

The Authority has again retained our firm to express its continuing concerns regarding Northern Pulp's Focus Report for the Replacement Effluent Treatment Facility Project.

The Authority's position continues to be that Northern Pulp's proposal fails to adequately address critical issues which could result in catastrophic damage to the rich fishing grounds of Caribou Harbour and beyond. On this basis, as detailed below, my client is calling on Minister Wilson to reject Northern Pulp's proposed replacement effluent treatment facility.

This submission will address the following issues of concern to the Authority and its patrons:

1. No leak detection for marine portions of effluent pipe
2. Leak repair to the marine pipe in Caribou Harbour would be virtually impossible in winter months
3. Risk of ice damage to marine pipe
4. Navigation issues
5. No confirmed marine pipe route in Caribou Harbour
6. No definitive plan for marine pipeline construction
7. Risk of siltation in the harbour during construction causing significant harm to marine life and to current users of the harbour
8. Timing of marine pipe trenching and installation conflicts with existing uses of the harbour
9. Effluent will enter Caribou Harbour with significant harmful effects
10. Errors of fact relating to fisheries and presence of fish.

1. There is an absence of leak detection on the marine portions of the effluent pipe.

TOR 3.5 requires Northern Pulp to "Provide viable options including the selected option for leak detection technologies and inspection methodologies ..." Northern Pulp has provided no plan for leak detection on the marine portions of the effluent pipeline. The leak detection systems outlined in Section 3.5 apply only to the on-land portion of the pipeline.

> "A leak detection system as described below will be installed with the effluent pipeline **to monitor for potential leaks in the overland portion of the route between Pictou and Caribou** ..." (FR, Section 3.5, p. 62) (emphasis ours).

In response to questions submitted about potential damage and leaks to the marine pipe, the public is directed to "Refer to section 3.5 for comments concerning pipeline leak detection and enhanced pipeline protection options." (Appendix 1.1, pp. 10 and 18) However, there is absolutely no mention of any leak detection system for the marine portion of the pipe in section 3.5. The marine pipe is explicitly excluded. There is similarly no mention of leak detection in other sections, e.g. section 2.5, Changes to Pipeline, and Appendix 2.5, which address marine pipeline construction.

The absence of attention to leak detection in the marine pipe is a critical omission. Risk of leakage in the marine pipe has been and remains a significant public concern. A leak

anywhere along the route of the marine pipe inside Caribou Harbour would result in build-up of effluent in the harbour, with the likely result being catastrophic damage to the marine environment, including juvenile lobster in the Marine Refuge Scallop Buffer Zone 24 and a highly productive rock crab nursery, both of which are critical to the regional fisheries of the Northumberland Strait.

Recommendation #1: Northern Pulp has not fulfilled the requirement of TOR 3.5 in relation to the marine portion of the pipeline. The Minister cannot approve this project without evidence that the project provides the highest level of effluent leak prevention, detection and timely repair to prevent significant and irreparable harm to the marine environment.

2. **Leak repair to the marine pipe in winter months would be virtually impossible.**

Even if effective leak detection technology was planned, in the event a leak developed during the 3- 4 month period when the harbour is ice-covered (with from 1- 5 metres of ice) repair would be nearly impossible. Ice conditions in Caribou Harbour and the Northumberland Strait are so severe that the PEI ferry does not run in the winter, and all fishing boats are taken out of Caribou Harbour.

The question of whether and how timely a repair could be carried out if a leak in the marine pipe occurred during winter months was raised repeatedly in public submissions. Northern Pulp has not addressed this issue, except by saying that burying the pipe will provide sufficient protection from ice scour. Ignoring and failing to address a possible occurrence on the basis that in Northern Pulp's view the event will not occur is not acceptable.

Recommendation #2: The Minister cannot approve this project without evidence that the project provides the highest level of effluent leak prevention, detection and timely repair to prevent significant and irreparable harm to the marine environment. The absence of attention to an acknowledged risk with such severe consequences greatly increases the likelihood of significant and irreversible harm at some point in the project life.

3. **Risk of ice damage to the marine portion of the pipe**

Ice damage to a marine pipe is an acknowledged risk in the Focus Report and accompanying documents, and in earlier reports from Stantec. TOR 2.2 requires Northern Pulp to "Conduct geotechnical surveys and provide the survey results to confirm viability of the marine portion of the pipeline route. The surveys must determine the potential impacts of ice scour on the pipeline."

