Fisheries and Aquaculture
1575A Lake Rd
Sandy Point, Nova Scotia
B0T 1W0
novascotia.ca

Public Notice – Adjudicative Application Posted

These documents have been submitted with respect to an adjudicative application for a boundary amendment of an existing Marine Aquaculture Licence/Lease. The application follows a Scoping period, during which the applicant collected information to support their application. The information in these documents is provided as part of the routine disclosure of information by the Department of Fisheries and Aquaculture (NSDFA, the "Department"). Some information may be redacted as business confidential information or personal information.

These documents were provided to the Department by the applicant (with the exception of the attached Schedule "A" which was generated by the Department). The Department is not responsible for the content of these documents, including, but not limited to, the accuracy, reliability, or currency of the information contained within.

Adjudicative Application for a Boundary Amendment to an Existing Aquaculture Licence and Lease	
Applicant: Kelly Cove Salmon Ltd.	**Species:** Atlantic salmon, Rainbow trout
Location: St. Mary's Bay, Westport Harbour, Digby County	**Method of Cultivation:** Marine Cage Cultivation
Application File Number: AQ#0742	**Application Received On:** October 28, 2016

To learn more about the marine aquaculture lease and license application process, please visit https://novascotia.ca/fish/aquaculture/licensing-leasing/Aqua-Licensing-and-Leasing-Overview.pdf

For information on the Nova Scotia Aquaculture Review Board, please visit https://arb.novascotia.ca/

Posting Date of this Notice: March 1, 2023

Please note that this application is being reviewed pursuant to the *Canadian Navigable Waters Act* by Transport Canada (TC). Written comments regarding the effect of this work on marine navigation may be submitted to Transport Canada as follows, for a period of 30 days following the posting date of this notice.

1. On line at : http://cps.canada.ca/ under the following Registry and NPP numbers:

NSDFA AQ#	TC Registry #	TC NPP File#
0742	4740	1993-200240

2. By Mail at: Manager
Transport Canada - Navigation Protection Program
P.O. Box 42, Moncton, NB E1C 8K6

Table of Contents (Page 1 starts after this table)

Sweeney International Marine Corp.
46 Milltown Blvd.
St. Stephen, New Brunswick
Canada E3L 1G3
Tel: (506) 467-9014
Fax: (506) 467-9503
www.simcorp.ca

October 24, 2016

SIMCorp File #SW2016-058

Ms. E. Lynn Winfield
Licencing Co-ordinator
Nova Scotia Department of Fisheries & Aquaculture
Aquaculture Division
1575 Lake Road
Shelburne, Nova Scotia
BOT 1W0

Dear: Ms. Winfield

Reference: **Boundary Amendment Application for Site #0742 / Brier Island**

On behalf of our client, Kelly Cove Salmon Ltd., we are submitting the following in support of an application for a boundary amendment for Site #0742 / Brier Island:

1) A completed "Aquaculture Amendment Application" Form;
2) A cheque in the amount of $1,000 ($500 application fee for the licence plus $500 application fee for the lease) payable to the Minister of Finance;
3) Supporting information as required by Network Agencies and the Aquaculture Review Board; and,
4) A complete set of Site Development Plans detailing the proposed amended lease boundaries, bathymetry, cage configuration, cross-sections and proposed marking plan.

If you require anything further please do not hesitate to contact our office at any time.

Yours truly,

[redacted]

cc. [redacted] VP Saltwater Operations, Cooke Aquaculture Inc.
Jeff Nickerson, NS Production Manager, Kelly Cove Salmon Ltd.
[redacted] SIMCorp

NOVA SCOTIA
Fisheries and Aquaculture

Office Use Only

Aquaculture Amendment Application

Licence/Lease No.: 0142

Name of licence/lease holder:

Applicant: Kelly Cove Salmon Ltd. Business Registration Number: [redacted]

Contact Person Jeff Nickerson, NS Production Manager

Telephone No. (Work): (902) 875-8603 (Home): _____ (Cell): [redacted]

Fax No. (902) 745-1492 Email Address jnickerson@cookeaqua.com

Mailing Address: P.O. Box 1546
Shelburne, NS
Postal Code B0T 1W0

Civic Address: 803 Ohio Road
Shelburne, NS
Postal Code B0T 1W0

20(1)

Is this aquaculture amendment application for: check (✓) appropriate box(s):

- ☐ Change of species
- ☐ Change of culture method
- ☑ Change of site boundaries

Provide explanation: Boundary amendment application is being filed to fully encompass existing occupation including all cages, mooring lines and anchors. Provision has been made for greater separation between cages to ensure long term environmental sustainability

A complete aquaculture amendment application includes the following: check (✓) appropriate box(s):

- ☑ Amendment fee (payable to Minister of Finance)
- ☐ Deed or Property Lease for land-based (if applicable)
- ☑ Development Plan (provided by NSDFA)
- ☐ Orthophoto with site layout (land based)
- ☑ Amendment Application Forms (Provided by NSDFA)
- ☑ Gear configuration sketches (if applicable)
- ☑ Hydrographic chart with site layout (marine based)
- ☐ Department of Environment fresh water withdrawal permit (if applicable)
- ☑ GPS coordinates of lease corners or boundary

Application packages are available at your local Coastal Resource Coordinator Office (see attached list) or the Shelburne Office at:

Nova Scotia Department of Fisheries and Aquaculture
Attention: Aquaculture Division
1575 Lake Road
Shelburne, Nova Scotia
B0T 1W0

Telephone Number (902) 875-7439
E-Mail: aquaculture@gov.ns.ca

For the purpose of assessing aquaculture amendment applications, it is necessary to provide information to other government departments and interested public. Business plan information is not released to the public. By signing this amendment application, the applicant agrees to the Department releasing application information about the proposed development.

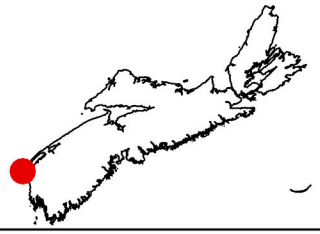
[redacted]

OCTOBER 24, 2016
Date

Signature of
Nova Scotia Department of Fisheries and Aquaculture Designate

Date

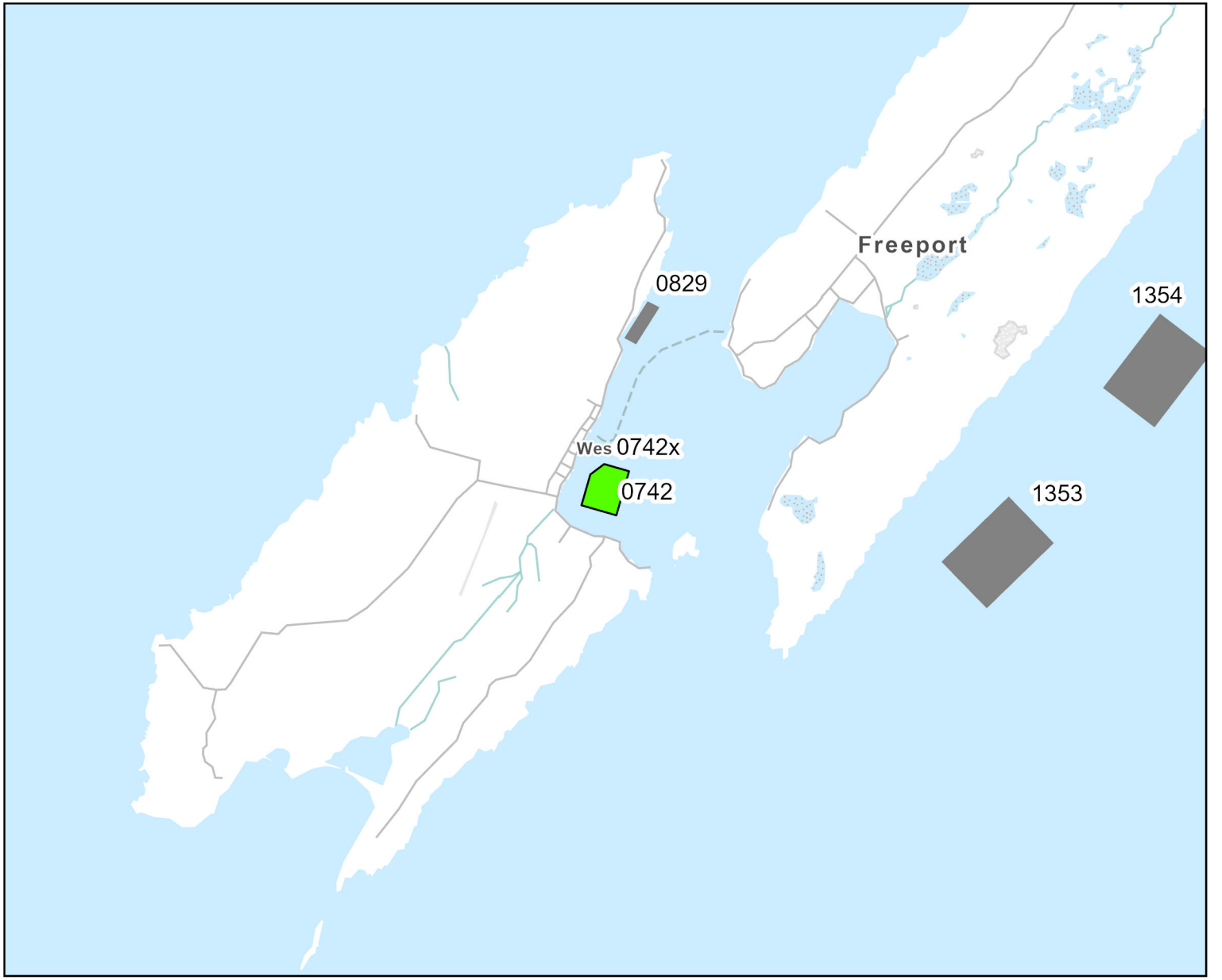
SCHEDULE A



Aquaculture Site
0742x

Corner	Latitude	Longitude
1	44° 15' 48.660"	-66° 20' 49.363"
2	44° 15' 47.014"	-66° 20' 39.946"
3	44° 15' 34.990"	-66° 20' 44.017"
4	44° 15' 37.303"	-66° 20' 57.244"
5	44° 15' 45.707"	-66° 20' 54.399"
Centre	44° 15' 41.966"	-66° 20' 48.465"

DATUM NAD 83 CSRS UTM Zone 19
The above coordinates are not from a legal survey



License/Lease Holder	County	Waterbody	Hectares	Species Type	Culture Type	Chart
Kelly Cove Salmon Ltd.	Digby	St. Marys Bay	11.04	Finfish	Suspended Culture	4118

Proposed Amendment
Other Issued Lease
Other Proposed Application

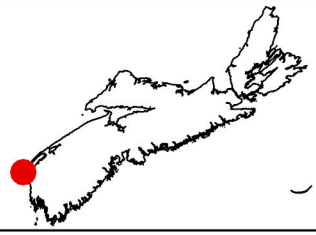
0 0.5 1 2
Kilometers

NOVA SCOTIA
Fisheries and Aquaculture

Disclaimer
This map should not be used for navigation or legal purposes. It is intended for general reference only.

Date: 2023-02-17
Created By: MK

SCHEDULE A



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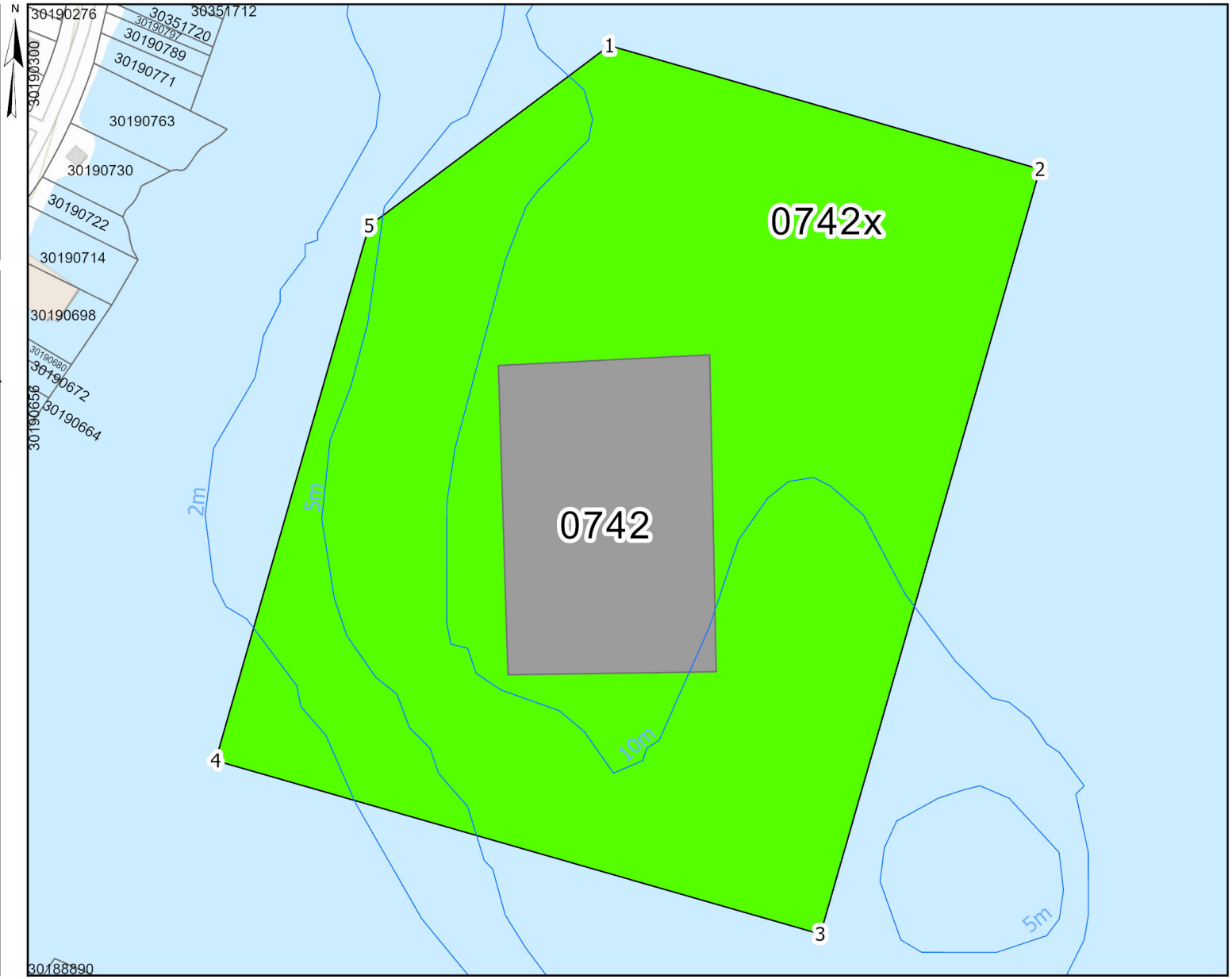

License/Lease Holder	County	Waterbody	Hectares	Species Type	Culture Type	Chart
Kelly Cove Salmon Ltd.	Digby	St. Marys Bay	11.04	Finfish	Suspended Culture	4118

Proposed Amendment
Other Issued Lease

0 25 50 100 150
Meters

NOVA SCOTIA
Fisheries and Aquaculture

Disclaimer
This map should not be used for navigation or property purposes. It is intended for general reference use only.

Date: 2023-02-17 Created By: MK

NS0742 Brier Island – Boundary Amendment

Finfish Marine Aquaculture Development Plan for
Site #0742
Brier Island
County of Digby
Province of Nova Scotia

October 11, 2022

Prepared for:
Kelly Cove Salmon Ltd.
P.O. Box 33
Bridgewater, NS
B4V 2W6

Prepared by:
Sweeney International Marine Corp.
46 Milltown Blvd.
St. Stephen, NB
E3L 1G3
Canada
Tel: (506) 467-9014
Fax: (506) 467-9503
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New Brunswick Newfoundland Nova Scotia

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www.simcorp.ca

October 11, 2022

SIMCorp File # SW2016-058

Jeff Nickerson
Kelly Cove Salmon Ltd.
P.O. Box 33
Bridgewater, NS
B4V 2W6

Dear Mr. Nickerson:

Reference: **Application for a boundary amendment for aquaculture site #0742, Brier Island, Nova Scotia**

Please find enclosed the supporting materials for the above-mentioned boundary amendment at marine aquaculture site #0742, in Westport Harbour, NS.

If you have any questions or comments on the following report, please do not hesitate to contact me at [redacted].

Sincerely,

[redacted]
Senior Marine Environmental Biologist
Atlantic Region
Sweeney International Marine Corp.
[redacted]

cc: [redacted] (SIMCorp)
[redacted] (KCS)
[redacted] (KCS)

EXECUTIVE SUMMARY

Project: Application for a boundary amendment of aquaculture site #0742 in Westport Harbour, Nova Scotia

Marine aquaculture site #0742, called Brier Island, is in Westport Harbour, Digby County, Nova Scotia. The Brier Island site has operated with eight 100-m cages housing up to 220,000 Atlantic salmon. The site was first granted in the mid-1990s but was acquired by Kelly Cove Salmon Ltd. (KCS) in 1999. Due to the limitations of GPS and surveying equipment, accurately placing site markers on water at the time the Brier Island site was first established was difficult to achieve, and the present locations of the cage array and moorings are not in perfect agreement with the official site boundaries. Several older leases within the Province of Nova Scotia have subsurface gear that extends beyond lease boundaries. KCS is working with the Province of Nova Scotia to bring the Brier Island site into compliance as part of the strategy to see all leases conform to current standards. To reach compliance, a boundary amendment is required to increase the lease area such that all aquaculture-related gear above and below the water line is within the new boundaries. KCS is not requesting an increase in production nor additional cages on site.

A large portion of Brier Island is a nature reserve, administered by the Nature Conservancy of Canada, and is a tourist attraction due to the many threatened and endangered species that can be found on or around the island. Brier Island is considered significant habitat for migratory and aquatic birds. The area offers a variety of tourist-related activities, including whale and bird watching, hiking, and botanical tourism. The Brier Island area provides many different resources for humans and animals. Fishing, specifically lobster, are important activities contributing to the economic wellbeing of the communities in Digby County. Being an existing site that has operated for several years, little change is expected with respect to environmental, social, or cultural concerns.

The Brier Island marine aquaculture site is within the range of the Nova Scotia Southern Upland designated unit of Atlantic salmon, which has experienced drastic declines in population over recent decades. The closest river with a remnant population of salmon is the Meteghan River, located 16 km from the Brier Island marine farm. KCS has made significant investments in both research and capital equipment for green-based thermo-mechanical sea-lice treatment technologies, cleaner-fish-based biocontrol of sea lice, and the use of approved natural products and/or medicated feed to control and remove lice from farmed salmon, and indirectly, the local environment. KCS continues to assess best practices and management strategies for their farms, evaluate and deploy leading farm technologies, and co-develop world-leading aquaculture research, training, and certifications for both existing staff and future employees. KCS and its parent company, Cooke Aquaculture Inc., are committed to salmon conservation, as evidenced by their involvement as founding members of the Fundy Salmon Recovery Project, which is working toward restoration of Inner Bay of Fundy salmon populations. Cooke Aquaculture is looking forward to partnering on similar projects to help restore native salmon populations in Nova Scotia.

The following report and associated documents have been prepared by Sweeney International Marine Corp. (SIMCorp) for Kelly Cove Salmon Ltd. (KCS) in support of a boundary amendment of site #0742 to include eight cages of 100-m circumference housed in 38-m grid cells in a 2 x 4 configuration. The lease dimensions applied for are 215 x 382 x 302 x 267 x 144 m, resulting in a farm with an area of 11.04 ha. Plans are to construct and stock the site with 220,000 Atlantic salmon in eight cages for spring 2024.

SIMCorp is assisting KCS in this application for a boundary amendment of site #0742 through the preparation of this report and other supporting roles. All correspondence should be copied to SIMCorp.

LIST OF SELECTED ACCRONYMS

KCS	– Kelly Cove Salmon Ltd.
SIMCorp	– Sweeney International Marine Corp.
AAR	– *Aquaculture Activities Regulation*
COHFT	– Certificate Of Health For Transfer
COSEWIC	– Committee On the Status of Endangered Wildlife In Canada
DFO	– Department of Fisheries and Oceans Canada
FCR	– Feed Conversion Ratio
FMP	– Farm Management Plan
GMG	– GMG Fish Services Ltd.
HDPE	– High-density polyethylene
ICCAT	– International Commission for the Conservation of Atlantic Tunas
NSDFA	– Nova Scotia Department of Fisheries and Aquaculture
SARA	– *Species at Risk Act* (Canadian)
WIP	– Wildlife Interaction Plan

PROJECT TEAM AND CONTACT INFORMATION

The project team, their qualifications, and roles with respect to the preparation of this report are summarised as follows:

Team Member	Affiliation	Role	Qualification
[redacted]	KCS	Corporate Support	Chief Sustainability Officer
Jeff Nickerson	KCS	Corporate Support	Business Development Manager
[redacted]	KCS	Corporate Support	Compliance Manager
[redacted]	SIMCorp	Sr. Project Manager	Company Owner
[redacted]	SIMCorp	Senior Marine Environmental Biologist, Atlantic Region	MSc
[redacted]	SIMCorp	Environmental Biologist, New Brunswick	BSc, EPt
Stephen Acker	Acker & Doucette Surveying Inc.	Survey Plan Preparation	NSLS

CONTACT INFORMATION

Proponent:

Company Name: Kelly Cove Salmon Ltd.
Principal Contact: Jeff Nickerson
Mailing Address: P.O. Box 33
Bridgewater, NS, B4V 2V6
Telephone: (902) 875-8603
Facsimile: (506) 755-1492
Cellular: [redacted]
E-mail: jnickerson@cookeaqua.com

Project Management:

Company Name:	Sweeney International Marine Corp.
Principal Contact:	[redacted]
Mailing Address:	46 Milltown Blvd. St. Stephen, New Brunswick, E3L 1G3
Telephone:	(506) 467-9014
Facsimile:	(506) 467-9503
Cellular:	[redacted]
E-mail:	[redacted]

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FACTORS TO BE CONSIDERED IN DECISIONS RELATED TO MARINE AQUACULTURE SITES

SECTION 1.0 OPTIMUM USE OF MARINE RESOURCES

Kelly Cove Salmon Ltd. (KCS) is the Atlantic Canada farming division of Cooke Aquaculture. Aquaculture site #0742 at Brier Island is owned and operated by KCS. The marine farm consists of eight, 38-m grid cells in a 2 x 4 configuration.

Due to the limitations of GPS and surveying equipment, accurately placing site markers on water at the time the Brier Island site was first established was difficult to achieve, and the present location of the cage array and moorings is not in perfect agreement with the official site boundaries. Several older leases within the Province of Nova Scotia have subsurface gear that extends beyond lease boundaries. KCS is working with the Province of Nova Scotia to bring the Brier Island site into compliance as part of the strategy to see all leases conform to current standards. To reach compliance, a boundary amendment is required to increase the lease area such that all aquaculture-related gear above and below the water line is within the new boundaries. The proposed lease has dimensions of 215 x 382 x 302 x 267 x 144 m, resulting in a farm with an area of 11.04 ha. KCS is not requesting an increase in production nor additional cages on site.

The general area around site #0742 appears on Canadian Hydrographic Service (CHS) Nautical chart #4118 (St. Mary's Bay) and National Topographic Systems Map Sector 021B (St. Mary's Bay, Nova Scotia). The coordinates of the corners of the proposed lease area were obtained using DGPS and are presented in Table 1.

Site #0742 is east of Brier Island, in Westport Harbour, Grand Passage, Digby County, Nova Scotia (Fig. 1). The Brier Island area provides many different resources for humans and animals. Fishing, specifically lobster, are important activities contributing to the economic wellbeing of the communities in Digby County. In addition, Brier Island and the surrounding waters are globally known for their congregations of migratory and water birds. Rare and endangered plant and animal species are also present on the island. The island offers a variety of tourist-related activities, including whale and bird watching, hiking, and boating.

Aquaculture in the Brier Island area has been able to successfully co-exist with other resources in the area, providing increased employment and industry diversity. KCS, along with other related divisions of Cooke Aquaculture Inc. (CAI), employs approximately 207 people in Nova Scotia. Brier Island is an existing site and does not displace or adversely affect other industries in the area. Extensive benthic and water-quality monitoring programs are in place at the site. KCS participates in various salmon restoration projects through Atlantic Canada and uses numerous operational measures to ensure wildlife interaction is as minimal and neutral as possible.

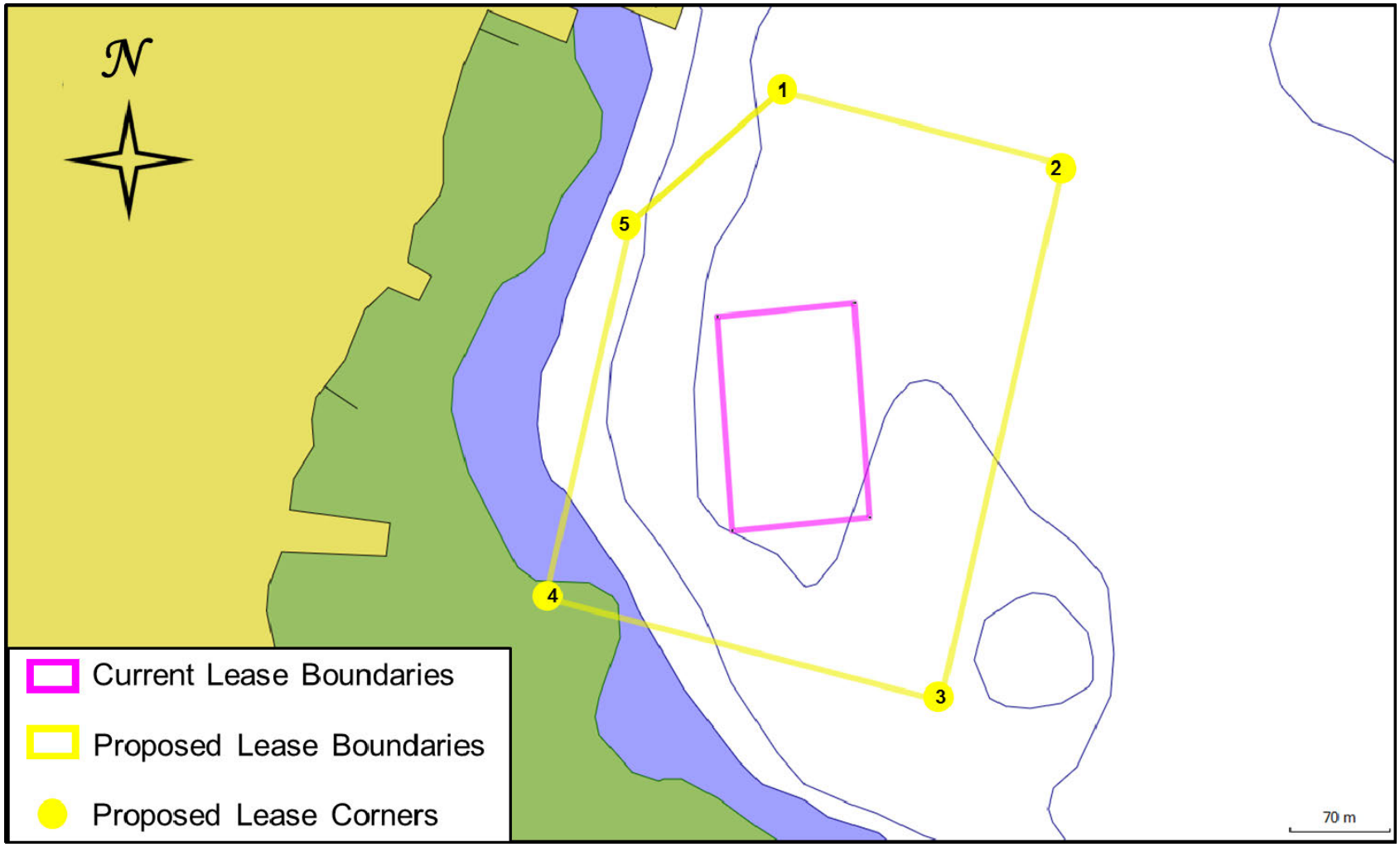
As part of the scoping process, KCS hosted a public session near the Brier Island site. Information was shared with the public regarding the farm and how the site is designed and

managed. Feedback from the public was gathered and can be found in the public engagement materials located in Appendix A.

Table 1. Coordinates for the Boundary Amendment in Westport Harbour

APPROXIMATE SITE CO-ORDINATES (NAD 83)		
Corner	**Latitude**	**Longitude**
1	44° 15' 48.7"	65° 20' 49.4"
2	44° 15' 47.0"	65° 20' 39.9"
3	44° 15' 35.0"	65° 20' 44.0"
4	44° 15' 37.3"	65° 20' 57.2"
5	44° 15' 45.7"	65° 20' 54.4"
Approximate Site Center	44° 15' 42.3"	65° 20' 47.8"

Figure 1. Proposed Boundary Location for Brier Island #0742 in Westport Harbour



SECTION 2.0 THE CONTRIBUTION OF THE PROPOSED OPERATION TO COMMUNITY AND PROVINCIAL ECONOMIC DEVELOPMENT

2.1 Production Plan

The total number of fish to be introduced to the Brier Island (#0742) site is 220,000 with an expected grow out period of 21 months (Table 2). The expected fallow period is 3 months as outlined in the harvest plan (Table 3).

Table 2. Projected maximum values for production cycle

Species and Strain	Stock Source (hatchery)	Number of Cages and Type	Cage Size (m)	Rearing & Predator Net Depth (m)		Total Number of Fish Introduced	Mean Weight of Fish Introduced (g)	*Length of Grow-out Period	*Maximum Stocking Density (kg/m^3)	*Maximum Biomass (kg)	*Total Amount of Feed (kg)	Average Harvest Weight (kg)
Atlantic Salmon, Saint John River	Any KCS owned and operated hatchery	8	100	Predator	10	220,000	150	21 months	21	1,188,000	1386 (MT)	6
		HDPE		Rearing	9							

- Projected maximum vales for production cycle is assuming a mortality of 10% and a FCR of 1.2.

Table 3. Harvest Plan Details

End Date	Date of Re-entry	Expected Fallow Period
February 1, 2024	May 2024	3 months

2.2 Infrastructure

All active KCS finfish farms operate under a Farm Management Plan (FMP), which is approved under the Nova Scotia Department of Fisheries and Aquaculture (NSDFA). The plan covers fish health management, containment management, farm operations, and environmental monitoring.

Brier Island is an existing, approved site that currently has infrastructure to support the operations already in place, including eight (8) net pens.

The containment management is an essential part of a marine finfish farm. The equipment and infrastructure must be of proven, sturdy construction and take many factors into consideration, such as weather, currents, ice flow, etc., to reduce the risk of fish being released or escaping into the environment. It is also an important aspect from a fish-health perspective. Mechanical damage from improper equipment can cause trauma and stress to the fish, leading to infection.

The cages at Brier Island are engineered to minimize wildlife interactions with farmed fish. Above-water bird rings and netting are installed to discourage bird encounters. Underwater predator netting during winter months eliminates incidents of predation.

GMG is the fish-services division of Cooke Aquaculture Inc. and a sister company to KCS. GMG provides the moorings for installation, and the specifications were determined by modelling of the oceanographical conditions encountered at this location. CAI engineering staff determined all the infrastructure components are adequate as per NSDFA regulations. The cages and moorings were modeled using guidance from the following engineering standards:

- NS 9415:2009 – “Marine fish farms: Requirements for site survey, risk analyses, design, dimensioning, production, installation and operation”
- “Marine Scotland: A Technical Standard for Scottish Finfish Aquaculture”
- ISO16488 – “International Standard: Marine fish farms – open net cage – design and operation”
- API RP 2SK – “Design and Analysis of Stationkeeping Systems for Floating Structures”
- DNV-OS-E301 – “Position Mooring”

Each area of the grid was designed to withstand different maximum loads based on the previously listed criteria. The cage components such as the handrail, float pipes, bird stands, and weight rings are made of HDPE.

NSDFA annually reviews and approves an FMP for each site. The FMP outlines all policies and procedures, infrastructure, equipment, and mitigation plans specific to a site with respect to fish-health management, containment management, farm operations, and environmental monitoring. NSDFA has approved the infrastructure, the equipment, and the containment

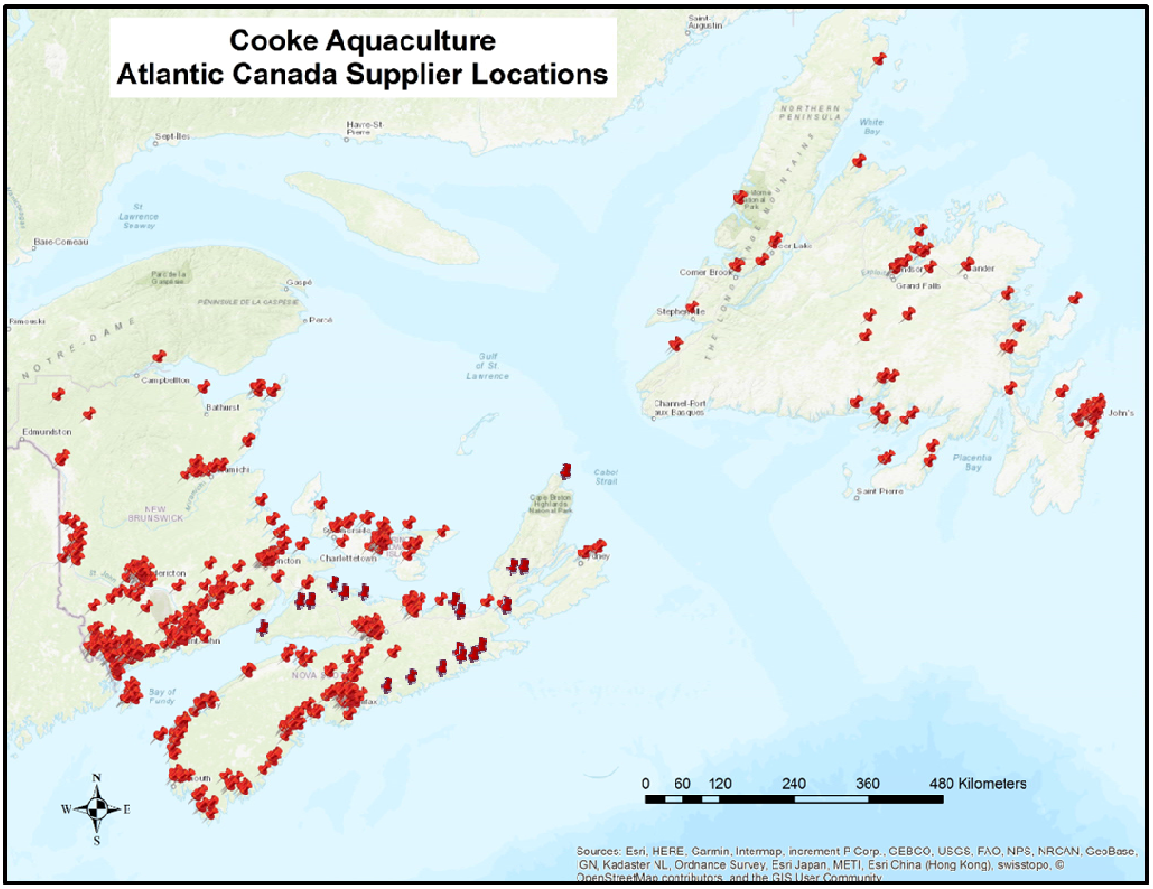
strategy as outlined in section **7.2.3.1 Infrastructure** and section **7.2.3.2 Containment Strategy** for the existing Brier Island site.

Multiple KCS vessels are used to service the cages at the site, depending on the required task. Vessels include feeding boats, skiffs, and maintenance barges. While in use, the vessels will be tied to the cages, otherwise they will be moored to the wharf or in service at other locations. Access to shore is necessary for all marine finfish sites. Wharves may be private or shared by multiple users or multiple sites and are suitable for site activities. The wharves used by this facility are the Government Wharf in Westport and the Government Wharf in Meteghan. Refer to section **5.3.2.1 Right to Navigation** and section **8.2.2 Boat Traffic and Wharves** for additional information.

2.3 Services and Suppliers

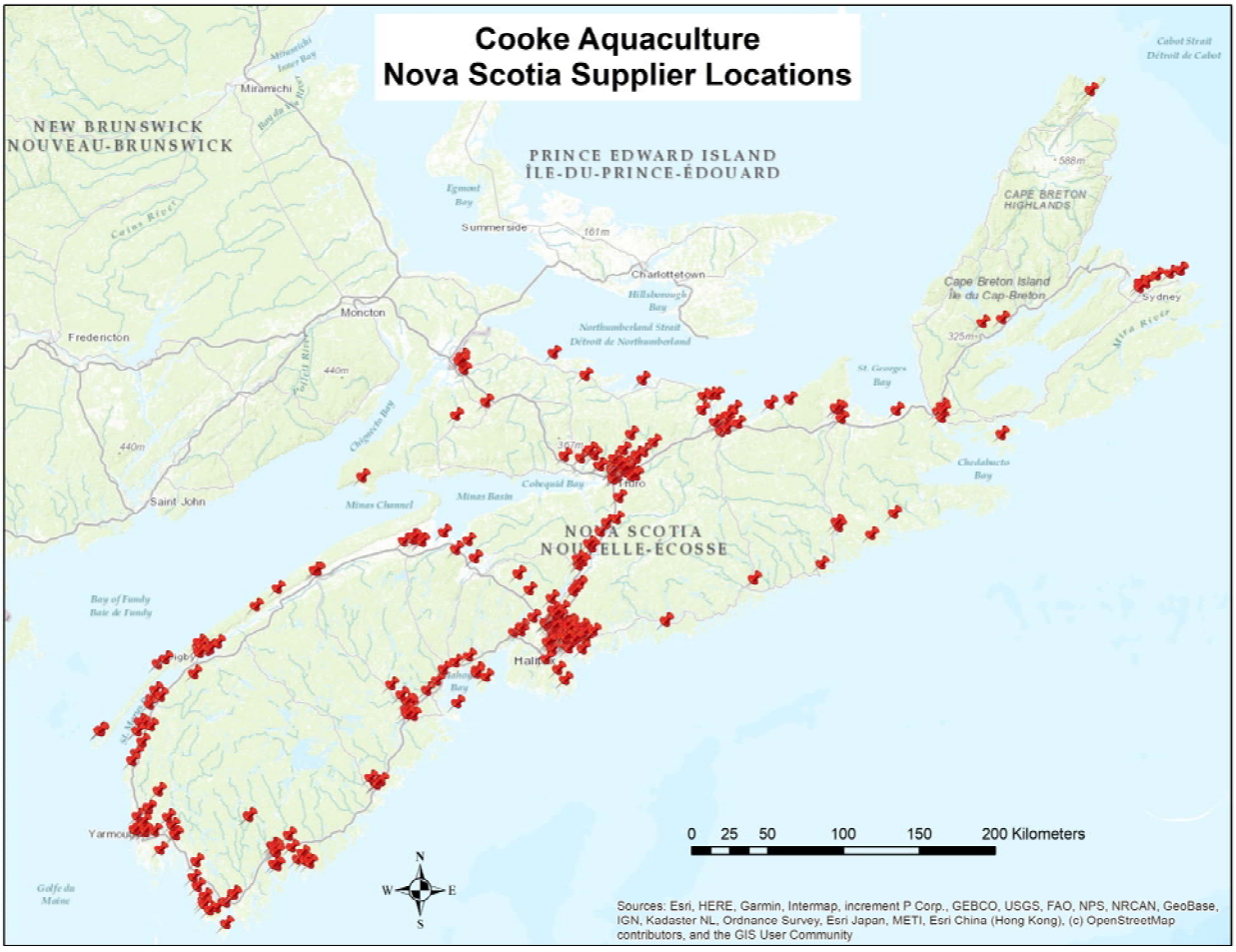
Although KCS is a vertically integrated company, it uses local suppliers whenever possible. Types of suppliers used by KCS in Nova Scotia includes divers, mechanics, boat repair facilities, hardware providers, welders, heavy-equipment operators, crane operators, marine supplies, fuel distribution companies, environmental consultants, electricians, boat brokers, boat builders, engine suppliers, hotels, restaurants, and ferries. Figures 2 and 3 illustrate the location of Cooke Aquaculture's suppliers in Atlantic Canada and Nova Scotia, respectively.

Figure 2. Cooke Aquaculture Atlantic Canada Supplier Locations



SW2016-058

Figure 3. Cooke Aquaculture Nova Scotia Supplier Locations



2.4 Employment

KCS is Cooke Aquaculture's farming division, and Brier Island is an important component of KCS' success in Nova Scotia. Cooke Aquaculture employs approximately 1968 people in Atlantic Canada, with approximately 207 people employed in Nova Scotia. KCS' positions include feed and maintenance technicians, fish-health and environmental-management professionals, technical support, boat captains, accounting, human resources, and various administrative positions. Most positions offered by KCS in Nova Scotia are full time. Cooke's operations also contribute to employment in service and supply industries, as listed in section **2.3 Services and Suppliers**. In addition, KCS' feed division, Northeast Nutrition Inc., is based in Truro and their distribution company, AC Covert, is based in Dartmouth.

2.5 Other Economic Contributions to the Local Community and Province

KCS contributes to the local economy in Digby and throughout Nova Scotia by using the services and suppliers listed in section **2.3 Services and Suppliers**. Services and suppliers are locally sourced whenever possible.

2.6 Financial Viability

Proof of financial viability will be submitted directly to NSDFA separate from this application.

2.7 Adverse Economic Impacts

The Brier Island site does not displace any other industry. KCS actively communicates with other local industries and permits local fishermen to use the lease area for fishing. There are no expected adverse economic impacts.

SECTION 3.0 FISHERIES ACTIVITIES IN THE PUBLIC WATERS SURROUNDING THE PROPOSED AQUACULTURAL OPERATION

3.1 Status of Fisheries Activities

3.1.1 Commercial Fisheries

There are over 500 species of fish found in Atlantic Canada and most of them are present off the Atlantic coast of Nova Scotia. However, the number of commercially harvested finfish is much less than this and can be roughly grouped into two categories: 1) groundfish, which occur on or close to the seafloor, and 2) pelagic fish, which occur in the water column usually away from the seafloor. Various shellfish and seaweeds also support commercial fisheries. In 2020, the top five groundfish and pelagic species landed included herring, haddock, redfish spp., halibut, and hake (Table 4; Fisheries and Oceans Canada 2021a).

Table 4. Atlantic Coast Commercial Landings for 2020
Note: sourced from Fisheries and Oceans Canada (2021a)

2020 ATLANTIC COAST COMMERCIAL LANDINGS, BY REGION (metric tonnes, live weight)				
	Maritimes	Nova Scotia Gulf	Total	Atlantic Total
Groundfish				
Atlantic Cod	1,010	5	1,015	14,004
Haddock	16,953	0	16,953	17,033
Redfish spp.	7,656	22	7,678	12,072
Halibut (Atlantic)	4,504	51	4,556	6,293
Flatfishes	x	x	717	15,762
Greenland turbot	26	x	x	10,707
Pollock	x	x	3,082	3,171
Hake	3,662	3	3,664	3,969
Cusk	146	0	146	146
Catfish	0	0	0	0
Skate	x	x	79	579
Dogfish	x	0	x	1
Other	x	x	651	710
Total	**38,487**	**82**	**38,569**	**84,446**
Pelagic & other finfish				
Herring	41,807	2,619	44,426	81,445
Mackerel	1,182	133	1,315	7,809
Swordfish	1,334	0	1,334	1,334
Tuna	471	51	522	768
Alewife	471	318	789	3,150
Eel	x	1	x	89
Salmon (Atlantic)	x	0	x	0
Smelt	0	0	0	59
Silversides	0	0	0	167
Shark	x	0	x	1

Capelin	0	0	0	26,391
Other	11	0	11	31
Total	**45,282**	**3,122**	**48,404**	**121,245**

X Suppressed to meet confidentiality requirements

Groundfish

There are a several commercially harvested species of groundfish off the shores of Nova Scotia. The most common traditional fisheries include cod, haddock, and pollock. Fisheries for cod, haddock, and pollock occur mainly on the large fishing banks and in the Bay of Fundy. The fishery is conducted using mobile gear (otter trawl) and fixed gear (longline, handline, and gillnet) with the most active time of year being July through September (Rozalska and Coffen-Smout 2020). Haddock in 4X is in a rebuilding phase with stocks continuing to increase in biomass for the last decade (DFO 2017a). However, fish size is decreasing at age (DFO 2017b). Cod in 4X demonstrate poor juvenile recruitment and low biomass levels (DFO 2019a), with biomass indices being the lowest in the time series (DFO 2020a). O'Boyle (2012) listed Western Scotian Shelf cod as critical. The western-component pollock fishery experienced a period of diminished numbers-at-age for older ages from 1995–2005, with some modest improvement since then (DFO 2020b) In 2018 and 2019, indices at length of western-component pollock were below both the long-term and short-term median for lengths greater than 51 cm (DFO 2020a).

Flatfish are also important commercial groundfish, but they are caught mostly on the fishing banks and deeper areas (Rozalska and Coffen-Smout 2020). In NAFO Divisions 4X5Y, these species are halibut, yellowtail flounder, American plaice, winter flounder, and witch flounder (Rozalska and Coffen-Smout 2020). Overall, most flatfish species in this area are in decline or at low levels. Winter flounder is better in overall status; however, recent declines in biomass have been observed (DFO 2020a). American-plaice stock status was still in decline as of 2016 and COSEWIC considers the Maritime population to be threatened (COSEWIC 2009a). Halibut stocks appear to be improving (DFO 2020a), and the biological information for this species continues to develop.

O'Boyle (2012) had considered silver-hake stock status to be critical; however, recent biomass estimates showed increases from 2008 to 2016 (DFO 2017b) but with further declines in 2017 and 2019 (DFO 2020a).

The Brier Island site is in Maritimes Statistical District 37, which encompasses all of Digby Neck. For 2015, 204,029 kg of groundfish were landed with a value of $1,072,258, key species being Atlantic cod, cusk, witch flounder, haddock, halibut, monkfish, pollock, redfish, sculpin, white hake, winter flounder, and striped wolfish. Bait fisheries for sculpin were noted for this district (C. O'Neil, pers. com). For 2018 and 2019, data from Districts 36, 37, and 38 were combined to encompass all of Digby County. In 2018 and 2019, haddock and redfish were among the top five species landed (A. Campbell, pers. com). In 2020 and 2021, haddock and redfish were again among the top five (D. Eberhard, pers. comm.). Other

species landed in 2020-2021 include halibut, cod, white hake, pollock, sculpin, winter and witch flounder, monkfish, and skates (D. Eberhard, pers. comm.).

Figures 4 - 8 show the approximate groundfish landings off the coast of Nova Scotia between 2014 and 2018 (Rozalska and Coffen-Smout 2020).