Makai Engineering states that depth of burial for a marine pipe should be determined by survey information and historical data. Historical data has not been provided in the

Focus Report. NP has provided only one year of data on ice scour. Survey information from CSR shows that Caribou Harbour is an area with many ice scour events. One hundred and thirty-three (133) were noted in the survey, which CSR believes were from 2018-2019 alone. The company also notes that scours begin to fill in immediately, (Appendix 2.2, Section 5.5, p. 95) so that the measured scours do not indicate the deepest scour that would have taken place.

The general consensus among local fishermen and divers who have observed ice in the area for decades is that there is high risk of damage to the marine pipe and diffusers from ice even if the pipe is covered by 2-metres of soil. These same individuals note that shifting bottoms could uncover areas of pipe, making it more vulnerable to damage.

The Stantec Preliminary Receiving Water Study prepared for Northern Pulp in August 11, 2017, p. 4.80-4.81 contains this information:

> *It was reported (in ENSR, 1999) that Maritime Telephone and Telegraph (MT&T) performed an ice evaluation in support of an optical communication cable deployment across the Northumberland Strait. Based on MT&T's review, the estimated potential for damage to the cable from ice scour extended to water depths of 12 to 14 m. In 1991 their cable was trenched and buried to a selected depth (depth is unknown) and left on the surface of the sea bottom at greater depths. Unfortunately, the winter of 1991/1992 was severe and the cable was severed by ice keels at a water depth greater than 18 m towards the Woods Island, PEI side of the Northumberland Strait.*

This indicates that ice scour can take place a much greater depths than expected. This is crucial information that should be considered by the Minister in determining likelihood of harm.

Ice scour is not the only source of risk to the marine pipe. There are also risks to the pipe's integrity from structural stresses, as explained in the submission of Colton Cameron, PEng. to the EARD. Cameron writes: "Due to the cyclical nature of the tidal forces and wave action these induced stresses combined with ice loads over time could present fatigue stress issues."

These risks have not been addressed by Northern Pulp and must be fully examined before this project can be approved.

Finally, the Authority notes that there has been no attention given to protection of the marine pipe from ice or storm damage at the point where the proposed pipe would enter Caribou Harbour, before it is buried. This is another serious omission. This is a point where the marine pipe is vulnerable to moving ice as well as strong storm and wave action. Damage at this point could have the same catastrophic results as outlined above.

Recommendation #3: Northern Pulp has not fully addressed the issues to confirm the viability of the marine route in relation to ice or other stresses. They have not established that ice scour and other conditions do not present significant risks to the marine pipeline. Northern Pulp has not considered or responded to information submitted by local diver Rob MacKay based on his direct experience, nor to the issues of potential structural damage from ice pressure raised by professional engineer Colton Cameron in his submission. They have not considered historical information on ice scour in the area.

Damage to the marine portion of the pipe would result in significant and irreversible harm to the entire Caribou Harbour ecosystem. A break or leak in the marine effluent pipe in an iced-over marine environment with minimal flushing capacity could continue for an extended period before detection – at the rate of 62 million litres per day.

We ask the Minister to reject this proposal. Northern Pulp has not provided sufficient information to conclude that a marine effluent pipe installed as described will not be at risk.

4. Navigation issues

NPNS completely fails to address the navigational concerns raised in our earlier submission. The Authority is very concerned that its patrons, both commercial and recreational, will have their navigational abilities under the *Navigational Protection Act* restricted. NPNS has responded only that "Impact to navigation is not anticipated. A Navigational waters review will be required before construction begins, at this time adjustments will be made as necessary."

In our submission this is not an adequate response.

The Authority's earlier submission pointed out that the patrons of the Authority, in particular seventy plus (70+) commercial fishermen, navigate directly across the path of the proposed pipe route in Caribou Harbour, on a daily basis, during regular fishing seasons of lobster, crab, herring and scallop, from April through November.

Any interference with existing navigation routes could cost individual fishermen hundreds of miles of additional travel every season for the lifetime of the project, with corresponding costs in time and fuel, and increased emissions to the environment.

My client also has serious concerns about interference with navigation during the proposed construction timeline of 84+ days, detailed below.

Recommendation #4: The Authority's position is that all navigation concerns must be addressed satisfactorily prior to any approval. The minister, in making his decision, must consider how the proposed project will impact existing uses of the area. Northern Pulp has not provided sufficient information to ensure that the proposal will not substantially

interfere with existing navigational uses of the area during construction and in the long-term.

5. There is no confirmed marine pipe route in Caribou Harbour.

NPNS has not presented a confirmed marine pipe route for Caribou Harbour. The only specific information provided about the route are the co-ordinates for the entry point of the marine pipe and the outfall location. This is in notable contrast to the detailed drawings and plans presented for the on-land portion of the pipe. Marine survey information was gathered from a corridor 200 metres wide, within which NPNS presumable plans to locate the marine pipe.

Recommendation #5: This project cannot be approved before a specific pipe route is presented for evaluation and input from the public and government departments. The minister cannot accurately evaluate whether there will be significant and irreversible harm in the absence of a detailed marine pipe route.

6. There is no definitive plan for marine pipeline construction.

Northern Pulp is required by TOR 2.5 to "Provide any proposed changes to the pipeline construction methodology and other associated pipeline construction work, related to the potential changes to the marine portion of the pipeline route (e.g., infilling, trenching, temporary access roads, excavation, blasting, disposal at sea, and others where applicable).

Northern Pulp has not fulfilled TOR 2.5. They have not provided a detailed plan for marine pipeline construction. The Focus Report states, "Appendix 2.5 provides the details of the current proposed construction." (Section 2.5, p. 39). This is not accurate. Appendix 2.5 **does not provide this information**. Makai Ocean Engineering Inc. which prepared the report for Appendix 2.5 writes, "This report provides an opinion of the likely construction methods and design features of the pipeline, based on the available data and standard practices for marine pipelines." They also state, "The exact method used for dredging will be determined by the selected marine contractor based on schedules, costs, and available equipment resources." (Executive Summary, p. 1)

Makai states clearly that, "While Makai has extensive experience with HDPE pipeline installations and has taken considerable efforts to consider the site specifics and likely approaches for this project, **the actual means and methods and construction processes will remain the responsibility of the Marine Contractor, and may vary from this approach."** (Introduction) (*emphasis ours*)

We note some, but not all, of the issues relating to TOR 2.5 where no concrete plan has been presented:

- **No plan for how excavated material will be dealt with during construction**: Neither the Focus Report Section 2.5 and Table 2.5-1, p.18 nor Appendix 2.5

provide a definitive plan for how excavated material will be dealt with during the construction process, (sidecast, removed to barge or other.) Options are presented, but no definitive plan is presented.

- **No plan for spoils disposal:** The question of potential disposal at sea is raised explicitly in TOR 2.5. NPNS downplays the issue of spoils and their disposal. The Focus Report states, "It is anticipated that spoils from the excavation will be repurposed as fill to cover over the trenched pipeline once placed. Excess spoils may be (sic) require disposal and will be subject to regulatory approval and permitting." (Section 2.5, p. 43)
  NPNS has provided no explanation of how spoils will be disposed of. They have not addressed the question of they will be looking at disposal at sea.
  The Harbour Authority notes that it appears physically impossible that there will not be a significant amounts of spoils requiring disposal in some way, given that 6" of gravel and a 36" diameter pipe will replace excavated soil for the 4 km distance of the trench.
- **Some of the excavated soil may exceed contaminant guidelines**. Contaminant levels beyond guidelines in some soils are identified in the Focus Report documentation. NPNS has not addressed this issue except to say that it will be dealt with at a later time.
- **There is no clear plan for how the trench will be finished.** "Once the trench is covered in soil, it could either be graded down using a towed grader bar, or left to the elements if local currents and sediment transport is agreeable." (Appendix 2.5, p.18) The possible use of armour stone in some places is mentioned. There has been insufficient attention given to the strong tides and currents that could expose the pipe to ice damage.
- **Blasting very unlikely**. In response to TOR 2.5, NPNS says only that blasting is "very unlikely." The Authority is very concerned with leaving this issue unresolved. My client's position is that sufficient information should have been gathered and provided in the Focus Report to determine whether blasting is proposed as part of this project or not, in order that this issue can be fully considered in terms of assessing potential impacts. Use of blasting could have significant consequences.
- **Siltation during construction**. See point 7 below regarding potential impacts of siltation during the 84+ day proposed construction period.