Species list

- Atlantic pollock (*Pollachius virens*)
- Haddock (*Melanogrammus aeglefinus*)
- Atlantic cod (*Gadus morhua*)
- American plaice (*Hippoglossoides platessoides*)
- Winter, yellowtail, and witch flounder (*Pseudopleuronectes americanus, Limanda ferruginea* and *Glyptocephalus cynoglossus*)
- Atlantic halibut (*Hippoglossus hippoglossus*)
- Redfish (*Sebastes* sp.)
- Monkfish (*Lophius americanus*)
- Spotted wolffish (*Anarhichas minor*)
- White hake (*Urophycis tenuis*), restricted to by-catch only
- Sculpin (*Myoxocephalus* spp.)
- Winter and barndoor skate (*Leucoraja ocellata* and *Dipturus laevis*)

Figure 4. Commercial Groundfish Landings (2014-2018)

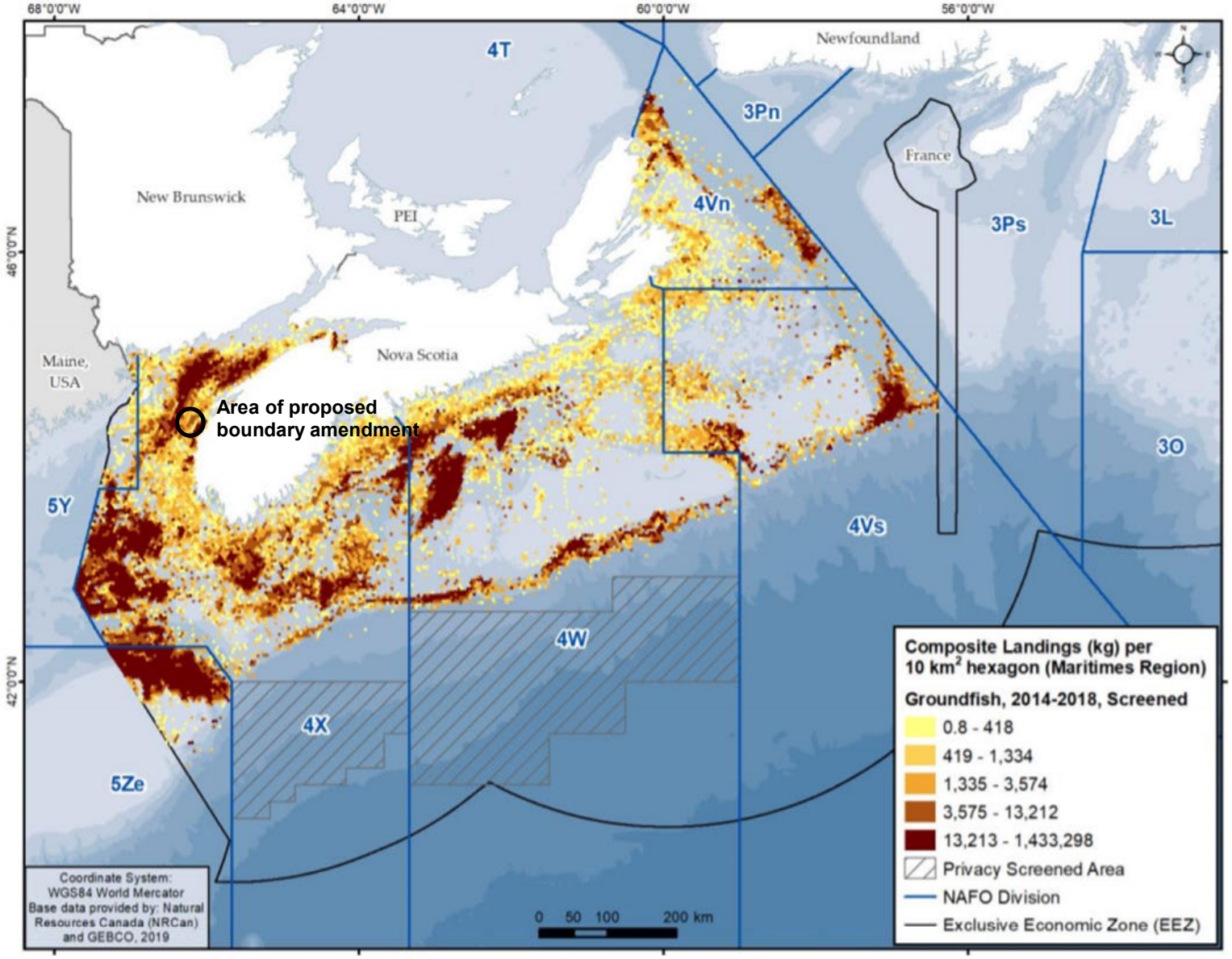


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Figure 5. Commercial Cod, Haddock, and Pollock Landings (2014 – 2018)

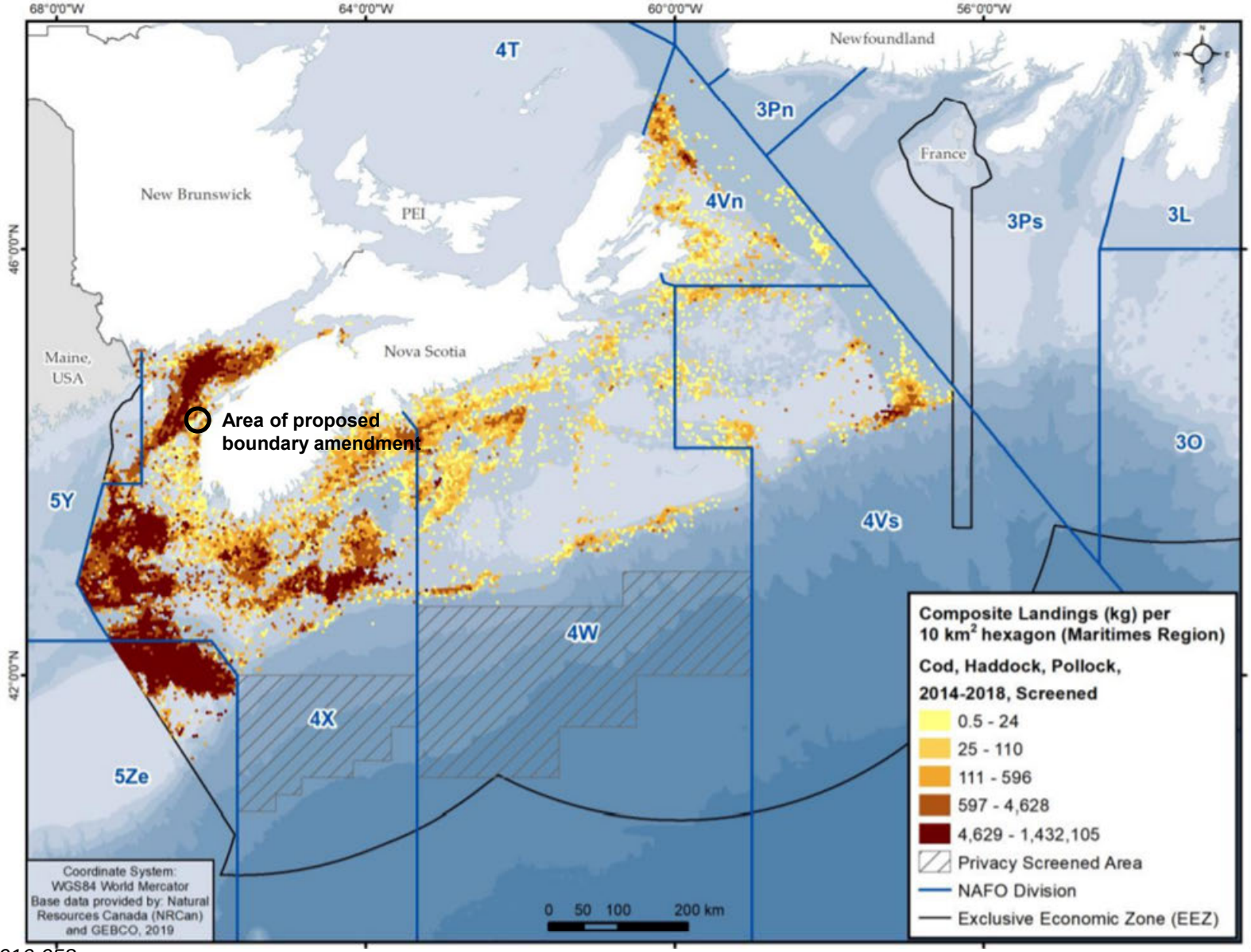

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Figure 6. Commercial Flatfish Landings (2014 – 2018)

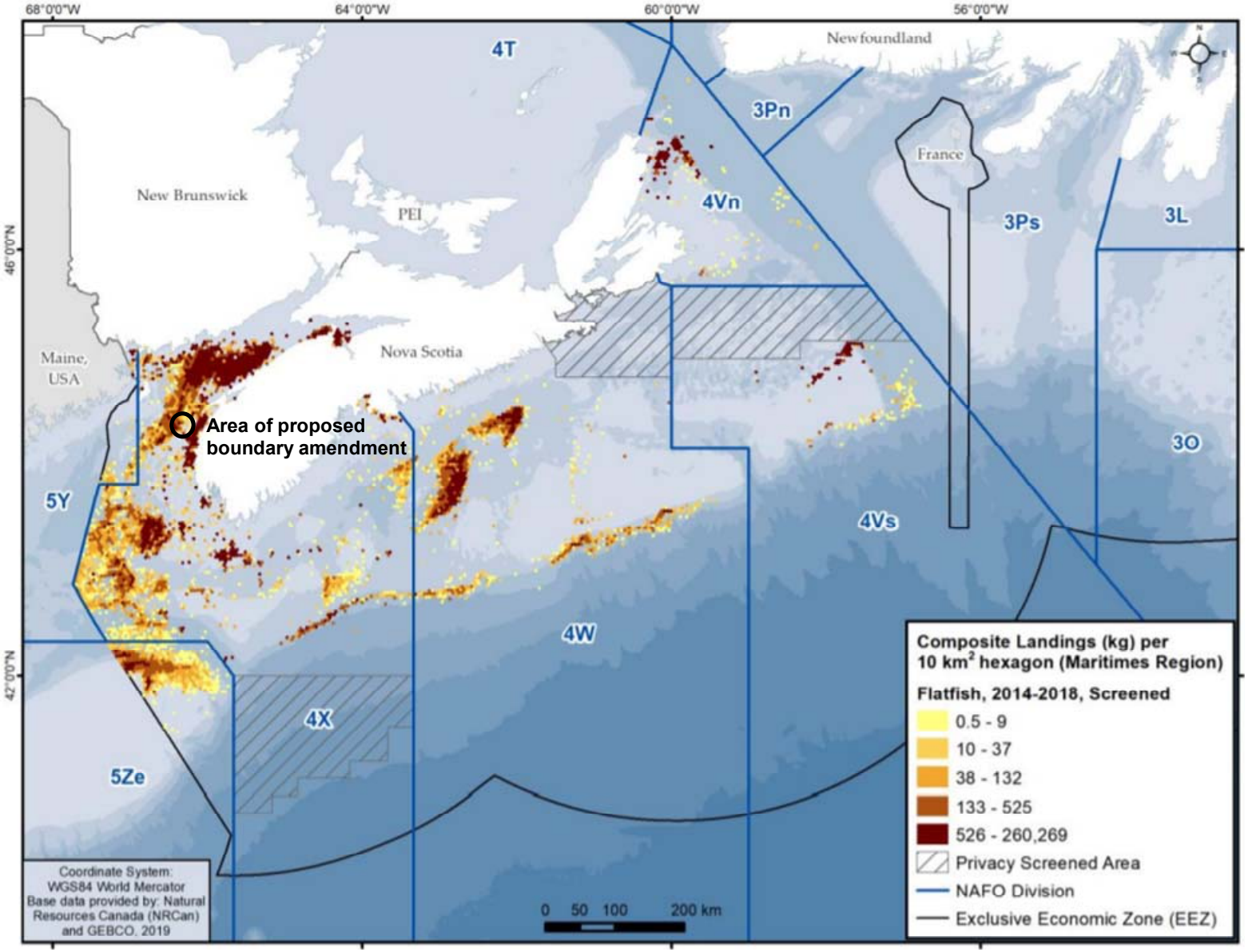

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Figure 7. Commercial Atlantic Halibut Landings (2014 – 2018)

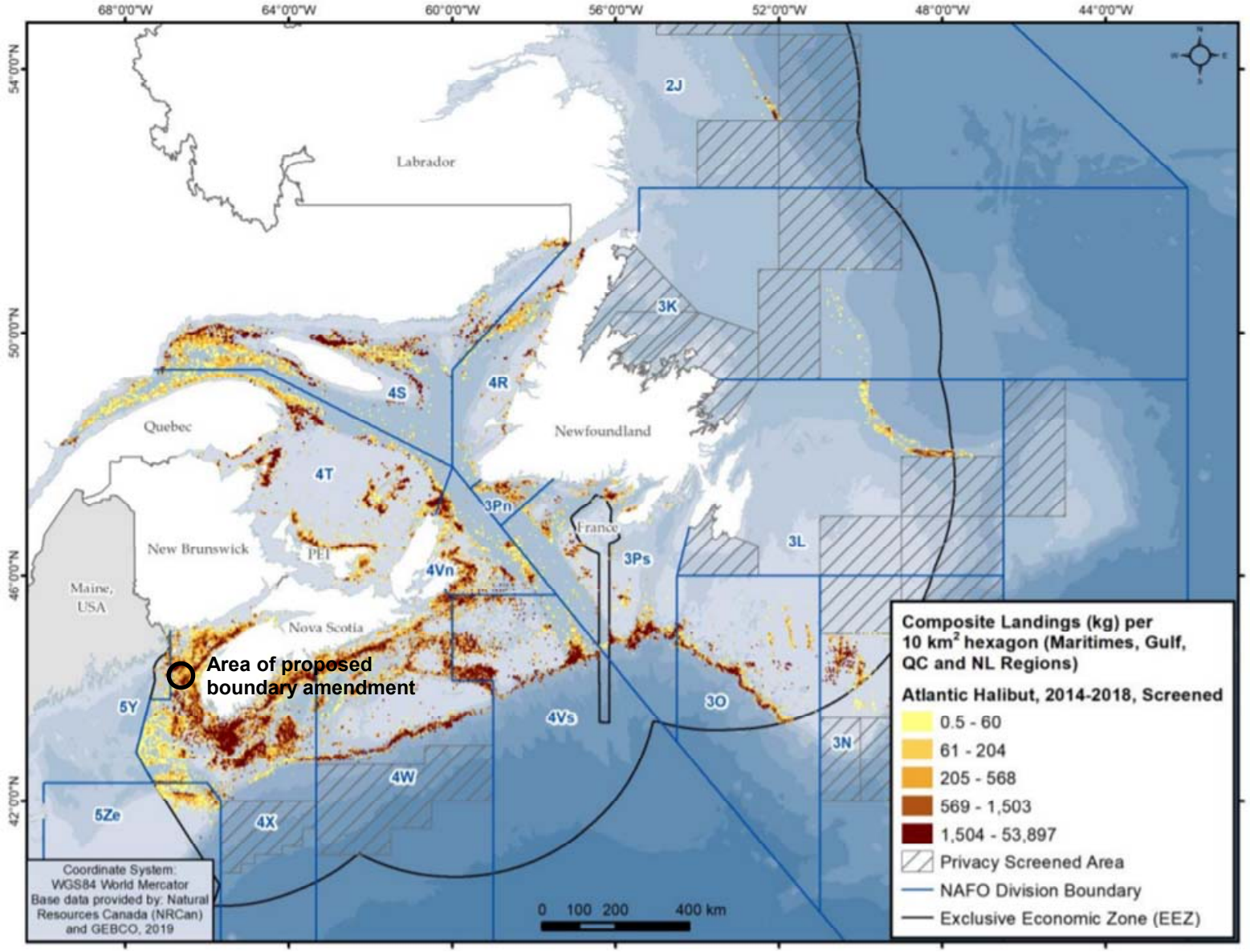

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Figure 8. Redfish Landings (2014 – 2018)

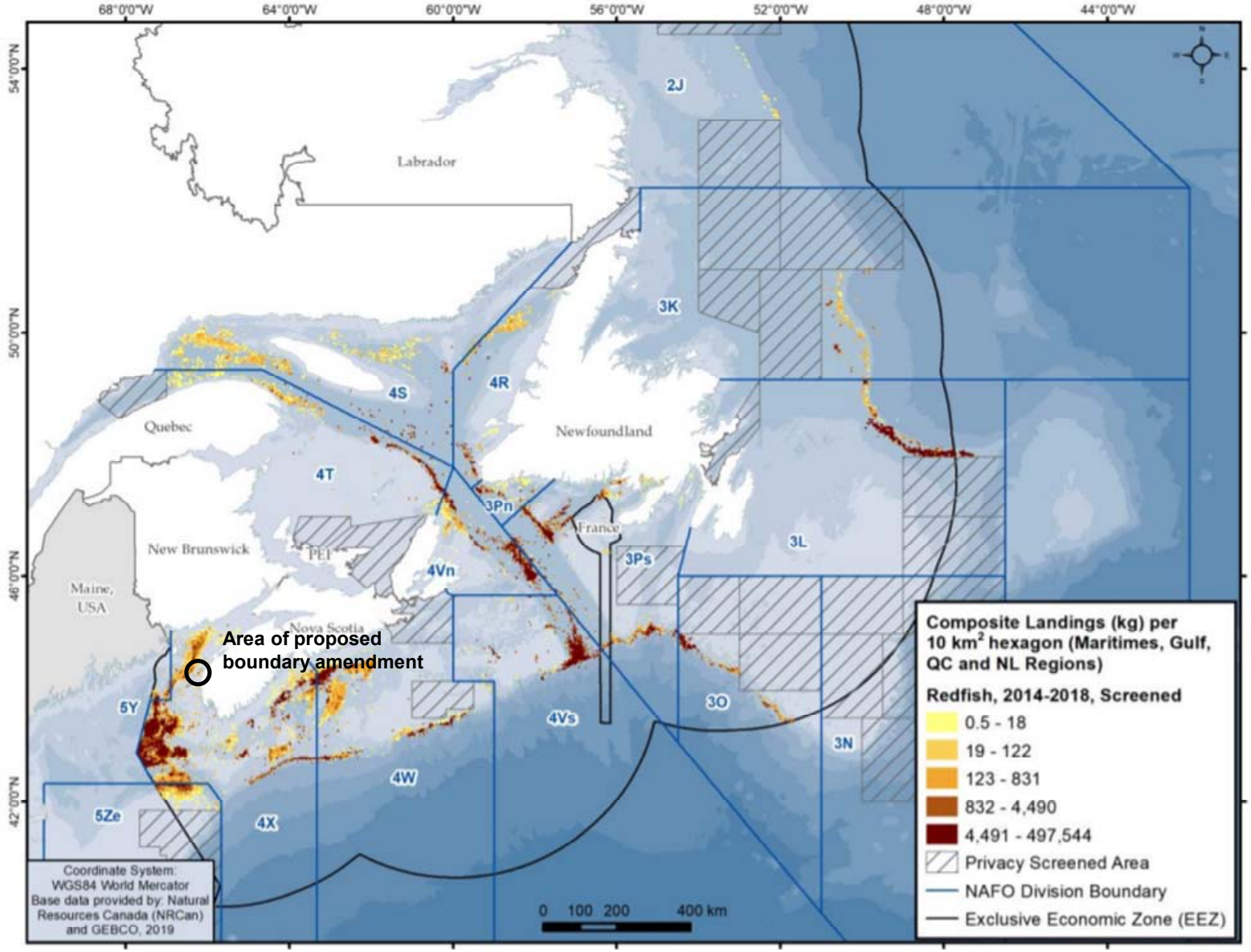

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Figure 9. Monkfish Landings (2014 – 2018)

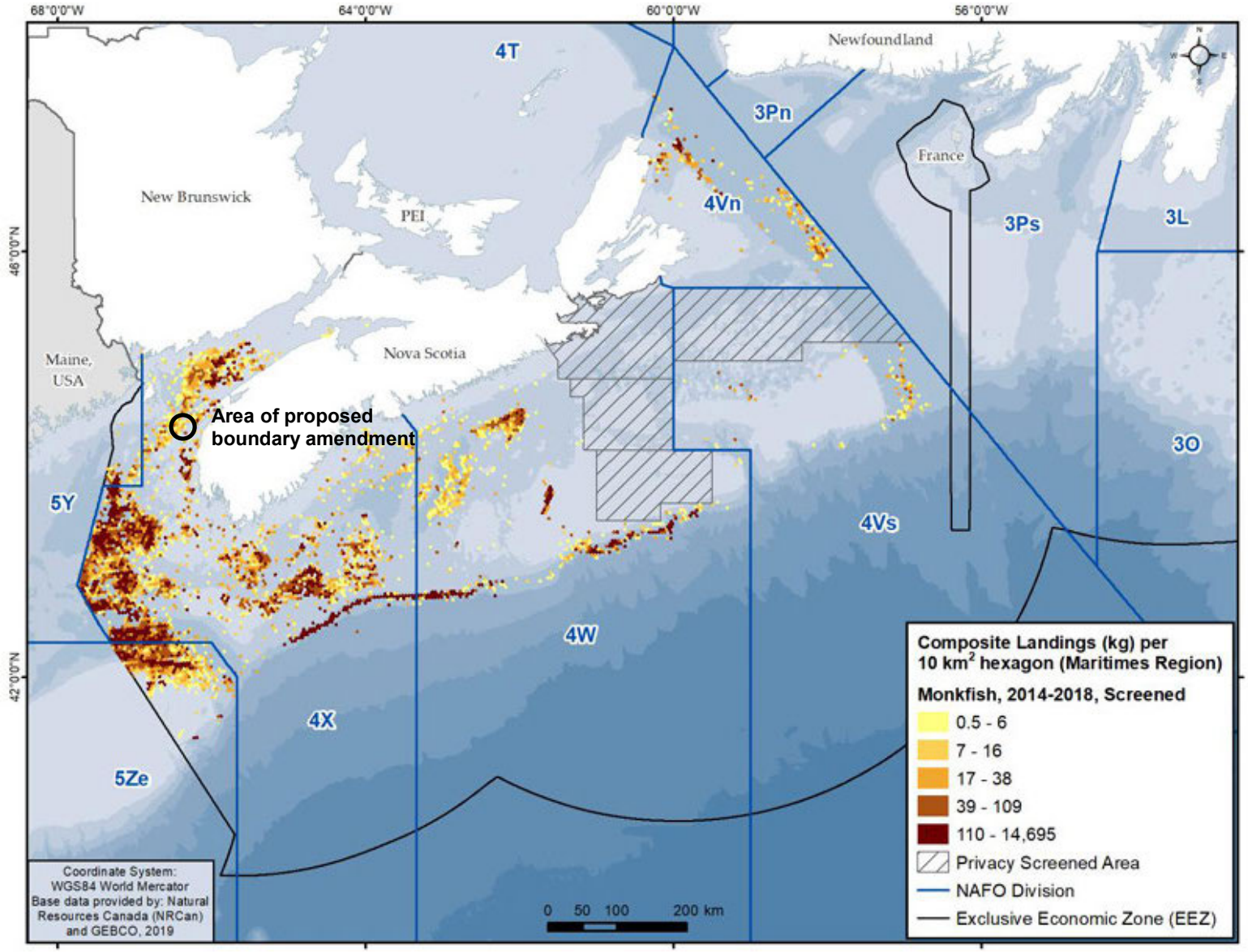

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Figure 10. Sculpin Landings (2014 – 2018)

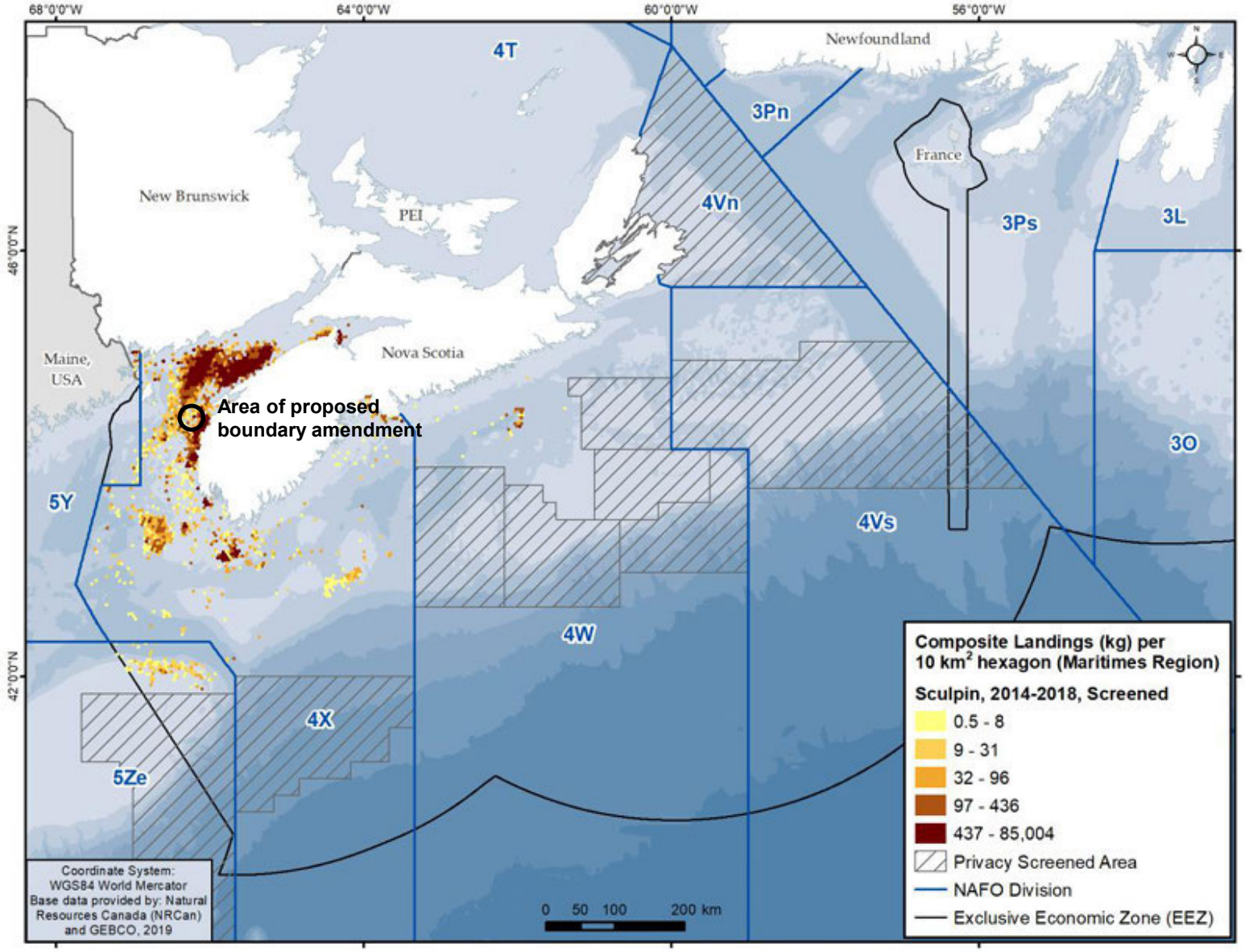

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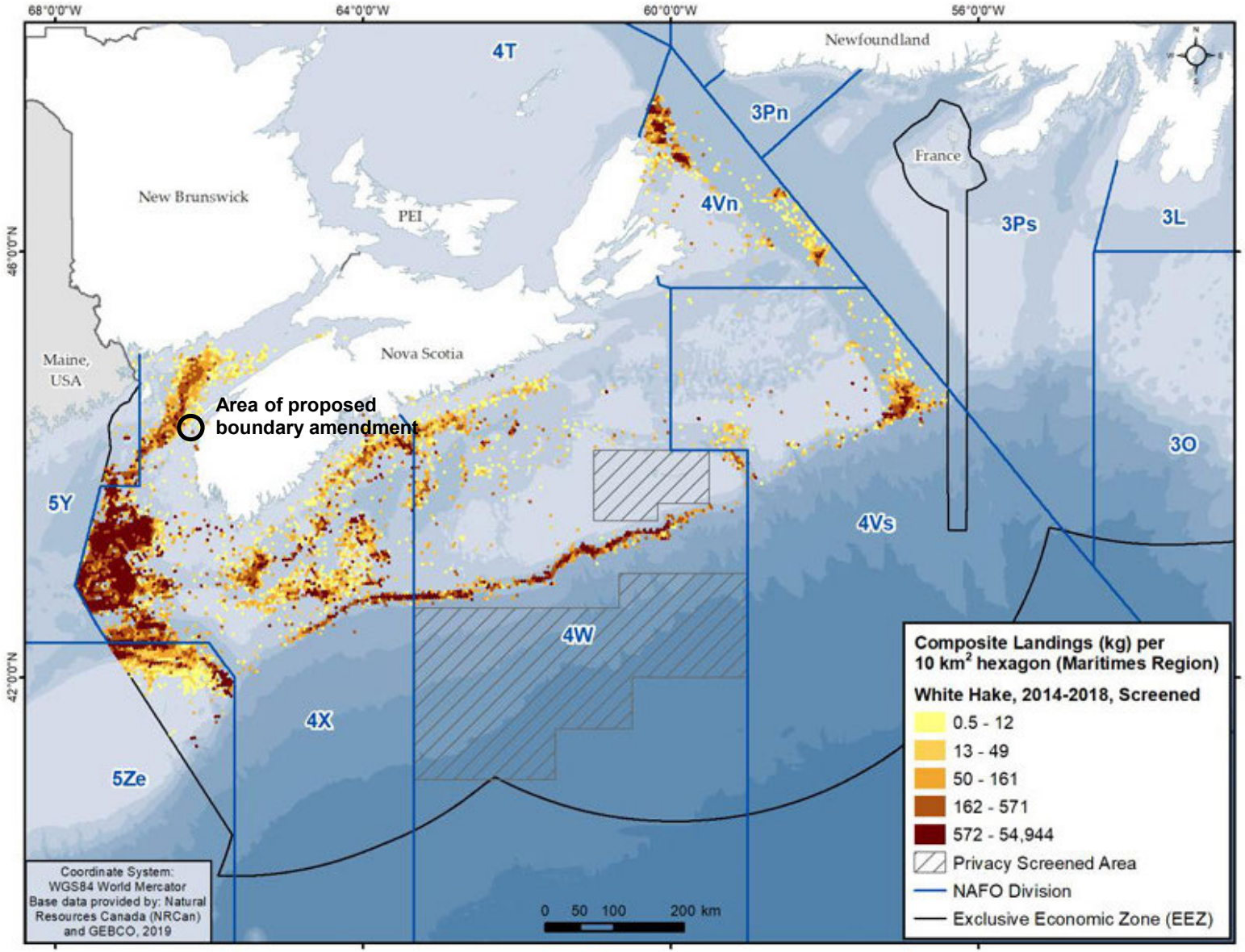
Figure 11. White Hake Landings (2014 – 2018)



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Pelagics

The most-common commercial species of pelagic fish off the shores of Nova Scotia include herring (Fig. 12), mackerel (Fig. 13), tuna, swordfish, and alewife, with herring being the most valuable pelagic in 2020 (Table 4; Fisheries and Oceans Canada 2021a). Herring (*Clupea harengus*) stocks in the Southwest Nova Scotia / Bay of Fundy herring spawning component have been of concern for a decade or more, with no observed increase in stock despite reduced catch levels (DFO 2020c). Clark et al. (2012) presented evidence of the decline in spawning grounds, targeting of juveniles in the fishery, and declines in catches. There was an increasing trend in Scots Bay from 2005 to 2019, and a decreasing trend in German Bank from 1999 to 2019, but recent biomass estimates show an increase in German Bank in 2019, and a decrease in Scots Bay (DFO 2020c). Approximated moving-biomass averages for the Southwest Nova Scotia / Bay of Fundy area have been decreasing since 2015 with a slight increase in 2019 (DFO 2020c). The herring fishery largely takes place on dense summer feeding, overwintering, and spawning locations and is dominated by purse seine, gillnet, and weir (DFO 2020c).

The Northwest Atlantic mackerel stock ranges from North Carolina to Labrador and has northern and southern spawning contingents (TRAC 2010). The Department of Fisheries and Oceans considered the status of the Atlantic mackerel stock to be in the critical zone and has since 2009 (Smith et al. 2021). The mackerel fishery is conducted with gillnets, jiggers, hand lines, seines, and traps, depending on the region and time of year. It is primarily an inshore fishery of the spring and summer months and extends into more offshore waters for the fall and winter (DFO 2019b). Current allowable catch is unlikely to allow for stock growth (Smith et al. 2021). Figure 13 illustrates the general distribution of mackerel fishing activities in Atlantic waters.

The small-pelagics fisheries are Scotia-Fundy wide, meaning that any gillnet licence holder may fish in the area.

The North Atlantic swordfish stock in 2015 was above B_{MSY} and the fishing mortality was below F_{MSY}, indicating that stocks were healthy and not overfished (ICCAT 2017). Swordfish (Fig. 14) are caught using longline and harpoon, primarily along the edge of Georges Bank, the Scotian Shelf, and the Grand Banks from vessels often less than 65 feet. The Government of Canada (2013) lists principal ports in Nova Scotia as Shelburne, Sambro, Wood's Harbour, and Clark's Harbour.

The bluefin tuna (Fig. 15) is the most common tuna found off the coast of Nova Scotia and is fished with tended line, rod and reel, electric harpoon, pelagic longline, and trap nets (Government of Canada 2019a). The 2020 Standing Committee on Research and Statistics (SCRS) advice to the International Commission for the Conservation of Atlantic Tunas (ICCAT) indicates that bluefin-tuna stock biomass has decreased between 2017 and 2020 due to the strong year class of 2003 having passed its peak biomass and below-average recruitment in recent years (ICCAT 2020a). The SCRS suggests that overfishing has been occurring since 2018. As of 2020, albacore tuna stocks are not considered to be overfished

(ICCAT 2020b). Yellow-fin tuna stocks are considered healthy but maybe at the overfishing threshold; bigeye-tuna stocks are being overfished (ICCAT 2019).

In Maritimes Statistical Districts 36, 37, and 38, fisheries landings were reported together for the county (Digby). Pelagic landings and their associated value were not recorded separately, other than herring. For 2015, 220,732 kg of species other than groundfish and lobster were landed with a value of $547,053. Key species landed included Atlantic mackerel and mako sharks (C. O'Neil, pers. com.). Preliminary data indicate in 2018 through 2021, Atlantic herring was among the top 5 species landed. Other species landed in District 37 included mackerel and alewives (A. Campbell, pers. com.).

Figures 9 - 12 show the approximate commercial pelagic landings off the coast of Nova Scotia between 2014 and 2018 (Rozalska and Coffen-Smout 2020).

Species list

- North Atlantic bluefin tuna (*Thunnus thynnus*)
- Swordfish (*Xiphias gladius*)
- Atlantic herring (*Clupea harengus*)
- Atlantic mackerel (*Scomber scombrus*)
- Alewife (*Alosa pseudoharengus*)
- Mako shark (*Isurus oxyrinchus*)

Figure 12. Commercial Herring Landings (2014 – 2018)

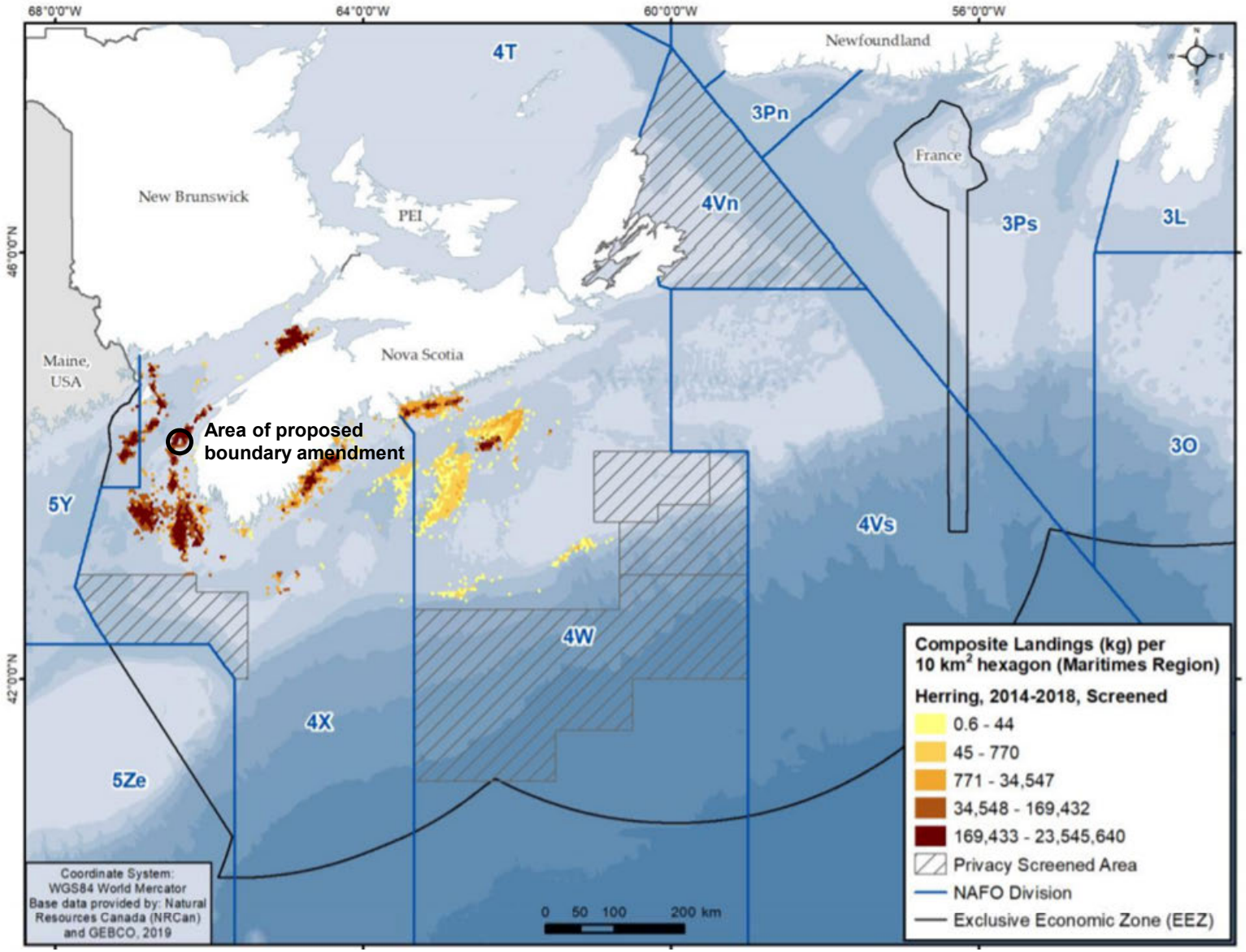

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Figure 13. Commercial Mackerel Landings (2014 – 2018)

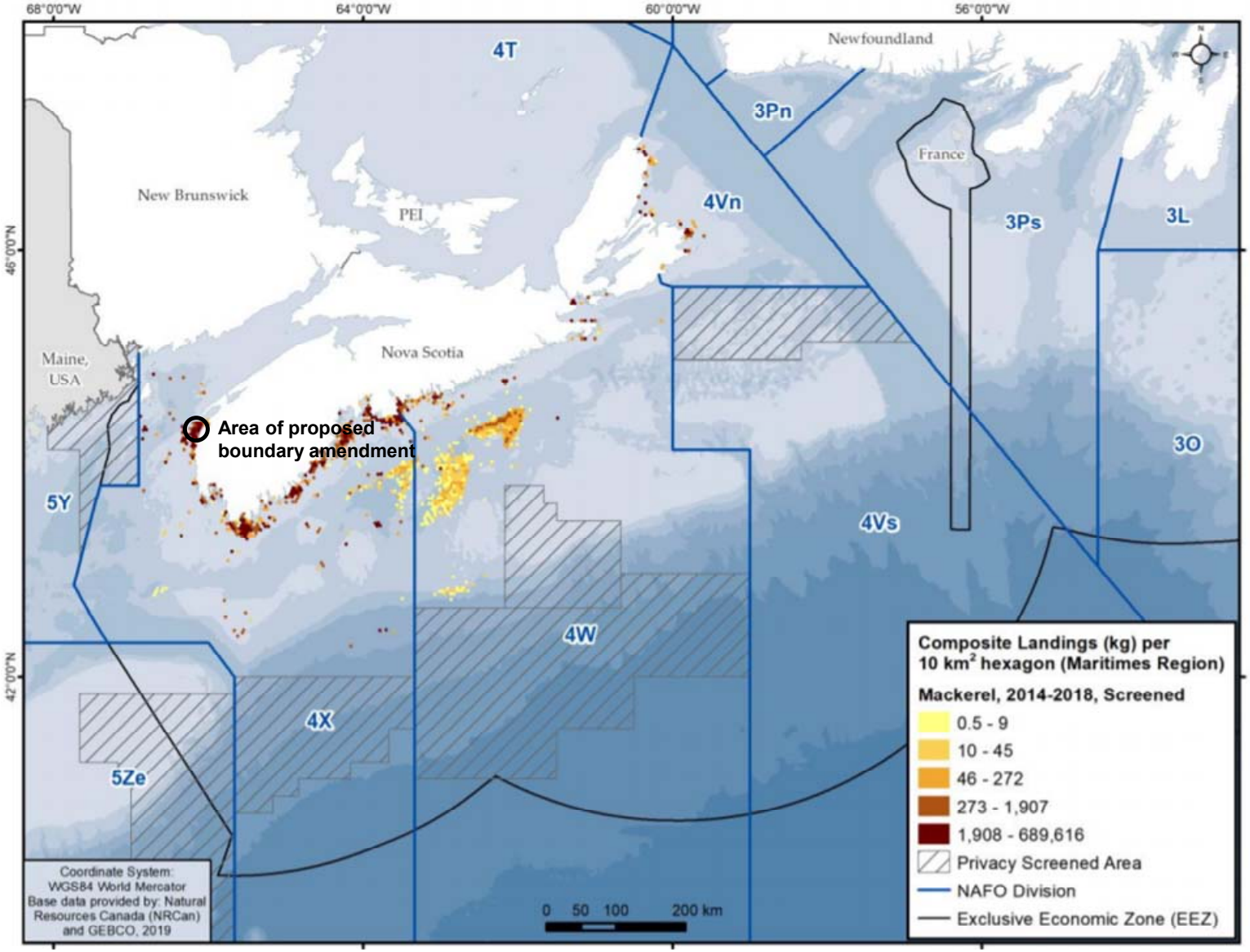

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Figure 14. Commercial Swordfish (2014 – 2018)

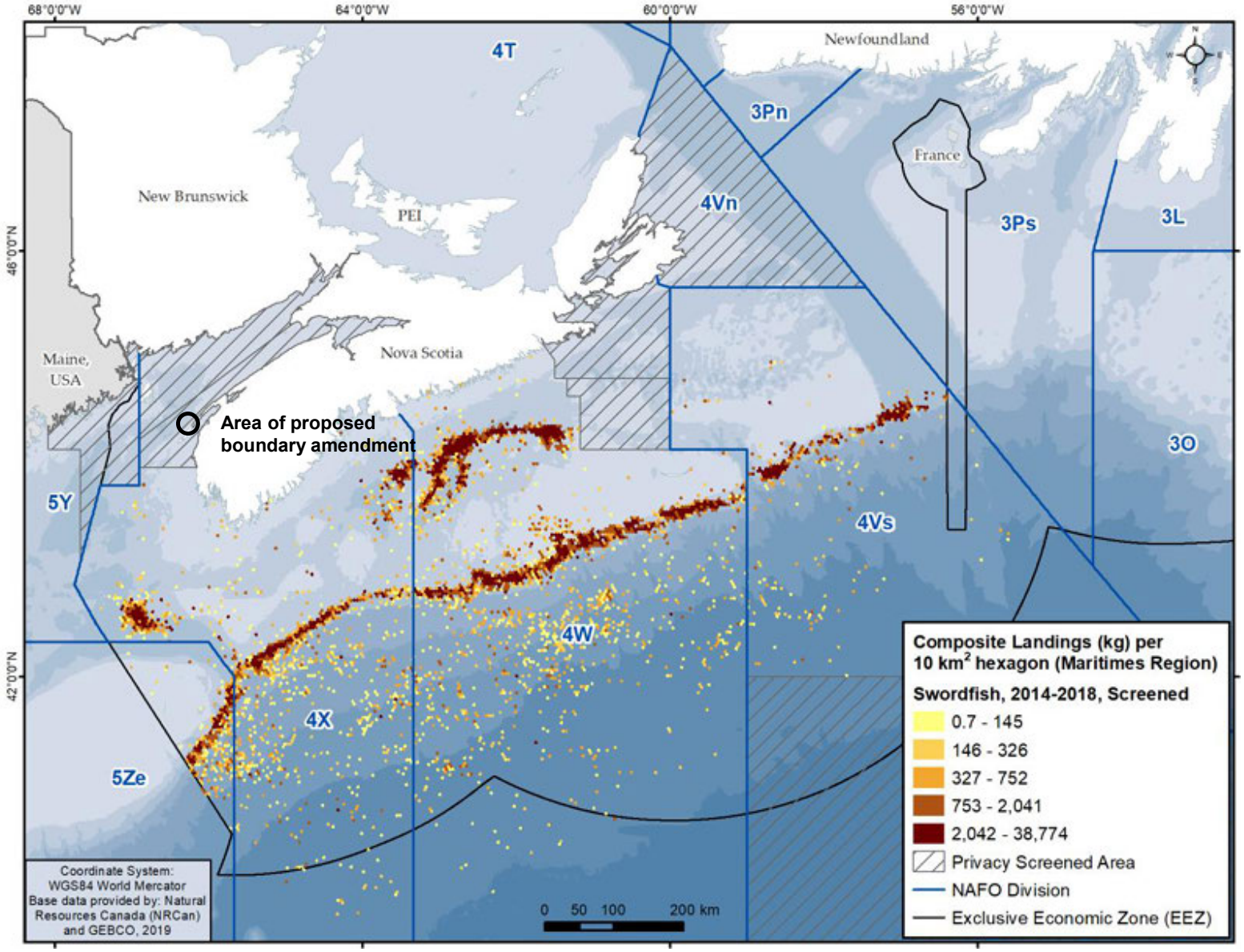

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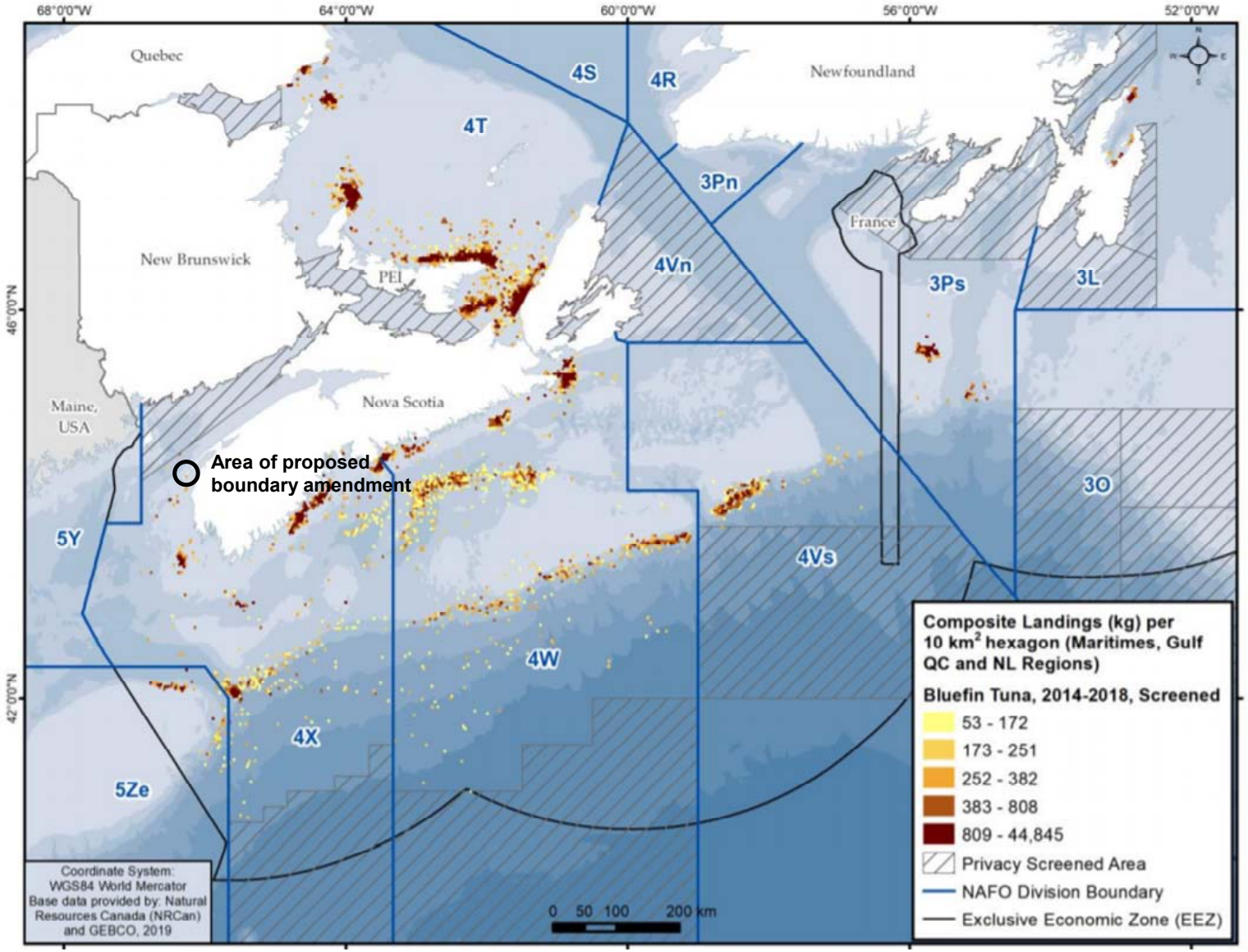
Figure 15. Commercial Bluefin Tuna Landings (2014 – 2018)



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Shellfish and Other Invertebrates

There are several shellfish species that are harvested off Nova Scotia and included are such commercially important species as scallops, lobsters, shrimp, and clams (Table 5; Fisheries and Oceans Canada 2021a). Also harvested are crabs, sea cucumber, and sea urchins.

Table 5. Atlantic Coast Commercial Landings for 2020
Note: source from Fisheries and Oceans Canada (2021a)

2020 ATLANTIC COAST COMMERCIAL LANDINGS, BY REGION (metric tonnes, live weight)				
Species	**Nova Scotia**			
	Maritimes	**Gulf**	**Total**	**Atlantic Total**
Shellfish				
Clams / quahog	21,303	27	21,330	38,627
Oyster[1]	x	x	29	x
Scallop[2]	57,687	92	57,780	63,412
Squid	x	0	x	3,530
Mussel[3]	0	0	0	0
Lobster	15,271	4,881	20,151	68,070
Shrimp	19,209	0	19,209	66,106
Crab, Queen	8,862	5,428	14,290	71,080
Crab, Other	239	x	x	2,545
Whelks	x	0	x	2,323
Cockles	x	0	x	x
Sea cucumbers	x	0	x	10,455
Sea urchin	x	0	x	1,474
Other	0	0	0	0
Total	**125,807**	**10,743**	**136,550**	**330,130**
Subtotal	**209,576**	**13,947**	**223,522**	**535,821**
Others				
Marine plants	x	0	x	9,886
Lumpfish roe	x	0	x	80
Miscellaneous (4)	x	0	x	2,335
Total	84	0	84	12,300
GRAND TOTAL (5)	**209,660**	**13,947**	**223,607**	**548,121**

x Suppressed to meet confidentiality requirements
(1) Oyster: Atlantic includes wild and farmed data
(2) Scallop includes meat with roe
(3) PEI mussels are now classified under "aquaculture" because they are a farmed product
(4) Totals may not add up due to rounding

Invertebrate fisheries constitute the largest piece of the Nova Scotia fishery (Fisheries and Oceans Canada 2021a), of which, the lobster fishery is the primary component in terms of value. In 2020, Nova Scotia landed 20,151 MT of lobster valued at $280 million (Fisheries and Oceans Canada 2021a). The inshore lobster fishery dominates the Maritimes lobster landings and is shown in Figure 16. The proposed farm falls within lobster fishing area (LFA)

34. Catch per unit effort steadily increased between 2010 and 2016 with landings peaking in 2016 (DFO 2022). Typical lobster grounds are characterized by a hard seafloor such as ledge, boulder, or cobble (Lawton 1993) whereas the proposed aquaculture farm is located over mixed substrate, predominantly sand (see **Appendix B Brier Island Baseline Assessment Report**). However, lobster fishermen are known to set their traps in waters ranging from a few feet deep to 25 fathoms and on various bottom types (C. MacDonald, pers. com.).

Fisheries for red crab, Jonah crab, and rock crab are smaller in scale than for snow crab. The Jonah-crab fishery occurs in both offshore and coastal areas of Southwestern Nova Scotia with landings occurring from the Bay of Fundy, Crowell Basin, and Browns Bank (Fig. 17; Rozalska and Coffen-Smout 2020). In 2020 and 2021, rock crabs and Jonah crabs were landed in District 37 (D. Eberhard, pers. comm.). Commercial snow (queen) crab landings for 2018 and 2019 are illustrated in Figure 18, which indicates that the proposed boundary amendment of Brier Island does not fall within a snow crab fishing area (see also Fig. 19). Snow crab is the second most valuable Canadian fishery export product; however, a stock assessment indicated the Scotian Shelf biomass and allowable catches have continued to decrease since 2016 (DFO 2020d).

Shrimp represents one of Canada's most valuable seafood exports, with the northern shrimp being the only one of commercial importance on the Scotian Shelf. The fishery uses demersal otter-trawl fishing vessels both in the inshore and offshore fishery. Initially, shrimp fishing on the Scotian Shelf was concentrated in Shrimp Fishing Area (SFA) 16, which is off Southwest Nova Scotia (Fig. 20). The fishery there peaked in 1970 with 50 vessels landing 800 tonnes, but by 1977 the SFA 16 stock had decreased substantially (Fisheries and Oceans Canada 2013). A surge in landings occurred in 2010 but since have been very low to nil. Brier Island is within shrimp fishing area 16, which currently has no total allowable catch and is not active (Government of Canada 2021a).

The commercial fishery for scallops is typically offshore, although a smaller inshore fishery does occur along parts of the Atlantic coast (Fig. 21 & 22). Historically, the area off Digby, in the Bay of Fundy, has been the most important area for the inshore fishery (Rozalska and Coffen-Smout 2020). Scallop production areas (SPAs) 1A and 3 are located off Brier Island. The commercial catch rate in SPA 1A (southeastern portion of Bay of Fundy) was 27.7 kg hr^{-1} in 2019 and 29.6 kg hr^{-1} in 2018 (DFO 2021). Biomass estimates of commercial scallops (meats) was 2268 t in 2019 and 3365 t in 2018, both above the long-term median of 1732 t (DFO 2021). The 2019 summer catch rate of scallops outside of St Mary's Bay in SPA 3 (Brier/Lurcher area) was 17.2 kg hr^{-1}, a decrease from 2018 (18.0 kg hr^{-1}) (DFO 2021). Estimates for commercial meats were 2062 t in 2019 and 2103 t in 2018 (DFO 2021). The population statuses for both SPAs remain in the healthy zone (DFO 2021).