Recommendation #6: The Harbour Authority of Caribou believes that Northern Pulp has not provided sufficient information to fulfill the requirements of TOR 2.5. NPNS has presented a number of possible scenarios, but no plan that can be evaluated for potential impacts. The missing information is not available in earlier documentation, i.e. the EARD or in Appendix F to the EARD.

The Harbour Authority is very concerned that, *"The exact method used for dredging will be determined by the selected marine contractor based on schedules, costs, and available equipment resources."* (Appendix 2.5, p. 1) Decisions based on schedules, costs and available equipment do not prioritize prevention of environmental harm to the

Harbour or impacts on present users of Caribou Harbour and do not ensure protection of the delicate harbour environment.

My client asks the Minister not to approve this project without a detailed construction plan subject to scrutiny and input from the public, including our patrons, who have detailed knowledge of the actual conditions of the area and the potential for harm. NPNS has not provided the Minister with the information needed to determine whether construction of the marine pipeline can be done without causing irreparable, long-term harm to Caribou Harbour and the nearby Northumberland Strait, including the marine life within it, both plant and animal, and current users.

7. **Siltation in the harbour during construction may cause significant harm to marine life and current users of the harbour.**

The Authority and our patrons have great concern about the impact of siltation on the Harbour and surrounding waters during construction and for an unknown period afterwards. No attention has been given to the potential effect of excavation of over 80,000 cubic metres of silty bottom over a period of 84+ days, (Focus Report, Table 2.5-1) in a shallow, tidal area. Caribou Harbour experiences tidal changes of up to 5 feet, twice daily. During a construction period of this length, storm conditions are almost inevitable. Storm surges can raise waters by 6 feet over normal conditions, with high winds and crashing waves. Northern Pulp has only addressed this issue by saying that silt curtains and isolating work areas will be used to reduce turbidity. This is completely insufficient for an issue which could have significant impacts on all life in the harbour.

Is it viable to isolate up to 4 km of trench and up to 80,000 cubic metres of sidecast soil effectively, without interfering with navigation and existing uses of the harbour? What amount of silt would be contained by these methods, what would be released? Conditions inside Caribou Harbour, with depths of between 0 and 8 metres, are significantly different than in many open ocean areas, where dispersion of silt would take place more effectively. What would be the impact of siltation under both normal and storm conditions on eel grass beds, on plankton, on juvenile lobster and crab and other forms of marine life, on the seabed itself? This issue must be fully examined based on the actual conditions in Caribou Harbour prior to approval being given for the project.

There are 70+ fishers, buyers and a nearby fish plant employing 140 people, that all need clean water for multiple purposes. During the months of May and June in Caribou Harbour at our wharf and at North Nova Seafood's, there is a minimum of 100,000 to 150,000 thousand pounds of live lobster, 'floating' every day. This means the lobsters are submerged in containment pens or 'cars' in seawater, in 100-pound crates. The lobsters are reliant on clean, oxygenated water. So are the oysters in the 4 oyster leases in the harbour, and the juvenile rock crab, lobster and other species. Fishers use seawater to spray down their catches as they fish, to keep them cool. They use seawater to wash down their boats and traps. That water must be clean.

Over 84+ days construction, with unpredictable weather, the Harbour Authority has serious doubts about whether installation of 4km of marine pipe can be carried out without significant, long-term harm. Certainly, Northern Pulp has not provided sufficient information to show that it can be done without such harm.

Recommendation #7: The Minister cannot approve this proposal until the potential impacts of siltation in the Harbour during the 84+ day proposed construction period is fully evaluated.

8. Timing of proposed marine pipe trenching and installation and existing uses of the harbour

The Authority's position is that there is no 84+ day construction window that would not severely interfere with existing activities. There is ice in the harbour from late December until April. Lobster season and the related storage/navigation/fishing from end of April to end of June. Major recreational activities occur throughout July, August and September, with rock crab season running from early August to November. Include the herring fishery in the Northumberland Strait from early September until later October, of which Caribou Harbour is the epicenter. Tuna fishing in August, September and October, then scallop fishing from early November to mid- December. Complicate that with the beginning of fall storms and high winds. Ice can close in by early December. Then add in the Northumberland Ferries running from May 1st until mid- December in a narrow channel only slightly larger than the vessels themselves.