Preliminary landings data for Maritimes Statistical Districts 36, 37, and 38 were reported together for the county (Digby). Shellfish landings and associated value were not provided separately, other than for scallops and lobster. For 2018 and 2019, 7,769 MT and 8,215 MT of scallops were landed, respectively (A. Campbell, pers. comm.). For 2020 and 2021, 7,912

MT and 7,762 MT were landed (D. Eberhard, pers. comm.). For lobster, the values were 5,311, 5,162, 4,006, and 3,146 MT for 2018, 2019, 2020, and 2021, respectively. Other species landed in District 37 for these years included soft-shell clams, quahogs, Jonah crab, and rock crab.

Fisheries and Oceans Canada offers a real-time map of openings and closures of Canadian harvesting areas for bivalve shellfish (mussels, oysters, clams, quahogs, and scallops) (Fisheries and Oceans Canada 2021b). Prior to harvesting bivalve shellfish, it is the harvester's responsibility to ensure that the area is safe by referring to the real-time map to identify approved and prohibited areas for each bivalve species. On March 24, 2022, Westport Harbour (the location of site #0742) and the north and west of Brier Island were closed to harvesting all species of bivalve shellfish (Fig. 23). South of Brier Island was open to harvesting of some species of bivalve molluscs.

Species list

- Lobster (*Homarus americanus*)
- Rock crab and Jonah crab (*Cancer irroratus* and *C. borealis*)
- Scallop (*Placopecten magellanicus*)
- Soft-shell clam (*Mya arenaria*)
- Quahogs (*Mercenaria mercenaria*)

Figure 16. Total Lobster Catch
Note: Sourced from Serdynska and Coffen-Smout (2017)

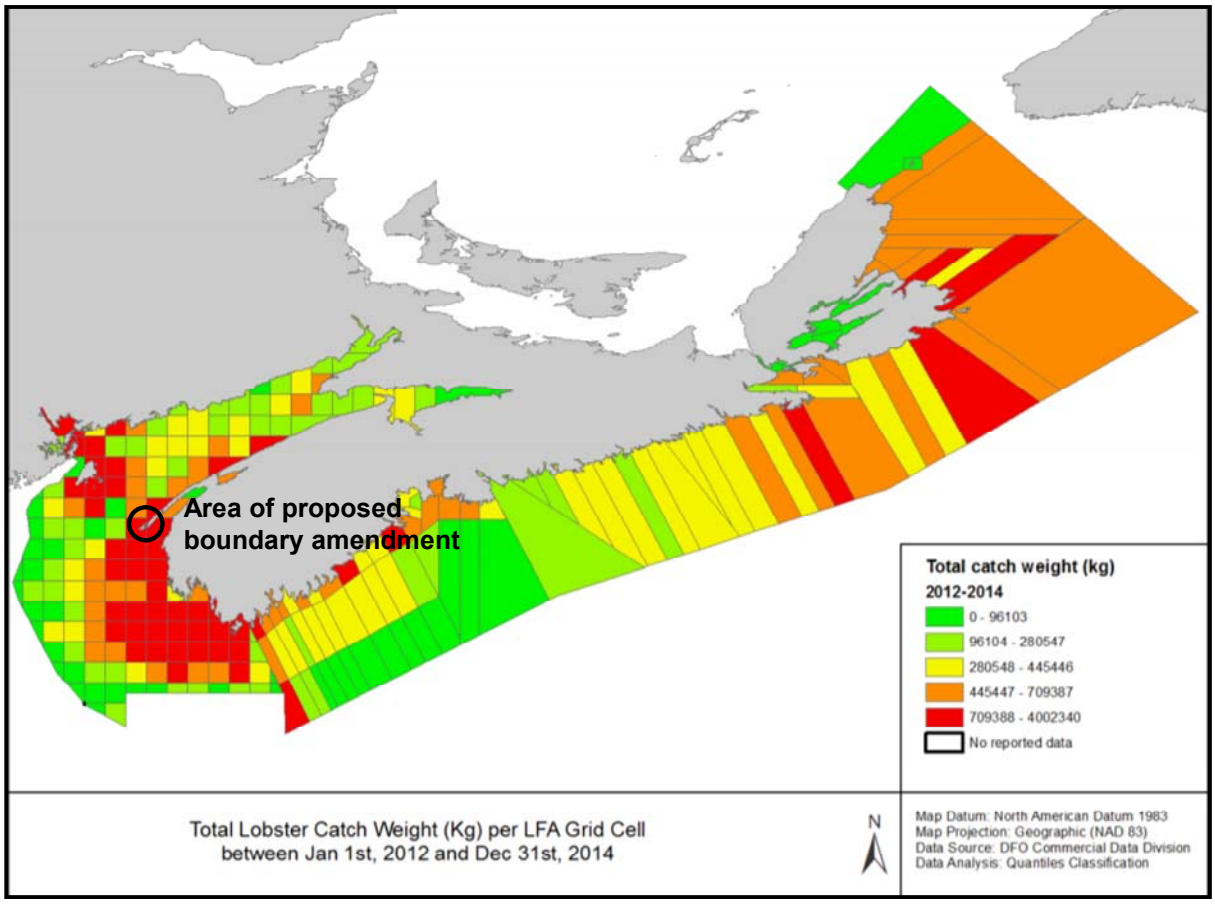

Figure 17. Other Crab Landings (2014 – 2018)
Note: sourced from Rozalska and Coffen-Smout (2020)

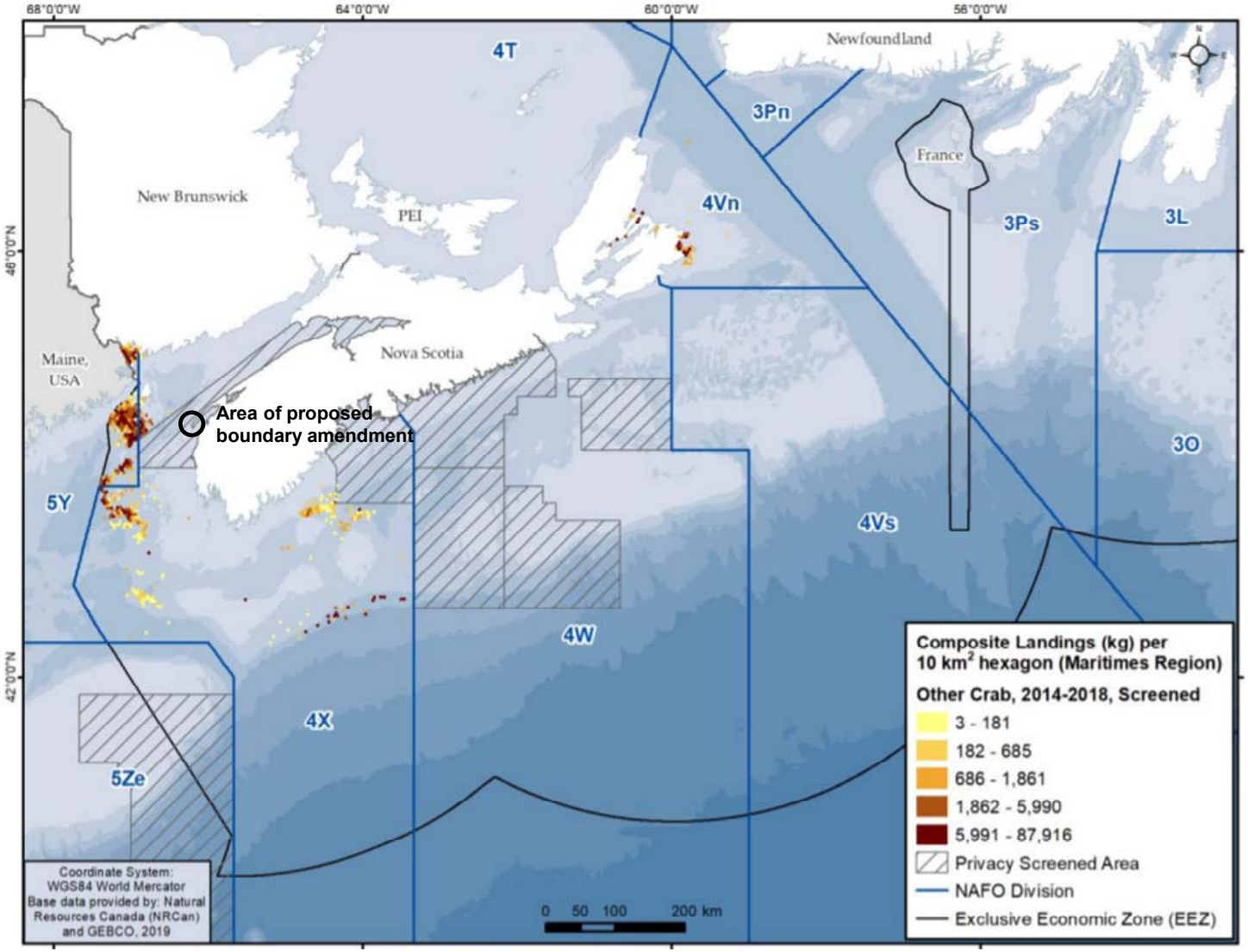

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Figure 18. Commercial Snow Crab Landings
Note: Sourced from Fisheries and Oceans Canada (2020e)

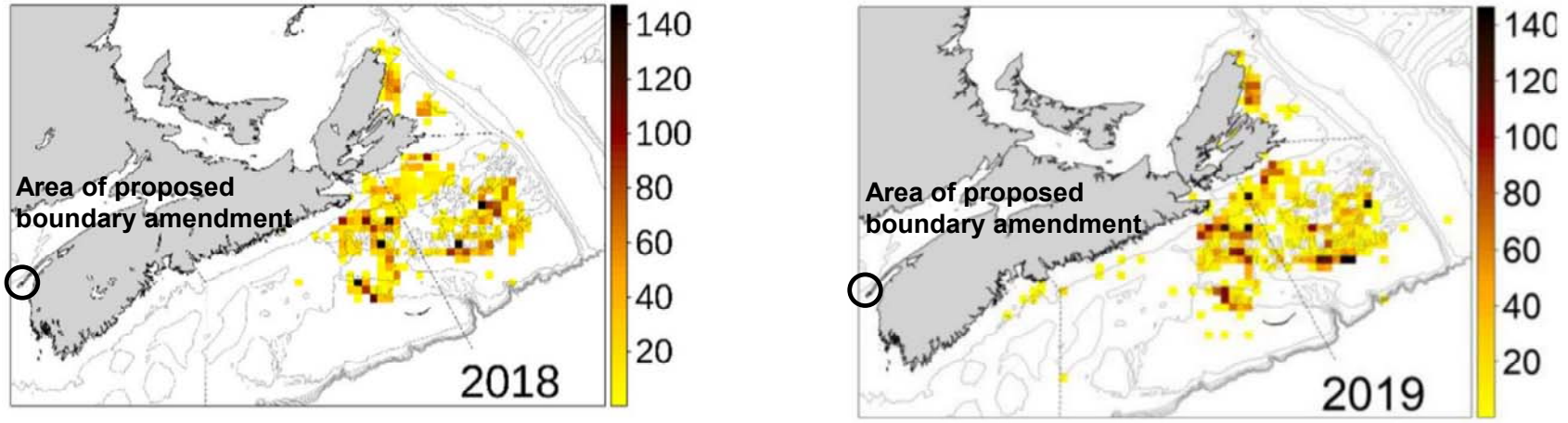

Figure 19. Commercial Snow Crab Landings (2014 – 2018)
Note: sourced from Rozalska and Coffen-Smout (2020)

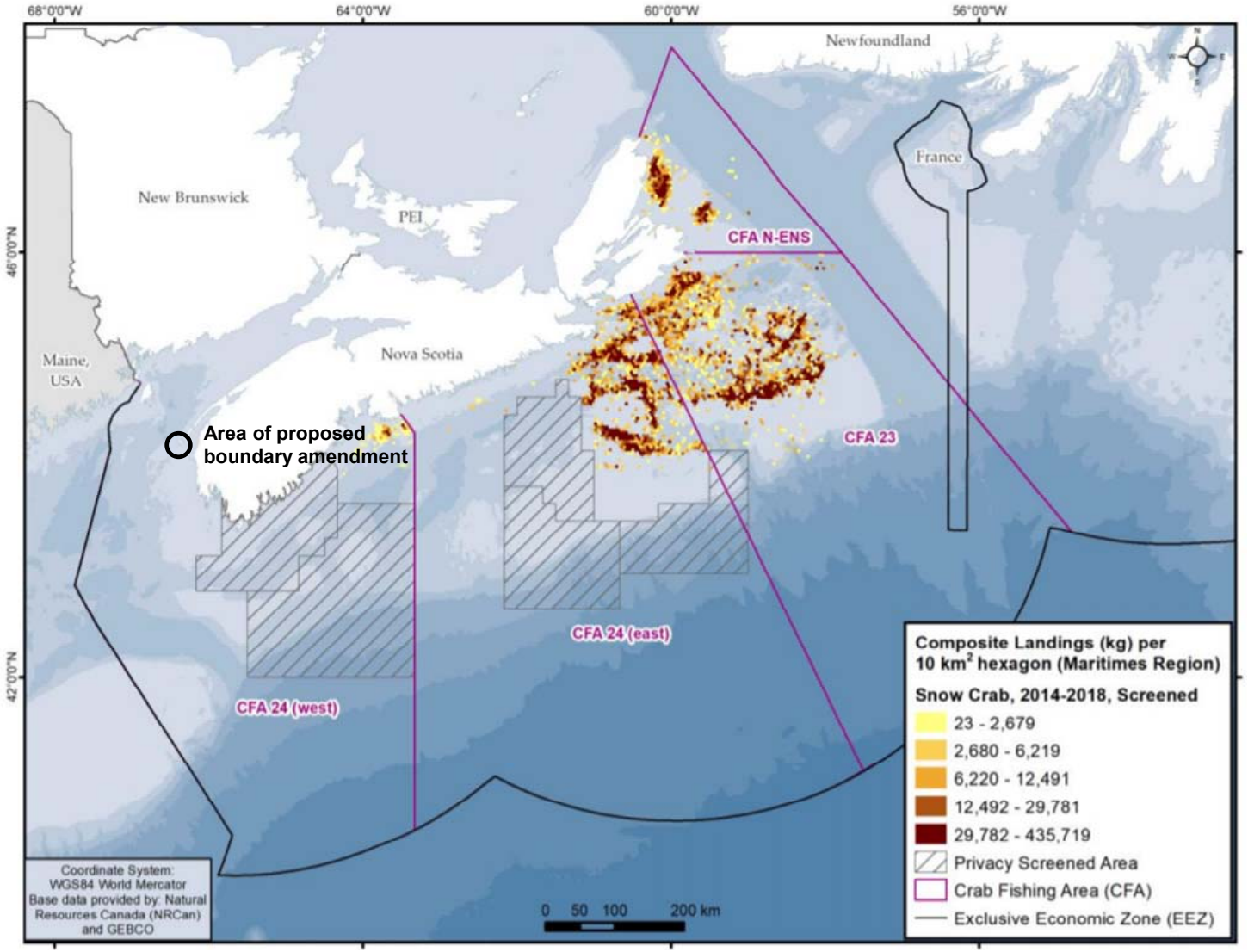

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Figure 20. Shrimp Fishing Areas in Atlantic Canada
Note: Sourced from Government of Canada (2015a)

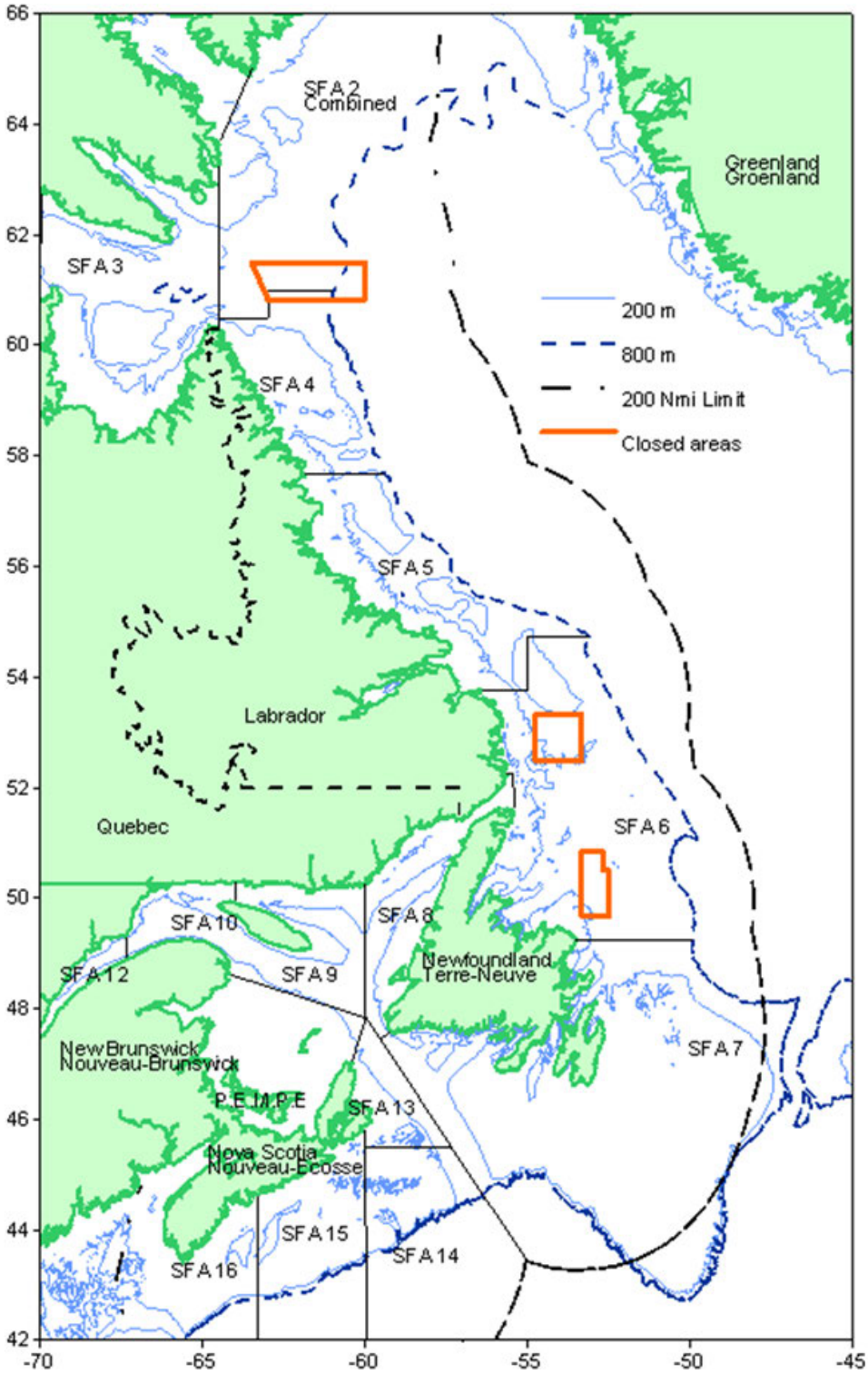

Figure 21. Commercial Scallop Landings (2014 – 2018)
Note: sourced from Rozalska and Coffen-Smout (2020)

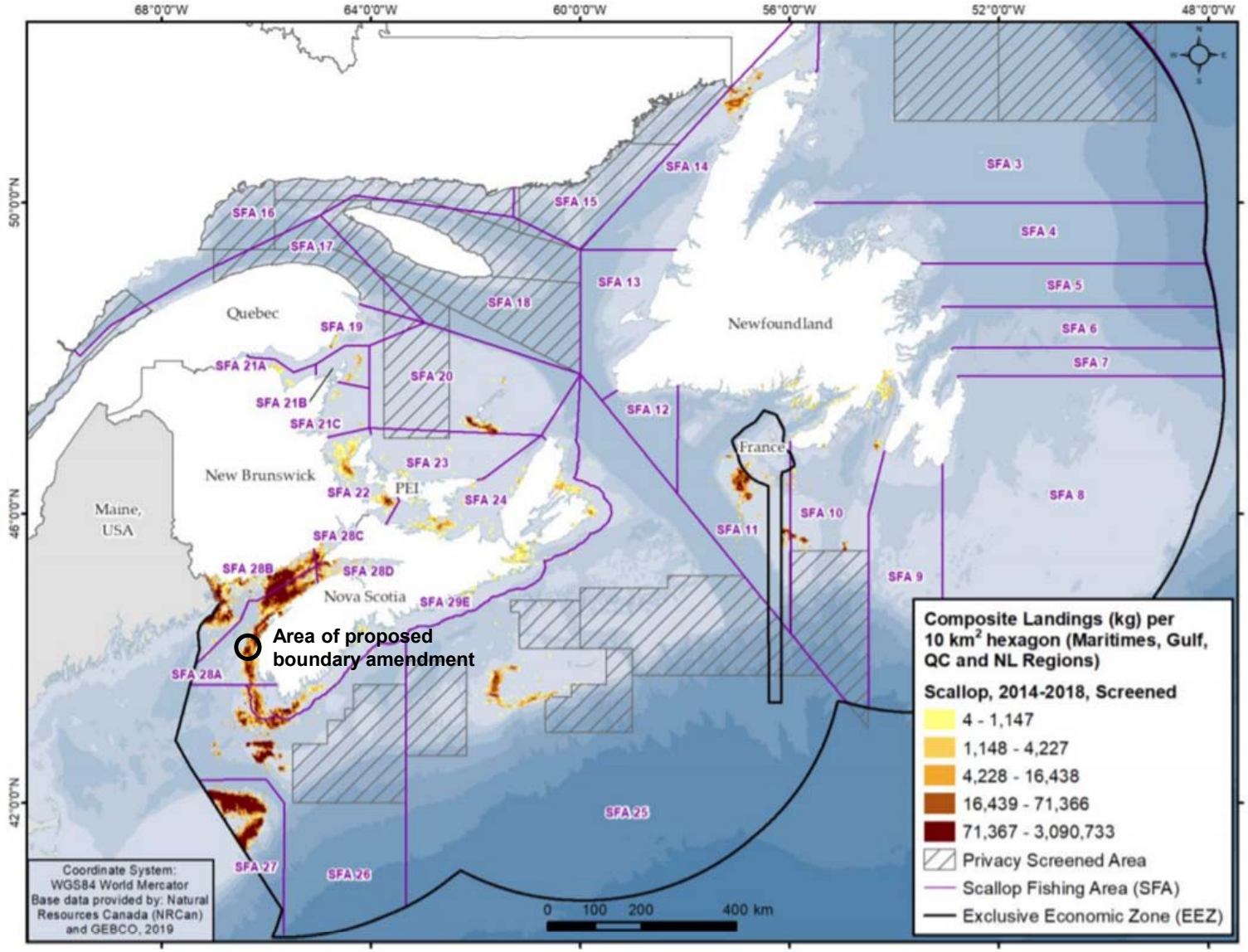

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Figure 22. Scallop Production Areas
Note: sourced from Fisheries and Oceans Canada (2016)

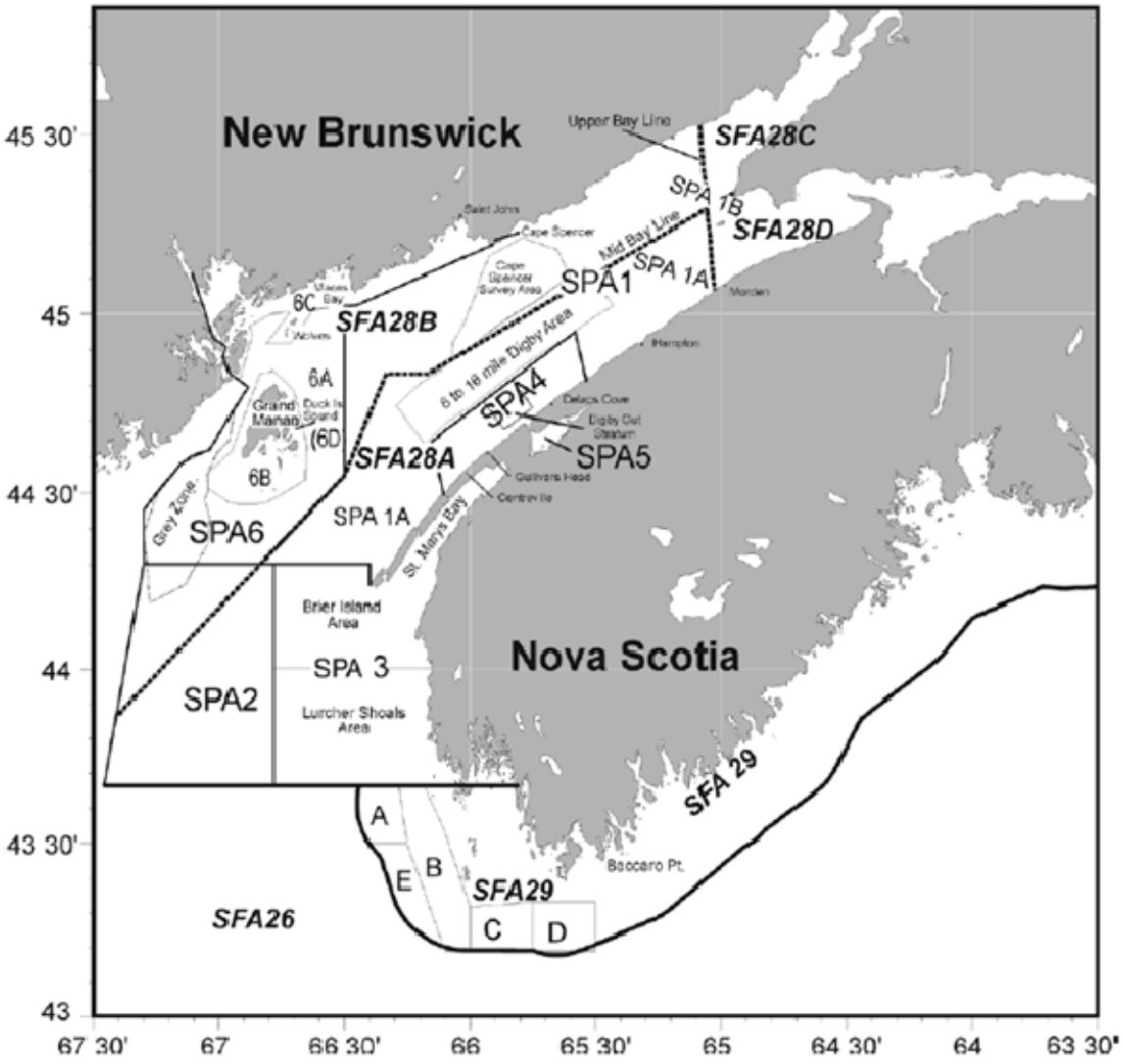
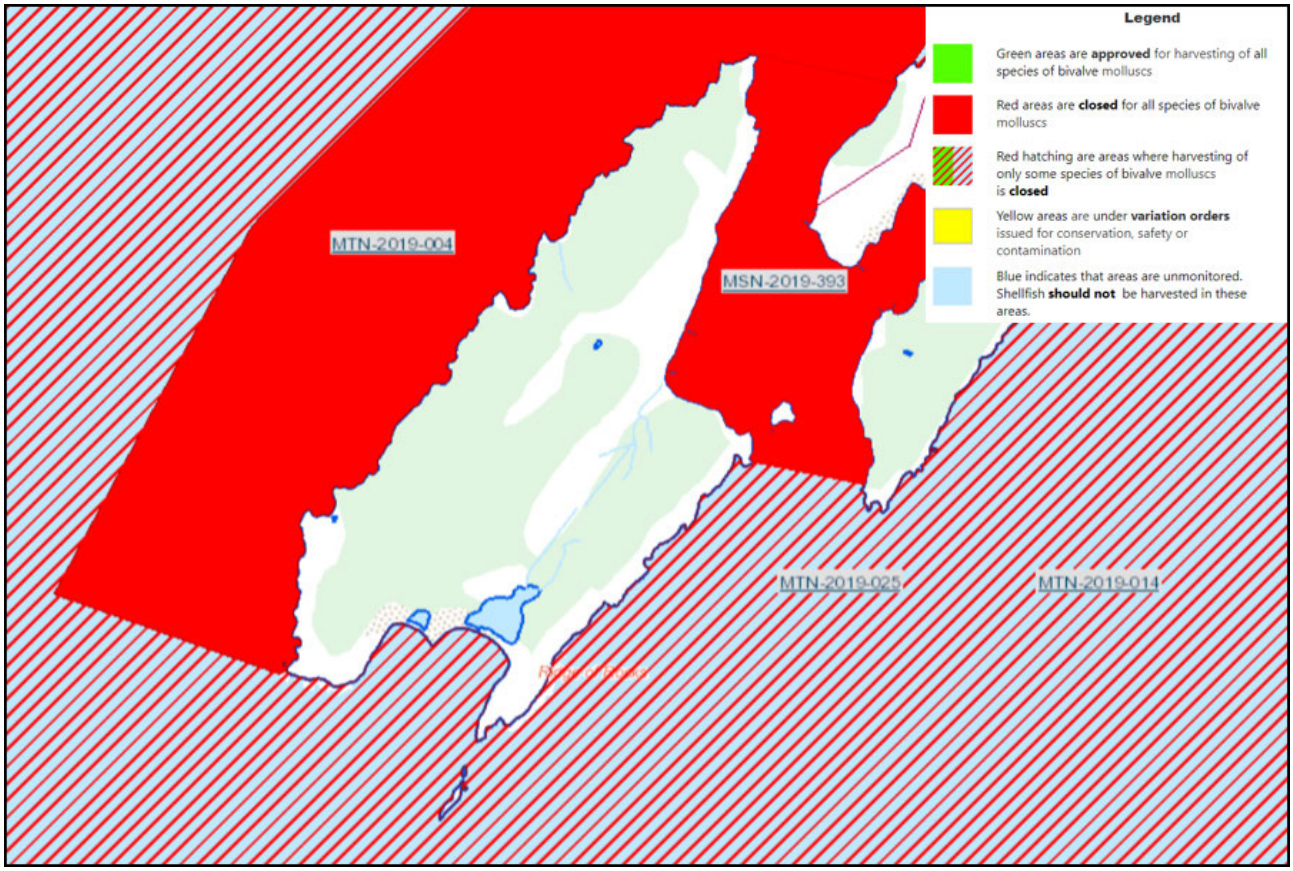


Figure 23. Real Time Shellfish Harvesting Classifications of the Westport Harbour Area on October 7, 2021
Note: Fisheries and Oceans Canada is the central CSSP agency with respect to the real-time status of shellfish growing area classifications. Fisheries and Oceans Canada should be contacted directly for information on shellfish area closures (Fisheries and Oceans Canada 2021b).



Seaweeds

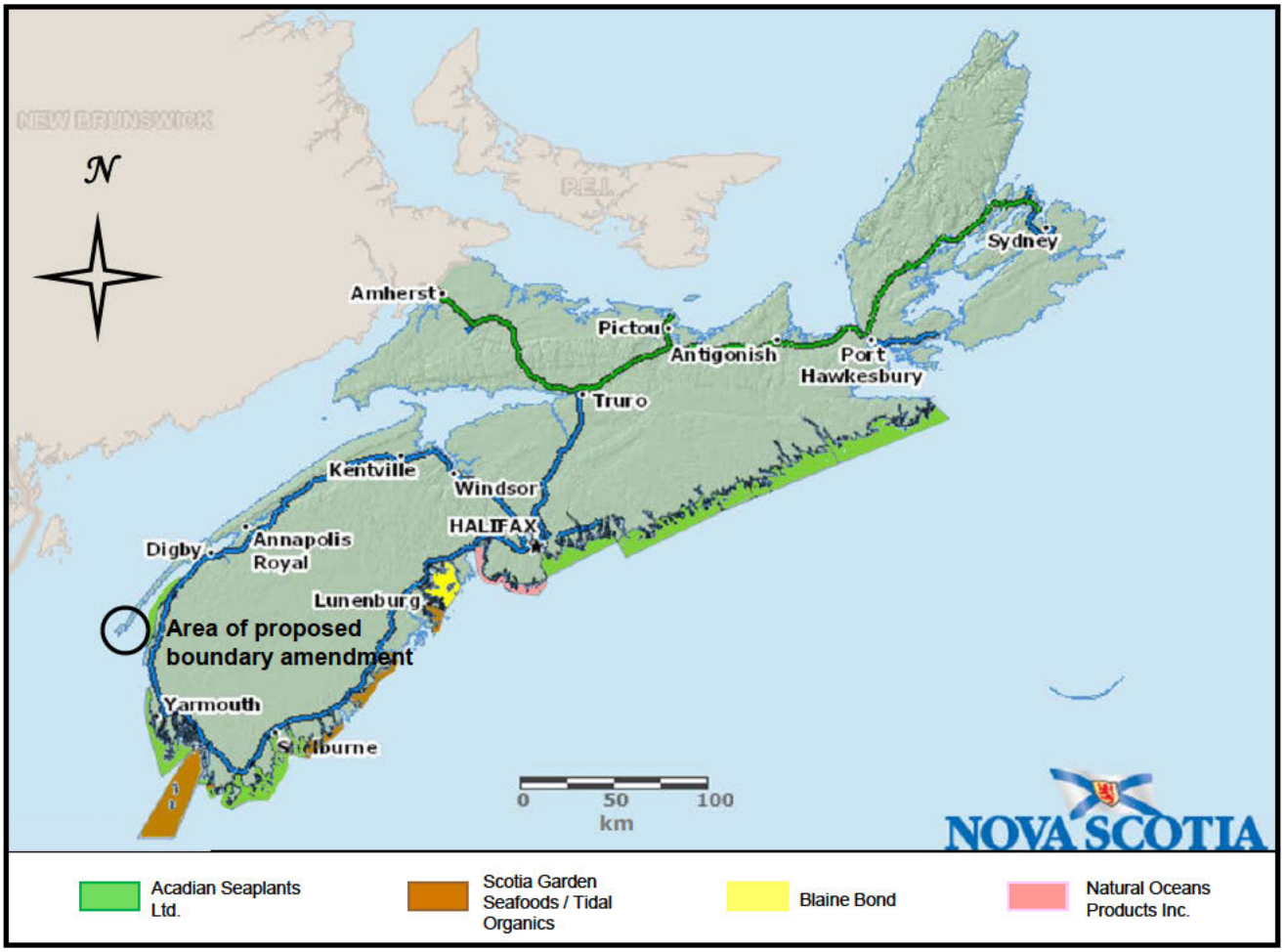
Marine plants that are harvested commercially in Nova Scotia include rockweed (*Ascophyllum nodosum*), Irish moss (*Chrondus Chrispus*), dulse (*Palmaria palmata),* and kelp (*Saccharina latissima* and *Laminaria digitata*). In 2019, approximately 134 t of marine plants were landed in Nova Scotia (Fisheries and Oceans Canada 2021a; Table 5).

In Nova Scotia, *Ascophyllum* is harvested for animal fodder, food additives, fertilizer, and other specialty products. Irish moss is commonly harvested for its thickening and stabilizing properties (i.e., carrageenan). Though the species is not under any immediate threat, Irish-moss populations were beginning to experience signs of increased pressure in site-specific harvesting, and protection methods were beginning to be recognized (DFO 2013a).

The province of Nova Scotia has jurisdiction over the issuing of rockweed licences. A provincial representative from NSDFA explained that rockweed harvesting can coexist with

aquaculture and no conflict is anticipated between the industries (J. Huston, pers. com.) because rockweed harvesting takes place in shallow, intertidal water but finfish aquaculture farms require deeper water. Irish moss also occurs low in the intertidal and into the shallow subtidal and is also harvested with a hand rake (DFO 2013a). Harvesting *Ascophyllum* is considered a high-risk activity as these plants and other biota can be damaged due to harvest. There are currently no rockweed leases in place for Westport Harbour (Fig.24).

Figure 24. Rockweed Licences in Nova Scotia
Note: sourced from NSDFA (2021a)



3.1.2 Recreational Fisheries

The management of Canada's recreational fisheries is a shared responsibility between the federal government and the provinces/territories. Generally, the federal government is responsible for all marine species except for catadromous or anadromous species in inland waters in some regions. The provinces are usually responsible for freshwater fisheries. NSDFA manages the recreational fishery in Nova Scotia.

Nova Scotia is divided into six Recreational Fishing Areas (RFA's) to allow for regional management. Recreational fishing Area 4 encompasses Digby, Queens, Shelburne, and Yarmouth counties. There were over 76,000 sportfishing licences sold in Nova Scotia in 2020 (Nova Scotia Department of Fisheries and Aquaculture 2021b). Freshwater species being fished recreationally in Area 4 include trout (rainbow, speckled, and brown), small mouth bass, chain pickerel, white perch, and yellow perch, (Nova Scotia Department of Fisheries and Aquaculture 2021c). As amendments to regulations can occur frequently, the Province of Nova Scotia asks that regulations be checked regularly, to ensure the public is knowledgeable about current laws and regulations (Province of Nova Scotia 2018).

3.1.3 Aboriginal Fisheries

Aboriginal landings were reported in the Maritimes Statistical Districts encompassing Digby County; however, the landings data, value, and fishing effort were not available. In Digby County, herring, bluefin tuna, alewives/gaspereau, elvers, soft shell clam, sea scallop, lobster, Jonah crab and green crab were landed in 2020 - 2021. Gear used for all fisheries included rakes/tongs, angling, drag, gill nets (drift, set, or fixed), traps, and electric harpoon (D. Eberhard, pers. comm.).

3.2 Impact on Fisheries Activities

NSDFA's Environmental Monitoring Program Framework for Marine Aquaculture in Nova Scotia – July 2021 (Nova Scotia Department of Fisheries and Aquaculture 2021d) outlines a series of principles and criteria to guide the management process and to determine levels of monitoring and mitigation strategies for each aquaculture site. Standard Operating Procedures for the Environmental Monitoring of Marine Aquaculture in Nova Scotia – July 2021 (Nova Scotia Department of Fisheries and Aquaculture 2021e) describes the procedures that support the application of the framework.

The Environmental Monitoring Program Framework focuses on benthic marine habitat in the immediate vicinity of the aquaculture site. Although sediment sulphide concentration is the key indicator for this environmental monitoring program, a suite of sediment variables is used to validate sulphide data. In addition, benthic video collected at each monitoring station is required and is used to evaluate a site's performance in the event sediment samples are unattainable.

Benthic monitoring assesses areas beneath and around areas of aquaculture production for organic loading, which is one of the primary concerns regarding aquaculture impacts on the environment, fish, and fish habitat. KCS and their contractors adhere to the Environmental Monitoring Program Framework and Standard Operating Procedures established by NSDFA.

Standard best management practices for rearing fish in a marine environment are followed at the site. These practices have controls in place to mitigate potential environmental effects on fish and fish habitat. The site must also have a selection of additional mitigation strategies to apply if an environmental compliance threshold is exceeded (refer to section **3.2.1 Environmental Impact Mitigation Strategies**).

3.2.1 Environmental Impact Mitigation Strategies

Mitigation strategies must be based on best management practices and a hazard analysis of environmental impacts. For the environmental-impact mitigation plan, hazards are identified for each operational process, and measures to control the hazard, in the form of procedures and policy, must be outlined. The site's FMP contains site-specific mitigation strategies which are reviewed annually and amended after every production cycle by NSDFA.

If poor environmental performance is determined through monitoring, mitigation must be implemented as stated in the Environmental Monitoring Program Framework. Furthermore, an updated mitigation plan to address the poor environmental performance must be added to the FMP and submitted to NSDFA. Table 6 outlines potential environmental hazards identified at the Brier Island aquaculture site. A healthy marine environment is paramount to the site's operation. If the marine environment is poor enough to affect fishing activities, it would also be detrimental to the site's production.

KCS provides detailed maps and diagrams of their sites when requested. These maps and diagrams show the location of all above-water and underwater infrastructure, thus informing fishing efforts. KCS reports harmful algal blooms to the province of Nova Scotia, potentially benefitting invertebrate fishing activities near the site.

Table 6. Potential Environmental Impact Hazards and Measures to Control Identified Hazards at the Brier Island Aquaculture Site

Potential Environmental Impact Hazard	Operational Process Step(s)	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Measures to Control Hazard
Boat traffic	• Stocking – shore to boat • Stocking – boat to cage • Harvest – cage to boat • Harvest – boat to shore	N		Not a significant hazard
Overstocking of site, or specific areas of site	• Stocking of cages	Y	Y	Controlled in Certificate of Health for Transfer (COHFT) and review/approval of production plan with NSDFA
Settlement of feces affects bottom sediments	• Grow out	Y	Y	Controlled in COHFT and review/approval of production plan with NSDFA
Cleaning of nets causes release of biofouling	• Grow out	Y	Y	Controlled within biofouling-control plan and net-washing protocol; approved by NSDFA
Disposal of non-organic waste	• Grow out	N		Controlled with waste-management strategy and waste-management plan; approved by NSDFA

Overfeeding causes settlement of uneaten feed	• Feeding	Y	Y	Controlled with recording of daily feed amounts and calculation of feed rate, use of Fishtalk, a software system, to control records, and underwater camera system to monitoring feeding; approved by NSDFA, regular monitoring of the benthos
Improper feeding technique causes settlement of uneaten feed or overfeeding	• Feeding	Y	Y	Controlled by using a central feeding system by highly qualified personnel who focus on fish behaviour during feeding; approved by NSDFA
Release of chemicals from treatments	• Sea-lice treatment	Y	Y	Controlled with sea-lice treatment plans and post-treatment reports; approved by NSDFA
Release of chemicals or antibiotics from treatments	• Disease treatment	Y	Y	Controlled with administration of treatments under the direction of a veterinarian and subsequent reporting; approved by NSDFA
Equipment disposal	• Net change	N	N	Controlled with equipment disposal procedures; approved by NSDFA
Disposal of mortalities	• Mortality and maintenance dives	Y	Y	Controlled with waste-management strategy, Site Specific Biosecurity Plan including blood water and offal; approved by NSDFA

SECTION 4.0 OCEANOGRAPHIC AND BIOPHYSICAL CHARACTERISTICS OF THE PUBLIC WATERS

4.1 Oceanographic Environment

4.1.1 Wind

The Brier Island aquaculture site #0742 is in Westport Harbour, between Brier Island and Long Island, on the Fundy shore of Nova Scotia. The site is sheltered by the surrounding islands. The most significant wind direction for this site is from the north-northeast, to which the site is exposed to the Bay of Fundy.

Hourly wind-speed and direction data were collected from the Brier Island weather station, located on Digby Neck at N44˚ 17’ 09.000” W66˚ 20’ 48.000” (Government of Canada 2021b). Data collected between January 1, 2012 and December 31, 2021 were used to produce the wind-rose plot of Figure 25. Based on this data, the most common winds in the Brier Island area occur between 145 and 165º (coming from approximately the south-southeast). The strongest winds are from the west-northwest to the northwest. The most common wind-speed class is 7 to 11 knots (Fig. 26). Maximum wind speed and direction recorded at the Brier Island weather station is presented in Table 7.

Figure 25. Wind-rose Plot of Brier Island Weather Station Data Collected Between January 1, 2012 and December 31, 2021
Note: the bars on the plot indicate the direction the wind was coming from; Data sourced from Government of Canada (2021b)

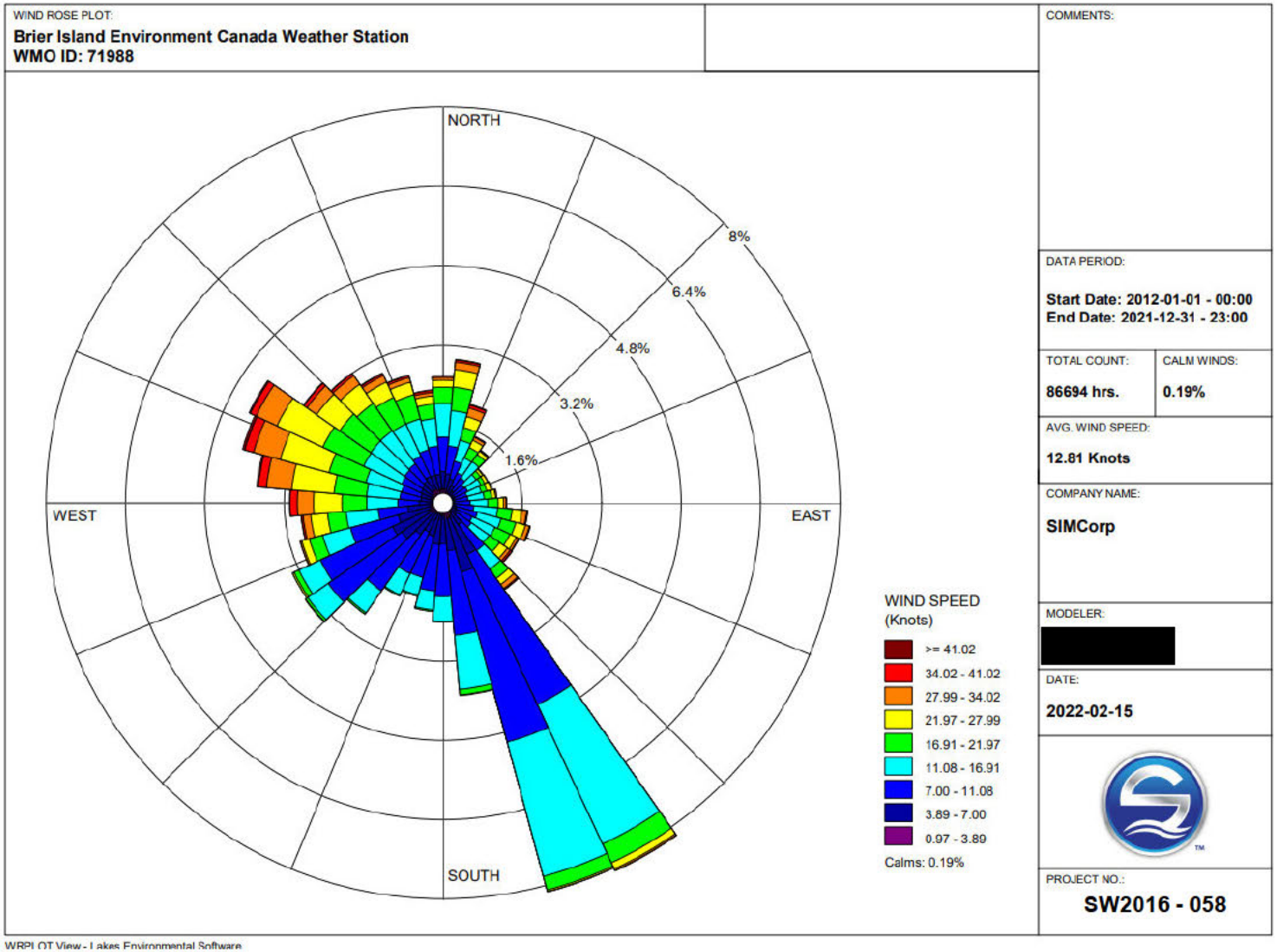


Figure 26. Frequency of Wind Speed Observed at the Brier Island Weather Station between January 1, 2012 and December 31, 2021
Data sourced from Government of Canada (2021b)

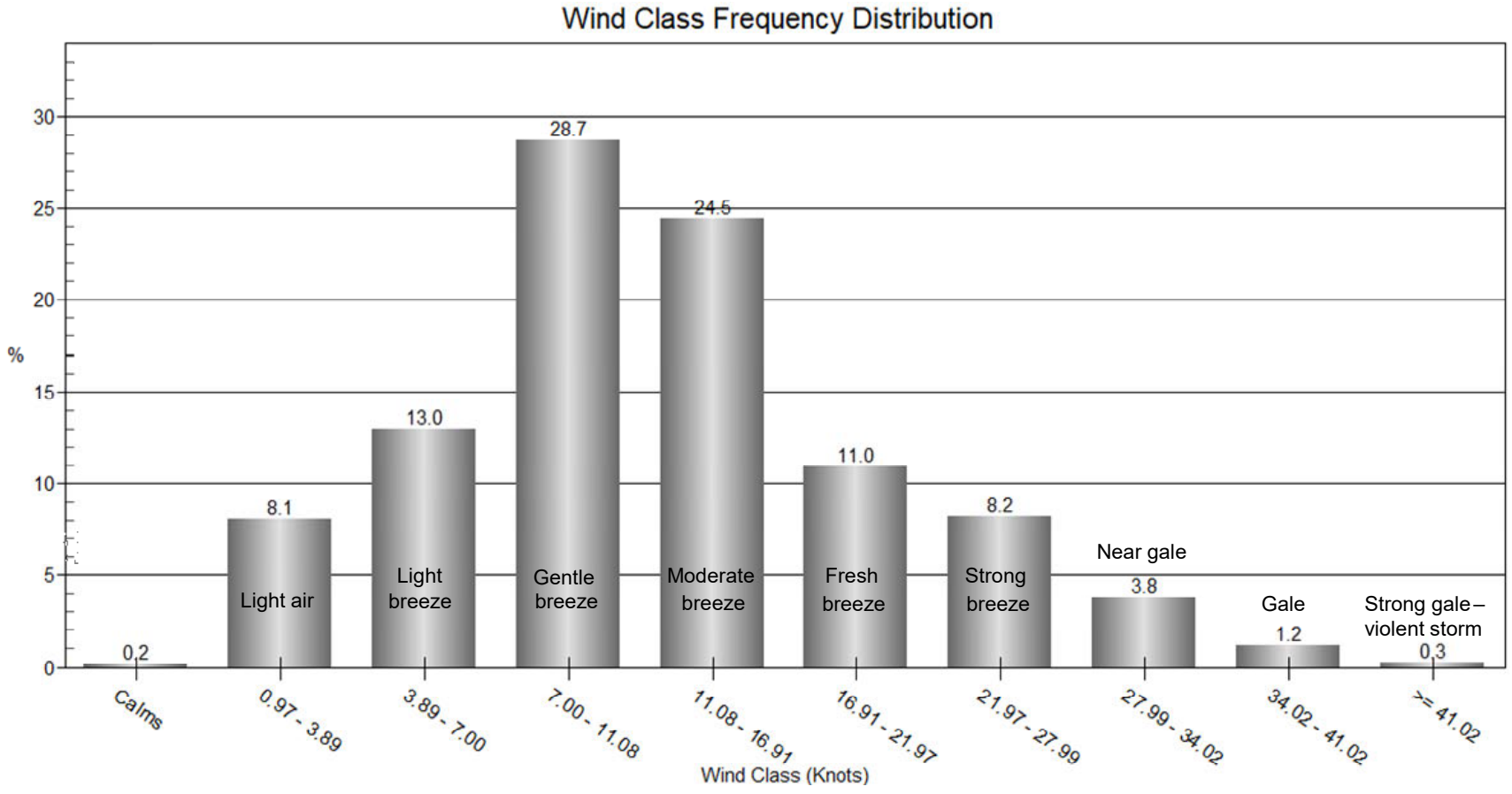


Table 7. Maximum Wind Speed and Direction Measured at the Brier Island Weather Station
Note: current to December 31, 2021(Government of Canada 2021b)

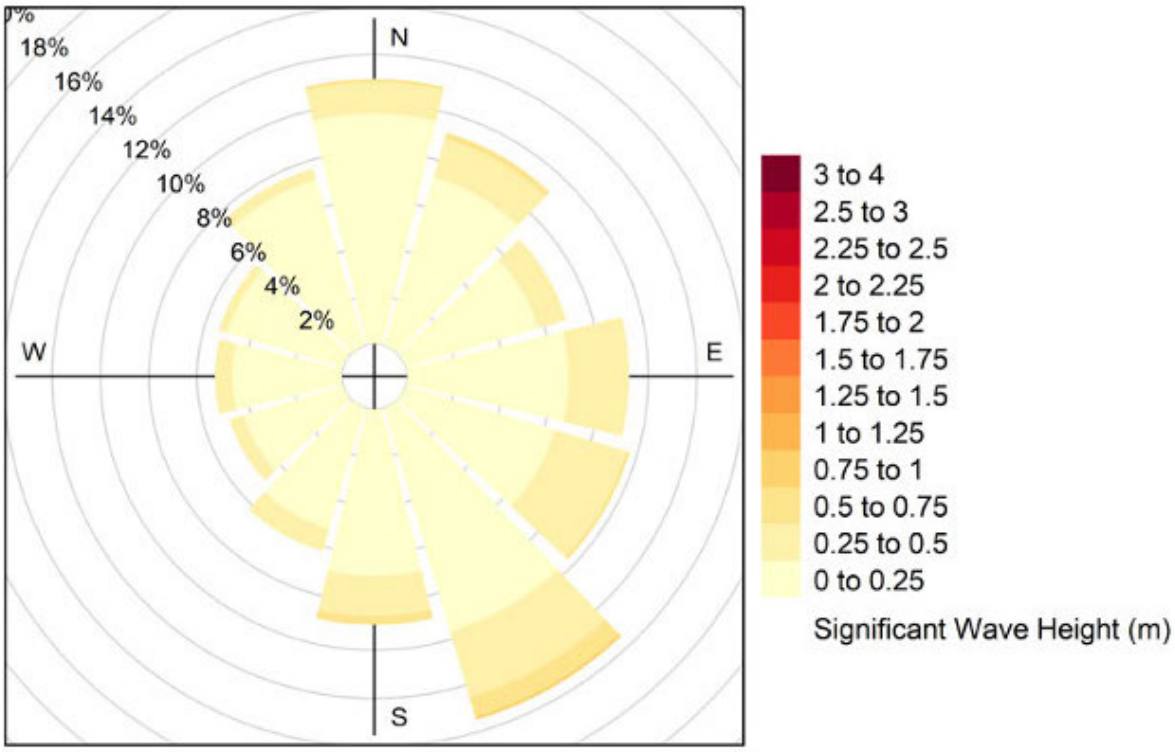
Date of Maximum Wind of the Year	Wind Speed (knots)	Wind Direction
November 13, 2021	46	ESE
May 9, 2020	44	W
September 7, 2019	46	N
January 4 & November 14, 2018	45	SE & W
February 13, 2017	49	N
February 16, 2016	50	SE
February 15, 2015	51	NNW
March 26, 2014	58	NNW
February 17, 2013	51	W
December 30, 2012	49	NW

4.1.2 Waves

The effect of waves generally diminishes with distance into the Bay of Fundy, with mean significant wave height being 1.0 to 1.6 m in the outer Bay of Fundy and Gulf of Maine, 0.5 to 1.0 m in the mid-Bay, and < 0.5 m in the upper Bay (Li et al. 2015). Maximum significant wave heights can reach 5 to 6 m in the outer Bay but are generally < 4 m in the mid-Bay and upper Bay (Li et al. 2015).

Wind and wave conditions for site #0742 in Westport Harbour were described by Torrie (2021). Data collected from March 30 to May 4, 2011 indicated the largest significant wave heights were generated from the southeast and reach heights of 1 m, with maximum wave heights of less than 1.5 m. Figure 27 is a wind-rose plot showing the frequency of significant wave height by direction for Westport Harbour.

Figure 27. Frequency of significant wave height by direction (travelling from) for site #0742
Note: from Torrie (2021)



4.1.3 Extreme Storm Events and Storm Surge

Nova Scotia is sometimes subject to extreme weather conditions. Wind and wave damage caused by storms and ice damage during extremely low temperatures are environmental hazards. Employing proper gear and using the most recent technologies for cage design and construction, as well as routine inspection and maintenance, will help prevent any unfavourable effects on the cage grid caused by weather and climate extremes. In New Brunswick, Nova Scotia, and Newfoundland, KCS has several high energy sites, which are exposed to strong winds and large waves. The grid and anchoring systems used on the proposed boundary amendment in Westport Harbour are engineered to be successful at these high energy sites. The plastic, circular cages and grid components that are employed by KCS have been engineered to withstand expected conditions at this location. During extreme weather conditions, personnel will not be working on the cage site. Once the extreme weather has passed, crews will be dispatched to examine the cage system and fish stock for damage. If damage is sustained, repairs will be carried out as necessary. Any significant damage will be reported to NSDFA. Refer to sections **7.2.3.1 Infrastructure**, **7.2.3.2 Containment Strategy**, and **7.2.3.3 Hazard Assessment for Containment Management** for additional information.

4.1.4 Tides

Based on Canadian Hydrographic Service (Fisheries and Oceans Canada 2021c) tide tables for Westport (Station #340), the predicted highest high tide for 2022 is 6.1 m and the lowest low tide is -0.1 m, giving a maximum tidal range of 6.2 m. In 2020 the highest high tide was 6.2 m and the lowest low tide is -0.2 m, giving a maximum tidal range of 6.4 m. On average, the tidal range is between 4 and 5 m. If a storm surge coincides with the highest high tide, it could result in higher water levels.

4.1.5 Currents

Collection of local current speed and direction data throughout the water column was carried out from October 24 to November 24, 2017 using a 600-kHz Acoustic Doppler Current Profiler (ADCP) deployed by NSDFA. The current meter was not deployed at the center of the proposed lease due to presence of gear and was positioned in an area representative of the lease's depth and currents. The current meter was located 128 m northeast of the center of the proposed lease (N44° 15' 43.5" W66° 20' 42.2").

Three meters above the seafloor, the most common direction of flow was to the south-southeast (Table 8). From four to eight meters above the seafloor, the most common direction of flow was to the south by east. Approximately 33.8% of all recorded currents were travelling between 155 and 185 degrees. The depth-averaged current speed was 27.3 cm/s. The maximum recorded speed was 69.3 cm/s, occurring 7 m from the bottom. The minimum current speed was 0.1 cm/s. At 3 m above the seafloor, the most common speed class was 21 to 28 cm/s (17.6%); the same was true at 6, 7, and 8 m above bottom (16.8, 17.1, and 17.2%, respectively). Data obtained from closer to the surface was not considered reliable and was omitted from the analysis. Average current speeds were relatively stable with depth, with the cells nearer to the surface having the highest occurrence of currents greater than 56 cm/s.

Graphs illustrating the current directions and current-speed frequency distributions are in **Appendix B Brier Island Baseline Assessment Report**. Additional information is present in section **4.2 Baseline Monitoring** and section **8.2.1 Environmental Conditions**.

Table 8. Current Data Summary Statistics for Brier Island

Distance from Bottom (m)	Distance from Surface (m)	Speed							Direction
		Most Frequent (cm/s)	Minimum (cm/s)	Average (cm/s)	Maximum (cm/s)	< 7.0 cm/s (%)	< 35.0 cm/s (%)	> 56.0 cm/s (%)	Highest Frequency (°)
3	**10**	21.0 - 28.0	0.4	26.3	62.6	6.7	71.5	0.5	165-175
4	**9**	28.0 - 35.0	0.4	27.1	65.1	6.6	69.8	1.0	165- 175
5	**8**	28.0 - 35.0	0.1	27.4	66.8	6.5	69.2	1.5	165-175
6	**7**	21.0 - 28.0	0.1	27.7	68.3	6.7	68.4	1.7	165-175
7	**6**	21.0 - 28.0	0.4	27.7	69.3	6.5	68.6	1.7	165-175
8	**5**	21.0 - 28.0	0.6	27.9	68.3	6.4	70.6	2.0	165-175
Depth Averaged		**21.0 - 28.0**	**0.1**	**27.3**	**69.3**	**6.5**	**69.3**	**1.4**	**165-175**

4.1.6 Salinity

KCS reported salinities for the Brier Island site between 30 and 32‰, indicating salinity at the existing, successful aquaculture site is tolerable for Atlantic salmon. According to the monthly average salinity data gathered in 2019 at the Fisheries and Oceans Canada AZMP Prince 5 station (Bay of Fundy), salinity ranges between 29.5 and 32.5‰ (Fig. 28; Hebert et al. 2021). In general, salinity is lowest in April to June and highest between the months of August to December. Figure 29 illustrates sea-surface seasonal salinities in Maritime waters (Copernicus Programme). In general, salinities are stable around Brier Island and exhibit an approximate range of 30 to 32 ppt.

Figure 28. 2019 Contour Plot of Salinity of Prince 5 Station (Bay of Fundy)
Note: Graph was obtained from the Hebert et al. (2021)

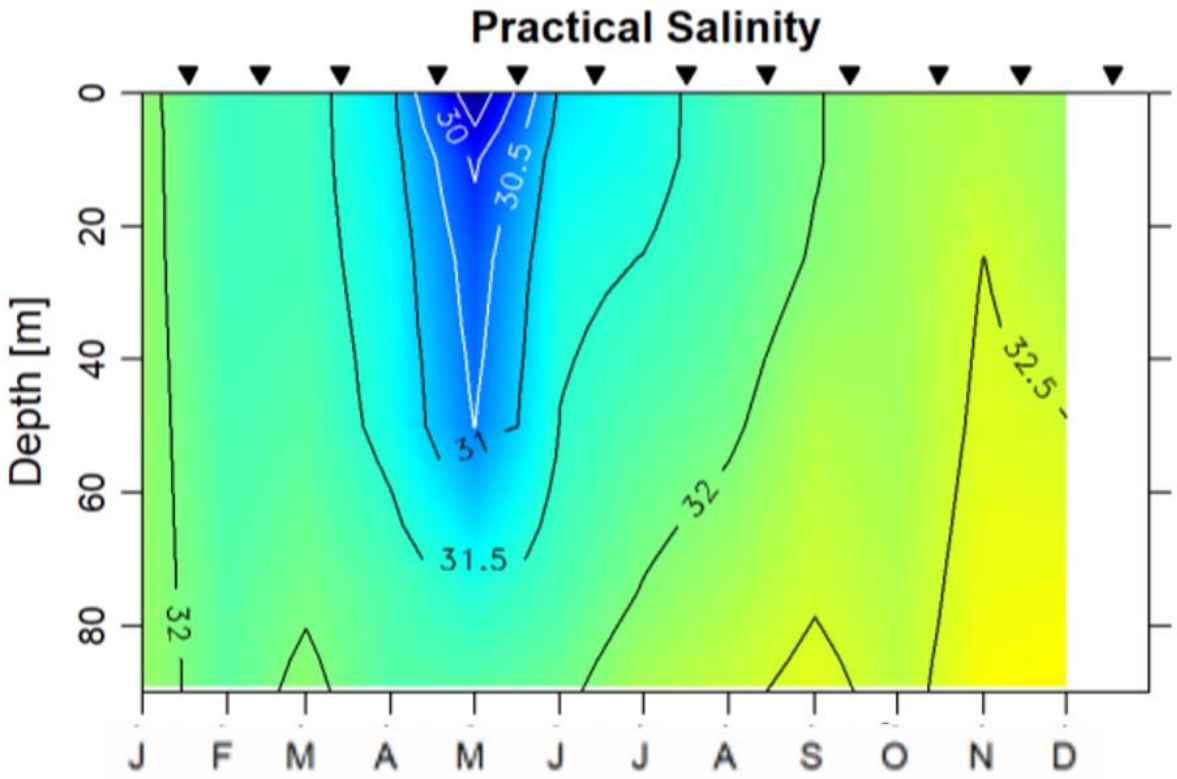
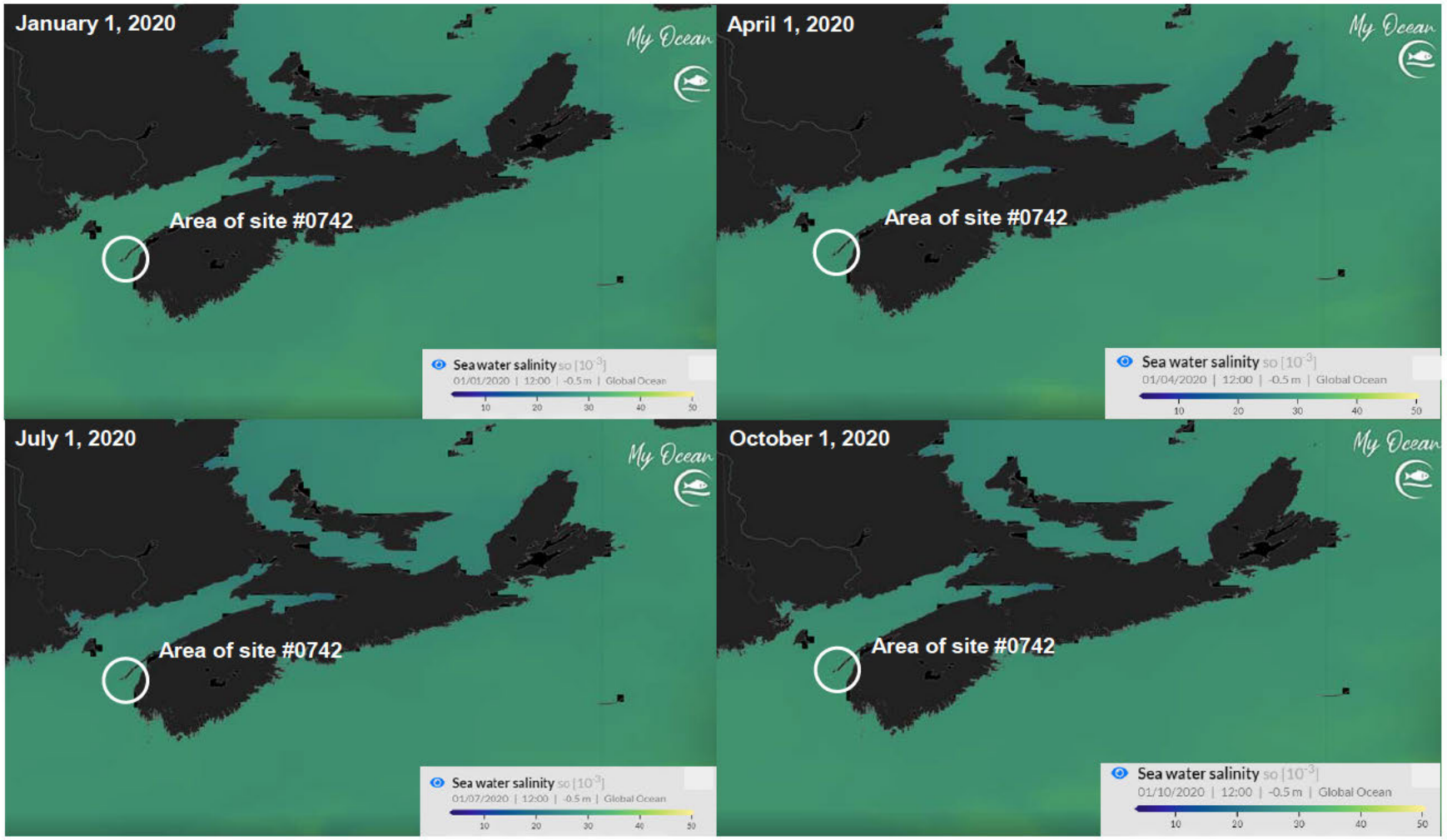


Figure 29. Seasonal Sea-surface Salinities in Maritime Waters
Note: Images were obtained from the Copernicus Marine Environment Monitoring Service, My Ocean visualization tool, Blue Ocean, salinity (Copernicus 2021).



4.1.7 Temperature

Temperatures at the Brier Island aquaculture site were recorded and collected by KCS between the dates April 2020 and June 2021. The minimum water temperature experienced was approximately 3.6˚C, which occurred in March 2021. The maximum temperature recorded was approximately 17.4°C in July 2020. The next highest temperature occurred in August 2020 with a recording of 13.8°C. Figure 30 displays water temperature trends from the most recent production cycle at the Brier Island site. The existing, successful, aquaculture site at Brier Island would indicate that the temperatures around Digby Neck are tolerable for Atlantic salmon.

The effects of superchill can be detrimental to fish health and may result in high mortalities. Superchill is a phenomenon caused by the cooling of seawater below the lethal temperature for Atlantic salmon (i.e., -0.75˚C). Although cold temperatures cannot be entirely avoided in a northern climate, the effects of superchill may be diminished by fitting the cages with deep nets and locating cage systems in deep enough water that the fish may avoid the surface water layer, which, in winter, tends to be colder than deeper water. Other mitigation strategies include avoiding stress in the fish by ceasing feeding and other activities at the cage site. These activities excite the fish and bring them up to the surface where the water is colder. KCS does not approach their cage sites or feed stock during time periods when superchill is a potential threat. Refer to section **2.1.9 KCS Mitigation Strategy** for additional information.

Sea ice is typically not a problem in The Bay of Fundy. While there is no data showing for the thirty-year frequency of presence of sea ice (Fig. 31) or the median of predominant ice type (Fig. 30) for the Bay of Fundy, a search of the Canadian Ice Service archives revealed that ice is typically confined to the head of the Bay (i.e., Minas Basin and Chignecto Bay). Only rarely does sea ice form in St. Mary's Bay, and, even then, it typically occurs further into the bay than Brier Island. Both figures 31 and 32 illustrate the thirty-year averages for the week of January 29, the week that appears to have the most sea-ice coverage in Nova Scotia. KCS has no intentions of deploying equipment, such as ice booms, near the proposed site. KCS does, however, continuously monitor for sea ice during winter months and will take necessary precautions, if needed. Freezing spray may occasionally build up on cage structures during extreme winter conditions. When ice build-up is a concern, it can be removed by site crews.

Refer to section **4.1.9 KCS Mitigation Strategy** for additional information.

Figure 30. Daily Water Temperature Data from the Brier Island Aquaculture Site #0742

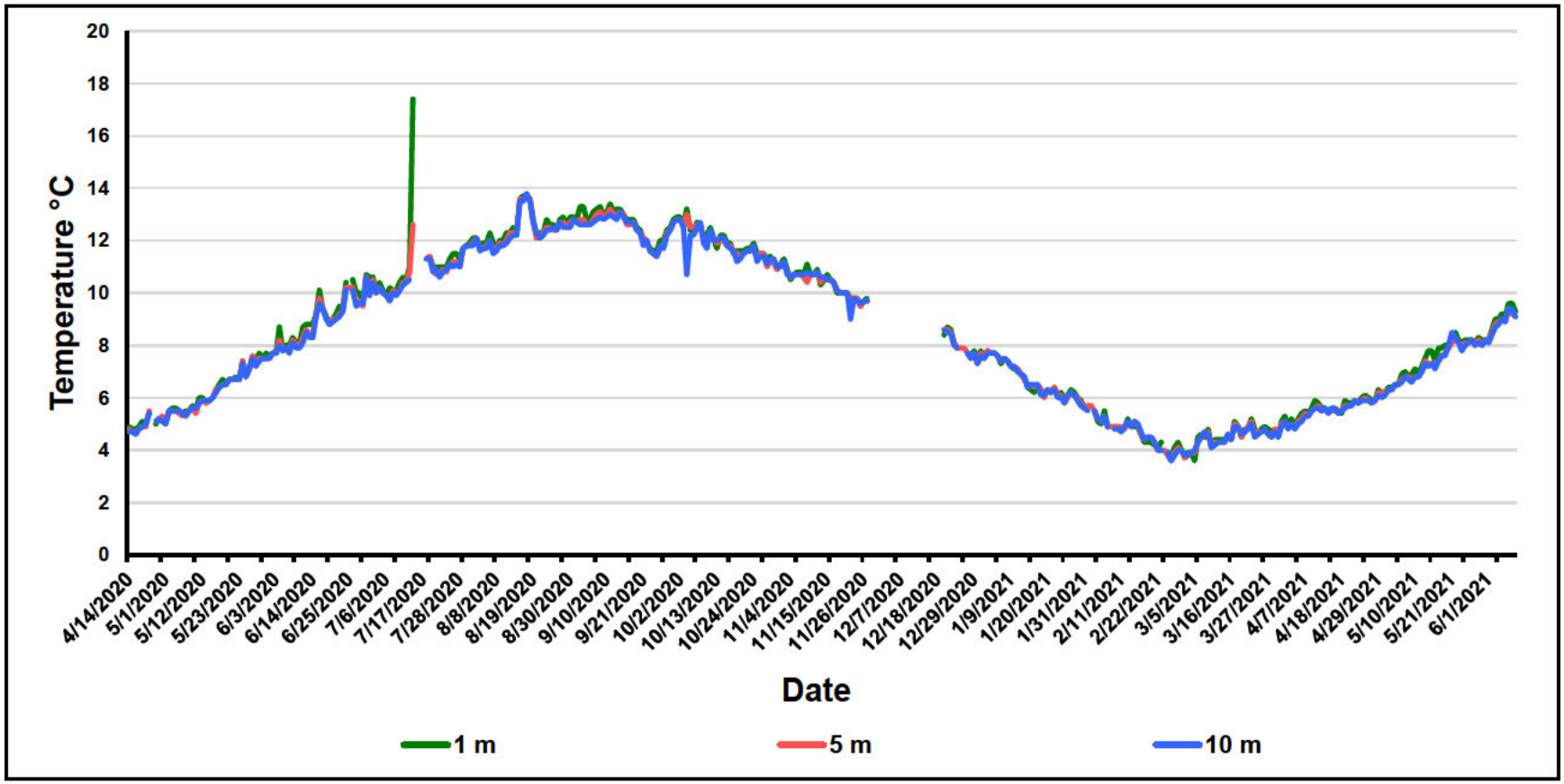


Figure 31. Frequency of Presence of Sea Ice in Atlantic Canada
Note: Figure sourced from Government of Canada (2020a)

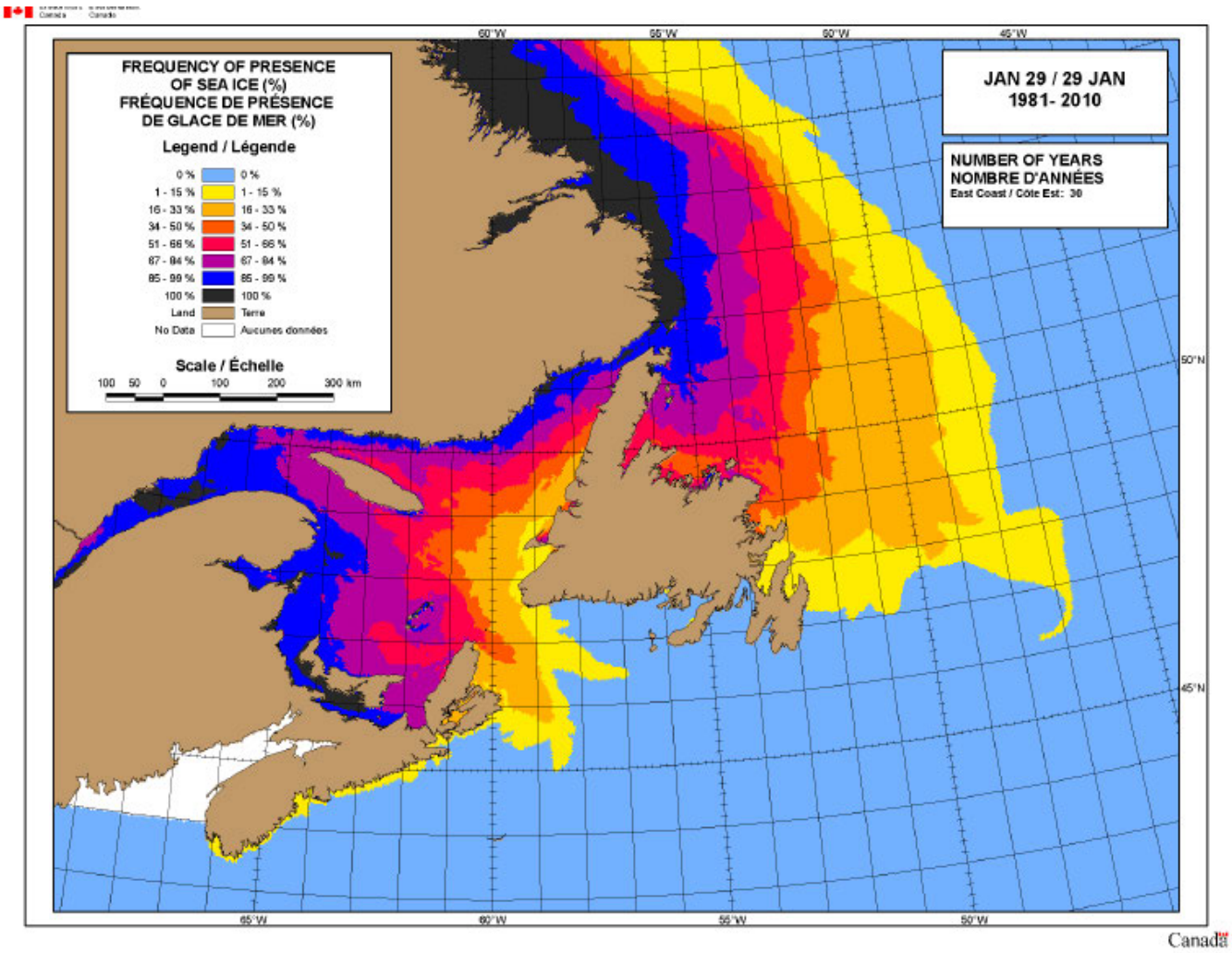
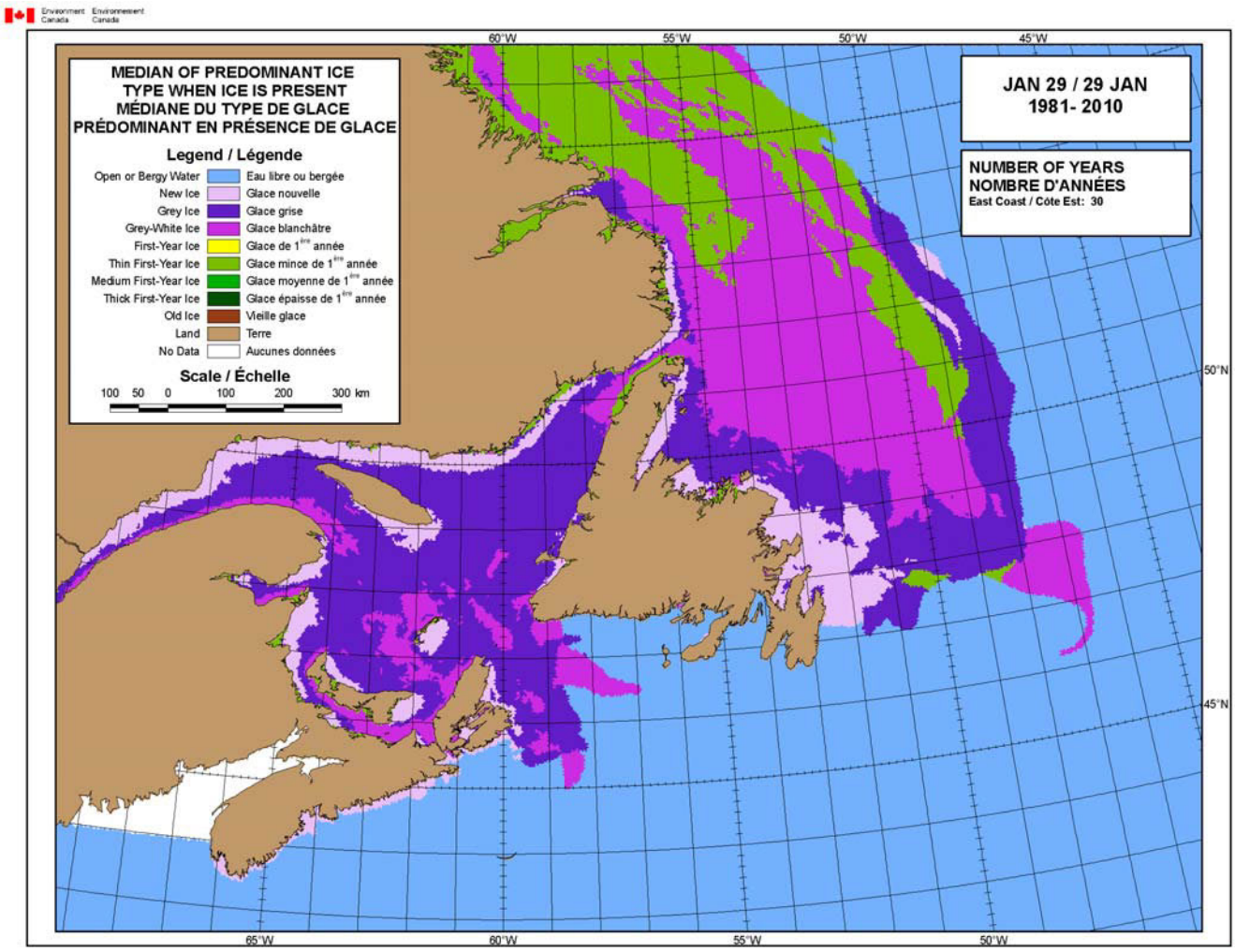


Figure 32. Median of Predominant Ice Type in Atlantic Canada
Note: Figure sourced from Government of Canada (2020a)



4.1.8 Oxygen

Sea-surface dissolved-oxygen (DO) data presented in Figure 33 are from the Copernicus Programme - My Ocean visualization tool (Copernicus 2021). The two satellite images are from the year 2021 and show the dates of highest and lowest DO. Off Brier Island on April 16, 2021, sea-surface DO was 341 mmol/m^3 (10.9 mg/L), and on August 25, DO was 261 mmol/m^3 (8.3 mg/L).

DO concentrations at the Brier Island aquaculture site were recorded by KCS staff during site operations from 2020 to 2021. The minimum DO value recorded was approximately 6.78 mg/L in July 2020 and the maximum was approximately 11.49 mg/L in April 2020. For adult salmon, the lower limit of DO for optimal growth is generally accepted as 6 mg/L. The Brier Island site typically displays DO values well above this threshold. Figure 34 displays DO-concentration trends from the most-recent production cycle at Brier Island. Refer to section **4.1.9 KCS Mitigation Strategy** for additional information.
SW2016-058

Figure 33. Extremes in Sea-surface Dissolved Oxygen in Maritime Waters
Note: Images were obtained from the Copernicus Marine Environment Monitoring Service, My Ocean visualization tool, Green Ocean, dissolved oxygen (Copernicus 2021).

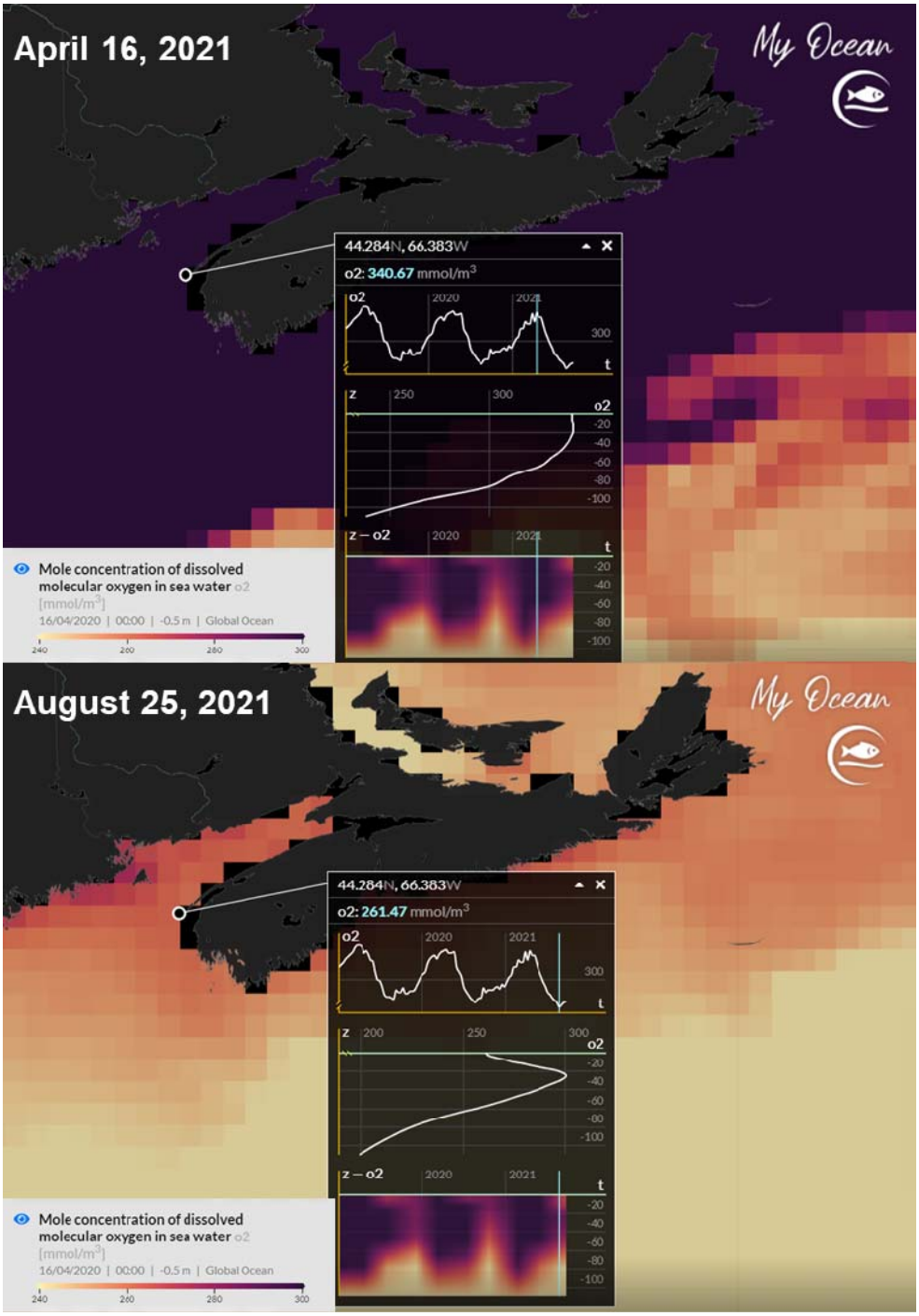
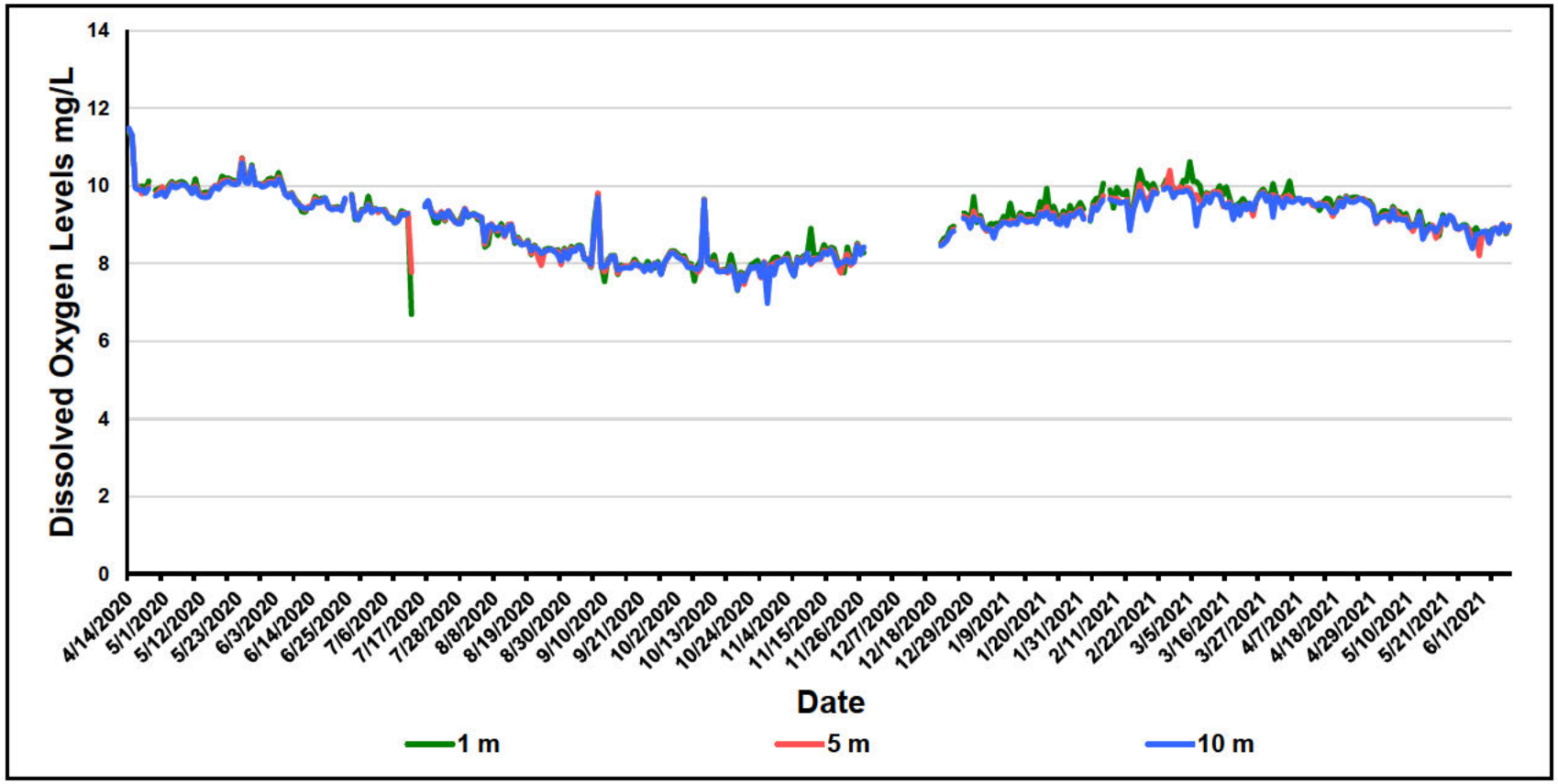


Figure 34. Dissolved-oxygen Concentration at the Brier Island Aquaculture Site #0742



4.1.9 KCS Mitigation Strategy

Water quality is monitored because of the uncertainty of natural cycles and processes such as season, thermoclines, weather, haloclines, algal blooms, etc. Monitoring specific water parameters will aid the producer in preparedness for dealing with fish health and will assist with feeding regimes. Mitigative actions will be taken when conditions are less than optimum. KCS will monitor oxygen and temperature daily unless weather conditions do not permit water-quality monitoring.

Requirements for water-quality monitoring and mitigation strategies are contained in the site-specific FMP, which is reviewed annually and amended after every production cycle. Table 9 describes the requirements for water-quality monitoring and the NSDFA-approved mitigation strategies.

KCS uses Fishtalk, a software system, to track water-quality parameters such as oxygen, temperature, and turbidity, as well other records including inventory (biomass, fish number, average weight), feeding (type and quantity), and fish density.

Table 9. Water Quality Monitoring Requirements and Approved Mitigation Strategies

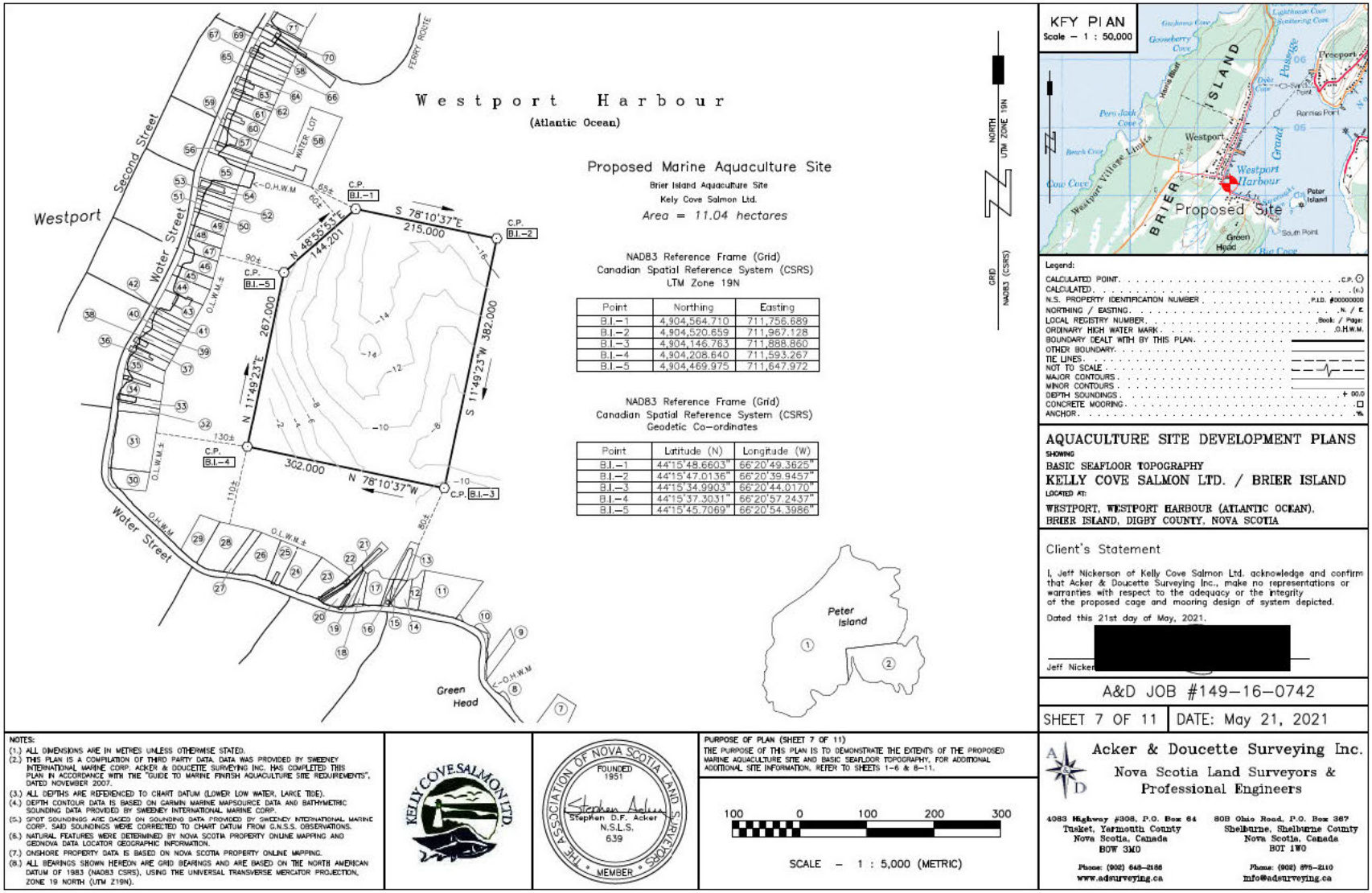
Parameter	Monitoring Requirements	Mitigation Threshold	Mitigation
Dissolved Oxygen	• Measured at 1-, 5-, and 10-m (or bottom of net) depths inside at least one stocked cage, at least once daily • Measured at 1-, 5-, and 10-m depths outside the cages, at least once daily • Daily record keeping	• When oxygen readings fall below 7.0 mg/L • Additional measures when readings fall below 6.0 mg/L	• Oxygen measures between 7.0 & 6.0 mg/L - Increase dissolved-oxygen monitoring to twice daily or more - Limit activity in the cages (reduce mort dives to once weekly if mort rates are < 0.05% per day, limit cage repairs/maintenance to essential work only) - Increase net cleaning activity if biofouling is an issue. • Oxygen measures below 6.0 mg/L - All measures listed above - Cease feeding - Attempt to determine cause of low dissolved oxygen
Temperature	• Measured at 1-, 5-, and 10-m (or bottom of net) depths, inside at least one stocked cage, at least once daily • Measured at 5-m depth outside the cages, at least once daily • Daily record keeping	• When temperature falls below 1.5˚C • When temperature rises above 14˚C	• Temperature below 1.0˚C - Limit activity in the cages (reduce mort dives to once weekly if mort rates are < 0.05% per day, limit cage repairs/maintenance to essential work only) - Cease feeding - Temperatures of 1.5 – 1.0˚C require caution and site-specific assessment. For sustained periods below 1.0˚C, maintenance rations may be assigned. • Temperature rises above 14˚C - Temperatures > 14.0˚C will affect consumption and need to be evaluated in conjunction with oxygen readings. Site specific protocols will be implemented, and guidelines established at temperatures > 15.0˚C. • Temperature rises above 18˚C - Oxygen supplementation if oxygen falls below 60% - Increase dive frequency to monitor mortality rates and health of the stocked fish - Adjust or stop feeding to reduce fish stress

Algae	Each site has its own risk of algal blooms; therefore, monitoring requirements are determined on a site-by-site basis, using history and best available knowledge as a gauge to establish the protocols Algal monitoring will take place at the site on a weekly basis from May to October: -the water samples are collected by the Site Manager at the surface of the water near the center of the farm -sample may be stored on ice depending on delivery time to Bridgewater -trained staff in Bridgewater will analyze and record algae with results sent to the Senior Fish Health Technician for review.	• When mortality is greater than 0.05% per day in the presence of a change in water turbidity, clarity, or colour there may be an effect of algal levels on the stock. Other indicators may include fish swimming or finning at the surface	• During plankton blooms, fish should not be fed, and site activity should be limited to decrease the fish's attention at the surface where the highest concentrations of plankton can be found during the day. Saltwater Management will advise on the mitigation practices based on the plankton identified. • Other mitigation strategies may include - Increased dive frequency - Increased algal monitoring - Investigation of cause of elevated mortality - Adjusted feeding schedules

4.1.10 Bathymetry

Basic seafloor topography around the Brier Island aquaculture site is present in Figure 35. Section **4.2 Baseline Monitoring** provides additional information.

Figure 35. Bathymetry of Site #0742 Shown with 2-m Isobaths



4.2 Baseline Monitoring

A baseline survey of the proposed lease area was conducted on December 5 and 10, 2018. The baseline survey report is entitled Brier Island Baseline Assessment Report and dated May 4, 2022 (**Appendix B**). The baseline survey was conducted in accordance with the NSDFA Standard Operating Procedures for the Environmental Monitoring of Marine Aquaculture in Nova Scotia (2021e) and the *Aquaculture Activities Regulations* (Government of Canada 2021c) Sections 8 and 9. Specifically, *Annex 7* in the *Aquaculture Activities Regulations* Guidance Document (Government of Canada 2018a) and *Section I: Survey for baseline information for new sites and expansion of existing sites* in the *Aquaculture Activities Regulations* Monitoring Standard state the federal government requirements for baseline monitoring (Government of Canada 2018b). It should be noted that at the time of the baseline monitoring, the 2018 version of the NSDFA Standard Operating Procedures was followed. There were no significant changes made to the way baseline environmental data was collected between 2018 and 2021.

4.3 Site Design

The Brier Island site was designed with acknowledgement of local conditions, including bathymetry, oceanographic conditions, and the benthic environment. Additional information was gathered during the baseline survey and is presented in sections **4.1.5 Currents**, **4.1.10 Bathymetry**, **4.2 Baseline Monitoring**, and **Appendix B Brier Island Baseline Assessment Report**. Details of the site design are presented in Figures 55 to 57 and section **7.2.3.1 Infrastructure**.

SECTION 5.0 THE OTHER USERS OF THE PUBLIC WATERS SURROUNDING THE PROPOSED AQUACULTURAL OPERATION

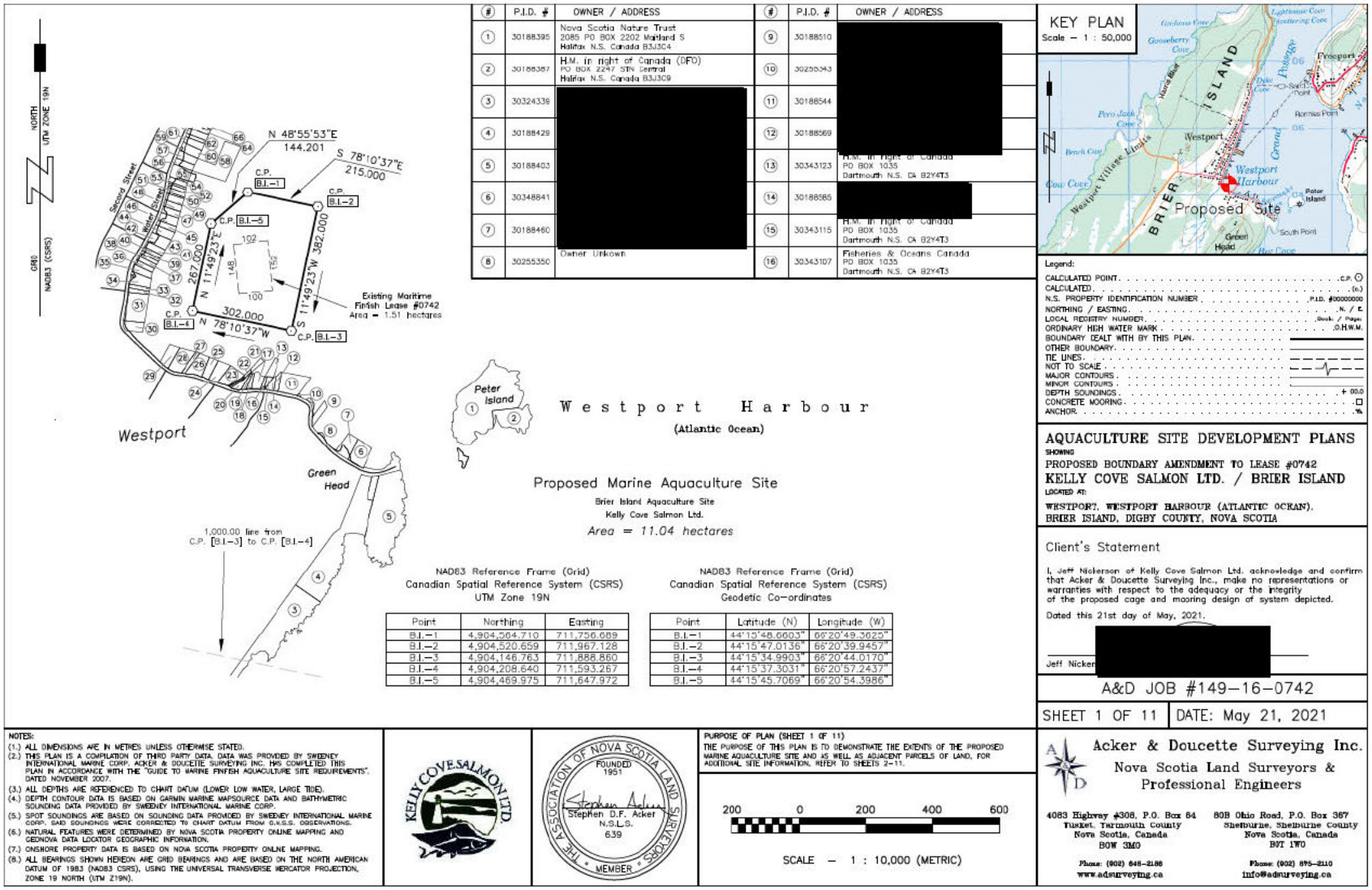
5.1 Description of Other Users

5.1.1 Adjacent Property Owners

Acker & Doucette Surveying produced aquaculture-site development plans, identifying adjacent property owners within 1,000 m of the proposed aquaculture lease for Brier Island #0742 (Figs. 36 to 41).