Recommendation #8: Caribou Harbour is used for activities central to the economy of the area for all months of the year when it is ice-free. There is need for a full evaluation of the potential impacts of proposed pipeline construction on existing uses prior to any approval of the project.

9. Effluent will enter Caribou Harbour

Northern Pulp's proposal relies on a receiving water study (RWS) prepared by Stantec. This study indicates that there will be minimal flow of effluent discharged into Caribou Harbour. The Authority reasserts its position that this conclusion is erroneous, and does not reflect what its fishers know from working the waters of Caribou Harbour year-round for many decades.

a) The receiving water study does not take into account conditions familiar to fishers in the area, including storm surges/surge tides or sustained, heavy onshore winds from the northeast or northwest that can last for several days and 'hold' the tide in.
b) There is a bottleneck effect at the mouth of the Harbour between Munroe's Island and Caribou Island caused by the deeper water, (the proposed location for the outfall and diffusers), meeting the shallow water adjacent to the sandbar at the mouth of the harbour. This is the actual narrow, marked

channel the Prince Edward Island and Northumberland Ferry navigates to exit Caribou Harbour, which averages a depth of 25 feet. (This channel needs to be dredged every so often to maintain a safe depth for the ferry to navigate in and out of the harbour.) A rising tide basically, especially with onshore winds, funnels in from the proposed diffuser location.

c) Under storm conditions, the water level in Caribou Harbour sometimes rises in excess of 2 meters. There is nowhere for this excess to come from but the mouth of the harbour, where the effluent outfall is proposed to be.

d) A local knowledge submission containing detailed information about the tides, currents and winds in the Caribou Harbour area was submitted as a response to the EARD by Caribou fishers . It contains important information that does not appear to have been considered in the revised RWS.

e) We draw your attention to the expert opinion of Dr. Oliver Fringer of Stanford University, an oceanographer with expertise in numerical modelling of coastal dynamics. Dr. Fringer reviewed the Stantec RWS in the EARD and concluded that errors of modeling lead,

> "to the incorrect conclusion that the environmental impacts will be negligible because the effluent concentrations are predicted to be unphysically low. **Instead, correct implementation of the models with more conservative and physically realistic scenarios would show that effluent concentrations in the region could be much larger and that effluent accumulation in Pictou and Caribou Harbours is likely.** (emphasis added) (Fringer, p. 1, Appendix 1, Ecojustice Response to EARD)

Dr. Fringer also states that Stantec's use of the two-dimensional Mike 21 model is inappropriate as it fails to take into account local dynamics caused by wind, river inflows, offshore currents, ice, waves and storm surge. (p. 7)

Recommendation #9: We are aware that Dr. Fringer is preparing an updated submission on the revised RWS. We ask the Minister, and government departments reviewing the NPNS proposal, to give Dr. Fringer's past and updated submissions their full attention, and to give attention and respect to the local knowledge of fishers submitted previously and to this review.

The RWS is a key element of NPNS's conclusion that no harm will be done by the release of an average of 62 million litres of treated effluent daily into the Northumberland Strait at the mouth of Caribou Harbour. If the information on which the RWS modeling is based is not correct or complete, the results will not be correct. Likewise, if the methodology is not correct. The RWS is not an area where mistakes can be allowed; there is too much at stake.

The Harbour Authority and its patrons are not experts in modelling. Dr. Fringer is an independent expert, and we note that his conclusions were consistent with our fishers' local knowledge. We note that there are many errors of fact in NPNS' focus report in relation to fisheries and the presence of fish. We have listed some of these errors in

point 10 below. Fisheries and fish are subjects on which the fishers of the Authority do consider themselves experts. The multiple errors on these subjects (see point 10 below) in the Focus Report and attached documents do not give us confidence that NPNS has provided accurate information in other areas.