The proposed amendment will not adversely impact adjacent property owners or their access to the water.

Figure 36. Plan View of the Proposed Boundary Amendment of the Brier Island Aquaculture Site Showing Nearby Property Owners



#	P.I.D. #	OWNER / ADDRESS
1	30188395	Nova Scotia Nature Trust 2085 PO BOX 2202 Maitland S Halifax N.S. Canada B3J3C4
2	30188387	H.M. in right of Canada (DFO) PO BOX 2247 STN Central Halifax N.S. Canada B3J3C9
3	30324339	[redacted]
4	30188429	
5	30188403	
6	30348841	
7	30188460	
8	30255350	
9	30188510	[redacted]
10	30255343	
11	30188544	
12	30188569	
13	30343123	H.M. in right of Canada PO BOX 1035 Dartmouth N.S. CA B2Y4T3
14	30188585	[redacted]
15	30343115	H.M. in right of Canada PO BOX 1035 Dartmouth N.S. CA B2Y4T3
16	30343107	Fisheries & Oceans Canada PO BOX 1035 Dartmouth N.S. CA B2Y4T3

Point	Northing	Easting
B.I.–1	4,904,564.710	711,756.689
B.I.–2	4,904,520.659	711,967.128
B.I.–3	4,904,146.763	711,888.860
B.I.–4	4,904,208.640	711,593.267
B.I.–5	4,904,469.975	711,647.972

Point	Latitude (N)	Longitude (W)
B.I.–1	44°15'48.6603"	66°20'49.3625"
B.I.–2	44°15'47.0136"	66°20'39.9457"
B.I.–3	44°15'34.9903"	66°20'44.0170"
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3986"

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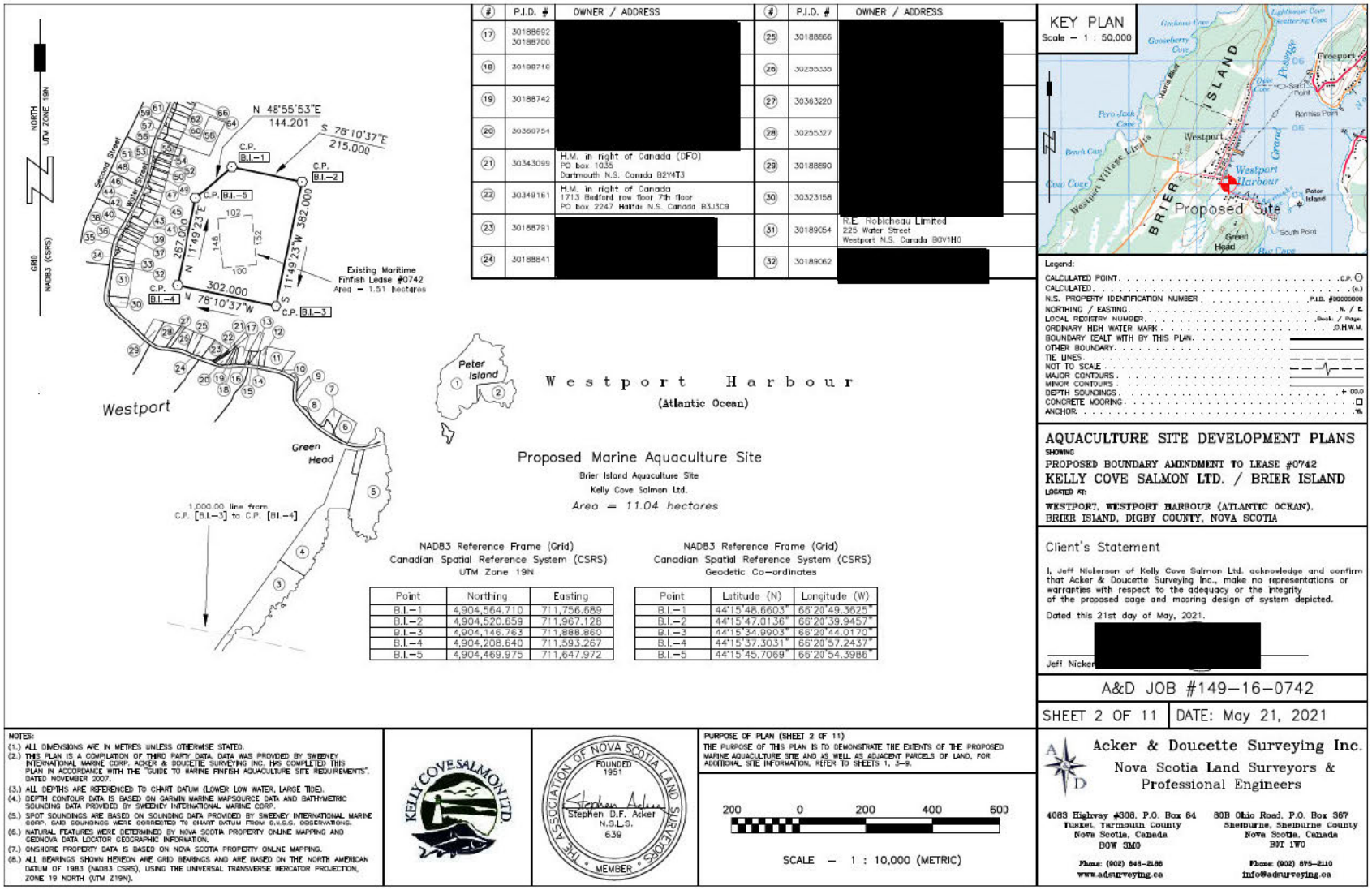
SW2016-058

Figure 37. Plan View of the Proposed Boundary Amendment of the Brier Island Aquaculture Site Showing Nearby Property Owners



#	P.I.D. #	OWNER / ADDRESS
17	30188692 30188700	[redacted]
18	30188718	
19	30188742	
20	30369754	
21	30343099	H.M. in right of Canada (DFO) PO box 1035 Dartmouth N.S. Canada B2Y4T3
22	30349161	H.M. in right of Canada 1713 Bedford row floor 7th floor PO box 2247 Halifax N.S. Canada B3J3C9
23	30188791	[redacted]
24	30188841	

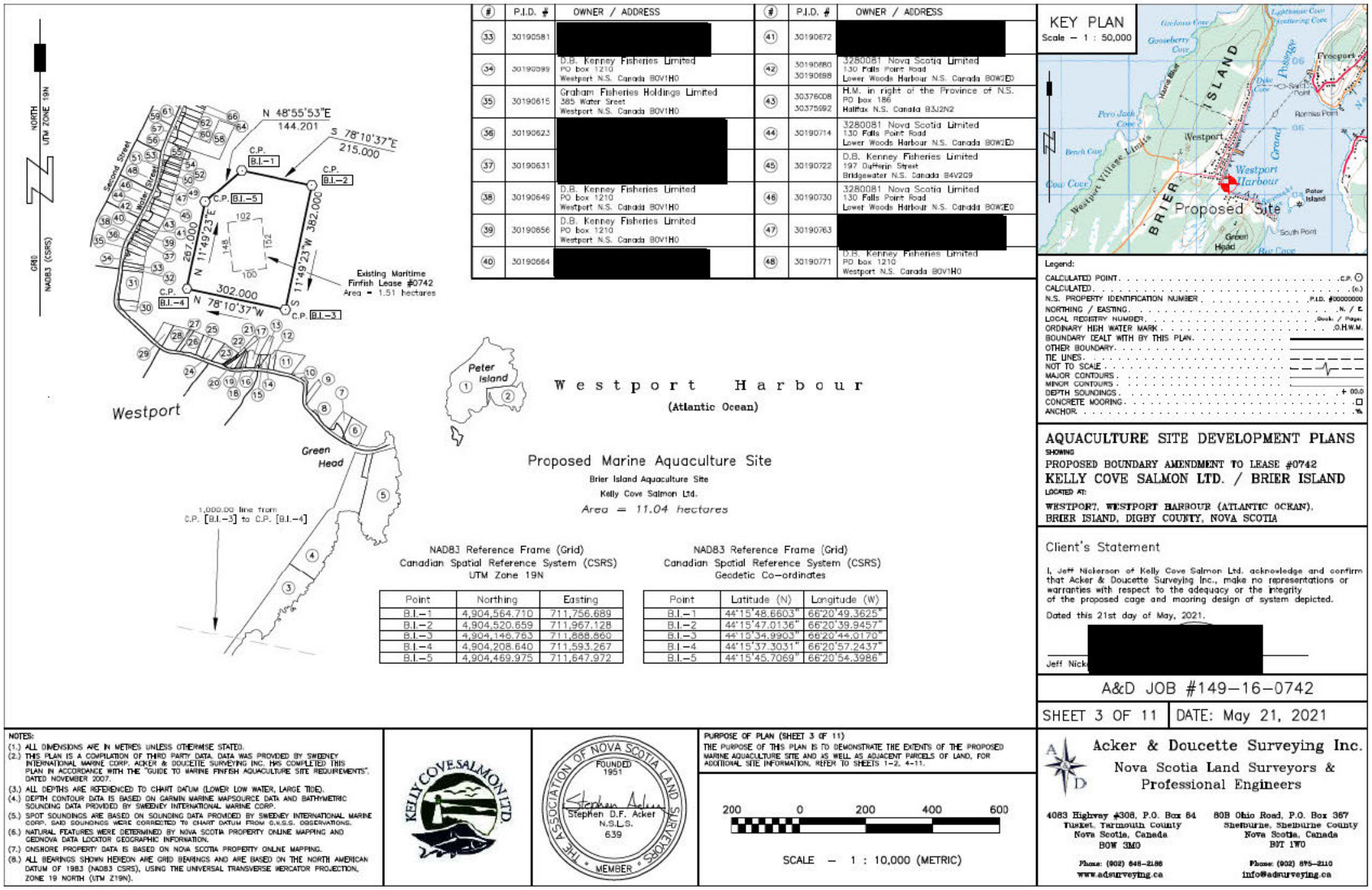
#	P.I.D. #	OWNER / ADDRESS
25	30188866	[redacted]
26	30255335	
27	30363220	
28	30255327	
29	30188890	
30	30323158	
31	30189054	R.E. Robicheau Limited 225 Water Street Westport N.S. Canada B0V1H0
32	30189062	[redacted]

Point	Northing	Easting
B.I.-1	4,904,564.710	711,756.689
B.I.-2	4,904,520.659	711,967.128
B.I.-3	4,904,146.763	711,888.860
B.I.-4	4,904,208.640	711,593.267
B.I.-5	4,904,469.975	711,647.972

Point	Latitude (N)	Longitude (W)
B.I.-1	44°15'48.6603"	66°20'49.3625"
B.I.-2	44°15'47.0136"	66°20'39.9457"
B.I.-3	44°15'34.9903"	66°20'44.0170"
B.I.-4	44°15'37.3031"	66°20'57.2437"
B.I.-5	44°15'45.7069"	66°20'54.3986"

SW2016-058

Figure 38. Plan View of the Proposed Boundary Amendment of the Brier Island Aquaculture Site Showing Nearby Property Owners



#	P.I.D. #	OWNER / ADDRESS
33	30190581	[redacted]
34	30190599	D.B. Kenney Fisheries Limited PO box 1210 Westport N.S. Canada B0V1H0
35	30190615	Graham Fisheries Holdings Limited 385 Water Street Westport N.S. Canada B0V1H0
36	30190623	[redacted]
37	30190631	[redacted]
38	30190649	D.B. Kenney Fisheries Limited PO box 1210 Westport N.S. Canada B0V1H0
39	30190656	D.B. Kenney Fisheries Limited PO box 1210 Westport N.S. Canada B0V1H0
40	30190664	[redacted]
41	30190672	[redacted]
42	30190680 30190698	3280081 Nova Scotia Limited 130 Falls Point Road Lower Woods Harbour N.S. Canada B0W2E0
43	30376008 30375592	H.M. in right of the Province of N.S. PO box 186 Halifax N.S. Canada B3J2N2
44	30190714	3280081 Nova Scotia Limited 130 Falls Point Road Lower Woods Harbour N.S. Canada B0W2E0
45	30190722	D.B. Kenney Fisheries Limited 197 Dufferin Street Bridgewater N.S. Canada B4V2G9
46	30190730	3280081 Nova Scotia Limited 130 Falls Point Road Lower Woods Harbour N.S. Canada B0W2E0
47	30190763	[redacted]
48	30190771	D.B. Kenney Fisheries Limited PO box 1210 Westport N.S. Canada B0V1H0

Point	Northing	Easting
B.I.-1	4,904,564.710	711,756.689
B.I.-2	4,904,520.659	711,967.128
B.I.-3	4,904,146.763	711,888.660
B.I.-4	4,904,208.640	711,593.267
B.I.-5	4,904,469.975	711,647.972

Point	Latitude (N)	Longitude (W)
B.I.-1	44°15'48.6603"	66°20'49.3625"
B.I.-2	44°15'47.0136"	66°20'39.9457"
B.I.-3	44°15'34.9903"	66°20'44.0170"
B.I.-4	44°15'37.3031"	66°20'57.2437"
B.I.-5	44°15'45.7069"	66°20'54.3986"

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(5.) SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
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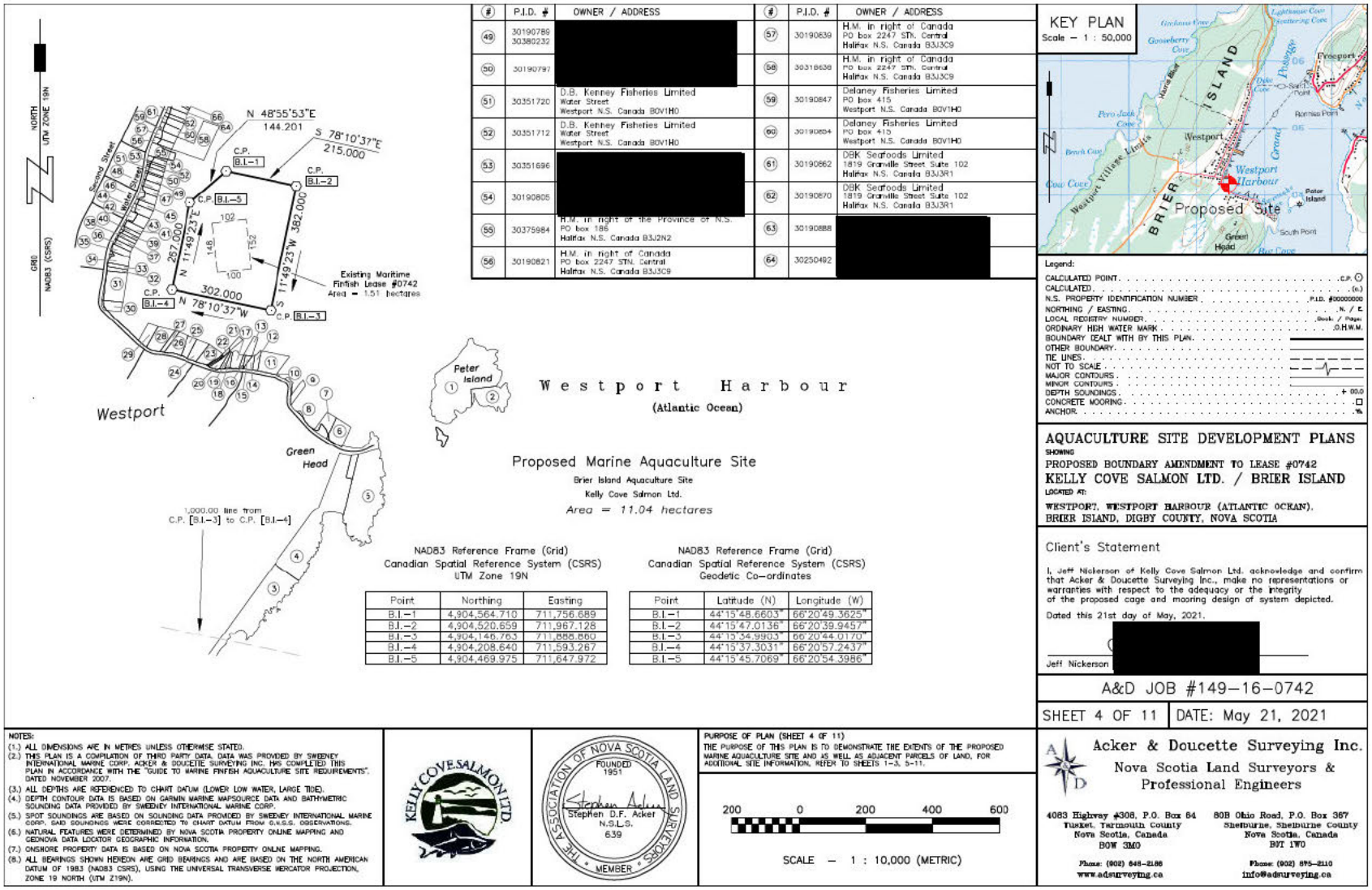
SW2016-058

Figure 39. Plan View of the Proposed Boundary Amendment of the Brier Island Aquaculture Site Showing Nearby Property Owners



#	P.I.D. #	OWNER / ADDRESS
49	30190789 30380232	[redacted]
50	30190797	[redacted]
51	30351720	D.B. Kenney Fisheries Limited Water Street Westport N.S. Canada B0V1H0
52	30351712	D.B. Kenney Fisheries Limited Water Street Westport N.S. Canada B0V1H0
53	30351696	[redacted]
54	30190805	[redacted]
55	30375984	H.M. in right of the Province of N.S. PO box 186 Halifax N.S. Canada B3J2N2
56	30190821	H.M. in right of Canada PO box 2247 STN. Central Halifax N.S. Canada B3J3C9

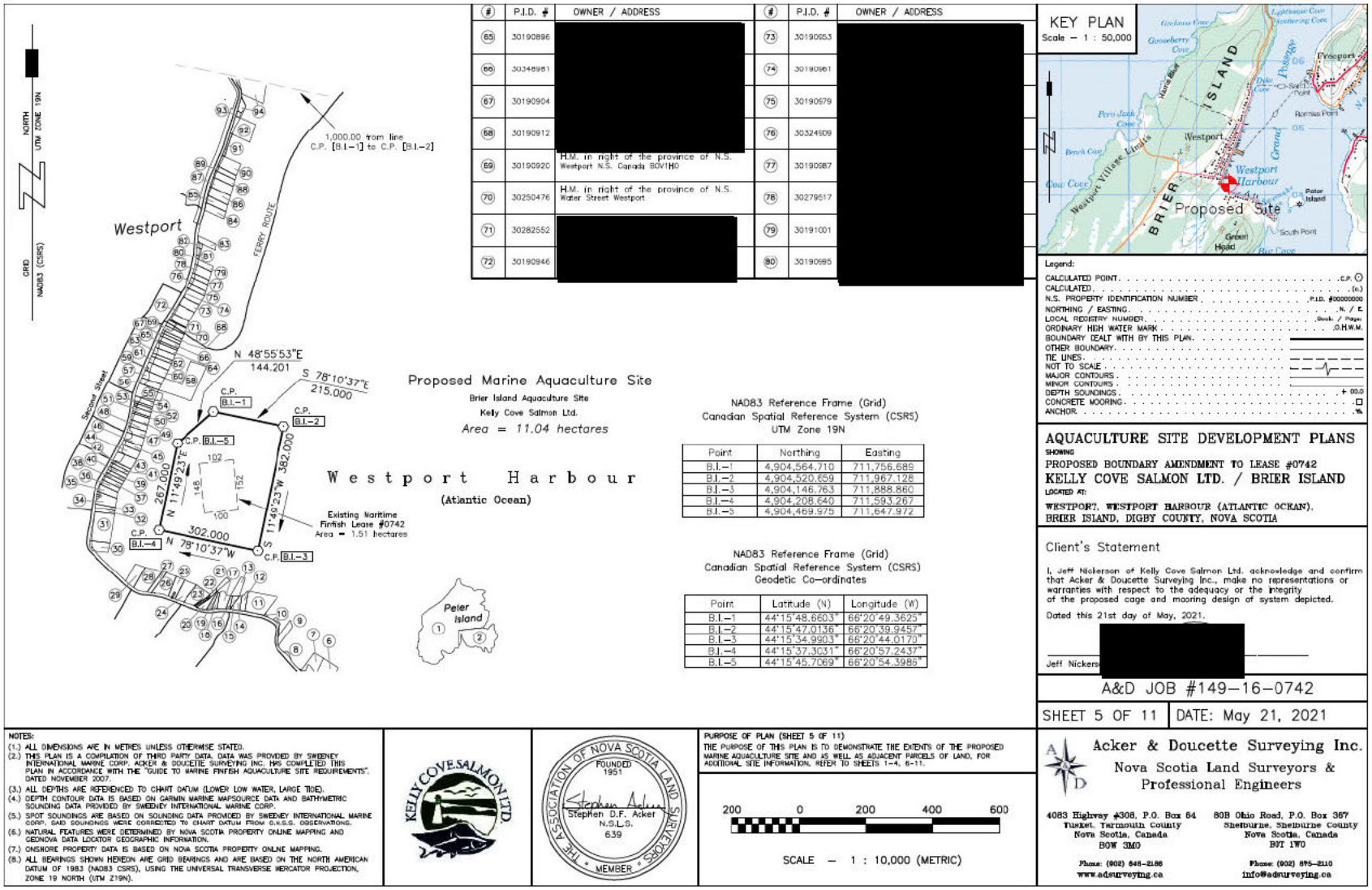
#	P.I.D. #	OWNER / ADDRESS
57	30190839	H.M. in right of Canada PO box 2247 STN. Central Halifax N.S. Canada B3J3C9
58	30318638	H.M. in right of Canada PO box 2247 STN. Central Halifax N.S. Canada B3J3C9
59	30190847	Delaney Fisheries Limited PO box 415 Westport N.S. Canada B0V1H0
60	30190854	Delaney Fisheries Limited PO box 415 Westport N.S. Canada B0V1H0
61	30190862	DBK Seafoods Limited 1819 Granville Street Suite 102 Halifax N.S. Canada B3J3R1
62	30190870	DBK Seafoods Limited 1819 Granville Street Suite 102 Halifax N.S. Canada B3J3R1
63	30190888	[redacted]
64	30250492	[redacted]

Point	Northing	Easting
B.I.–1	4,904,564.710	711,756.689
B.I.–2	4,904,520.659	711,967.128
B.I.–3	4,904,146.763	711,855.860
B.I.–4	4,904,208.640	711,593.267
B.I.–5	4,904,469.975	711,647.972

Point	Latitude (N)	Longitude (W)
B.I.–1	44°15'48.6603"	66°20'49.3625"
B.I.–2	44°15'47.0136"	66°20'39.9457"
B.I.–3	44°15'34.9903"	66°20'44.0170"
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3986"

SW2016-058

Figure 40. Plan View of the Proposed Boundary Amendment of the Brier Island Aquaculture Site Showing Nearby Property Owners



#	P.I.D. #	OWNER / ADDRESS
65	30190896	[redacted]
66	30348981	
67	30190904	
68	30190912	
69	30190920	H.M. in right of the province of N.S. Westport N.S. Canada B0V1H0
70	30250476	H.M. in right of the province of N.S. Water Street Westport
71	30282552	[redacted]
72	30190946	

#	P.I.D. #	OWNER / ADDRESS
73	30190953	[redacted]
74	30190961	
75	30190979	
76	30324509	
77	30190987	
78	30279517	
79	30191001	
80	30190995	

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 19N

Point	Northing	Easting
B.I.–1	4,904,564.710	711,756.689
B.I.–2	4,904,520.659	711,967.128
B.I.–3	4,904,146.763	711,888.860
B.I.–4	4,904,208.640	711,593.267
B.I.–5	4,904,469.975	711,647.972

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co–ordinates

Point	Latitude (N)	Longitude (W)
B.I.–1	44°15'48.6603"	66°20'49.3625"
B.I.–2	44°15'47.0136"	66°20'39.9457"
B.I.–3	44°15'34.9903"	66°20'44.0170"
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3985"

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(5.) SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
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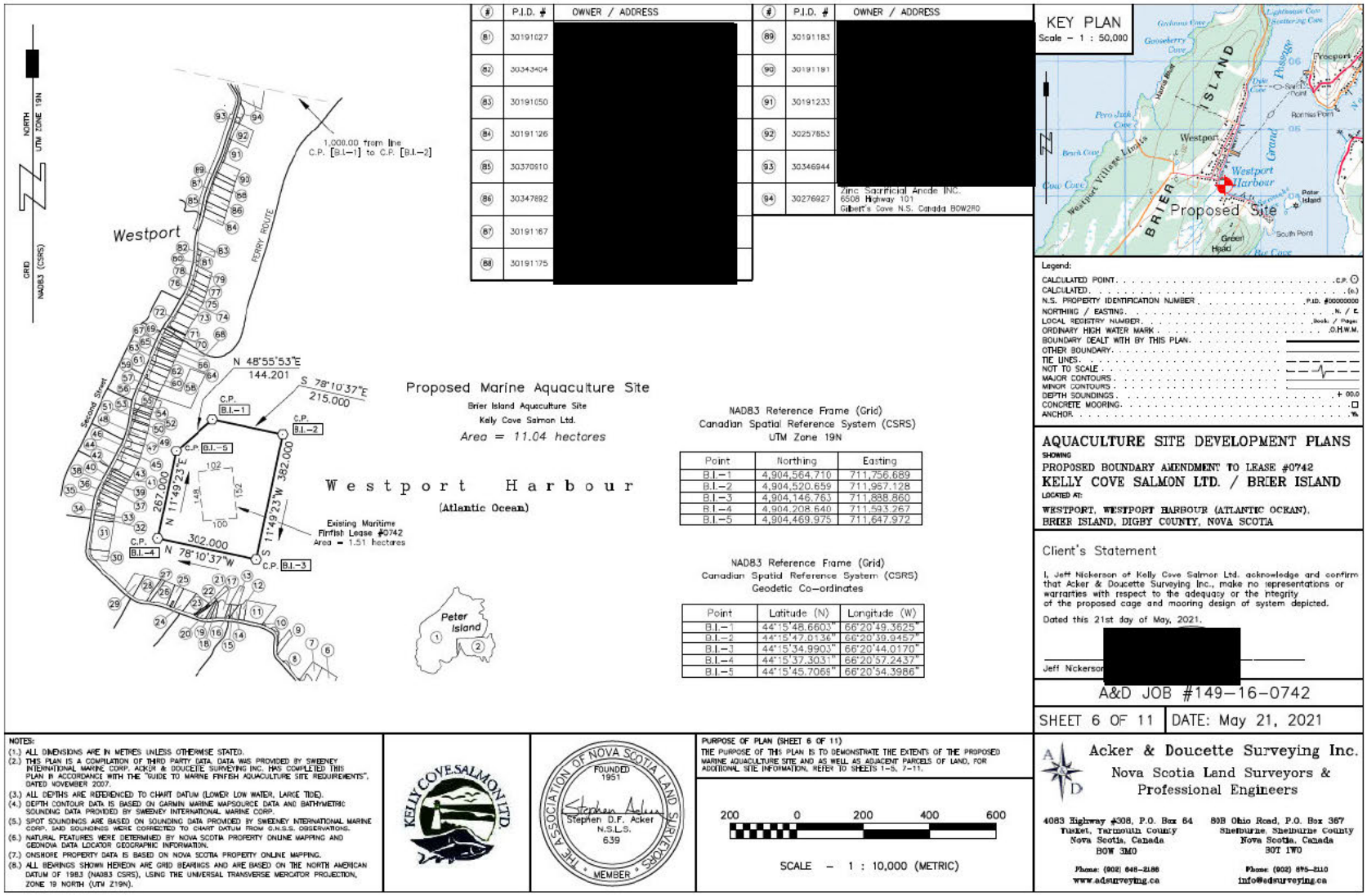
PURPOSE OF PLAN (SHEET 5 OF 11)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1–4, 6–11.

4083 Highway #308, P.O. Box 64, Tusket, Yarmouth County, Nova Scotia, Canada, B0W 3M0. Phone: (902) 648–2186. www.adsurveying.ca
808 Ohio Road, P.O. Box 367, Shelburne, Shelburne County, Nova Scotia, Canada, B0T 1W0. Phone: (902) 875–2110. info@adsurveying.ca

Figure 41. Plan View of the Proposed Boundary Amendment of the Brier Island Aquaculture Site Showing Nearby Property Owners



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5.1.2 Pleasure Craft and Commercial Vessels

Within 10 km of the Brier Island site, there are four (4) active small-craft harbours (Fig. 42). Fish Point, Northeast Cove, South Cove, and the Westport Government Wharves are small-craft harbours maintained by DFO (Government of Canada 2020b).

The Grand Passage ferry route is located north of the site. The self-propelled ferry travels between Freeport and Westport. It is a 24-hour, on-demand service, departing Westport 25 minutes past the hour (Nova Scotia Canada 2021a). The ferry route is outlined in Figure 43.

All pleasure craft and commercial vessels must abide by navigation buoys and markers. The general route to enter and exit Grand Passage and navigational aids are presented in Figures 44 and 45.

Refer to section **8.2.2 Boat Traffic and Wharves** for additional information.

Figure 42. Current Wharves and Boat Landings near Brier Island Aquaculture Site

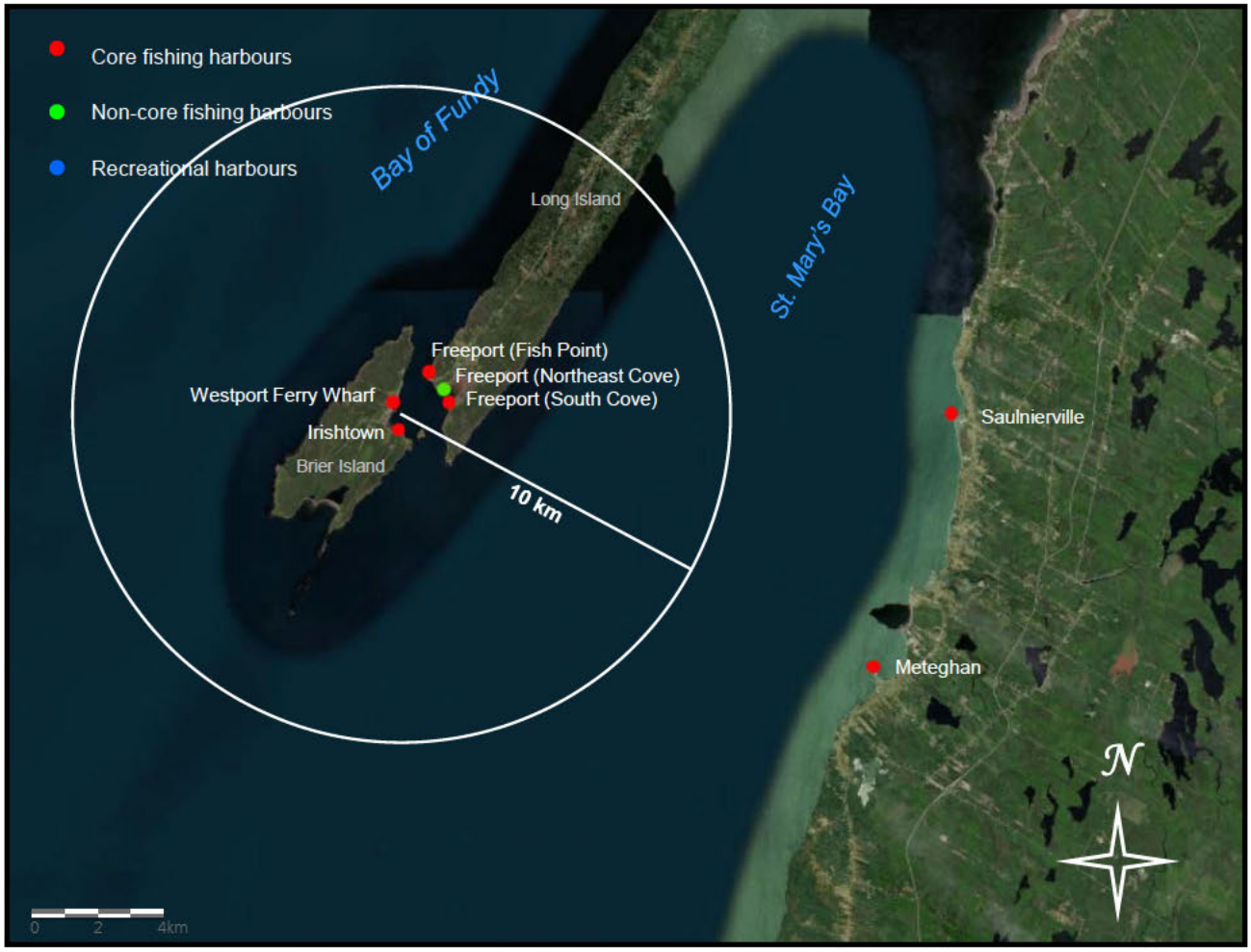


Figure 43. Ferry Route Between Westport and Freeport, Nova Scotia

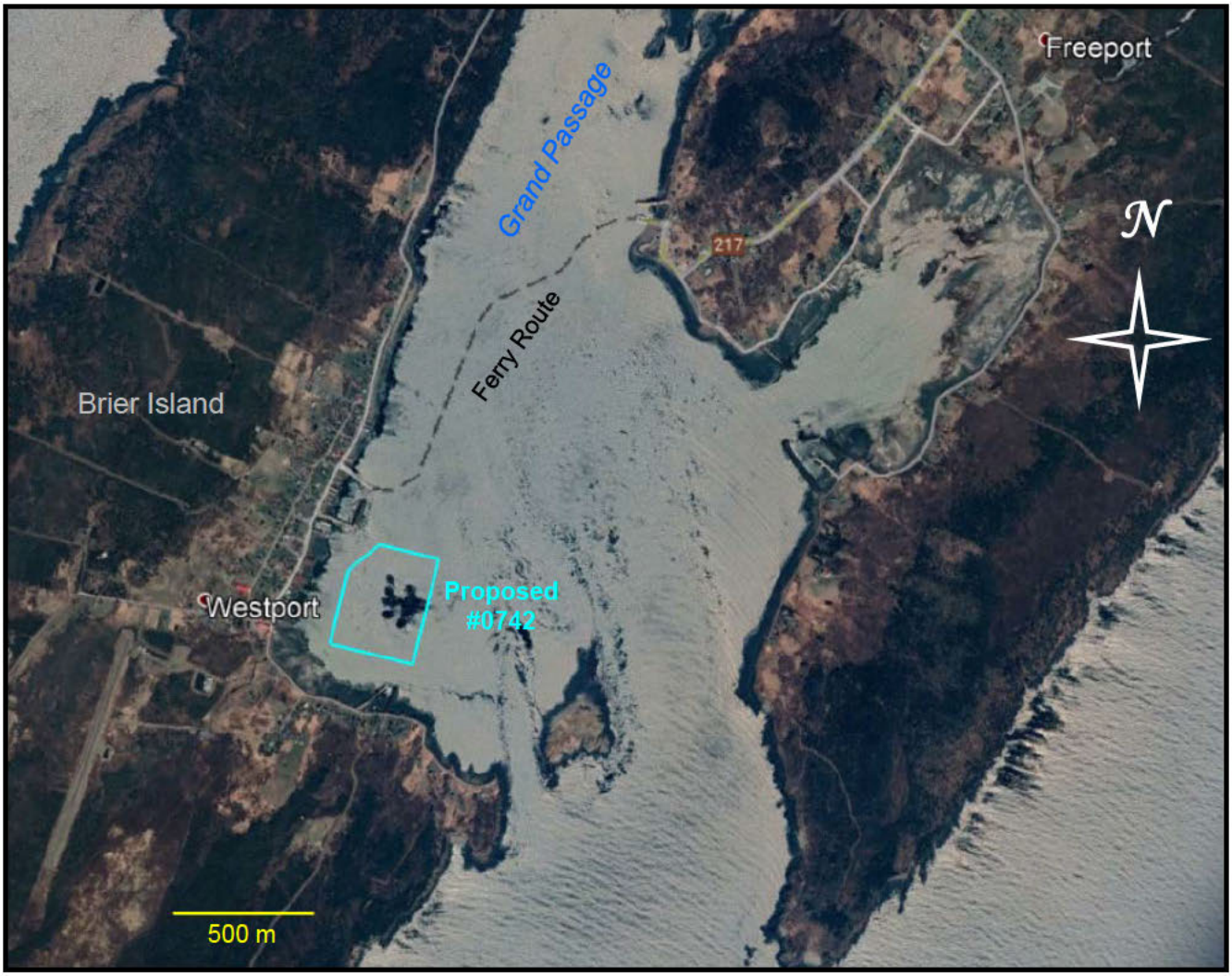


Figure 44. Main Vessel Traffic in Grand Passage

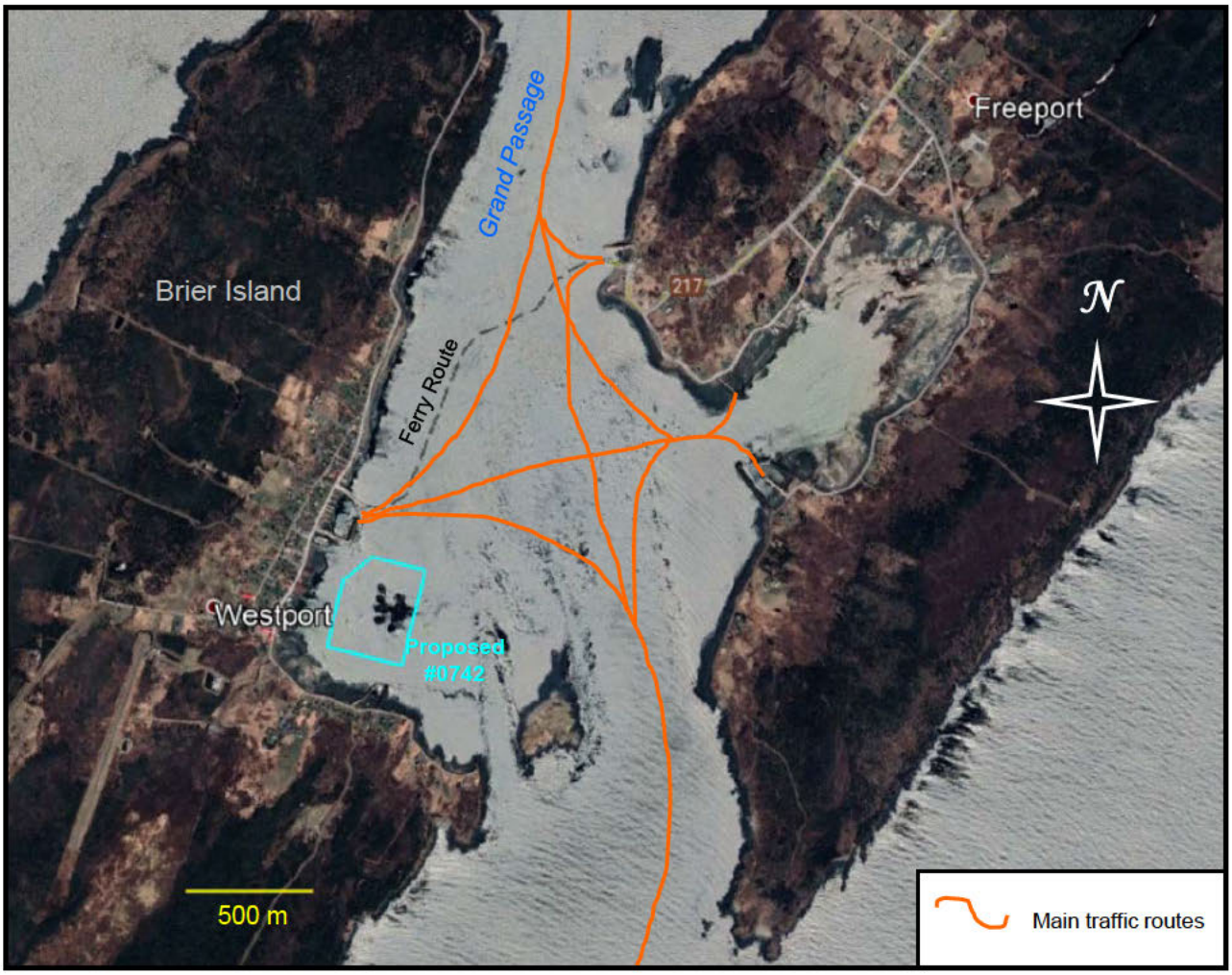
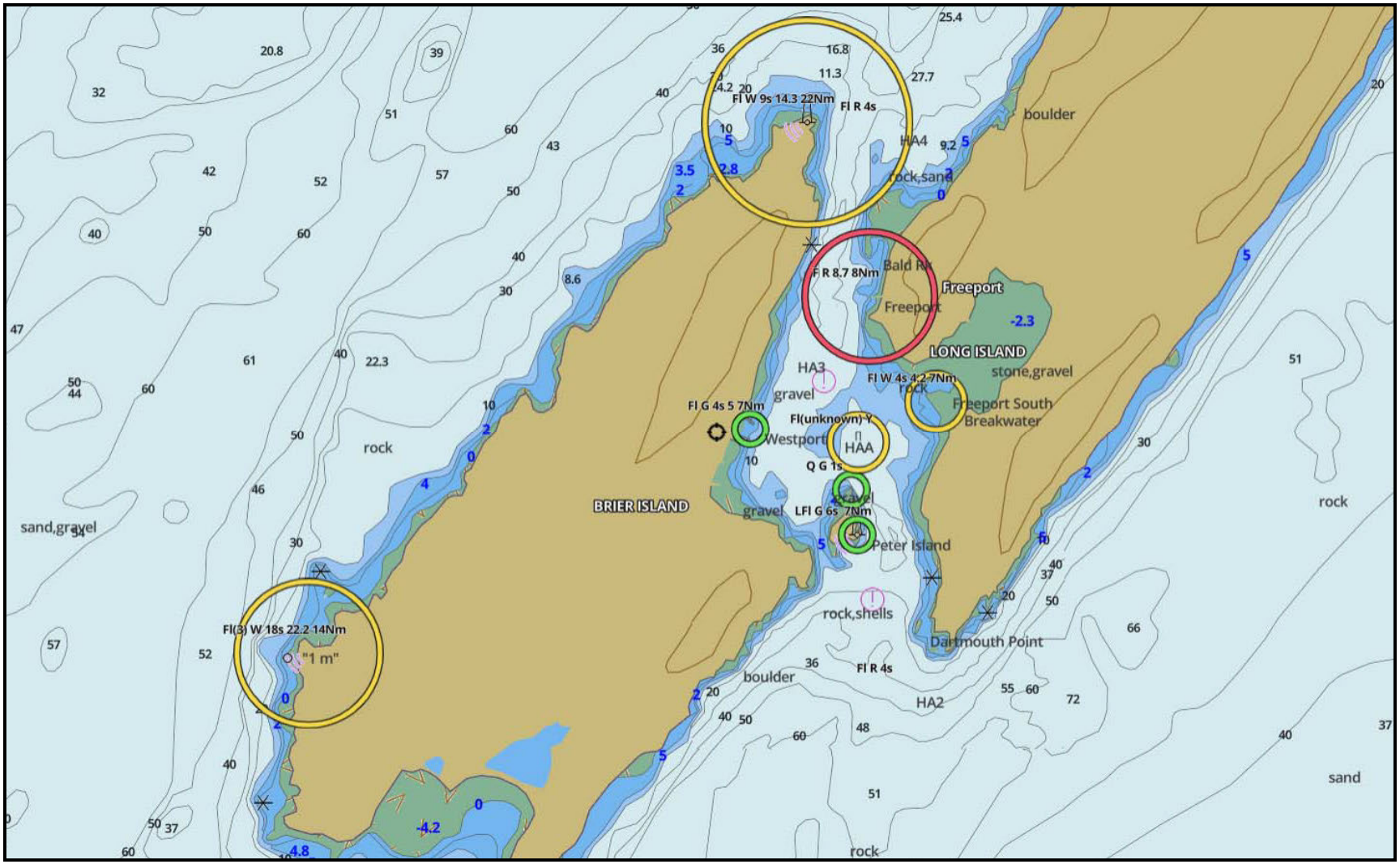


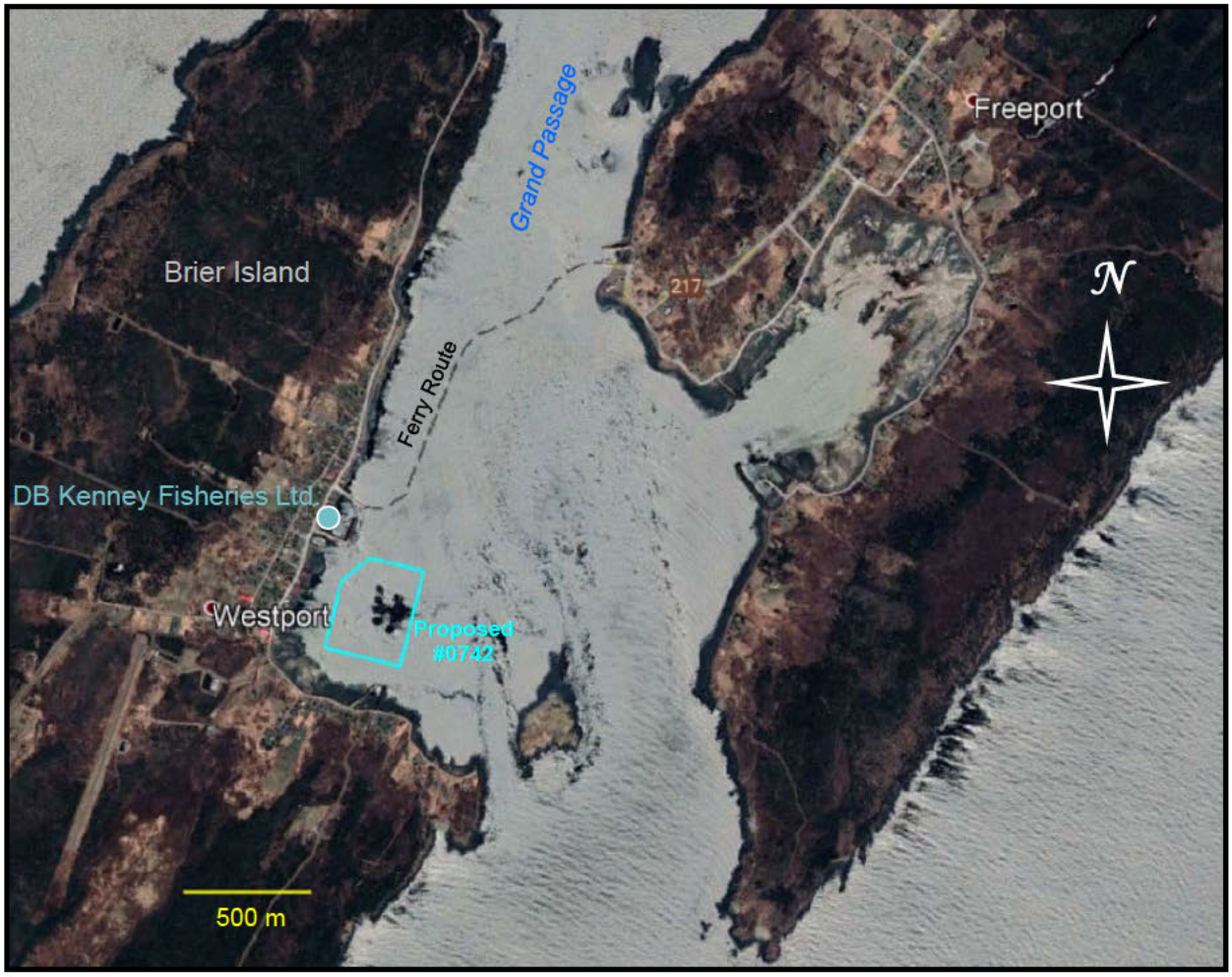
Figure 45. Navigation Aids in Grand Passage
Note: Figure was sourced from i-Boating (2021)



5.1.3 Fish and Seafood Processors

Only one fish-and-seafood processor was identified within the area of the Brier Island site. DB Kenney Fisheries Ltd. is located at 301 Water St, Westport, NS, which is approximately 220 m northwest of the Brier Island lease boundaries (Fig. 46). The company processes scallops, lobster, halibut, and periwinkles. No known negative interaction has been identified between the processor and the existing Brier Island aquaculture site.

Figure 46. Fish and Seafood Processor in Westport



5.1.4 Recreation and Tourism

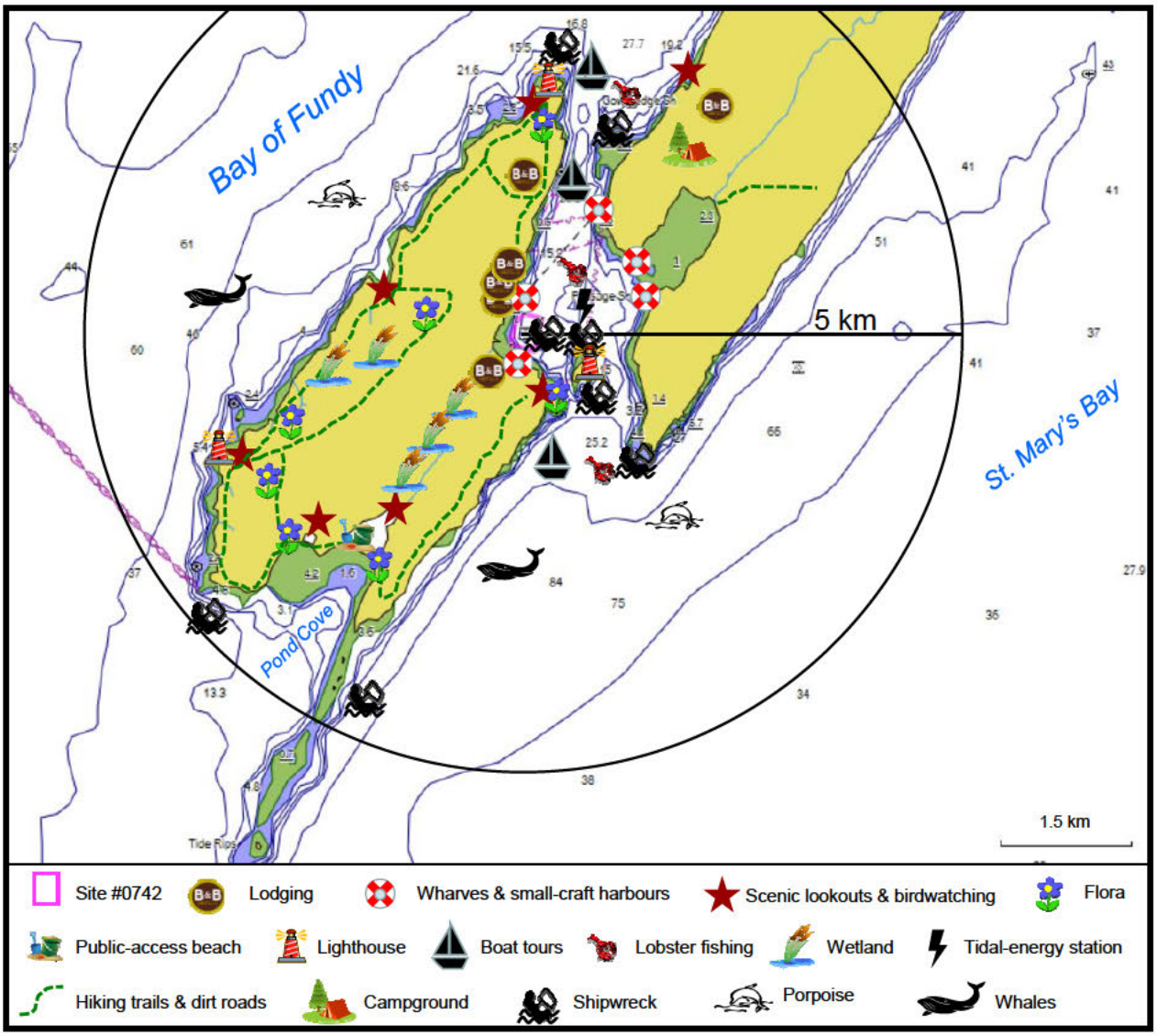
A large portion of Brier Island is a nature reserve, administered by the Nature Conservancy of Canada, and is a tourist attraction due to the many threatened and endangered species that can be found on or around the island. The island offers many coastal hiking and walking trails from which some of these species can be viewed. The waters surrounding Brier Island are commonly visited by many different marine mammals and seabirds. Several boat-tour companies are stationed in the island's only community, Westport (e.g., Brier Island Whale Watching and Seabird Cruises, Mariner Cruises, and Freeport Whale and Seabird Tours).

Three lighthouses attract tourists, one on the headland at Northern Point and one near Lighthouse Cove on the western side of the island. The third lighthouse is on Peter's Island and can be viewed from Southern Point on Brier Island. Brier Island has one large sand beach accessible to the public; it is at Pond Cove (~ 3 km from the aquaculture site). Scenic lookouts and birdwatching sites are scattered along the coast, and several picnic areas are present on the eastern side of the island. The island is also of interest to geologists and rock collectors.

Options for overnight accommodations are listed in section **5.1.5 Communities and Lodging**.

Figure 47 illustrates several tourist and recreational attractions near the Brier Island aquaculture site.

Figure 47. Resource Map of Brier Island and Grand Passage



5.1.5 Communities and Lodging

The Brier Island site is located approximately 260 m south of Westport and 1.5 km southwest of Freeport. The population of the village of Westport is 218 (Statistics Canada 2017a) and the population of the village of Freeport is 223 (Statistics Canada 2017b).

In Westport and Freeport, there are a few cottages, hotels, lodges, bed and breakfasts, and a campground, including the Bay of Fundy Inn and Guesthouse, the Dock and Doze Hotel, the Brier Island Lodge, the Paradise on Brier Apartment, the Beautiful Cove Cottage, the Hooking by the Sea Bed and Breakfast, and the Whale of a Time Camping and Cottages. Few are available throughout the year due to the decline in tourism over the winter months. Table 10 lists lodging options within 10-km of the proposed Brier Island boundaries.

Table 10. Lodging Options near Brier Island #0742

Type of Lodging	Lodging	Distance and Location from the Site	General Location
Hotel, Lodge, Inn, and Bed and Breakfast	Bay of Fundy Inn and Guesthouse	380 m NNW	Westport
	Dock and Doze Hotel	330 m NNW	Westport
	Hooking by the Sea	380 m SW	Westport
	Brier Island Lodge	1.2 km N	Westport
Cottage or apartment	Paradise on Brier	475 m N	Westport
	Beautiful Cove Cottage	2.7 km NE	Freeport
Campground	Whale of a Time Camping and Cottages	2.4 km NE	Freeport

5.1.6 Municipal, Industrial and Agricultural

5.1.6.1 Municipal

Residents and businesses have access to proper disposal of any residential, commercial, or industrial waste. Waste removal, which includes compost, recycling, and garbage, is available through the municipality of Digby. Monday is the currently designated collection day on the biweekly schedule; garbage and recycling are collected one week and compost the following week (Waste Check 2021). In addition, a public drop off and transfer station is in Seabrook, and a full collection site is at Conway Workshop Association (Digby) for residential eWaste and waste from the industrial-commercial-institutional (ICI) sector. Digby Salvage & Disposal accepts all construction and demolition debris such as metal, shingles, wood, cement blocks,

bricks, asphalt, and cardboard. Webbers Bottle Exchange, located in the town of Digby, is the nearest bottle exchange and ENVIRO-DEPOT™ (DivertNS 2021).

Municipal wastewater is one of the largest sources of pollution to surface water in Canada (Government of Canada 2020c). The Government of Canada manages the risks associated with effluent discharge under the *Canadian Environmental Protection Act 1999* (Government of Canada 2021d). Municipal wastewater treatment plants operate in accordance with the *Wastewater Systems Effluent Regulations*, which have been established under the *Fisheries Act* and state minimum quality standards. A waste treatment plant located in Smith's Cove services both the town of Digby and Digby County. Residents and businesses on the Brier Island site primarily use septic tanks and well water.

5.1.6.2 Industrial and Economic Drivers

Fishing and fish processing are the primary contributors to the Digby Neck economy; however, the tourism and hospitality industries provide significant economic boost, particularly during the months of June to October (Rousseau 1989). Refer to section **5.1.3 Fish and Seafood Processors** and section **5.1.4 Recreation and Tourism** for additional details.

A floating, tidal-energy platform has been launched and is being tested in Grand Passage, north of Peter Island. In 2020, Sustainable Marine received a licence from the NS Department of Energy and Mines to feed up to 700 kW into the NS grid (Sustainable Marine 2021). The underwater cable connecting the platform to the substation was expected to be completed in 2021 (Sustainable Marine 2021). The platform is located at NAD83 coordinates N44.26385^{o} W66.33686^{o}, which is approximately 600 m on a bearing of 78^{o} from the proposed boundaries for aquaculture site #0742.

5.1.6.3 Agricultural

According to the Statistics Canada 2016 census profile, 10 people are employed in Westport's agriculture industry (Statistics Canada 2017a). The Brier Wood Farm was the only agriculture operation identified in Westport. The farm raises heritage sheep and laying hens. This business offers visitors lodging, food, and rug-hooking workshops (Hooking By The Sea 2021). In Freeport, employment in the agriculture sector is absent, according to Statistics Canada (2017b).

5.1.7 First Nations Territories/Reserves

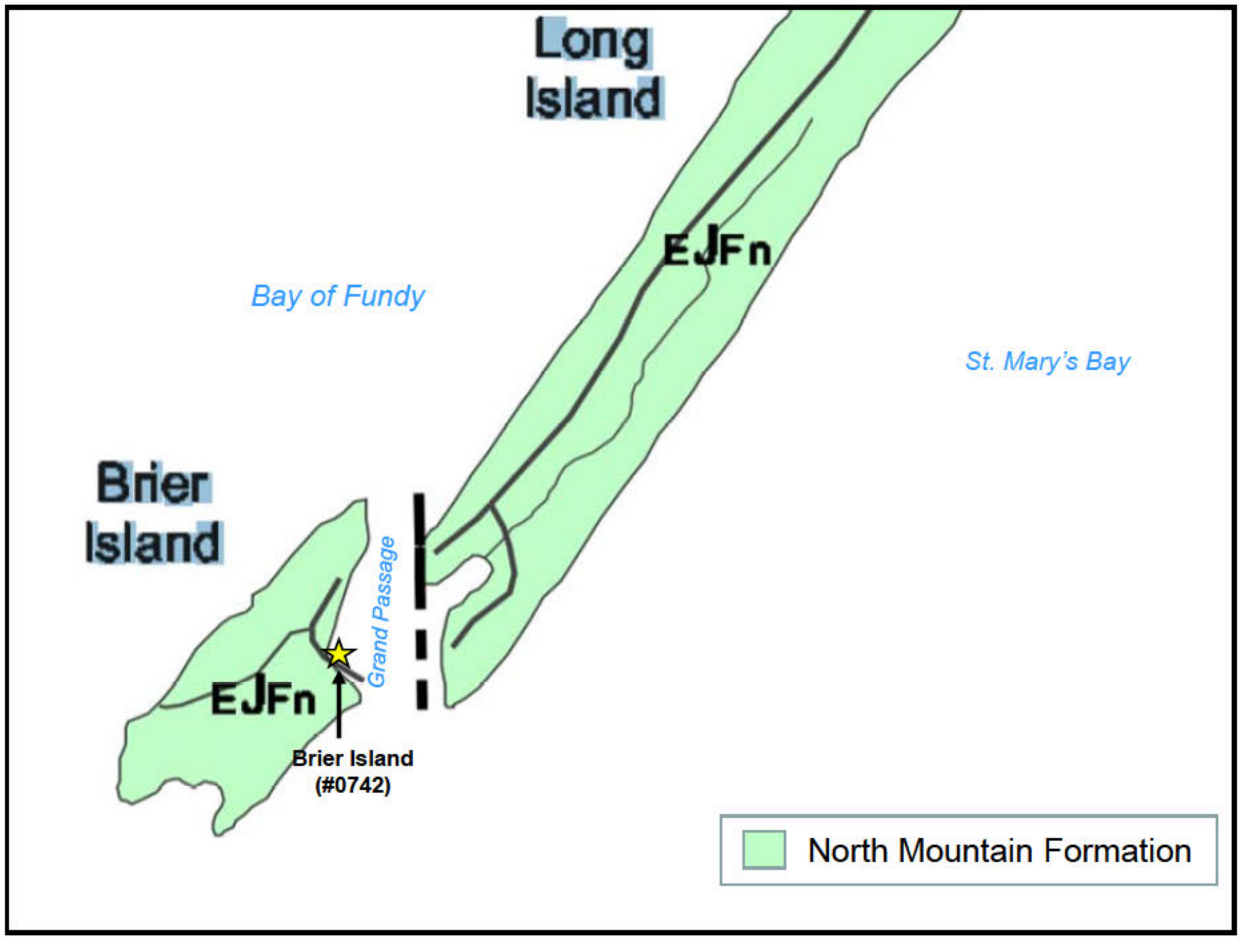
The closest First Nations communities to the Brier Island site are the Bear River First Nations reserve from the Confederacy of Mainland Mi'kmaq and the Yarmouth 33 Acadia First Nations reserve. According to the Bear River First Nation website (2016), the area of the reserve is 3.34 km^2 and has an on-reserve population of 108 individuals. This reserve is approximately 65 km east-northeast of aquaculture site #0742. In 2016, The Yarmouth 33 First Nation reserve had a population of 157 individuals and a total private dwelling count of 70 (Statistics Canada 2017c). The Yarmouth 33 reserve is approximately 52 km south-southeast of the Brier Island site.

5.1.8 Geology and Archaeology

Keppie (2000) mapped the Digby Neck and Islands as North Mountain Formation comprised of tholeiitic plateau basalt (Fig. 48). White (2010) reports the same area as shale, siltstone, sandstone, limestone conglomerate, and basalt.

In the past, impacts to paleontological resources were assessed by the Nova Scotia Museum. An internal provincial review of new and existing aquaculture sites will be undertaken by Nova Scotia Communities, Culture, and Heritage (CCH) (S. Weseloh-McKeane, pers. com.). In general, most cage-based aquaculture sites, like Brier Island, cause minimal damage to submerged archaeological resources as the anchors are the only portion of the site in contact with the seafloor.

Figure 48. Geological Map of Brier Island and Long Island
Note: Figure taken from Keppie (2000)



5.1.9 Shipwrecks

Several shipwrecks may be in the vicinity of the proposed site; however, detailed locations or coordinates are not available. At least twenty-one vessels were reported stranded, wrecked, or foundered in Westport Harbour or Grand Passage, including the *Little Belt*, the *Emeline*, the

David Howes, the *Cyclone*, the *Jane Porter*, the *Grace Rice*, the *Sarah C Pyke*, the *Donald Cann*, the *Little Fred*, the *Alfred*, the *Boniform*, the *Blythe*, the *Jennie B. Thomas*, the *Edward A. Horton*, the *Annie E. Richardson*, the *Mina German*, the *Grace Darling*, the *Glen & Jean*, the *Evelyn Mc D,* the *Eleanor L*., and the *Donald II* (Maritime Museum of the Atlantic 2021).

In 1829, the *Little Belt* was wrecked in Grand Passage. The sloop, which was carrying lumber, was a loss.

The Brig called *Emeline* was stranded and lost in 1845 in Grand Passage. It's cargo was ballast.

The schooner *David Howes* was stranded due to stress of weather along the coast of Peter's Island in 1876. The event resulted in the total loss of the ship along with approximately $1200 worth of cargo.

In 1881, the schooner *Cyclone* was stranded at Cow Ledge during a snowstorm, resulting in a total loss.

The schooner *Jane Porter* was stranded in Westport due to current in 1884. The ship was considered a total loss along with $250 worth of cargo.

While on a voyage from St. Kitts and Nevis in 1885, the schooner *Grace Rice* was stranded due to stress of weather at Southwest Point on Brier Island. The event was only considered a partial loss.

The *Sarah C Pyke* was stranded in Westport in the winter of 1885 due to stress of weather; the schooner was considered a partial loss.

In 1889, the schooner *Donald Cann* was stranded by causes unknown on the North Point of Brier Island, resulting in a total loss including $500 of cargo.

The schooner *Little Fred* foundered and was lost on Peter's Island in 1890 due to tide.

The schooner *Alfred* was stranded at Dartmouth Point in 1892 due to stress of weather during a fishing excursion out of Westport. The event resulted in a total loss.

The *Boniform* was stranded in Westport due to unknown causes in 1892. The wreck resulted in the partial loss of the schooner along with $300 worth of cargo.

The *Blythe* was stranded in 1894 by wind and tide on Peter's Island Ledge, resulting in a total loss.

In 1898, the schooner *Jennie B. Thomas* was stranded and lost on Peter's Island due to stress of weather.

At North Point, the *Edward A. Horton* was stranded by unknown causes in 1898 during a fishing voyage. The schooner was considered a total loss.

The *Annie E. Richardson* was stranded on the southwest point of Westport in 1902 due to unknown causes. The schooner was considered a partial loss.

The *Mina German* was wrecked in Grand Passage due to stress of weather. The schooner, which was carrying lumber to Puerto Rico in 1912, was a loss.

In 1914 the schooner *Grace Darling* was stranded in the south entrance to Grand Passage. The event was considered a partial loss, which included $300 of cargo.

An explosion and fire resulted in the wreck of the *Glen & Jean* in Westport Harbour in 1959; the vessel was deemed a total loss.

In 1960, the *Evelyn Mc D* was wrecked and lost in Westport when she broke her moorings.

Fire wrecked the *Eleanor L.* in 1967 at Westport, resulting in the lost of the ship.

The *Donald II* caught fire in 1968, resulting in the total loss of the schooner near Westport.

Numerous other shipwrecks are recorded, but the details of their locations are unknown and documented only broadly as Brier Island.

5.1.10 Important Habitats and Conservation Areas

The coastline of Brier Island is identified as habitat for species at risk. Brier Island is inhabited by several at-risk species, including eastern mountain avens, monarch butterfly, harlequin duck, Barrow's goldeneye, and peregrine falcon. The coastline is frequented by humpback and fin whales and occasionally the endangered North Atlantic right whale. Peter's Island, between Brier and Long Islands, is designated as a species-at-risk area frequented by peregrine falcons and harlequin ducks (Fig. 49). A historic roseate tern colony was also located at Peter's Island (COSEWIC 2009b).

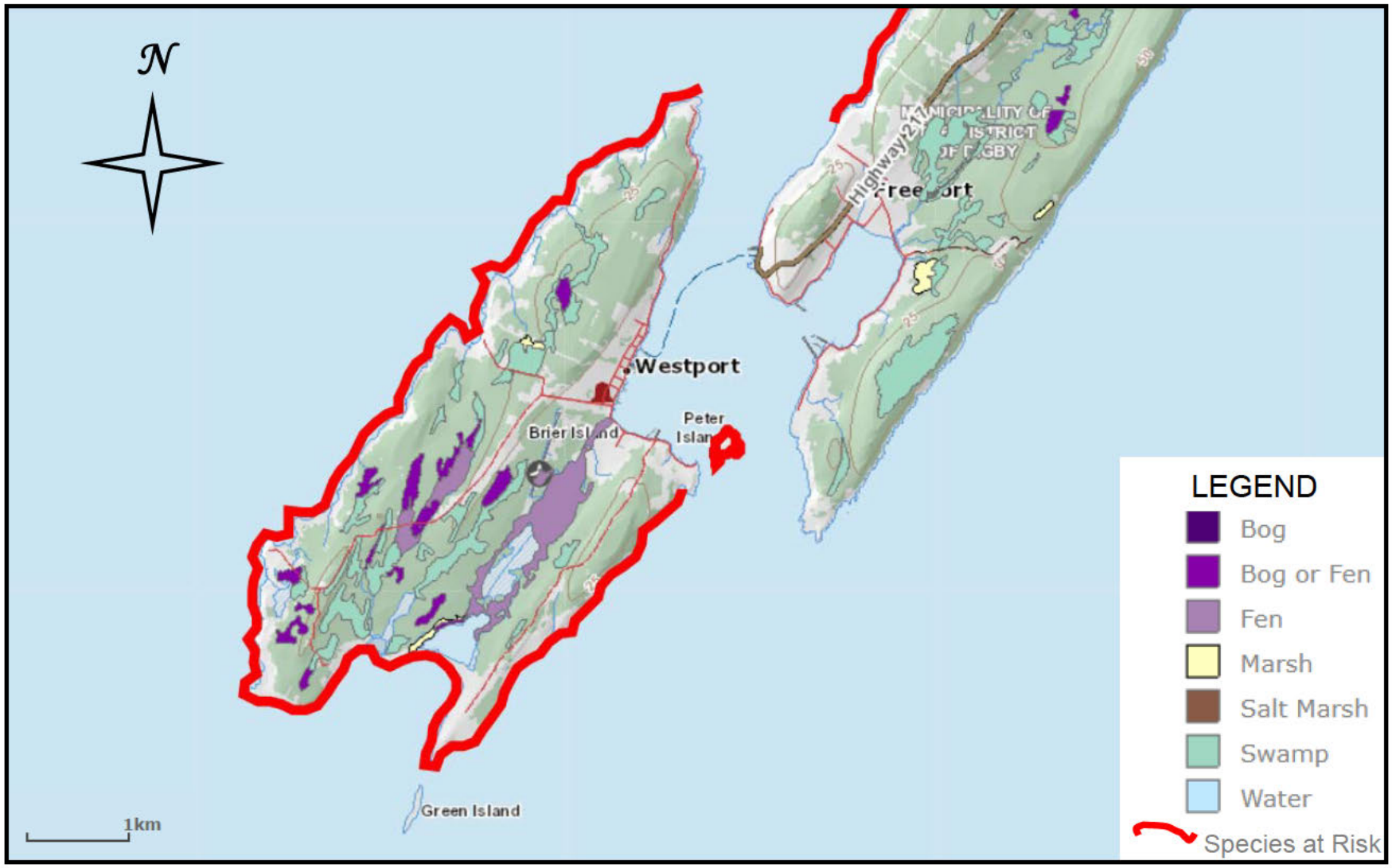
A large area (35,378 ha), which includes Brier Island, Westport Harbour, and St. Mary's Bay, is considered significant for migratory birds. This area is part of an important migratory route called the Atlantic Americas Flyway which connects the Canadian Arctic Archipelago to the southern tip of South America, Tierra del Fuego. North America's Atlantic coast is heavily trafficked by migrating birds (Bird Life International 2021).

The western side of Brier Island has 485 ha dedicated to the Brier Island Conservation Lands protected area (Fig. 50). The protected area includes the Big Meadow Bog, which provides rich habitat for many birds and rare plants. More than 300 species of birds have been recorded here (Nature Conservancy of Canada 2020). Brier Island and the surrounding waters have long been recognized as a globally significant Important Bird Area (IBA Canada 2021).

For additional information regarding important bird areas and habitats around the Brier Island aquaculture site, refer to section **5.2.4 Significant Habitat for Birds**.

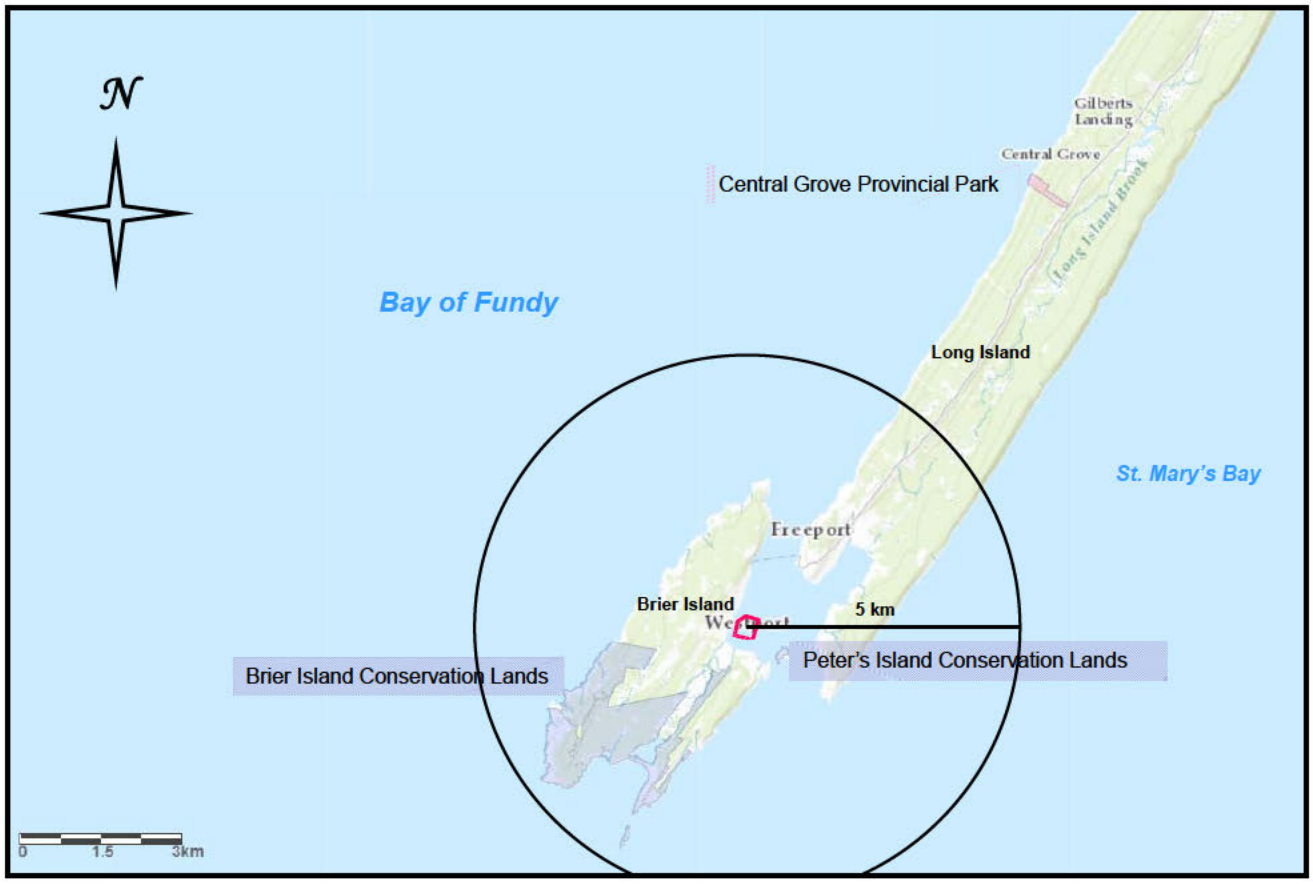
Mitigation strategies in response to sensitive habitats/areas and species are present in section **5.3.1 Critical Habitat and Mitigation Plans for Wildlife** and the Wildlife Interaction Plan (WIP) of **Appendix C**.

Figure 49. Significant Species and Habitats
Note: Base map was obtained from Nova Scotia Canada (2018)



SW2016-058

Figure 50. Parks and Protected Areas
Note: Base map was obtained from Nova Scotia Canada (2021b)



5.2 Significance of Proposed Area to Wildlife

5.2.1 National Wildlife Area

Currently, there are 55 designated National Wildlife Areas (NWA) in Canada. Six NWAs are present in the province of Nova Scotia with a seventh (Isle Haute) in progress; however, none of the NWAs are within 50 km of the proposed aquaculture site. The closest NWA is Sand Pond located in Argyle County (Government of Canada 2021e).

5.2.2 Wetlands

In Canada, 37 sites have been designated as Wetlands of International Importance. Three (3) are in Nova Scotia; however, none of the wetlands are within 50 km of the proposed aquaculture site (Ramsar 2014). The nearest Wetlands of International Importance is Southern Bight – Minas Basin.

5.2.3 Marine Protected Areas

As defined by Fisheries and Oceans Canada, Marine Protected Areas (MPAs) are parts of the ocean legally protected and managed to achieve the long-term conservation of nature. MPAs

may allow some current and future activities, depending on their impacts to the ecological features being protected. They provide many benefits for Canadians, including environmental, social, and cultural contributions (Government of Canada 2021f). In 2019, the Government of Canada adopted a new approach to marine conservation; MPAs will now function similarly to national parks, enjoying a high level of environmental protection by including new standards that prohibit four key industrial activities: oil and gas activities, mining, dumping, and bottom trawling (Government of Canada 2019b).

The nearest MPAs to the proposed aquaculture site include the Gully, located 200 km off Nova Scotia and east of Sable Island, and the Musquash Estuary located 20 km southwest of Saint John, New Brunswick.

The Sable Gully (Government of Canada 2020d) is a submarine canyon formed by glacial erosion over thousands of years. Surrounding the Sable Gully is an important and highly functional area, in which several commercial fisheries are supported, and it is of great importance to the oil-and-gas industry. This MPA is a crucial habitat to several endangered or threatened species inhabiting the Scotian Shelf. Some of these species live in the Sable Gully year-round, including the northern bottlenose whale. Many endangered or threatened species, such as various species of sharks, tuna, marlin, and seabirds, are drawn to the area due to its copious amounts of plankton. The slopes and floor of the Sable Gully are known to have various crab species, sea pens, anemones, brittle stars, and a large variety of cold-water coral. Conservational efforts are in place as the area is used for continuous research and monitoring. The conservation efforts of Fisheries and Oceans Canada include the collection and analysis of data, regulatory monitoring of the shipping, fishing, research, tourism, and oil-and-gas activities in the surrounding area, development of regulation and industry codes, provision of educational activities at the Bedford Institute of Oceanography, and the evaluation and reporting required to produce a MPA management plan.

The Musquash Estuary is conserved by Fisheries and Oceans Canada with the help of the managers and owners of the surrounding area, including Ducks Unlimited Canada, the Eastern Habitat Joint Venture, the Nature Conservancy of Canada, the Province of New Brunswick, and the Government of Canada. Conservational efforts for the area include the production of a management plan to maintain the productivity and biodiversity and reduce any human-caused modification to the habitat.

In 2010, Fisheries and Oceans Canada announced a commitment to protect 10% of Canadian waters by 2020 (Government of Canada 2021g), with two (2) areas of interest for MPAs in Nova Scotia including the Fundian Channel – Browns Bank and Eastern Shore Islands. The nearest area of interest is the Fundian Channel-Browns Bank which is approximately 150 km south of site #0742 (Government of Canada 2020e).

5.2.4 Significant Habitat for Birds

Most of the species of birds in Canada are protected under the *Migratory Birds Convention Act* (Environment and Climate Change Canada 2017a). Several migratory marine birds, shorebirds, gulls, and waterfowl inhabit the waterways and shores of coastal Nova Scotia.

Migratory birds protected by the *Migratory Birds Convention Act* and associated regulations generally include all seabirds (except cormorants and pelicans), all waterfowl, all shorebirds, and most land birds, such as eagles, falcons, and hawks.

The Western Hemisphere Shorebird Reserve Network (WHSRN) has designated the upper beaches of the Bay of Fundy, to include Shepody Bay and Cumberland Basin in New Brunswick and Cobequid Bay and Minas Basin in Nova Scotia as a WHSRN site (WHSRN 2019). Cumberland Basin and Cobequid Bay are expansions of the Bay of Fundy WHSRN site, which is the only WHSRN site located in Nova Scotia.

Brier Island and the offshore waters of Westport, Nova Scotia are identified by IBA Canada (Birds Canada 2021a) as important bird area NS021, one of the most important bird areas in the Maritimes (Fig. 51). It is a migration spot for land birds, and marine birds feed there year-round.

In Grand Passage, Peter's Island is frequented by large populations of common and Arctic terns. Herring and great black-backed gulls, double-crested cormorants, and black guillemots breed on this grassy, flat island. Peter's Island, Brier Island, and the surrounding marine area to approximately 15 km offshore are known to be one of the most important bird areas in the Maritimes, as it is a year-round feeding area for marine birds and a migration stop for land birds. Both red-necked and red phalaropes regularly arrive by the thousands in the offshore waters of Brier Island in August. Shearwaters, kittiwakes, and alcids are other marine birds which frequent the area. Many migrating raptors, such as sharp-shinned hawks, broad-winged hawks, and peregrine falcons, pass through in autumn (Birds Canada 2021b).

Bird sightings specifically around the Brier Island aquaculture site have not been documented. However, the Brier Island aquaculture site is within blocks 119 - 121 of the Canadian Wildlife Service (CWS) survey areas (Fig. 52). According to CWS records (A. Hicks, pers. com.), a variety of water birds, shorebirds, and other birds inhabit the area of Brier Island, Westport Harbour, and St. Mary's Bay (i.e., bird blocks 119 - 121). Surveys, completed between February 2000 and March 2010 by CWS and NSDNR, identified several species of waterfowl in blocks 119 - 121 (Tables 11 - 13). The American black duck was the most common type of bird noted in block 119 followed by the common eider and merganser. In block 120, the long-tailed duck was the most prevalent bird; however, the common eider and merganser were present in large numbers. Fewer birds were noted in block 121 with the common eider being most common. For additional information regarding important habitats for birds around the Brier Island aquaculture site, refer to section **5.1.10 Important Habitats and Conservations Areas**.

KCS operates with a WIP, which outlines all control measures and special requirements as they relate to wildlife encounters at the site. Birds are specifically addressed in the WIP (**Appendix C**).

Figure 51. Important Bird Area NS021, Brier Island and Offshore Waters, Westport, Nova Scotia

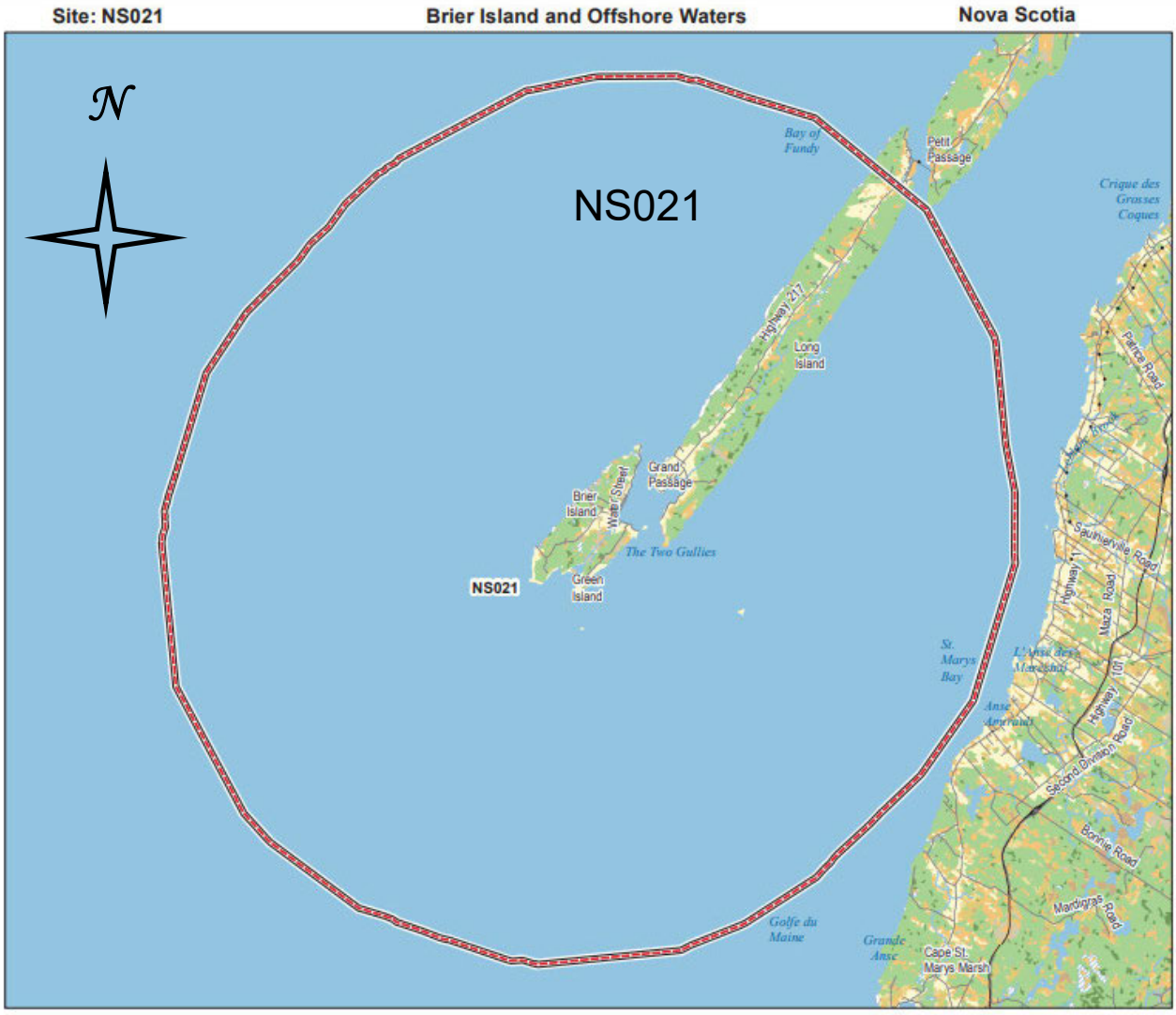


Figure 52. Map of Canadian Wildlife Service Survey Areas Blocks 119 - 121

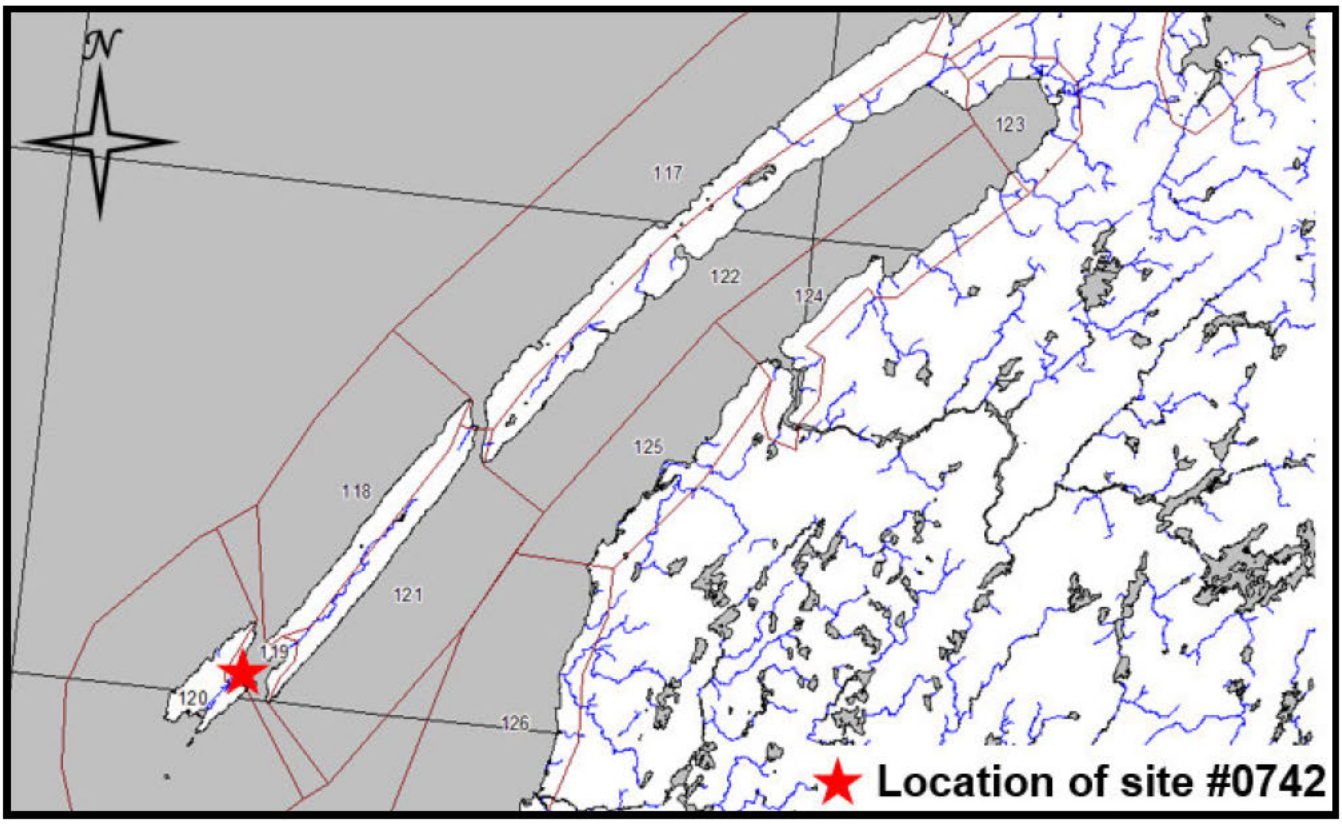


Table 11. Waterfowl Identified in Block 119

	Canadian Wildlife Service - Block 119 Numbers of Sightings per Survey					
Bird Name	**02-Feb-00**	**25-Mar-04**	**26-Feb-07**	**18-Feb-09**	**22-Jan-10**	**Grand Total**
Adult eagle	0	0	1	0	0	**1**
American black duck	210	0	72	14	81	**377**
American Green-winged Teal	0	0	0	0	0	**0**
American wigeon	0	0	0	0	0	**0**
Atlantic brant	20	0	0	0	25	**45**
Barrow's goldeneye	0	0	0	0	0	**0**
Black scoter	0	0	0	0	0	**0**
Blue-winged Teal	0	0	0	0	0	**0**
Bufflehead	0	0	0	0	0	**0**
Canada goose	0	0	45	25	0	**70**
Common eider	0	22	141	86	85	**334**
Common goldeneye	0	31	0	7	47	**85**
Common loon	0	1	3	0	1	**5**
Common merganser	0	0	0	0	0	**0**
Female common eider	80	0	0	0	0	**80**
Gadwall	0	0	0	0	0	**0**
Great cormorant	21	0	0	0	0	**21**
Greater scaup	0	0	0	0	0	**0**
Harlequin duck	0	0	0	0	0	**0**
Hooded merganser	0	0	0	0	0	**0**
King eider	0	0	0	0	0	**0**
Lesser scaup	0	0	0	0	0	**0**
Long-tailed Duck	0	2	9	0	5	**16**
Male common eider	82	0	0	0	0	**82**
Mallard	0	0	0	0	0	**0**
Northern pintail	0	0	0	0	0	**0**
Northern shoveler	0	0	0	0	0	**0**
Red-breasted Merganser	0	0	0	0	0	**0**
Ring-necked Duck	0	0	0	0	0	**0**
Snow goose	0	0	0	0	0	**0**
Surf scoter	0	0	0	0	0	**0**
Unidentified cormorant	0	0	20	0	0	**20**
Unidentified diving duck	0	0	0	0	0	**0**
Unidentified duck	0	0	0	0	0	**0**
Unidentified goldeneye	0	0	0	0	0	**0**
Unidentified merganser	0	7	77	52	8	**144**
Unidentified scaup	0	4	0	15	0	**19**
Unidentified scoter	0	0	11	0	0	**11**
Unidentified teal	0	0	0	0	0	**0**
White-winged Scoter	0	0	0	0	0	**0**
Wood duck	0	0	0	0	0	**0**
Grand Total	**413**	**67**	**379**	**199**	**252**	**1310**

Table 12. Waterfowl Identified in Block 120

	Canadian Wildlife Service – Block 120 Numbers of Sightings per Survey					
Bird Name	**02-Feb-00**	**25-Mar-04**	**26-Feb-07**	**18-Feb-09**	**22-Jan-10**	**Grand Total**
American black duck	8	0	5	29	0	**42**
American Green-winged Teal	0	0	0	0	0	**0**
American wigeon	0	0	0	0	0	**0**
Atlantic brant	0	0	0	0	0	**0**
Barrow's goldeneye	0	0	0	0	0	**0**
Black scoter	0	0	0	0	1	**1**
Blue-winged Teal	0	0	0	0	0	**0**
Bufflehead	0	2	0	0	0	**2**
Canada goose	0	0	0	0	0	**0**
Common eider	0	165	102	161	42	**470**
Common goldeneye	0	9	3	0	28	**40**
Common loon	0	0	2	5	0	**7**
Common merganser	5	0	0	0	0	**5**
Female common eider	32	0	0	0	0	**32**
Gadwall	0	0	0	0	0	**0**
Great cormorant	11	0	0	0	0	**11**
Greater scaup	0	0	0	0	0	**0**
Harlequin duck	0	5	0	5	0	**10**
Hooded merganser	0	0	0	0	0	**0**
King eider	0	0	0	0	0	**0**
Lesser scaup	0	0	0	0	0	**0**
Long-tailed Duck	4	428	43	47	66	**588**
Male common eider	68	0	0	0	0	**68**
Mallard	0	0	0	0	0	**0**
Northern pintail	0	0	0	0	0	**0**
Northern shoveler	0	0	0	0	0	**0**
Purple sandpiper	0	3	0	3	0	**6**
Red-breasted Merganser	0	0	0	0	0	**0**
Ring-necked Duck	0	0	0	0	0	**0**
Seal	0	2	60	45	50	**157**
Snow goose	0	0	0	0	0	**0**
Surf scoter	0	0	0	0	0	**0**
Unidentified cormorant	0	0	8	20	6	**34**
Unidentified diving duck	0	0	0	0	0	**0**
Unidentified duck	0	0	0	0	0	**0**
Unidentified goldeneye	32	0	0	0	0	**32**
Unidentified merganser	0	49	60	55	1	**165**
Unidentified scaup	0	0	0	0	0	**0**
Unidentified scoter	0	0	21	0	0	**21**
Unidentified teal	0	0	0	0	0	**0**
White-winged Scoter	12	0	1	0	0	**13**
Wood duck	0	0	0	0	0	**0**
Grand Total	**172**	**663**	**305**	**370**	**194**	**1704**

Table 13. Waterfowl Identified in Block 121

	Canadian Wildlife Service – Block 121 Numbers of Sightings per Survey					
Bird Name	**02-Feb-00**	**25-Mar-04**	**26-Feb-07**	**18-Feb-09**	**22-Jan-10**	**Grand Total**
American black duck	0	0	0	0	0	**0**
American Green-winged Teal	0	0	0	0	0	**0**
American wigeon	0	0	0	0	0	**0**
Atlantic brant	0	0	0	0	0	**0**
Barrow's goldeneye	0	0	0	0	0	**0**
Black guillemot	0	0	1	0	0	**1**
Black scoter	0	0	0	2	0	**2**
Blue-winged Teal	0	0	0	0	0	**0**
Bufflehead	0	0	0	0	0	**0**
Canada goose	0	0	0	0	0	**0**
Common eider	0	0	419	2	60	**481**
Common goldeneye	0	2	0	0	2	**4**
Common loon	0	4	4	4	1	**13**
Common merganser	1	0	0	0	0	**1**
Female common eider	87	0	0	0	0	**87**
Gadwall	0	0	0	0	0	**0**
Great cormorant	44	0	0	0	0	**44**
Greater scaup	0	0	0	0	0	**0**
Harlequin duck	0	0	0	0	0	**0**
Hooded merganser	0	0	0	0	0	**0**
King eider	0	0	0	0	0	**0**
Lesser scaup	0	0	0	0	0	**0**
Long-tailed Duck	0	12	48	0	0	**60**
Male common eider	87	0	0	0	0	**87**
Mallard	0	0	0	0	0	**0**
Northern pintail	0	0	0	0	0	**0**
Northern shoveler	0	0	0	0	0	**0**
Purple sandpiper	0	0	0	33	0	**33**
Red-breasted Merganser	0	0	0	0	0	**0**
Ring-necked Duck	0	0	0	0	0	**0**
Seal	0	0	50	0	0	**50**
Snow goose	0	0	0	0	0	**0**
Surf scoter	0	0	0	0	0	**0**
Unidentified cormorant	0	1	5	35	1	**42**
Unidentified diving duck	0	0	0	0	0	**0**
Unidentified duck	0	0	0	0	0	**0**
Unidentified goldeneye	17	0	0	0	0	**17**
Unidentified merganser	0	3	9	11	2	**25**
Unidentified scaup	0	0	0	0	0	**0**
Unidentified scoter	0	0	0	0	0	**0**
Unidentified teal	0	0	0	0	0	**0**
White-winged Scoter	0	0	0	0	0	**0**
Wood duck	0	0	0	0	0	**0**
Grand Total	**236**	**22**	**536**	**87**	**66**	**947**

5.2.5 Significance of Proposed Area to SARA

The *Species at Risk Act* (SARA) protects species designated at risk by preventing destruction of their habitat and prohibiting harassment, capture, or harming/killing of listed species. There are several species found in Nova Scotia and the Atlantic Ocean that are listed by COSEWIC, the Government of Canada *Species at Risk Act*, or the Nova Scotia *Endangered Species Act* as either endangered, threatened, or of special concern/vulnerable. Tables 14 – 17 list those species, their status, and their occurrence in the area of interest. These tables could not be condensed to outline only specific species of the SARA list that are present around the Brier Island aquaculture site. Many of the animals listed are mobile and are included in the tables as species known to be within the general area of the site. Plants are also incorporated into the tables even though it is unlikely that any KCS employee will encounter these species while executing aquaculture operations; however, they have been identified on the immediate land masses near the aquaculture site.