10. Errors of fact relating to fisheries and the presence of fish.

Due to limitations of time for public comments, my client is unable to fully respond to errors of fact relating to fish and fisheries that may exist in Northern Pulp's documents. However, we would like to point out some which are apparent to the Harbour Authority and its patrons.

a) Appendix 7.3, p. 68, erroneously states that rock crab are not found at depths greater than 10 m. To give an idea as to how inaccurate this is, you simply need to understand that most fishermen have 35 to 60 meters of buoy line to fish rock crab. Rock crab are fished as deep as 35 to 50 m in the Strait. Depending on the time of year they congregate at different depths.
b) Appendix 7.3, p. 68 also states that rock crab are not fished near the proposed outfall. This is false. The area is extensively fished for rock crab. The vast majority, if not all, fishers in Caribou who participate in the rock crab fishery have fished rock crab in the direct vicinity of the diffuser location.
c) Figure 7.3-3, p. 130 of the Focus Report, titled Northumberland Strait Lobster Buoy Locations, gives a highly inaccurate picture of the presence and amount of lobster fishing directly in the vicinity of the diffusers. The entire harbour and channel area including the vicinity of the proposed diffuser is fished for lobster. Lobster fishing effort and locations change sometimes on a daily basis. They are dependent on many factors, including water temperatures, molt cycles, and annual migration inland to molt, spawn and feed.
(In fact, Northern Pulp's own information contradicts itself. Figure 7.3-4 Lobster Distribution and Harvest Area indicates that lobster fishing takes place much closer to the proposed diffuser than the representation in Figure 7.3-3)
d) Figure 3-12 (Appendix 7.3, p.66) suggests Atlantic Herring resources in the LAA are limited to the outer Caribou Harbour / Northumberland Strait where depths approach 10 m and greater. This is false and completely in error. The adjacent Pictou Banks, (middle ground), Caribou Point and northwest to Pictou Island, all are basically less than 10 meters depth and extensively fished for Atlantic Herring.
Atlantic Herring converge in the exact location of the channel and proposed diffuser to spawn there and in the adjacent banks. Northern Pulp says herring are generally located outside the zone of discharge (Appendix 7.3, Section 4.1.3.6, p. 4.2) and pass through this area on their way to spawning grounds. (Appendix 7.3, Appendix D, last page, no page #) This is incorrect. This entire area including the area of the diffuser is the spawning ground for Atlantic Herring.

e) Mackerel is fished extensively in the exact location of the channel and proposed diffuser location. Mackerel feed on juvenile herring and herring spawn and basically are in abundance when the herring come to this area to spawn. The greater depth of the channel allows for more line in the water, which enables more hooks to fish mackerel effectively at the exact diffuser location and all along the channel.

f) Northern Pulp states that the proposed marine pipe intersects the scallop buffer zone and that the diffuser is not within the scallop buffer zone. (Appendix 2.5, p. 8) This is incorrect. The entire 4 km proposed pipe including outfall location is within a Scallop Buffer Zone, SFA 24. The buffer zone is measured 1 nautical mile (1.1 miles) from any land.
These zones are part of a marine refuge for American Lobster and are part of Canada's Marine Refuge program, which contributes to Canada's marine conservation targets. Consider that part of the considerations given for the marine refuge is that 'no human activities that are incompatible with the conservation of the ecological components may occur or be foreseeable within the area'. This entire proposed pipe and associated effluent is not compatible with the intent of a Marine Refuge. Marine refuges contribute to Canada's marine conservation targets.

The Harbour Authority submits for your attention Appendix 1, consisting of signed documentation from 65 fishers who fish lobster, rock crab and/or herring in the vicinity of the diffusers. This information is submitted to correct inaccurate information in Appendix 7.3 of Northern Pulp's Focus Report, which represents the area around the proposed outfall as free from fishing.
Sixty-five (65) fishermen and women indicated that they fish for either lobster, rock crab or herring in the vicinity of the proposed outfall. Thirty-eight (38) state that they fish one or more of these species within 300 metres of the proposed effluent outfall. Forty-three (43) state that they fish one or more of these species within 1 km of the proposed outfall.
This information was gathered in Pictou, Nova Scotia, on November 1 and November 4, 2019. Due to time constraints, this information represents some, but not all, of the fishers who fish in the vicinity of the proposed effluent outfall. It does not include information from fishers who fish other species in the immediate vicinity of the outfall.

Recommendation #10:

My client is disturbed by the many errors of fact regarding the presence of fish and fisheries in the area of the proposed outfall, including continued misrepresentation of the relationship of the 4 km pipeline and outfall to marine refuge SFA 24. Fishermen have presented information about the presence of fish and fisheries to Northern Pulp from the very first meeting almost two years ago. Northern Pulp has not reflected this information in their Focus Report. As noted, the short time for public input limits our ability to fully review the documents for errors in these areas. We ask the Minister to take into consideration the repeated errors of fact, which raise significant questions

about potential inaccuracies in other information, and must limit confidence in the conclusions drawn by NPNS that the project will cause no significant, residual harm.