Table 14. Endangered Species in Nova Scotia and the Atlantic Ocean
Note: Unless otherwise specified, the information in the following table was derived from the Species at Risk Public Registry and associated pages (Government of Canada 2021h)

COMMON NAME	SCIENTIFIC NAME	COMMENTS
Endangered Species		
Beluga whale St. Lawrence Estuary population	*Delphinapterus leucas*	-Last COSEWIC designation (Nov 2014): endangered -This population occurs mainly in the St. Lawrence River estuary, concentrating around the mouth of the Saguenay River in summer -Threats include increased vessel traffic, noise, loss of habitat, and pollution -Protected under the federal *Species at Risk Act* (Schedule 1) and the *Marine Mammals Regulations*, which fall under the *Fisheries Act* -Very rarely spotted around Brier Island (Brier Island Lodge and Restaurant)
Blue whale Atlantic population	*Balaenoptera musculus*	-Last COSEWIC designation (May 2012): endangered -Blue whales range widely, inhabiting both coastal waters and the open ocean. Individuals belonging to the Atlantic population are frequently observed in estuaries and shallow coastal zones where the mixing of waters ensures high productivity of krill -Protected under the federal *Species at Risk Act* (Schedule 1) and the *Marine Mammals Regulations*, which fall under the *Fisheries Act* -Very rarely spotted around Brier Island (Brier Island Lodge and Restaurant)

Eastern Mountain Avens	*Geum peckii*	-Last COSEWIC designation (Apr 2010): Endangered -Occurs on Brier Island and Digby Neck -Large populations inhabiting the bog on Brier Island have decreased in the last 40 years -Generally, inhabits boggy areas amid other vegetation such as shrubs; however, have been found in dry depressions on mineral soil -Protected under the federal *Species at Risk Act* (Schedule 1) -Protected as an endangered species under the Nova Scotia *Endangered Species Act*
Leatherback sea turtle Atlantic population	*Dermochelys coriacea*	-Last COSEWIC designation (May 2012): endangered -Atlantic Canada supports one of the largest seasonal foraging populations of leatherbacks in the Atlantic (Atlantic Leatherback Turtle Recovery Team 2006) -Protected under the federal *Species at Risk Act* (Schedule 1)
Loggerhead sea turtle	*Caretta caretta*	-Last COSEWIC designation (Apr 2010): endangered -Routinely found in Atlantic Canadian waters; usually associated with the warmer offshore waters of the Gulf Stream
North Atlantic right whale	*Eubalaena glacialis*	-Last COSEWIC designation (Nov 2013): endangered -Summer and fall occurrences in the offshore area called Grand Manan Basin -Protected under the federal *Species at Risk Act* (Schedule 1) and under the *Marine Mammal Regulations* of the *Fisheries Act* -Occasionally seen around Brier Island (Brier Island Lodge and Restaurant)

Red knot rufa Tierra del Fuego / Patagonia wintering population	*Calidris canutus rufa*	-Last COSEWIC designation (Apr 2007): endangered -Migratory stopovers are vast coastal zones swept by tides twice a day, usually sandflats but sometimes mudflats. In these areas, the birds feed on molluscs, crustaceans, and other invertebrates. The species also frequents peat-rich banks, salt marshes, brackish lagoons, mangrove areas, and mussel beds (Environment and Climate Change Canada 2017b) -Protected under the federal *Species at Risk Act* (Schedule 1) and the Nova Scotia *Endangered Species Act* -A regular spring and early fall migrant at Brier Island (Mills and Laviolette 2011)
Roseate tern	*Sterna dougallii*	-Last COSEWIC designation (Apr 2009): endangered -2 largest colonies are at The Brothers and Country Islands -Protected under the federal *Species at Risk Act* (Schedule 1), the federal *Migratory Birds Convention Act* and the Nova Scotia *Endangered Species Act* -Once an occasional breeder at a historic colony on Peter's Island (Mills and Laviolette 2011)
White shark	*Carcharodon carcharias*	-Last COSEWIC designation (May 2021): endangered -Occurs in both inshore and offshore waters; ranges in depth from just below the surface to just above the bottom, down to a depth of at least 1,280 m -It occurs in the breakers off sandy beaches, off rocky shores, and readily enters enclosed bays, lagoons, harbours, and estuaries but does not penetrate brackish or fresh waters to any extent -No federal or provincial laws explicitly protect white sharks in Canadian waters; however, it is given SARA Schedule 1 status

Table 15. Threatened Species in Nova Scotia and the Atlantic Ocean
Note: Unless otherwise specified, the information in the following table was derived from the Species at Risk Public Registry and associated pages (Government of Canada 2021h)

COMMON NAME	SCIENTIFIC NAME	COMMENTS
Threatened Species		
Bank swallow	*Riparia riparia*	-Last COSEWIC designation (May 2013): threatened -In the Maritimes, it is most common and widespread on Prince Edward Island and the Northumberland Coasts of New Brunswick and Nova Scotia -Considered endangered under the Nova Scotia *Endangered Species Act* -Nested in Pond Cove until 1972 but is since only a common migrant in spring and fall (Mills and Laviolette 2011)
Barn swallow	*Hirundo rustica*	-Last COSEWIC designation (May 2021): special concern -Protected under the *Migratory Birds Convention Act, 1994* -Considered endangered under the Nova Scotia *Endangered Species Act* -Used to be a common breeder on Brier Island but was reduced to one or two pairs in Westport (Mills and Laviolette 2011)
Bicknell's thrush	*Catharus bicknelli*	-Last COSEWIC designation (Nov 2009): threatened -Has one of the most restricted breeding ranges among the forest birds of North America, usually breeding in the higher elevations of northeastern mountain ranges but also in some coastal and lowland areas in Canada -Considered endangered under the Nova Scotia *Endangered Species Act* -Only two site records for Brier Island, one in 1983 and one in 2003 (Mills and Laviolette 2011)
Bobolink	*Dolichonyx oryzivorus*	-Last COSEWIC designation (Apr 2010): threatened -Suffered severe population declines since 1960's -Threatened by agricultural operations, habitat loss, and pesticide exposure -Protected under the *Species at Risk Act* (Schedule 1) -Considered vulnerable under the Nova Scotia *Endangered Species Act* -A common migrant in spring and fall; in spring, singing males are regularly seen in the Westport area (Mills and Laviolette 2011) -Bird Studies Canada has a record of breeding on the Island or in Freeport in the first Maritimes Breeding Bird Atlas of 1986-1990 (2021)

Canada warbler	*Cardellina canadensis*	-Last COSEWIC designation (Nov 2020): special concern -Found in a variety of forest types, but it is most abundant in wet, mixed deciduous-coniferous forest with a well-developed shrub layer -Protected under the *Species at Risk Act* (Schedule 1), the *Migratory Birds Convention Act, 1994* and the *Canada National Parks Act* -Considered endangered under the Nova Scotia *Endangered Species Act* -Bird Studies Canada has confirmed records of the bird in their first atlas in the Brier Island area (2021), now an uncommon migrant (Mills and Laviolette 2011)
Chimney swift	*Chaetura pelagica*	-Last COSEWIC status (Apr 2018): threatened -The species breeds in Nova Scotia -Roosts in chimneys, crevices, caves, and hollow trees -Protected under the *Species at Risk Act* (Schedule 1), the *Migratory Birds Convention Act, 1994*, and the Nova Scotia *Endangered Species Act* -A sparse migrant in spring and fall (Mills and Laviolette 2011)
Common nighthawk	*Chordeiles minor*	-Last COSEWIC designation (Apr 2018): special concern -Nests in a wide range of open, vegetation-free habitats including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and riverbanks; also inhabits mixed and coniferous forests -Protected under the *Species at Risk Act* (Schedule 1), the *Migratory Birds Convention Act, 1994* and the Nova Scotia *Endangered Species Act* -A possible occurrence of breeding was recorded in the first *Atlas of Breeding Birds of the Maritime Provinces* (Bird Studies Canada 2021) -A common fall migrant (Mills and Laviolette 2011)

Eastern meadowlark	*Sturnella magna*	-Last COSEWIC designation (May 2011): threatened -Threatened by loss of grassland habitat of breeding and wintering grounds. -Protected under the federal *Species at Risk Act* (Schedule 1) -An infrequent vagrant on Brier Island during spring and fall migration (Mills and Laviolette 2011)
Least bittern	*Ixobrychus exilis*	-Last COSEWIC designation (Apr 2009): threatened -Prefers large marshes with relatively stable water levels throughout the nesting period -Wintering habitat includes emergent marshes, like those used for breeding, and brackish and saline swamps -Protected by the *Canada National Parks Act*, the federal *Species at Risk Act*, and the *Migratory Birds Convention Act, 1994* -No breeding activity in the vicinity of the proposed project (Bird Studies Canada 2021) -Very rarely seen on Brier Island (Mills and Laviolette 2011)
Northern wolffish	*Anarhichas denticulatus*	-Last COSEWIC designation (Nov 2012): threatened -Extends from the Canadian portion of the Gulf of Maine north to the Bay of Fundy, the Scotian Shelf, the Grand Banks, Gulf of St. Lawrence, Northeastern Newfoundland Shelf, and Labrador Sea as far as the waters west of Greenland -Typically found offshore in water < 5^{o}C
Olive-sided flycatcher	*Contopus cooperi*	-Last COSEWIC designation (Apr 2018): special concern -Breeds in scattered locations throughout most of forested Canada -Most often associated with open areas containing tall, live trees or snags for perching -Protected under the federal *Species at Risk Act* (Schedule 1) and the *Migratory Birds Convention Act, 1994* -Considered threatened under the Nova Scotia *Endangered Species Act* -A sparse migrant during spring and fall (Mills and Laviolette 2011)

Wood thrush	*Hylocichla mustelina*	-Last COSEWIC designation (Nov 2012): threatened -Protected by federal *Species at Risk Act* (Schedule 1) -Bird Studies Canada has confirmed records of the bird on Digby Neck in the first *Atlas of Breeding Birds of the Maritimes Provinces* (2021) -Considered a rare migrant on Brier Island (Mills and Laviolette 2011)

Table 16. Species of Special Concern in Nova Scotia and the Atlantic Ocean
Note: Unless otherwise specified, the information in the following table was derived from the Species at Risk Public Registry and associated pages (Government of Canada 2021h)

COMMON NAME	SCIENTIFIC NAME	COMMENTS
Species of Special Concern		
Atlantic wolffish	*Anarhichas lupus*	-Last COSEWIC designation (Nov 2012): special concern -Primarily inhabits the cold, deep waters of the continental shelf; prefers rocky or hard clay bottoms and uses areas with sandy or muddy bottoms only occasionally -Protected under the federal *Species at Risk Act* (Schedule 1) -May be present in the study area
Barrow's goldeneye	*Bucephala islandica*	-Last COSEWIC designation (May 2011): special concern -Protected under the *Species at Risk Act* (Schedule 1) and *Migratory Birds Convention Act* -While the Species at Risk Public Registry shows the entire coast of Nova Scotia as Barrow's goldeneye habitat, there have been no known sightings in the vicinity of the site (Bird Studies Canada 2021) -Some records exist of Barrow's goldeneye in the big pond between December and April of various years. It is suspected they are regularly in flocks of overwintering common goldeneye (Mills and Laviolette 2011)

Eastern wood-pewee	*Contopus virens*	-Last COSEWIC designation (Nov 2012): special concern -Bird Studies Canada (2021) has evidence of possible breeding on Brier or Long Island in their second atlas -Considered a common migrant in spring and fall (Mills and Laviolette 2011)
Fin whale	*Balaenoptera physalus*	-Last COSEWIC designation (May 2019): special concern -Associated with low surface temperatures and oceanic fronts during summer months; found from close inshore to well beyond the shelf break -Protected under the federal *Species at Risk Act* (Schedule 1)
Golden crest	*Lophiola aurea*	-Last COSEWIC designation (May 2012): special concern -Ranges from Mississippi to New Jersey in the United States, and Nova Scotia in Canada -Only occurs around Fancy Lake, Shingle Lake, Hog Lake, Ponhook Lake, Dunraven Bog, and the Digby Neck -Inhabits cobble lakeshores, bays, bogs, and fens where there is often little competition due to physical stress -Protected by the federal *Species at Risk Act* (Schedule 1) and by provincial Nova Scotia *Endangered Species Act*
Harlequin duck	*Histrionicus histrionicus*	-Last COSEWIC designation (November 2013): special concern -Spends most of the year in coastal marine environments and feeds close to rocky shorelines, moving once a year into fast turbulent rivers -Protected under the federal *Species at Risk Act* (Schedule 1), the federal *Migratory Birds Convention Act*, and the Nova Scotia *Endangered Species Act* -Overwinters in small numbers, most likely around Green Island and Gull Rock, but also seen regularly along the shores of Pond Cove and at the western light (Mills and Laviolette 2011)
Peregrine falcon *anatum* subspecies	*Falco peregrinus anatum*	-Last COSEWIC designation (Nov 2017): not at risk -Prefer open habitats, such as seacoasts, for hunting -Protected under the federal *Species at Risk Act* (Schedule 1) and the Nova Scotia *Endangered Species Act* -Protected by the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (Appendix I) -A regular fall migrant (Mills and Laviolette 2011)

Red-necked phalarope	*Phalaropus lobatus*	-Last COSEWIC status (Nov 2014): special concern -During winter and while migrating, the species concentrates at sea in areas where prey is abundant (e.g., convergences and upwellings) -Common offshore and along the ledges to the west of Brier Island, sometimes in spring but more commonly in fall (Mills and Laviolette 2011)
Rusty blackbird	*Euphagus carolinus*	-Last COSEWIC status (Apr 2017): special concern -The breeding range of the rusty blackbird includes a vast portion of Canada; a very small number of rusty blackbirds winter, albeit sporadically, in the southern part of most Canadian provinces -Protected under the federal *Species at Risk Act* (Schedule 1) -Considered endangered under the Nova Scotia *Endangered Species Act* -Bird Studies Canada has a possible occurrence of the bird on Digby Neck in the first atlas (2021) -A scarce migrant in spring and fall (Mills and Laviolette 2011)
Savannah sparrow princeps subspecies	*Passerculus sandwichensis princeps*	-Last COSEWIC status (Nov 2009): special concern -Nests in heath-dominated terrain and in dense marram grass on coastal dunes and upper beaches (prefers heath areas) -Savannah sparrows are very common migrants on Brier Island and are breeders in the limited areas of suitable nesting habitat, especially Pond Cove (Mills and Laviolette 2011)
Short-eared owl	*Asio flammeus*	-Last COSEWIC designation (May 2021): threatened -Breeds sporadically in arctic areas, coastal marshes, and interior grasslands, where voles and other small rodents proliferate -Occasionally seen in coastal areas of Atlantic Canada -Mainly a fall migrant (Mills and Laviolette 2011)
Sowerby's beaked whale	*Mesoplodon bidens*	-Last COSEWIC designation (Apr 2019): special concern -This species is most often sighted in deep water, along the continental shelf edge and slope; only rarely seen in coastal waters -Protected under the *Marine Mammal Regulations* of the *Fisheries Act*

Table 17. Species with no SARA Status but with COSEWIC Designation in Nova Scotia and the Atlantic Ocean

Note: Unless otherwise specified, the information in the following table was derived from the Species at Risk Public Registry and associated pages (Government of Canada 2021h)

COMMON NAME	SCIENTIFIC NAME	COMMENTS
Species with no SARA status		
Acadian redfish Atlantic population	*Sebastes fasciatus*	-Last COSEWIC designation (Apr 2010): threatened -Ranges across all Atlantic Canada's marine waters, except for the northern-most areas -They live primarily along continental slopes and in deep channels, from 150 to 300 m
American eel	*Anguilla rostrate*	-Last COSEWIC designation (May 2012): threatened -Canadian range includes all fresh water, estuaries, and coastal marine waters that are accessible to the Atlantic Ocean -Blockage of migratory streams is a major threat to the species
American plaice Maritime population	*Hippoglossoides platessoides*	-Last COSEWIC designation (Apr 2009): threatened -Wide distribution throughout the North Atlantic -Overfishing and natural mortality are the main threats to the Maritime population
Atlantic bluefin tuna	*Thunnus thynnus*	-Last COSEWIC designation (May 2011): endangered -Occurs in the western Atlantic from Newfoundland to the Caribbean Sea; actively fished in Canadian waters from July through December over the Scotian Shelf
Atlantic cod Southern population	*Gadus morhua*	-Last COSEWIC designation (Apr 2010): endangered -Atlantic cod inhabit all waters overlying the continental shelves of the Northwest and the Northeast Atlantic Ocean -Commercial fishing is ongoing and contributes to the decline; there is evidence of an unexplained increase in natural mortality in the 4X portion of the designatable unit
Atlantic salmon Nova Scotia Southern Upland population	*Salmo salar*	-Last COSEWIC designation (Nov 2010): endangered -Acidification of freshwater habitats by acid rain is a major threat as is poor marine survival related to incompletely understood changes to the marine ecosystem

Atlantic sturgeon Maritime population	*Acipenser oxyrinchus*	-Last COSEWIC designation (May 2011): threatened -Occurs in rivers, estuaries, near-shore marine environments, and shelf regions to at least 50 m depth along the Atlantic coast of North America
Basking shark Atlantic population	*Cetorhinus maximus*	-Last COSEWIC designation (Nov 2009): special concern -Uses coastal, temperate waters -Mortality caused by fishing by-catch and boat strikes are cited as the major threats to the species
Cusk	*Brosme brosme*	-Last COSEWIC designation (Nov 2012): endangered -Is never found near the shore or at depths less than 20 - 30 m -Fishing is an important cause of mortality, especially as bycatch in cod, haddock, pollock, and halibut longline fisheries
Hudsonian godwit	*Limosa haemastica*	-Last COSEWIC designation (May 2019): threatened -An Arctic-nesting shorebird often found flying over Atlantic coast lines during their migration to South America -Largest threats to populations are the loss or disturbance of suitable habitats and prey availability for both nesting and over-wintering locations -Protected by the *Migratory Birds Convention Act, 1994*, in Canada and the *Migratory Bird Treaty Act* within the United States -A scarce migrant in late July to mid-August (Mills and Laviolette 2011)
Killer whale Northwest Atlantic population	*Orcinus orca*	-Last COSEWIC designation (Nov 2008): special concern -Very rarely spotted around Brier Island (Brier Island Lodge and Restaurant)
Leach's storm-petrel	*Oceanodroma leucorhoa*	-Last COSEWIC designation (Nov 2020): threatened -Nests on offshore islands in the North Atlantic -Feeds on small, bioluminescent fish and is attracted to human sources of light (e.g., offshore oil platforms), which cause collisions and stranding of young birds -Most birds seen around Brier Island are probably post-breeders or juveniles and records are scarce (Mills and Laviolette 2011)

Lesser yellowlegs	*Tringa flavipes*	-Last COSEWIC designation (Nov 2020): threatened -Breeds in Canada's boreal region -Loss of wetland and intertidal habitat used during migration is a key concern -A sparse spring migrant but an abundant migrant in summer and fall (Mills and Laviolette (2011)
Lumpfish	*Cyclopterus lumpus*	-Last COSEWIC designation (Nov 2017): threatened -Can be found in the water column and near the seafloor in a variety of habitats -Fishing and destruction of inshore spawning and nesting habitat are suspected threats to the species
Porbeagle shark	*Lamna nasus*	-Last COSEWIC designation (May 2014): endangered -Can be found from the coast to the open sea -Protected by the *Oceans Act* and by the *Fisheries Act* under the terms of the *Atlantic Fishery Regulations, 1985* -Target fishing and by-catch of longline fisheries has resulted in the population decline and continues -Currently no fisheries management measures for this species
Sei whale	*Balaenoptera borealis*	-Last COSEWIC designation (May 2019): endangered -Sei whales range widely, encompassing all the world's oceans including the Scotian Slope and Shelf, particularly during the summer months. -Atlantic population follows large pelagic concentrations of zooplankton along the continental shelf -Nova Scotian stock protected under the United States *Endangered Species Act, 1973,* and the *Marine Mammals Regulations*, which fall under the *Fisheries Act*
Shortfin mako Atlantic population	*Isurus oxyrinchus*	-Last COSEWIC designation (May 2019): endangered -Found in both inshore and offshore waters -COSEWIC has identified fishing, especially pelagic long-lining, as being the most significant threat to the shortfin mako; there is no directed fishery for shortfin mako in Atlantic Canada, but it is caught as by-catch in other pelagic fisheries and is sought after for sport fishing -Managed under the Canadian Atlantic Pelagic Shark Integrated Fisheries Management Plan which allows for an unrestricted by-catch along with 100% dockside monitoring

Smooth skate Lauranian-Scotian population	*Malacoraja senta*	-Last COSEWIC designation (May 2012): special concern -One of the smallest species of skate endemic to the western North Atlantic -By-catch mortality contributes to population decline -No direct fisheries for this species but is taken as by-catch in fisheries directed towards groundfish -Population of the Laurentian-Scotian has accounted for 90% of the smooth skates in Canada, while covering 70% of the Canadian smooth-skate range -Area of abundance along the Scotian Shelf has drastically declined since the 1970s
Spiny dogfish	*Squalus acanthias*	-Last COSEWIC designation (Apr 2010): special concern -Inhabits Canadian waters ranging from Newfoundland to the Scotian Shelf, approximately 10 to 20% of those on the Scotian Shelf migrate south in the fall, returning in the spring (Government of Canada 2018c) -Widely distributed in temperate regions of the world's oceans and appears to be a habitat generalist; subject to both targeted and by-catch fishing mortality -Target of a directed fishery in Atlantic Canada, but the fishery is currently inactive (Government of Canada 2020f)
Striped bass Bay of Fundy population	*Morone saxatilis*	-Last COSEWIC designation (Nov 2012): endangered -Shubenacadie, Annapolis, and Saint John Rivers are historical spawning grounds, of which only the Shubenacadie is still used, but a native population in the Saint John River may still exist
Thorny skate	*Amblyraja radiata*	-Last COSEWIC designation (May 2012): special concern Ranges widely and is one of the most common skate species in the Northwest Atlantic (Government of Canada 2018d) -Both a target of directed fisheries and caught as by-catch, although directed fisheries along the Scotian Shelf stopped in 2005 (Government of Canada 2018d) -Regarded as over-fished and landing of this species is prohibited throughout the Gulf of Maine (Government of Canada 2018d)
White hake	*Urophycis tenuis*	-Last COSEWIC designation (Nov 2013): threatened -Fish of all sizes tend to move inshore in summer and to deeper water for winter -Overfishing is thought to be the main reason for the decline of the species and high levels of natural mortality impede recovery

5.3 Impacts to Other Users Including Wildlife

5.3.1 Critical Habitat and Mitigation Plans for Wildlife

KCS operates with a WIP that outlines all control measures and special requirements as they relate to wildlife encounters at the site (**Appendix C**).

Leatherback Sea Turtle

In 2006, the Atlantic Leatherback Turtle Recovery Team published a recovery strategy for the turtles in Atlantic Canadian waters. The recovery strategy document listed entanglement in commercial fishing gear, vessel collision from recreational boating and other ship traffic, marine pollution, and oil and gas exploration and development as potential threats contributing to mortality. A summary of the gear types thought to be the highest risk for entanglement included longline, gillnet, traps, and pots (Government of Canada 2021i). Aquaculture gear was not mentioned in the document, but it stands to reason that aquaculture equipment, including all lines, should be kept in good working order.

Mitigation: The leatherback sea turtle is protected under the *Species at Risk Act*, which makes it an offense to kill, harm, harass, capture, or take any individuals of a listed species. KCS will comply by these rules. If a leatherback sea turtle is spotted by any of the crew working on the aquaculture site, the Marine Animal Response Society (MARS) will be contacted at 1.866.567.6277 and provided details of the sighting.

Migratory Birds

Most species of birds in Canada are protected under the *Migratory Birds Convention Act, 1994*. Under the *Migratory Birds Regulations* (C.R.C, c. 1035; Environment and Climate Change Canada 2017a), it is an offense to disturb, destroy, or take a nest, egg, or shelter of a migratory bird, or possess a live migratory bird, or the carcass, skin, nest, or egg of a migratory bird except under the authority of a permit (Government of Canada 2021j).

Mitigation: KCS personnel will abide by the *Migratory Birds Convention Act* and the associated regulations

Roseate Terns

Two criteria have been used to identify critical habitat for the roseate tern in Canada (Environment Canada 2010). The first includes less than 10% of the Canadian population of roseate terns. These sites currently support more than 15 pairs of roseate terns. This includes North Brother, South Brother, and Country Islands. The second criterion includes tern colonies in areas that have supported small but persistent numbers of nesting roseate terns. The areas currently identified under this criterion include Sable Island and the Magdalen Islands. Historically, there was a small colony of roseate terns on Peter's Island until about 2001 (COSEWIC 2009b, Mills and Laviolette 2011).

Mitigation: None of the areas identified as critical habitat are within 5 km of the aquaculture site; however, KCS will limit beach clean-up activities to the fall and winter months so as not to interfere with sensitive breeding, nesting, and fledging times (i.e., mid-April to mid-August). KCS employees will not kill, harm, or collect adults, young, or eggs of the roseate terns.

Sharks

The white shark is listed under Schedule 1 of the *Species at Risk Act*; it is illegal to kill, harm, harass, capture, take, possess, collect, buy, sell, or trade individuals of endangered, threatened, or extirpated species listed in Schedule 1 of the Act (Government of Canada 2021k). In Atlantic Canada, there are only two directed shark fisheries. One is a recreational fishery for the blue shark which is primarily in the form of annual derbies; the other is a commercial fishery, currently inactive, aimed at spiny dogfish (Government of Canada 2020f). The practice of finning, removing and retaining the fins and discarding the remainder of the shark at sea, was banned in Canadian waters in 1994 (Government of Canada 2020f).

Mitigation: KCS personnel will not attempt to attract, capture, or harass any sharks in any way.

Whales

The St. Lawrence Estuary population of beluga whales is at its southernmost limit of the species distribution. In summer, the species concentrates around the mouth of the Saguenay River from Ile aux Coudres to Bic and as far up the Saguenay as Saint-Fulgence. Little is known about wintering grounds. Vagrants are sometimes seen as far away as New York (Hamilton 2018).

The blue whale remains listed under the *Species at Risk Act* as an endangered species throughout the Atlantic. A recent science advisory report (DFO 2018a) has identified areas important to blue whales. The areas identified include the lower St. Lawrence Estuary, Mecatina Trough, South and Southwestern Newfoundland, the edge of the continental shelf, Honguedo Strait, and the Cabot Strait. These areas were identified based on their importance to the species for feeding and transit; none are near the Brier Island aquaculture site.

North Atlantic right whales have occurred throughout history in the coastal waters of the Atlantic, ranging from lower latitudes throughout winter for calving, and higher latitudes for feeding during the spring, summer, and autumn months (NOAA Fisheries Service 2022). Throughout these migrations, areas of high use include Coastal Florida and Georgia, the Great South Channel, Cape Cod Bay, the Bay of Fundy, and the Scotian Shelf (Brown et al. 2009, Government of Canada 2020g, NOAA Fisheries Service 2022).

Mitigation: Beluga, blue, and North Atlantic right whales are protected under the *Species at Risk Act*. KCS will comply with these regulations and will not attempt to harvest, kill, or harass any whales (such as blue whales, right whales, belugas, orcas, sei, etc.) that are seen during aquaculture activities. Should any whale in distress be noted by any of the crew members at the aquaculture sites, the Marine Animal Response Society (MARS) will be contacted at 1.866.567.6277 and provided with details of the sighting. Vessels servicing the site will travel at a maximum speed of 9 knots to prevent damaging collisions between whales and aquaculture service vessels. This is below the recommended speed set by NOAA Fisheries Service for ships travelling through areas known to have whales present (i.e., 10 knots or less: NOAA Fisheries Service 2022).

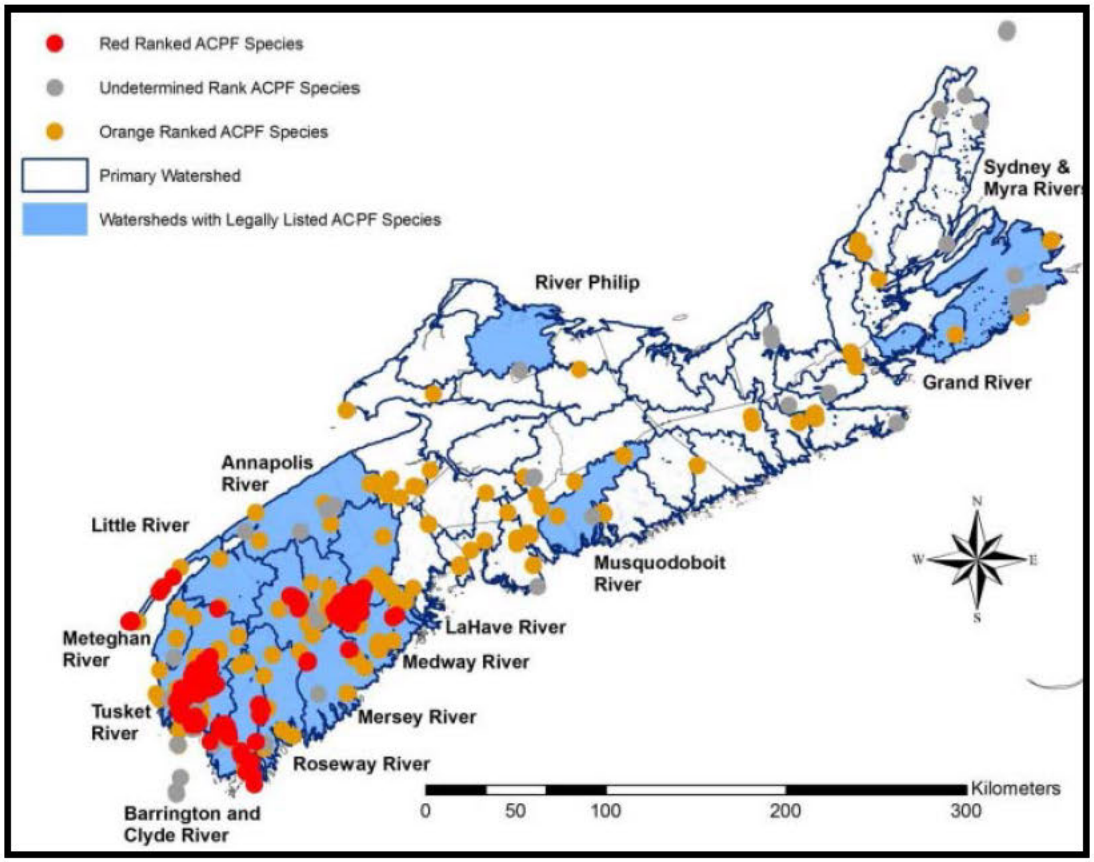
Atlantic Coastal Plain Flora

Some species of Atlantic Coastal Plain Flora (ACPF) are within 5 km of the Brier Island aquaculture site. The ACPF include over 90 unrelated species of herbaceous plants. These plants are at the most northern limit of their range, with many being listed as "at risk" or "sensitive". A combination of protection, prevention of threats to the species and habitats, and public education has been used to reduce impacts on the ACPF.

The ACPF grow in lakes, rivers, bogs, fens, and estuaries. These species are at risk due to biologically limiting factors and anthropogenic threats. The ACPF are present in small population sizes with limited ranges and reduced sexual reproduction capabilities. The greatest threat affecting ACPF is the loss and degradation of their habitat through such activities as residential development, alteration of shorelines, off-highway vehicle use, and peat mining. The Brier Island aquaculture site is in an area where watersheds are identified as having legally listed ACPF species (Fig. 53; Environment Canada and Parks Canada Agency 2016).

Mitigation: Since most ACPF species grow on the land, it is unlikely that any KCS employee will encounter these plants while executing aquaculture operations.

Figure 53. High Priority Watersheds in Nova Scotia Containing Atlantic Coastal Plain Flora Species
Note: Figure sourced from Environment Canada and Parks Canada Agency (2016)



SW2016-058

5.3.2 Impacts to Other Users

5.3.2.1 Right to Navigation

Figure 54 provides information regarding navigation routes that are used by KCS while servicing the Brier Island aquaculture site. The layout of on-site equipment is provided in Figures 55 - 57. Please refer to section **5.1.2 Pleasure Craft and Commercial Vessels**, **Section 6.0 The Public Right of Navigation** and **8.2.2 Boat Traffic and Wharves** for additional information regarding the right to navigation around the Brier Island aquaculture site.

Figure 54. Marine Chart Showing KCS Vessel Route from Brier Island to Westport Government Wharf and Meteghan Government Wharf

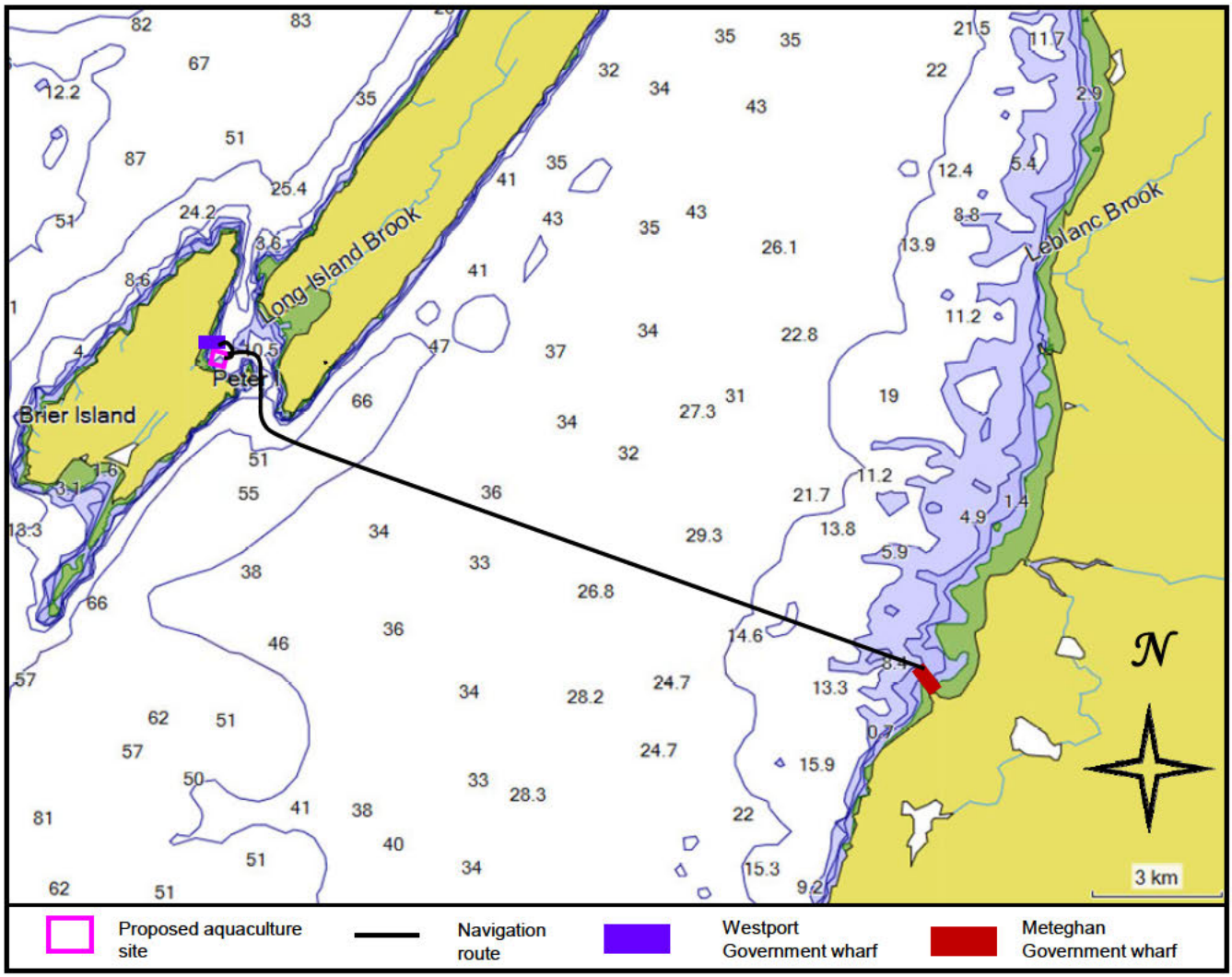


Figure 55. Brier Island Site Development Plan Showing Cage Configuration

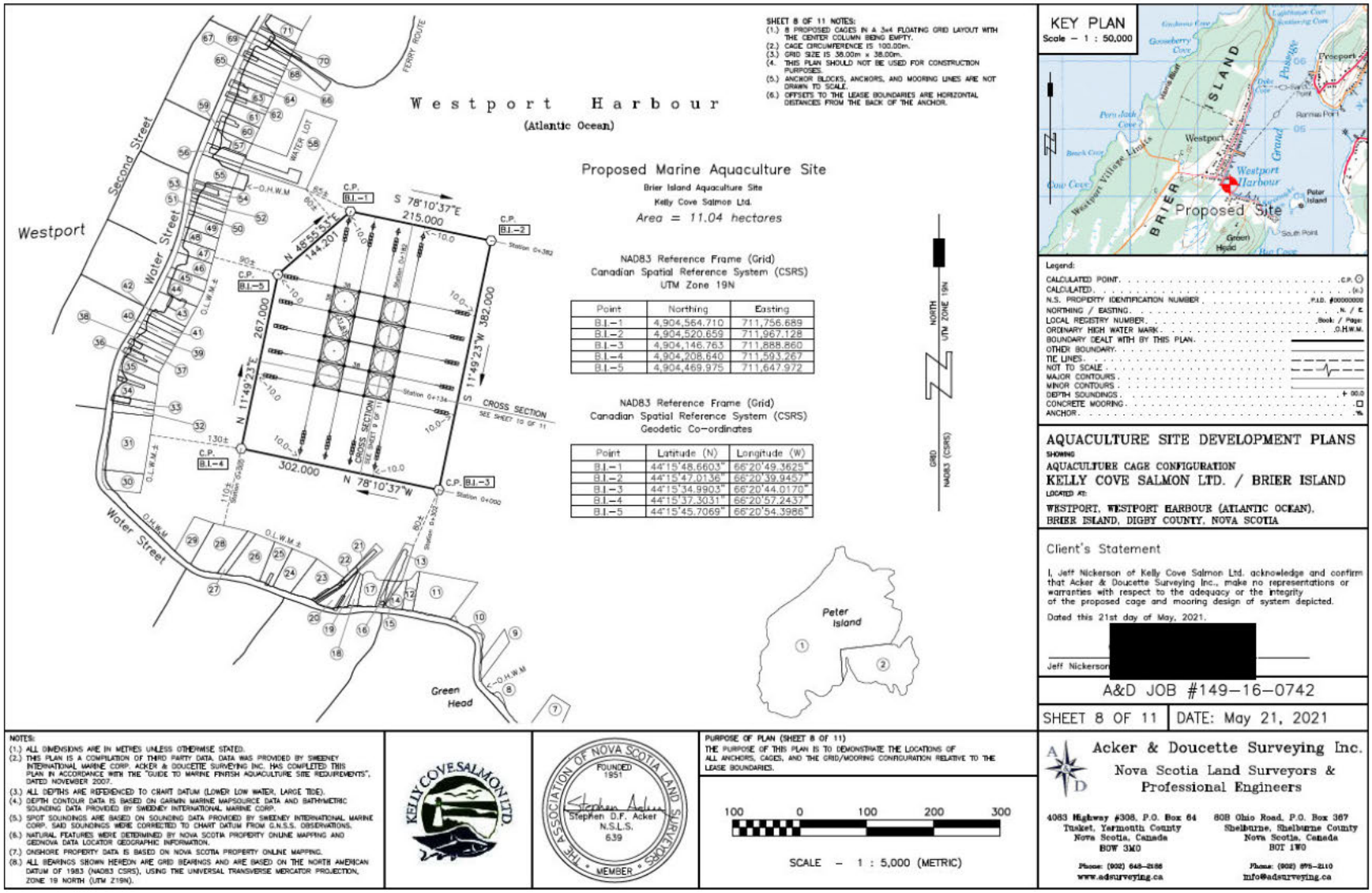


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Figure 56. Brier Island Cross-Sectional Plan A

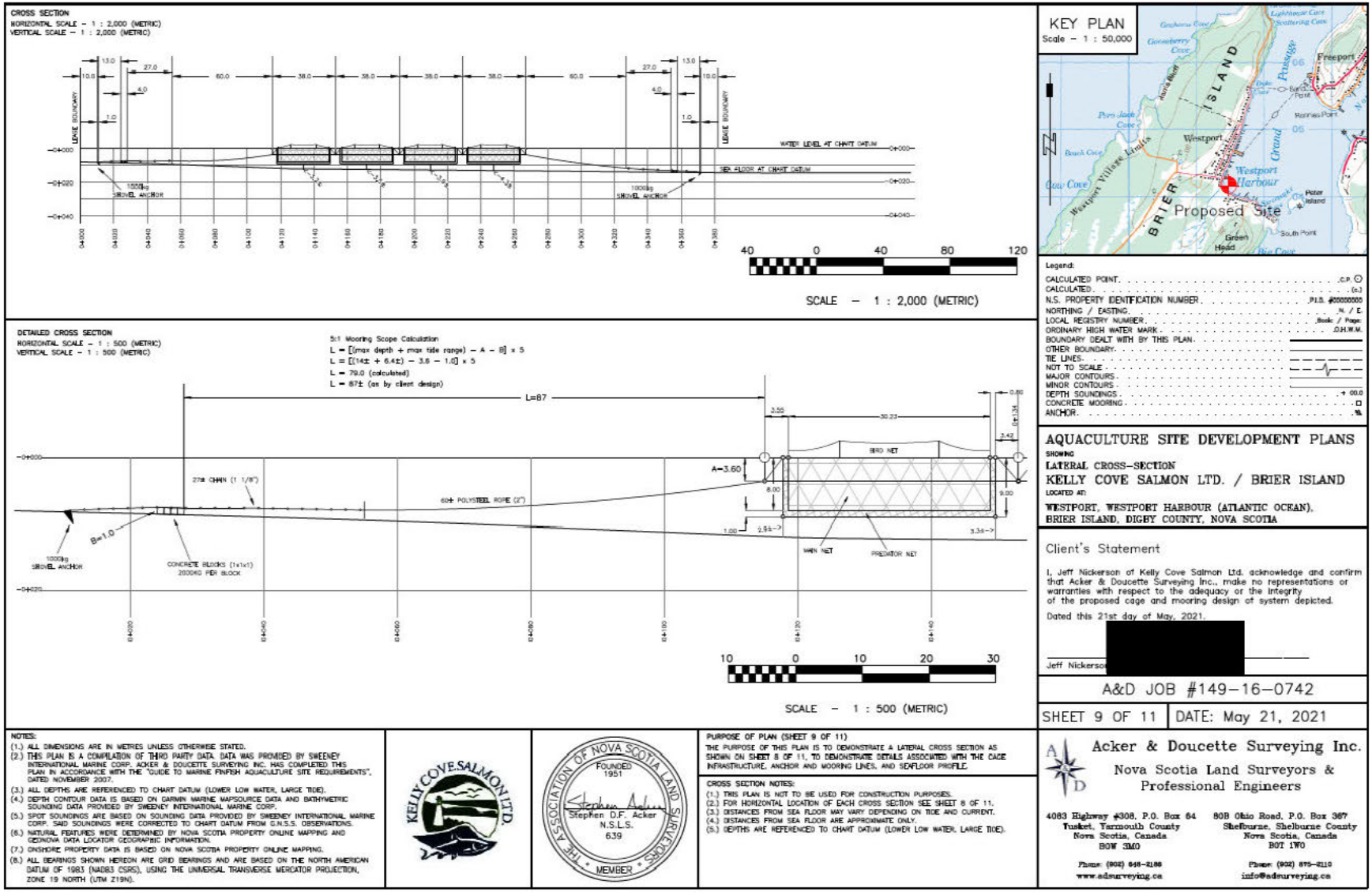
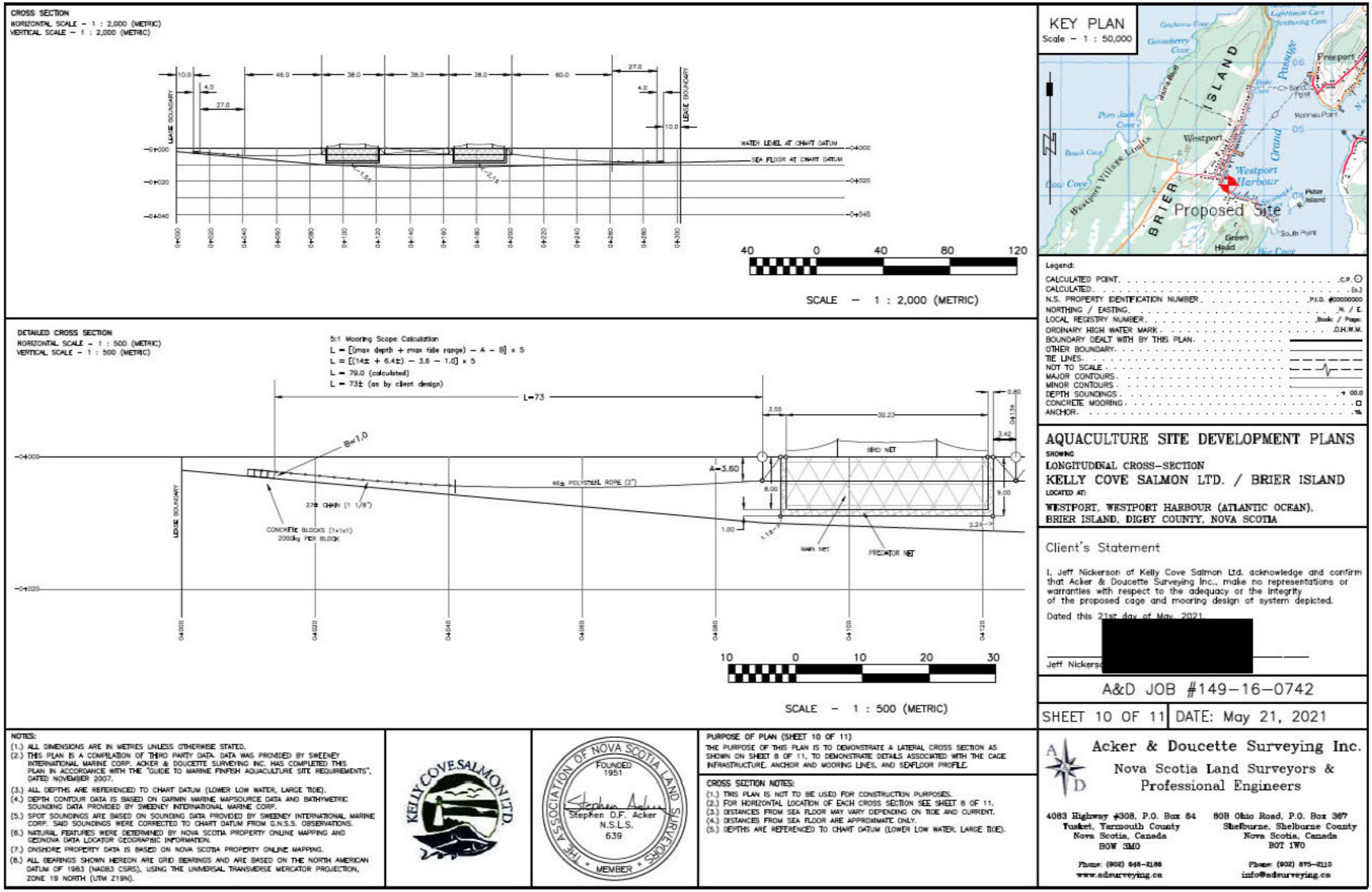


Figure 57. Brier Island Cross-Sectional Plan B



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5.3.2.2 Esthetics

The Brier Island site is an existing site. The requested boundary amendment will not affect the visual appearance of the site. The site is maintained in good working order in agreement with the site's FMP. Refer to **7.2.3.1 Infrastructure** for additional details.

5.3.2.3 Bird Activity

Seabirds, such as seagulls, are endemic to the Bay of Fundy. Any activity on the water, which includes fishing and aquaculture, can attract opportunistic birds such as seagulls. These birds can become a nuisance for site operations, and they may become conditioned to seek food from human activities. KCS will continue to discourage bird activity at the site by using bird nets over the cages, implementing innovative feeding equipment, and keeping the feed in a closed hopper. Refer to **5.4.1 Wildlife** for additional details.

5.4 Impacts from Other Users Including Wildlife

5.4.1 Wildlife

Due to the environment in which KCS operates, wildlife interactions will be unavoidable – positive, neutral, or negative. Positive and neutral interactions may require management notification if the species is listed on a species-at-risk registry or other similar document.

Negative interactions, such as predators, should be noted to determine if there is an increase or decrease in activity. Any interaction must be reported. Interactions with birds and predators at a marine finfish site are to be avoided. Unwanted attention from birds and predators, such as seals, endangers the wildlife themselves, can present a nuisance to workers, may cause stress on the fish, and may pose biosecurity and fish-health risks.

Predator deterrence is key to containment management. Predator exclusion includes predator netting, bird nets, and containment nets. Site mortalities are to be contained in a secure, closed bin and removed promptly from the site. The containers are to be checked daily to ensure their integrity. Feed is to be stored inside, or, if outside, covered with tarps or stored inside a tub with a securely fastened lid. Routine, daily examinations of dead and live fish are conducted to inspect for signs of predator attack and are noted. Divers are called in when deemed necessary to verify net integrity below the water if predator problems are detected.

To deter birds and to mitigate against interactions, each cage containing fish is equipped with a bird stand and net for the duration of the grow-out. These stands and nets remain in place during the production cycle but may be temporarily lifted during activities such as mortality dives, net washing, fish transfers, or treatments. KCS performs and documents surface inspections to ensure netting and gear are maintained in good working order. At minimum, weekly bird-net inspections are performed.

Predator nets surrounding the primary nets will be in use during the months of December to May to aid with predator deterrence. Predator nets will not be placed on the cages from May to December as predator presence is low. Removal of the predator nets on the cages during these months will aid in reducing the amount of biofouling on the cages.

Measures taken to protect fish from predators are always carried out in a manner that considers predator welfare and does not endanger the predator population.

The WIP contains prevention and control measures for wildlife (**Appendix C**).

5.4.2 People Interaction

Interaction with people outside of KCS is inevitable. Use of the Westport and Meteghan Government Wharves and the proximity of the site to the villages of Westport and Freeport contribute to this. Interactions with people and organizations outside of KCS can raise concerns for biosecurity, pollution, and safety of the site staff.

Biosecurity is a key component to managing the risk of pathogen spread. Biosecurity helps mitigate outbreaks of disease through the control of personnel, traffic, vehicles, biologics, and equipment. Biosecurity standard operating procedures must be developed and used to mitigate risk and to manage activities to reduce stress in animals and to reduce the potential for pathogen spread. Biosecurity must be considered for all procedures and must be addressed within procedural descriptions. All sites have a wharf-usage biosecurity procedure, which considers other users of the wharf.

The potential for pollution from other industries within Grand Passage exists. The Westport – Freeport ferry operates near the site and there is a fish processing plant nearby in Westport.

Responsible operation of a site includes consideration for neighbours in terms of noise and its potential for causing disruption. Sound attenuation is an important factor when purchasing any new equipment that will be used on the site – new equipment will be assessed for noise reduction opportunities. When possible, machinery will be placed in areas that will have the least amount of impact for other water- and shore-based users. KCS uses mufflers or noise reduction methods/materials on air blowers and diesel engines and minimizes activities that can create noise. It is KCS policy to turn off non-essential equipment, whenever possible, to reduce noise.

Visitors to the Brier Island site are welcomed and are expected to follow basic biosecurity and health and safety (H&S) rules. This aids in ensuring that all parties on the site remain safe. The Site Management should confirm with the Area Manager that any visitor has approval to be on site if the Site Manager was not previously informed. All visitors must sign the logbook. Visitors must change their footwear prior to stepping on site; rubber boots will be provided from the office. All visitors must wear PPE, including a PFD, while travelling to the site and while on site, and the use of footbaths and proper hygiene is mandatory. By adhering to strict biosecurity, H&S rules, and visitor protocols, KCS provides a safe working environment for employees, visitors, and the fish on site.

KCS operates under a detailed safety management system (SMS). The SMS contains procedures for dealing with emergency preparedness and transportation. An emergency is classified as any situation that has the potential to cause harm to any employee, visitor, or infrastructure on site.

SECTION 6.0 THE PUBLIC RIGHT OF NAVIGATION

6.1 Navigation Protection Program Approval

6.1.1 Notice of Works

Transport Canada requires a notice of works form to notify the Navigation Protection Program (NPP) regarding a proposed work or change to an existing work in navigable waters. An application for approval has been filed via the online portal for the proposed boundary amendment of Brier Island. A completed and signed notice of works form with supporting documentation is present in **Appendix D** for reference. Acker & Doucette Surveying Inc. produced the aquaculture site development plans submitted with the signed notice of works. The plans include:

a. Proposed navigation-aids, to demonstrate the extent of the marine aquaculture site, as well as parcels of land adjacent to the lease. Property identification number (P.I.D. #) with corresponding owner names and addresses are also outlined in the plans
b. Depiction of the basic seafloor topography within the proposed lease boundaries
c. Demonstration of anchors, cages, and grid/mooring configuration location within the proposed lease boundaries
d. Lateral and longitudinal cross sections demonstrating cage infrastructure, anchor blocks, mooring lines, and seafloor profile, and
e. Proposed navigational and marking plan.

Each plan indicates the shape and position of the proposed lease, legal lease number, and position of the lease.

6.1.2 Project Description

The proposed lease incorporates all proposed aquaculture-related gear, above and below the water line. Installation of specific buoys to mark the lease area will be completed, as per Transport Canada's approval package.

SECTION 7.0 THE SUSTAINABILITY OF WILD SALMON

7.1 Identification of Local Salmon Populations

The abundance of the iconic Atlantic salmon, both globally and in the Canadian Maritimes, has undergone steep declines for several decades. Hundreds of research studies, conducted by thousands of researchers have attempted to identify the causative agents behind this alarming North Atlantic trend, but, to date, it is unclear what factor(s) are causing the continued decline. Numerous potential threats in both freshwater and marine habitats have been identified, yet conclusive, scientific evidence remains elusive. These threats include, but are not limited to, environmental change, exposure to contaminants, reduced habitat access, ecological community changes, aquaculture interactions, fisheries bycatch, and depressed population phenomena (Amiro et al. 2008, DFO 2010). However, recent expansive reviews by leading, global salmon conservationists are increasingly indicating the likelihood of illegal, unreported, and unregulated (IUU) fisheries occurring outside the exclusive economics zones (EEZ) of the North Atlantic Ocean (Dadswell et al. 2021). This is deeply concerning, as salmon conservation efforts, to date, have largely ignored IUU as a causative agent, and that any remedy of this on-going threat will require significant international agreements and joint enforcements. Until such time, salmon populations within the North Atlantic basin will remain vulnerable, despite significant conservation efforts and investments remediating rivers and the near shore environment. Regardless of the ultimate causative reason(s), many river populations in eastern Canada have become extirpated, or are listed as endangered under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

The Brier Island marine aquaculture site is in the range of the Nova Scotia Southern Upland population of Atlantic salmon. The Southern Upland region of Nova Scotia is divided into three Salmon Fishing Areas: SFA 20, SFA 21, and part of SFA 22 (Fig. 58). The marine aquaculture site is in Westport Harbour, within the SFA 21. Notable salmon rivers of SFA 21 include Medway River, LaHave River, West River (Sheet Harbour), and St. Mary's River (ASF 2019). Of these, the Medway River is the closet at ~ 230 km (by water) from the Brier Island aquaculture site. Within the adjacent SFA 22, notable salmon rivers include the Gaspereau, Stewiake, Big Salmon, and Petitcodiac, all greater than 225 km by water.