11. Conclusion and Final Recommendation:

The Authority's position is that the Minister must reject Northern Pulp's proposed new ETF. Northern Pulp's Focus Report response contains errors of fact and lacks information on critical issues. It lacks key protective measures. Northern Pulp has failed to address the Terms of Reference adequately and they have failed to address realistic and legitimate concerns raised by ourselves and other members of the public. Critical scientific studies have not been done, including lobster larvae studies recommended by NPNS's own consultants. Northern Pulp has drawn the conclusion that this project will cause no significant, irreversible harm without providing the science to back up this conclusion.

There is credible evidence of significant, long-term of risks to the marine environment presented by ourselves and others. There is also evidence of the devastation caused by pulp effluent to Boat Harbour. The Authority does not want to see this repeated in Caribou Harbour.

Because of these errors and omissions, and because of credible evidence of risk, we believe the Minister cannot approve this project. The Minister does not have a basis to conclude that the project can be undertaken without likelihood of serious consequences and irreparable harm to Caribou Harbour and the marine ecosystem that the Authority and its patrons rely on to earn a decent and moderate living. We ask that this proposal be outright denied based on these very realistic and legitimate concerns.

Yours truly,
MACISAAC CLARKE & DUFFY

cc Client
Minister of Environment and Climate Change
Minister of Fisheries Oceans and the Canadian Coast Guard
Canadian Environmental Assessment Agency NS Regional Office

Appendix 1

Submission of Caribou Harbour Authority

November 6th, 2019

The proposed effluent outfall is at: 14307.6
29812.2

Check the boxes for any species that you have fished within 1 km of the proposed outfall.

Name - print	Lobster	Rock Crab	Herring	Signature
	✓		✓	
	✓	SCALLOPS	✓	
	✓		✓	
	✓		✓	
		✓	✓	
	✓	✓	✓	
	✓		✓	

The proposed effluent outfall is at: 14307.6
29812.2

ALSO: Check the boxes for any species that you have fished within 300 metres of the proposed

Name - Print	Lobster	Rock Crab	Herring	Signature
	✓	✓	✓	
	✓		✓	
			✓	
	✓	✓	✓	
	✓		✓	
			✓	
	✓		✓	

The proposed effluent outfall is at: 14307.6
29812.2

Check the boxes for any species that you have fished within 1 km of the proposed outfall.

Name - print	Lobster	Rock Crab	Herring	Signature
	✓	✓	✓	
	✓	✓	✓	
	✓	—	—	
	✓		✓	
	✓	✓	✓	
	✓	✓	—	
	✓		✓	

The proposed effluent outfall is at: 14307.6
29812.2

ALSO: Check the boxes for any species that you have fished within 300 metres of the proposed

Name - Print	Lobster	Rock Crab	Herring	Signature
	✓	✓	✓	
	✓	✓	✓	
	✓	—	—	
	✓		✓	
	—	—	—	
	✓	✓	—	
	✓		✓	

The proposed effluent outfall is at: 14307.6
29812.2

Check the boxes for any species that you have fished within 1 km of the proposed outfall.

Name - print	Lobster	Rock Crab	Herring	Signature
			✓	
		✓	✓	
	✓	✓	✓	
			✓	
	✓	✓	✓	
		✓	✓	

The proposed effluent outfall is at: 14307.6
29812.2

ALSO: Check the boxes for any species that you have fished within 300 metres of the proposed

Name - Print	Lobster	Rock Crab	Herring	Signature
	✓	✓	✓	
	Less than 100 ✓	Less than 100 ✓	✓	
			✓	
			✓	
			✓	
	✓	✓	✓	
	✓			

The proposed effluent outfall is at: 14307.6
29812.2

Check the boxes for any species that you have fished within 1 km of the proposed outfall.

Name - print	Lobster	Rock Crab	Herring	Signature
	✓	✓	✓	
	✓	✓	✓	
	✓	✓	✓	
	groundfish			
	✓		✓	
	✓	✓		
			✓	

The proposed effluent outfall is at: 14307.6
29812.2

ALSO: Check the boxes for any species that you have fished within 300 metres of the proposed

Name - Print	Lobster	Rock Crab	Herring	Signature
		✓	✓	
	✓	✓	✓	
	✓	✓	✓	
	✓		✓	
	✓	✓		
			✓	

The proposed effluent outfall is at: 14307.6
29812.2

Check the boxes for any species that you have fished within 1 km of the proposed outfall.

Name - print	Lobster	Rock Crab	Herring	Signature
	✓		✓	
			✓	
	✓			

The proposed effluent outfall is at: 14307.6
29812.2

ALSO: Check the boxes for any species that you have fished within 300 metres of the proposed

Name - Print	Lobster	Rock Crab	Herring	Signature
	✓		✓	
			✓	
	✓	✓	✓	
		✓	✓	

The proposed effluent outfall is at: 14307.6
29812.2

Check the boxes for any species that you have fished within 1 km of the proposed outfall.

Name - print	Lobster	Rock Crab	Herring	Signature
	✓		✓	
	✓		✓	
			✓	
	✓		✓	
			✓	
			✓	
			✓	

The proposed effluent outfall is at: 14307.6
29812.2

ALSO: Check the boxes for any species that you have fished within 300 metres of the proposed

Name - Print	Lobster	Rock Crab	Herring	Signature
	✓			

The proposed effluent outfall is at: 14307.6
29812.2

Check the boxes for any species that you have fished within 1 km of the proposed outfall.

Name - print	Lobster	Rock Crab	Herring	Signature
	✓	✓	✓	
	✓	✓	✓	
	✓			
	✓	✓	✓	
	✓	✓	✓	
			✓	
			✓	

The proposed effluent outfall is at: 14307.6
29812.2

ALSO: Check the boxes for any species that you have fished within 300 metres of the proposed

Name - Print	Lobster	Rock Crab	Herring	Signature
		✓	✓	
	✓	✓	✓	
			✓	
	✓	✓	✓	
	✓	✓	✓	
	✓	✓		
	✓		✓	

From:
To: Minister, Env
Subject: Northern Pulp
Date: November 8, 2019 1:57:38 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Dear Minister Wilson,

I am writing to inform you that I strongly oppose Northern Pulp's plan to pump effluent into the Northumberland Strait. At a time of a climate crisis and considering all of the recent international reports of habitat loss and degradation of the oceans and environment, it's difficult to imagine that the Province of Nova Scotia is actually considering letting this happen.

The saga of this pulp and paper mill and it's toxic legacy has to end. The time has come for decisive action by the government. Please be a strong leader and say no to Northern Pulp.

Sincerelv.

Halifax and Aberdeen, Cape Breton

From: @xplornet.ca
To: Minister, Env
Subject: Northern Pulp
Date: November 8, 2019 2:39:31 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Sir,

It is a travesty for you to consider funnelling effluent to Northumberland Strait. Somehow this needs a better solution. First of all, Boat Harbour needs to be cleaned up (what a legacy of lies and deceit THAT nightmare is) and another solution found to toxic waste. Impossible? I dont really know the answer to that, but I certainly know that what you propose is wrong. Absolutely.

Sincerely,

Response to Northern Pulp Replacement of Effluent Treatment Facility

October 31, 2019

Via fax: 902-424-6925



Environmental Assessment Branch
Attn: Honourable Gordon Wilson, Minister of Environment
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

Dear Minister Wilson:

I am in favour of giving Northern Pulp an extension to complete their new effluent system. As the government cannot start the cleanup of Boat Harbour until a Federal Environmental Assessment is completed and approved, I think it is appropriate that the government allow Northern Pulp to use Boat Harbour until such time the cleanup process can begin.

Top on the minds of Canadians and folks all over the world is "climate change". If Northern Pulp is forced into closure, the Forest Industry of Nova Scotia will take a dramatic hit. Well managed forests aid in the prevention of forest fires. Forest fires emit mass volumes of greenhouse gasses into the atmosphere. Well managed forests aid in the prevention of massive pest outbreaks, killing trees of all ages. When trees die, they fall to the ground and decay. Decaying trees release the carbon stored into the soils and waterways. Harvested trees can be turned into products which store the carbon instead of releasing the carbon into the atmosphere. In summary, a healthy forest industry plays a vital role in climate change management. I strongly support an approval of Northern Pulp's Environmental Assessment.

Sincerely,

Elmsdale, NS

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Sincerely

Elmsdale, NS