Historically, the Carleton, Tusket, Barrington, and Clyde Rivers contained salmon (Clair et al. 2004), all of which are closer to the Brier Island site than the Medway (Fig. 59) or Gaspereau Rivers. Clair et al. (2004) found that the Tusket, Barrington, and Clyde rivers were sensitive to acidification from acid rain, and recovery, even with reductions in acid deposition, would be long and slow due to the underlying geology. The Carleton and Tusket Rivers are approximately 100 km from the Brier Island aquaculture site. The Carleton River is considered not significantly affected by acidification according to Clair et al. (2004); however, surveys completed in 1960 (Smith, no date) indicated suitable salmon spawning and nursery areas are few and scattered. The Tusket River sustains a small run of Atlantic salmon in its more fertile and less acidic branches (Anon). The Salmon River of Digby County is approximately 26 km from the Brier Island site and the Meteghan River is approximately 16 km from the site. These are also considered salmon rivers (Native Council of Nova Scotia Netukulimkewe'l Commission 2018). Figure 60 shows the major watersheds of the Southern Upland Region.

DFO stock status reports, most of which pre-date any significant local commercial aquaculture activity (mid 2000's), indicate an increasingly dire condition of the local stock. According to the DFO Science Stock Status Report D3-12 (1998), all commercial fisheries of wild salmon, due to reduced catches, were closed in 1985. Following subsequent local salmon declines, all remaining recreational and aboriginal fisheries were also closed by 1990. Extensive regional electrofishing surveys conducted in 2000 found remaining salmon in only 28 of 52 rivers surveyed (54%), and more recent surveys conducted in 2008/2009 indicated continuing decline, with remaining salmon in only 21 of 54 rivers surveyed (39%) (DFO 2011).

All Atlantic salmon index populations within Fisheries and Oceans Canada (DFO) Maritimes Region were assessed to be well below conservation (egg) requirements in 2017 (DFO 2018b). Southern Upland (SU) and Outer Bay of Fundy (OBoF) Atlantic Salmon populations remain critically low. Adult salmon returns to the LaHave River (SU), the Saint John River upriver of Mactaquac Dam, and the Nashwaak River (OBoF) remain among the lowest returns on record with estimated egg deposition of 7% of the requirement in 2017 (DFO 2018b). In 2017, assessment of the index population for SFA 21 (Lahave River), indicate that the egg deposition and parr densities were below conservation requirements (DFO 2018b).

In November 2010, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated the OBoF, Nova Scotia SU, and Eastern Cape Breton population assemblages as endangered (Government of Canada 2021h). However, the SARA status remains as "no status, no schedule". Within SFAs 20 to 22, all rivers have been closed to recreational fishing as of 2010 (DFO 2018b).

Figure 58. Atlantic Salmon Fishing Areas of Atlantic Canada
Note: Figure was sourced from DFO (2015). White, numbered circles identify designated Salmon Fishing Areas.

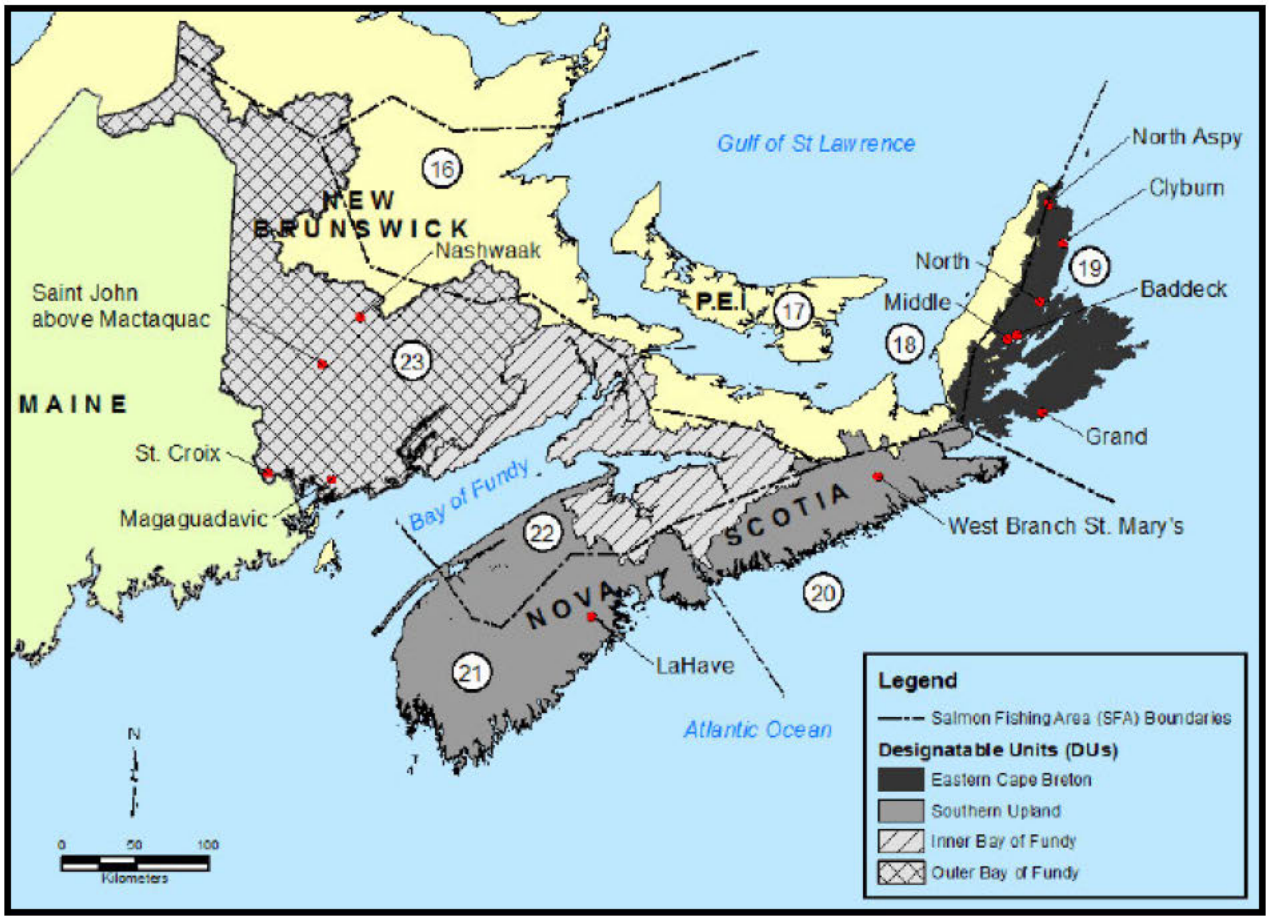


Figure 59. Salmon Rivers in Southwest Nova Scotia

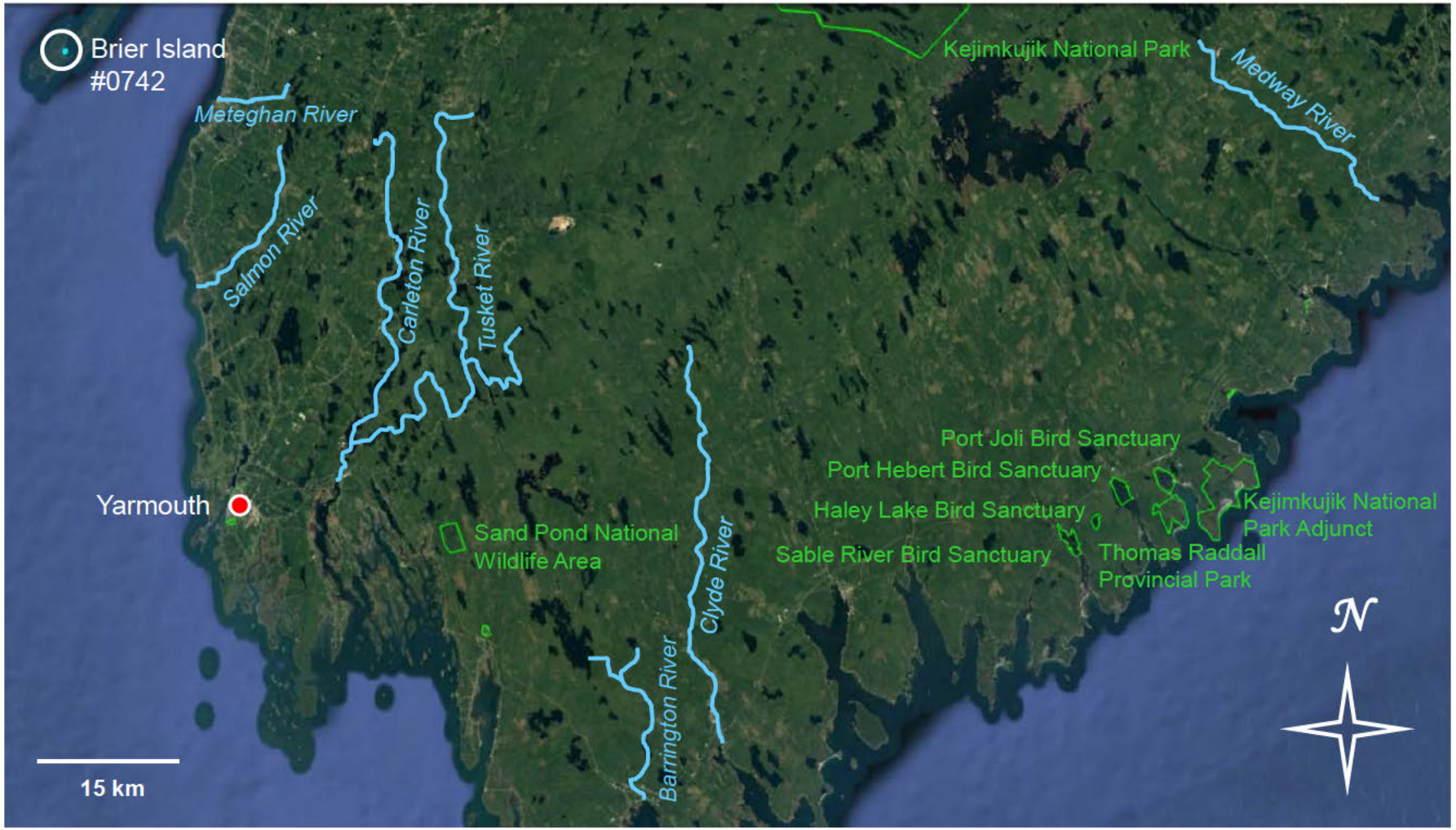
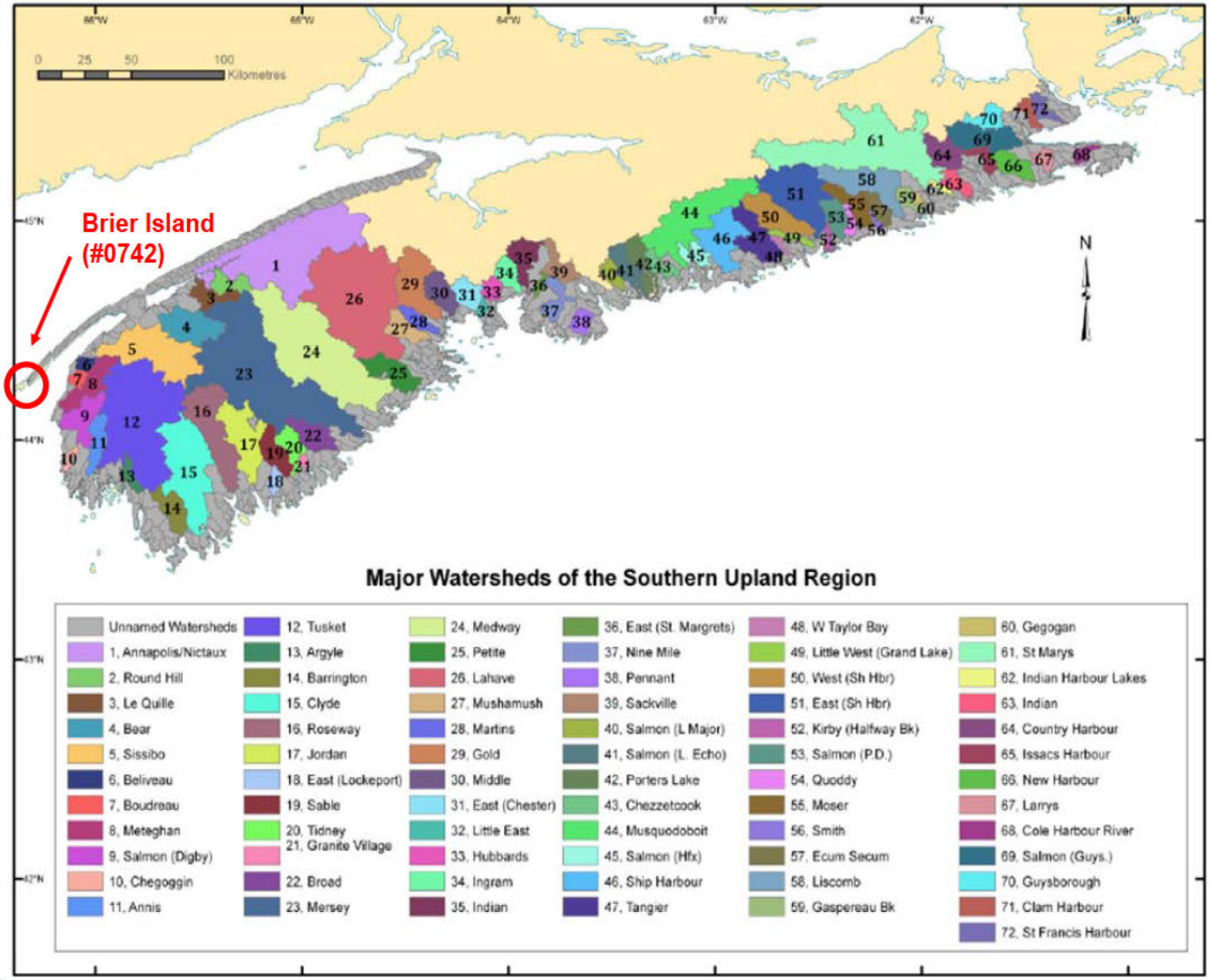


Figure 60. Major Watersheds of the Southern Upland Region
Note: Figure was sourced from DFO (2013b)



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7.2 Support of the Sustainability of Wild Salmon

7.2.1 Potential Impacts to the Wild Salmon Population

To reduce potential impacts to the wild salmon population, the Doelle-Lahey panel suggested that a regulatory framework should deal more extensively with the prevention of escape and should require operators to adopt, implement, track and report on the performance of a comprehensive containment system. Such a system should aim to prevent escapes to the greatest extent that is practicable, using best management practices and the best-available, commercially proven technologies.

The Brier Island site is some distance from the mouth of all known/potential wild-salmon rivers of SFA 21 and SFA 22. Concerns that marine-based finfish aquaculture can harm wild salmon by increasing their exposure to sea-lice infestation and diseases like ISA was also discussed in the Doelle-Lahey report. Currently, Nova Scotia farms tend to have very low lice loads usually not requiring treatment. By comparison, past and present surveys of lice on wild salmon, either very distant from aquaculture operation, or even prior to the establishment of salmon aquaculture (Templeman 1967 reviewed by Dadswell et al 2021), show natural sea-lice loads can be 10x that found on untreated farmed salmon. Although there have been reports of sea lice affecting post-smolt ability to successfully return as adults, this appears to only occur in regions where post-smolts must navigate a complex of multiple farms, situated in narrow passageways, such as occurring in Scotland and Norway (Butler and Watt 2003, Greaker et al. 2020). However, for sites such as Brier Island distant from rivers and isolated by its offshore geographic position, any post-smolt exposure to sea-lice infestations, and therefore potential to negatively impact post-smolt survival, would be absent or negligible at worst (Carr and Whoriskey 2004, Lacroix and Knox 2005). In addition, the temporal management of the salmon farms further reduces potential effects upon post-smolt (as outlined below). Current research also suggests that farmed salmon are more likely to contract pathogenic strains of ISA from wild salmon, which are more resistant (Doelle and Lahey 2014). Lastly, according to Fisheries and Oceans Canada (DFO 2013b) there have been no proven cases of the transmission of sea lice or ISA disease in wild populations from aquaculture sites.

In stewardship of the nearshore environment, and recognizing potential risks to wild salmon in Nova Scotia, KCS has adopted many measures, best-practices, and state-of-the-art technologies known to greatly reduce potential impacts to wild salmon. Unlike many other global salmon growing regions, with multiple salmon farming organizations operating in concert and poor oversight by government regulators, Nova Scotia benefits from strong regulatory oversight and an industrially proven “bay management area” (BMA) approach to farming. Specifically, all BMA farms are collectively and spatially managed as units, which means they are stocked, maintained, and harvested as a single, but spatially distributed farm. As is proven practice with terrestrial livestock farms, KCS salmon farms are stocked and harvested simultaneously as a single age class. This has been shown to mitigate risk of disease outbreaks on farms, and more importantly, reduces risks to any wild salmon. All salmon smolt stocked on KCS marine farms are delivered from land-based hatcheries, are fully vaccinated for known salmon diseases (e.g., furunculosis, vibrio, etc.), have a Certificate of Health for Transfer (COHFT), and are free of sea lice at the time of stocking to the sea cages. Constant and vigilant monitoring, applying

approved treatments by accredited veterinarians, with oversight by provincial specialists, maintains both the health and welfare of the farmed salmon, as well as mitigates disease-transference risk to Nova Scotian wild salmon. Farms are also managed temporally to avoid any interactions with wild salmon. For instance, farms are stocked (early summer) after the period in early spring that the vulnerable wild salmon smolts would have migrated from nearby rivers. During the first year at sea, sea-lice numbers are generally very low, thus presenting a very low risk to any native, wild salmon in area. During late fall and winter of the second year at sea, when sea-lice numbers at farms can become problematic, farmed salmon are harvested, also removing all attached sea lice from the area. The winter harvest thus acts to eliminate any potential exposure risk to juvenile wild salmon that may emerge from nearby rivers later in the early spring. Furthermore, salmon returning to spawn spend relatively little time in nearshore/estuarine areas (e.g., timing the ebb tide, waiting for dusk/dawn periods, acclimate to fresh water, etc.). Any sea lice picked up by passing wild adults during their spawning period, would be naturally cleared when they enter freshwater upon their return to natal rivers and streams. Lastly, any subsequent risk to sea-returning spawned adults would similarly be very low, due to typically very brief nearshore periods during post-spawning seaward migrations.

KCS has made significant investments into both research and capital equipment for green-based thermo-mechanical sea-lice treatment technologies, cleaner-fish-based biocontrol of sea lice, and the use of approved natural products and/or medicated feed to control and remove lice from farmed salmon and the local environment. Future operation of the under-construction Centreville, NS “post smolt salmon hatchery” will further mitigate any potential risks to local wild salmon of Nova Scotia. Planned as the largest recirculating aquaculture system (RAS) in Atlantic Canada, juvenile farmed salmon will be able to be reared on land much longer (from 1.5 to 2.5 years), in complete isolation from wild salmon and any at-sea diseases. This post-smolt facility will also reduce the time of farmed salmon at sea from the traditional 2 years to potentially as little as 1 year. As disease and pests mostly affect fish during their second year at sea, this large investment will not only improve the performance of KCS’ farmed salmon, but it should also further reduce any remaining concerns of the impact of cultured salmon to nearby, wild-salmon populations.

Accidental, farmed-salmon escapes and potential breeding with wild-salmon populations (introgression) are both concerns for wild-salmon conservation and KCS’ business continuity. Proactively, KCS is constantly improving aquaculture practices with new and proven technologies. KCS routinely provides updated training and refreshes the knowledge of their operators in leading best practices. Cage integrity is addressed using state-of-the-art engineered netting and anchoring materials, extensive computational modelling of real and potential farm environments, regular and frequent failure testing, and replacement of critical components and materials. Farms in Nova Scotia are managed by experienced teams, with a demonstrated, excellent track record for site integrity and performance. Additionally, KCS is consistently developing new protocols to suit changing conditions, allowing it to adaptively manage operations for over 25 years in Nova Scotian waters. Lastly, KCS operates under full transparency regarding any real or potential escape events, communicating to government immediately as is required.

KCS continues to engage Nova Scotian public institutions, such as the Nova Scotia Community College and Dalhousie University, to assess best practices and management strategies, evaluate and deploy leading farm technologies, and co-develop world-leading aquaculture research, training, and certifications for both existing staff and future employees of KCS. Further, in collaboration with the Province of Nova Scotia, DFO, and several not-for-profit groups, KCS has recently begun the deployment of a proven, genetic-identity program, currently in use in the State of Maine, to definitively identify any salmon suspected of being an escaped farmed fish. Data-driven tools such as these are important for collective goals towards salmon conservation and to elevate the general public's accurate understanding of robust, modern salmon aquaculture.

7.2.2 Restoration Efforts

Hatchery/biodiversity facilities have been operating for decades throughout the natural range of Atlantic salmon for use in mitigation and stock-enhancement strategies. To bolster imperiled populations, traditional recovery strategies include a rearing-and-jonssorelease component with hatchery-reared salmon releases at several life stages (i.e., fry, juveniles, smolts) (Jonsson and Jonsson 2006). This involves the capture of returning, wild, adult salmon and/or collecting juveniles/smolts and rearing them to maturity in hatchery/biodiversity facilities. Salmon are manually spawned and eggs reared in artificial environments. Rearing environments in hatcheries/biodiversity facilities are highly atypical of their wild counterparts, often resulting in a reduced capacity of released fish to become established in the wild (Youngson and Verspoor 1998). Juvenile Atlantic salmon produced in traditional breeding programs, even with a limited period in captivity, do not meet the criteria necessary to ensure the preservation of the ecological integrity of the species (Metcalfe et al. 2003, Blanchet et al. 2008). As a result of spending a greater proportion of their life in captivity, the reproductive success of hatchery-reared salmon for conservation is greatly reduced (Fleming et al. 1996) and has not resulted in the recovery of salmon abundance. As outlined below, KCS and its parent company Cooke Aquaculture Inc. (CAI) are engaged in an innovative program that has successfully taken a different approach to enhancing the reproductive success of wild salmon.

7.2.2.1 Past and Current Regional Restoration Efforts

Nova Scotia has a rich history and active participation in salmon enhancement and, more recently, restoration. The Mersey Biodiversity Facility, near Milton NS, was once one of only two federal fish hatcheries in the province of Nova Scotia. The facility was tasked for the recovery efforts of both wild Atlantic salmon and Atlantic whitefish (Whitelaw et al. 2015). The Department of Fisheries and Oceans closed this facility in 2012, with it being fully decommissioned in 2014. The closure of the Mersey Biodiversity Facility greatly reduced restoration efforts of wild salmon in Nova Scotia, as only one remaining federal fish hatchery in the province (Coldbrook) was kept. Further, without redundancy measures in place, even a minor issue at the single facility could cease all wild-salmon production in the province, risking a loss of the maintained genetic diversity.

Currently, the NSSA Adopt a Stream reports one restoration project for the Salmon River (Digby Co.). The Spectacle Brook is undergoing restoration efforts coordinated by the Salmon River

Salmon Assoc. (NSSA Adopt a Stream 2020a). Another ongoing project is the Tusket Water Quality Project, aimed at detecting changes in nutrient levels in lakes of the Tusket catchment (NSSA Adopt a Stream 2020b).

7.2.2.2 Cooke Aquaculture Inc. (CAI) Restoration

Leadership by CAI towards salmon conservation in Atlantic Canada is demonstrated by its founding role in the Fundy Salmon Recovery (FSR) project. CAI helped develop and operate the world's first Wild Salmon Marine Conservation Farm on Grand Manan Island, New Brunswick. This on-going project is a collaboration of community, academic, government, First Nations, and industry stakeholders to protect and restore severely threatened Inner Bay of Fundy (IBoF) salmon. FSR is the first project in the world to rear wild-origin salmon within a marine conservation farm (operated by CAI) and subsequently return mature adults back to their natal river to spawn naturally. FSR is built on research demonstrating the immense value of early wild exposure on Atlantic salmon development and fitness (Clarke et al. 2016).

Given the dramatic loss of wild salmon, largely documented to occur following entry to the sea (reviewed by Dadswell et al. 2021), the primary objective of the FSR program is to bypass the observed, high, at-sea mortality and re-establish natural spawning within native rivers. This novel strategy captures a subset (~ 10%) of the out-migrating smolts during their departure from a given river. These smolts are then transferred and reared to maturity in the world's first Marine Conservation Farm, located in Dark Harbour on the island of Grand Manan, NB. Modified sea cages, operated by CAI, allow smolts exposure to the ocean environment while relieving pressure of predators and food scarcity. CAI supplied and installed custom-designed conservation cages and are the daily caretakers of the wild fish, providing them with proper nutrition, health monitoring, and equipment maintenance. To promote natural growth and maturity, the fish are fed specialized diets developed by nutrition experts specifically for wild salmon. When the salmon have grown safely to sexually maturity, they are transported by CAI and safely released in significant numbers (~1000 - 2500 mature adults annually) into their home rivers in the Fundy National Park and Petitcodiac watersheds to spawn naturally. The success of releasing marine-raised adult salmon is being assessed by tagging and tracking these adults to monitor at sea survival, spawning and reproductive performance, and ecological benefits.

This novel approach to salmon conservation has already produced unprecedented results. It is suspected that by protecting some of these smolts from the IUU fisheries, at-sea predators, or another unknown at-sea loss, conservation sea-cage-raised wild salmon, once returned to native rivers as adults, are far more effective at generating successful river-reared juveniles than what traditional, human-biased hatchery practices can produce. Despite the historic collapse and virtual extirpation of these river populations, since its beginning in 2015, FSR has successfully released over 8000 critically endangered IBoF Atlantic salmon back to their natal rivers, with 2021 seeing record numbers across the board. Fundy National Park recorded its largest ever, completely wild-produced smolt run. The Upper Salmon River in Fundy National Park is the only IBoF river with exclusively wild-produced juvenile salmon, at densities approaching what was present in the pre-collapse era. Finally, with 216 adult salmon returning

to Fundy National Park, this marked the largest natural salmon returns in over three decades (K. Samways, Fundy Salmon Recovery). The project continues to this day, and stakeholders, excited by the success of this approach, have plans to expand this proven strategy to salmon conservation with other willing community groups and, potentially, from nearby Southern Uplands populations.

For example, in February 2019, KCS met with the Medway River Salmon Association (MRSA) to discuss a partnership on a project like the FSR project. The meeting indicated another potential collaborative effort could be formed to improve remaining salmon numbers in the nearby Medway River. Early collaboration with the MRSA has been towards financial support to gather baseline information of river conditions, restoration viability, student sponsorship, and the purchase of a project salmon-smolt wheel.

Similarly, KCS has had forward-thinking discussions with other Park Canada representatives from the Cape Breton Highlands National Park, who have expressed interest in establishing a much larger program involving the creation of a Nova Scotian wild-salmon conservation farm, which could simultaneously assist in the recovery of multiple endangered river populations across the province. Further goals of this plan would include creating designs, procedures, education, and hands-on training for other groups wishing to establish similar but more local conservation facilities. KCS feels strongly that training and knowledge transfer of this now-proven approach could be the best chance to facilitate lasting recovery of the iconic Atlantic salmon and highlights its commitment to meaningfully contribute to this cause.

7.2.3 Mitigation Efforts and Regulatory Requirements

Several mitigation measures can be employed to reduce the potential impacts of salmon aquaculture on wild salmon populations. A list of priority objectives to reduce the risk of interactions between wild and farmed salmon was provided by Fisheries and Oceans Canada (1999) and updated in 2008 (DFO 2008). They are as follows:

1) Improved containment, including contingency plans and a reporting system for escaped fish, as well as marking of infrastructure and fish
2) Improved fish-health management including contingency plans and a reporting system for specified disease and parasite outbreaks
3) Improved effluent management
4) Improved risk assessment to determine appropriate donor stocks (including consideration of alternative species) and site selection for hatcheries and salmon farms, and improved enforcement
5) Enhanced education and training of aquaculture workers, particularly relative to containment and farm/hatchery management
6) Use of sterile fish
7) Use of predator nets at all aquaculture sites and reporting of significant predator attacks. Use of predator deterrence devices such as acoustic pingers at all aquaculture sites, though risks to other species and effectiveness would have to be investigated prior to implementation.

Aquaculture licence holders of marine finfish sites must comply with the *Aquaculture Management Regulations* for Nova Scotia (Schedule A – Regulations Respecting Aquaculture Management made by the Governor in Council under Section 4 Chapter 25 of the Acts of 1996, the *Fisheries and Coastal Resource Act*). A detailed FMP is required to outline the company's policies for fish-health management, containment management, farm operations, and environmental monitoring. The FMP is reviewed by NSDFA to ensure compliance with the *Aquaculture Management Regulations*. KCS policies, as outlined in the FMP, address priority objectives 1, 2, 3, 5, and 7 listed above, to reduce the potential impacts of salmon aquaculture on wild-salmon populations. Points 4 and 6 are beyond the control of KCS.

7.2.3.1 Infrastructure

An essential component of a marine finfish farm is containment. Equipment and infrastructure must be capable of withstanding the prevailing environmental factors. Any mechanical damage from ill-repaired or ill-suited equipment/infrastructure can become a fish health and containment concern. Figures 54 to 56 show the cage and mooring infrastructure. Upon approval of the boundary amendment, NSDFA will be provided with engineer-stamped drawings for all cage and mooring infrastructure.

All moorings, cages, containment nets, and predator nets meet best management practices and are engineered to meet the expected conditions of the location. Table 18 presents the specifications of the infrastructure on the Brier Island aquaculture site.

Moorings and Grid

GMG Fish Services Ltd (GMG), a sister company to KCS, provides the moorings for installation. The moorings and materials were engineered based on modelling completed by KCS Engineers, using site specific oceanographic data to ensure that all components will withstand expected conditions. Each area of the grid was designed to withstand different maximum loads, using modelling with built-in safety factors. The materials and breaking strengths and specifications for the components of the grid system are outlined in Table 19.

Table 18. Infrastructure Specifications at the Brier Island Aquaculture Site

Infrastructure	Component	Size/Specification	Material	Operating Pressure (water @ 23°C)	Average Inside Diameter	Minimum Wall Thickness	Average Weight (lbs/ft)
Moorings	Anchor lines	2" 8 strand, MBS 80,689 lbs (36,600 kg)	Polysteel				
	Grid lines	2" 8-strand, MBS 80,689 lbs (36,6000 kg)	Polysteel				
	Compensator buoys	CB4,400 lbs and CB 2,000 lbs	HDPE				
	Chain	1⅛" open-link chain, MBS 100,000 lbs	Alloy Steel				
	Shovel Anchor	2,000 kg (200,000 kg holding power)	Alloy Steel				
	Thimbles	2" Galvanized Heavy Duty	Heavy-duty steel hot-dip galvanized				
	Shackles	SWL- 9.5-Ton 1⅛" screw-pin shackle	Safety ratio 5:1 (47.5)				
	Grid plates	11½"-diameter, 1"-thick plate	High grade steel AR 400F				
	Bridal grid plates	13x14x1" plate	High grade steel AR 400F				
	Concrete Blocks	5,000 lbs (2,268 kg)	Concrete				
Cages (HDPE)	Bird Stand	110 mm (Series 125 PE3608)		125 psi	93.60 mm	7.97 mm	1.74
	Float Pipe	315 mm (Series 80 PE3608)		80 psi	284.60 mm	15.00 mm	9.61
	Brackets	6" (DR 17 PE4710)		125 psi	5.80"	0.390"	3.35
	Handrail	5" (DR 17 PE4710)		125 psi	4.87"	0.327"	2.36
	Weight Ring	6" (DR 11 PE4710)		200 psi	5.35"	0.602"	4.99

Table 19. Materials and Breaking Strengths/Specifications for the Components of the Grid System

Grid System Component	Specifications	Breaking Strengths
Screw-pin shackle	1⅛" SWL 9.5-T safety factor ratio of 5:1	47.5 T
Grid plates		179,000 lbs (81,363 kg)
Rope	2" 8-strand polysteel rope	MBS 80,689 lbs (36,676 kg) each line
Chain	1⅛" open link chain	MBS 100,000 lbs (45,359 kg)

Nets

Containment and predator nets must meet the breaking-strength requirements outlined in the BC *Fisheries Act*, *Aquaculture Regulation*, B.C. Reg. 78/2002, deposited April 19, 2002. The minimum specifications of containment nets and predator nets used at Brier Island are reported in Tables 20 and Table 21, respectively. Both containment and predator nets were determined to be adequate based on product testing completed by GMG. The net life cycle depends on a variety of factors; however, it is not company policy to limit a net simply by age but rather its strength. Likewise, a net may be retired due to the number and/or severity of repairs required but with passing breaking-strength scores. Nets that do not meet the breaking-strength testing requirements are retired.

All nets (smolt, market, bird, and predator) are given a unique identifier. The history and maintenance of each net is maintained by GMG. Each net, new or repaired, is tested by trained personnel at GMG prior to installation at a site. GMG follows established testing protocols and breaking-strength requirements, which are specific to the materials used. The procedures used are in alignment with the NSDFA requirements.

The nets are repaired immediately with the on-site net-repair kit once wearing, weakness, or holes have been identified. KCS has a documented repair procedure, which has been accepted by NSDFA. All repairs must be recorded in the net-specific history record.

Table 20. Minimum Specification Requirements for All Nets Used on the Site

Net Type	Brand Name	Mesh Stretched Opening (mm)	Material	Mesh Strength/ Rating (kg)	Diameter of Mesh Material (mm)
Smolt	Star K (Knotless)	26 ± 1	HDPE Fiber	130	4.2 (360 Ply)
Market	Star Market	57 ± 2	HDPE Fiber	130	4.2 (360 Ply)
	Sapphire UC	57 ± 1	HDPE Fiber with Ultra Core	150	2.6

Note: HDPE – High Density Polyethylene

Table 21. Predator Net Specifications

Net Type	Brand Name	Mesh Stretched Opening (mm)	Material	Mesh Strength/ Rating (kg)	Diameter of Mesh Material (mm)
Predator	Sapphire UC	150 ± 1	HDPE fiber with Ultra Core	380	3.8
Bird net	Star Knotted	35 ± 1	HDPE fiber	90.72	1.9 mm (#21)
	Plateena/Dyneema	51 ± 1	UHMWPE fiber	91	1.5 (1600+800D/6 Bar)
	Plateena/Dyneema	51 ± 1	UHMWPE fiber	91	1.5 (2400D/2 Bar)
	Plateena/Dyneema	51 ± 1	UHMWPE fiber	95	1.6 ([1600+1360]/1x2)
	PPMF/MFPP	25.7 ± 1	PPMF fiber	77	2.5 (1000D/18 Ply)
	PPMF/MFPP	51 ± 1	PPMF fiber	77	2.5 (1000D/18 Ply)
	PPMF/MFPP	51 ± 1	PPMF fiber	105	3 (1000D/24 Ply)
	Bird Net – Sapphire	35 ± 1	HDPE fiber	110	1.7
	Shogun – Smolt BN	35	HDPE	93	400/38
	Shogun – Market BN	57	HDPE	106	400/38

Notes: PPMF – polypropylene multi-filament
UHMWPE – ultra-high-molecular-weight polyethylene

7.2.3.2 Containment Strategy

Fish

Fish stocked at Brier Island will be approximately 150 g at entry to sea water (Table 2). KCS ensures that the fish size is adequate not only for fish health and survival but to prevent containment breaches due to inappropriate netting size in relation to fish size. The use of proper-sized mesh is important for a variety of reasons. Mesh size that is too small could cause poor water quality, inadequate dissolved oxygen, poor water movement within the cage, and increased biofouling. The use of mesh size that is too large could result in fish caught in the mesh or a way for fish to escape. Industry's best practices are used to determine the net-changing strategy for mesh size (Table 22). The net-mesh sizing strategy was determined to be adequate based on thirty years of experience with fish farming in Atlantic Canada and exceeds the guidelines proposed by research conducted at Memorial University of Newfoundland Marine Institute in March 2000.

Table 22. Net Changing Strategy for Mesh Size

Average fish size (g)	Minimum fish size (g)	Mesh size (inches)
120	50	1 ⅛
600	450	2 ¼

Infrastructure and Equipment

Moorings and anchors will be inspected prior to the stocking of a new production cycle. This may include removing them from the water and visually inspecting prior to redeployment. Once installed, the grid system, moorings, and anchors will be inspected every 6 months, unless otherwise required. After a change in tension, a shift in the array, or a significant storm event, the moorings and anchors will be visually inspected at depth using divers or ROV. Any issues and their causes will be determined and corrected as soon as possible. All inspections and corrections/repairs are recorded by KCS in a central data base.

Above-water inspections will be continuous as staff work on the site daily. Any net repairs will be recorded in the on-site net-repair record. In addition, formal inspections will occur on a weekly basis for surface components, and they will be recorded in the surface-inspection record. This inspection examines compensator buoys, visible portions of the grid, shackles, thimbles, float collars, stanchions, jump-net rails, above-water nets (containment, bird), attachment of nets, and site markers.

Underwater inspections will be conducted every six months using divers and/or an ROV. Additionally, cameras that are placed in each of the cages on site can be used to ensure that all below-water infrastructure is being monitored and maintained. Additionally, maintenance barges will be used to lift the components to the surface for visual inspection at the end of each production cycle when the site is fallowed. Any weaknesses in the containment structure will be repaired as soon as possible and recorded. Suspected underwater irregularities, damage, or points of wear will be investigated and repaired as soon as possible and recorded in the on-site net-repair record. Furthermore, below-water net inspections will be formally completed every 60 days. A below-surface-inspection checklist is to be completed.

Severe Weather

Severe weather can greatly impact the containment structures. Cage location, relative to wind direction and land, and other variables can affect the level of impact. Events that trigger management measures at Brier Island include high winds more than 40 knots, cold water temperatures below 1.5°C, warm water above 18°C, and dissolved oxygen below 6.2 mg/L.

The Site and Area Managers will track forecasts to determine if a weather event may impact the site. The Site Manager will ensure that reasonable preparations are made by all site workers in response to an impending severe-weather event. Site workers will monitor oxygen and water temperature daily to track environmental data, and KCS will follow the guidelines set out in Table 10.

Time permitting, additional, above-water inspection of the net pens will take place (in addition to daily, routine inspections) prior to a predicted event, and any appropriate actions (potential reinforcement) will be taken to ensure the system is ready for the impending weather. Time permitting, additional, below-water inspection of the net pens will be conducted (in addition to weekly, routine inspections), if the Site Manager believes it to be necessary.

Staff will conduct above-water inspections after a severe weather event. These inspections will take place either the day after a severe weather event or as soon it is safe for the crews to return to work following the weather event.

Inspection of the net pens below water will occur at the next scheduled mortality dive following the severe weather event or sooner, if the Site Manager believes that the net pens need inspection earlier. This extra inspection will either occur the day after the severe weather event or as soon as it safe for staff to return to work on the site.

Immediately after a severe weather event, a detailed evaluation of damage(s) will be conducted. A complete list of repairs will be created. Repairs will then be prioritized and tracked until completed. In some instances, temporary repairs may take place until permanent repairs can be completed.

Mortality Collection

The procedure to collect mortalities at the Brier Island site has been approved by NSDFA as outlined in the site's FMP. The procedure considers containment risks. Note, the mortality collection schedule varies depending upon the age of the fish. During smolt entry and the first few weeks post entry, the frequency of mortality collection may increase. After these production milestones, mortality collection occurs once per week unless there is a fish-health event identified.

Harvesting

NSDFA has approved harvesting procedures at the Brier Island site as outlined in the site's FMP. The procedure considers fish health and welfare, biosecurity, and containment risks.

7.2.3.3 Hazard Assessment for Containment Management

Potential containment-management hazards that may occur throughout the production cycle at Brier Island and strategies to prevent their occurrence have been identified. This information is contained in the FMP and summarized below (Table 23). The FMP has been approved by NSDFA.

Table 23. The Operational Process Steps with the Potential Containment Hazard and the Measures to Control Hazards

Potential Containment Hazard	Operational Process Step(s)	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Measures to Control Hazard
Weak or incorrectly attached equipment	• Stocking - fish transport shore to boat • Stocking - fish transport boat to cage • Harvest - fish transport cage to boat • Harvest - fish transport boat to shore	Y	Y	Controlled with fish transport, smolt delivery, and harvesting standard operating procedures; approved by NSDFA
Fish release during transfer to and from well boat	• Stocking - fish transport boat to cage • Sea lice treatment • Splitting / Transfers • Harvest - fish transport cage to boat	Y	Y	Controlled with well-boat treatment procedures and splitting / transfers standard operating procedures; approved by NSDFA
Fish release during transfer from well boat	• Harvest - fish transport boat to shore	Y	Y	Controlled with well-boat treatment procedures standard operating procedures; approved by NSDFA
Fish too small for mesh	• Stocking of cages • Net change	Y	Not without prior knowledge	Controlled with COHFT and review of production plan with NSDFA. Also controlled with net mesh sizing strategy; approved by NSDFA.

Hole in net due to chafing or other equipment wear	•	Grow out	Y	Y	Controlled with equipment maintenance and inspection requirements; approved by NSDFA
Predator attacks	•	Grow out	Y	Y	Controlled with predator netting and farm husbandry
Storms	•	Grow out	Y	Y	Cannot be controlled during production. Reduced risk with emergency plans; approved by NSDFA
Net washing	•	Grow out	Y	Y	Controlled with biofouling control plan and net washing protocols; approved by NSDFA
Fish jumping out of transfer net	•	Sampling (fish health, sea lice counting, biomass estimates)	Y	Y	Controlled with weight-sampling-by-hand standard operating procedure; approved by NSDFA
Fish released due to insecure new net	•	Net change	Y	N	Controlled by net changing standard operating procedure; approved by NSDFA
Net not removed properly	•	Net change	Y	N	Controlled by net changing standard operating procedure; approved by NSDFA
Not dropping the net properly for diver entry may allow fish escape	•	Mortality and maintenance dives	Y	N	Controlled by mortality-removal standard operating procedure; approved by NSDFA
Not closing the net after dive entry may allow fish escape	•	Mortality and maintenance dives	Y	Y	Controlled by mortality-removal standard operating procedure; approved by NSDFA

Fish released from collection bags/equipment	• Mortality and maintenance dives	Y	Y	Controlled by mortality-removal standard operating procedure; approved by NSDFA
Last fish in cage difficult to see and may be released if net is dropped prior to emptying	• Harvest - fish transport cage to boat	Y	Y	Controlled by harvesting, seining, and corking standard operating procedures; approved by NSDFA

7.2.3.4 Breach Response

All sites have an emergency response plan to address a breach as outlined in the site's FMP. The plan considers the areas of potential impact and respects all federal and provincial regulations and licencing requirements. After a breach of containment is confirmed or suspected, NSDFA is notified as soon it is safe or possible to do so. If the cages or nets have been damaged or compromised by an unusual event such as vandalism or boat collision, KCS' escape-and-response procedures will be followed. These procedures have been approved under the Best Aquaculture Practices (BAP) certification. Situations such as interactions with vessels, marine mammals, or other users will require specific handling, and the best course of action is determined in consultation with senior management and/or regulatory bodies.

SECTION 8.0 THE NUMBER AND PRODUCTIVITY OF OTHER AQUACULTURE SITES IN THE PUBLIC WATERS SURROUNDING THE PROPOSED AQUACULTURAL OPERATION

8.1 Identification of Other Aquaculture Sites

There are three aquaculture sites less than 5 km from the Brier Island site. Aquaculture sites #1353 and #1354 are owned by KCS for producing Atlantic salmon; however, only one (#1354) has been recently operational. Innovative Fisheries Products owns the other marine finfish site (#0829). It is licenced to culture Atlantic salmon, Arctic char, and rainbow trout and is currently unstocked (Fig. 61, Table 24).

Figure 61. Marine Chart Showing Other Aquaculture Operations within 5 km from Brier Island #0742
Note: Figure was sourced from NSDFA (2021a)

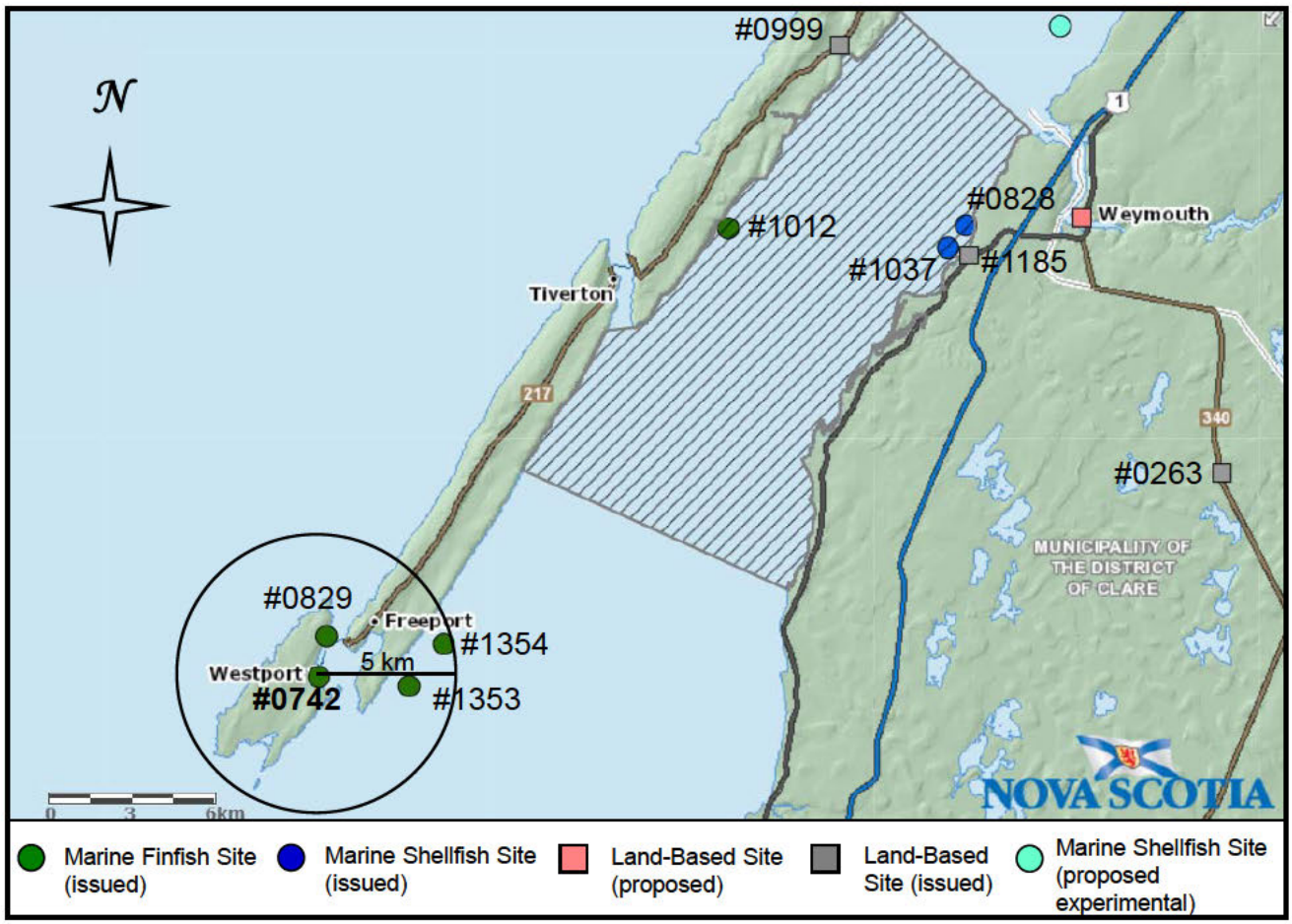

Table 24. Straight-line distance from Brier Island #0742 to finfish aquaculture sites within a 5-km radius

Site #	Distance from Brier Island (km)	Species	Owner
0829	1.2	Atlantic salmon, Arctic char, rainbow trout	Innovative Fisheries Products
1353	2.8	Atlantic salmon	Kelly Cove Salmon Ltd.
1354	4.2	Atlantic salmon	Kelly Cove Salmon Ltd.

8.2 Interactions with Other Aquaculture Operations

Site #0742 is not part of an Aquaculture Management Area (AMA) for the purpose of managing the health of aquatic animals. KCS agrees to establish an AMA agreement(s) with other licence holders if required by the Minister. However, KCS operates with a company management stocking/harvesting plan that follows similar principles to an AMA.

8.2.1 Environmental Conditions

Based on Canadian Hydrographic Service (Fisheries and Oceans Canada 2021c) tide tables for Westport (Station #340), the predicted highest high tide for 2022 is 6.1 m and the lowest low tide is -0.1 m, giving a maximum tidal range of 6.2 m. However, storm surges, should they co-occur with the highest high water, could result in higher water levels.

Collection of local current speed and direction data throughout the water column was carried out between October 24 and November 24, 2017, using a 600-kHz Teledyne RDI Workhouse Sentinel ADCP deployed by NSDFA. The most common directions of flow were between the south southeast and the south, with approximately 34% of all recorded currents travelling between 155 and 185 degrees. Mean current speeds were 26.3 cm/s near the seafloor 27.9 cm/s closer to the surface. The most frequently observed speed class, throughout the water column, was 21.0 - 28.0 cm/s, and current velocities below 7.0 cm/s represented 6.5% of the measurements. Current velocities below 35.0 cm/s accounted for 69.3% of data points recorded throughout the deployment. Refer to section **4.1.5 Currents** and **Appendix B Brier Island Baseline Assessment Report** for addition information on currents.

Annual environmental monitoring of Brier Island is conducted in accordance with the NSDFA Standard Operating Procedures for Environmental Monitoring of Marine Aquaculture Sites in Nova Scotia. Brier Island has returned Oxic classifications, or passed under the hard/mixed bottom protocols, for the last two production cycles, indicating this site is stocked and managed sustainably.

8.2.2 Boat Traffic and Wharves

Site #0742 is located on the southwestern side of Westport Harbour, near the southern opening of Grand Passage. This site does not pose a navigational risk or impedance to other water users since it is situated near the shore and the farm gear and structures are marked in accordance with NPP requirements.

The Westport and Meteghan Government Wharves accommodate community vessels including fishing vessels and working vessels from the KCS sites of Brier Island (#0742) and Freeport (#1354) (Figs. 45 & 52).

At the present time, KCS is the only aquaculture company using the above wharves. There is a potential for future use by Innovative Fishery Products if site #0829 becomes active.

Diseases and parasites can be spread by the movement of live fish (both farmed and wild), dead fish, humans, animals, or equipment to or from farms. Threats from diseases or parasites can be minimized through following good management and biosecurity practices. Footbaths are used upon entering and exiting the site vessel. All equipment is disinfected prior to transfer to the Brier Island site. Site crews are made aware of internal biosecurity protocols regarding staff and equipment movement from site to site and from public locations to the site.

Visitors to the Brier Island site are welcomed and are expected to follow KCS' biosecurity and health and safety rules. The Site Manager should confirm with the Area Manager that a visitor(s) has approval to be on site if the Site Manager was not previously informed. If a site has a fish-health concern, visitors will not be allowed on site – unless granted permission by Saltwater Management or the Fish Health Manager. Visitors must sign the logbook. Unannounced visitors such as government inspectors should also be reported to management. Visitors must change their footwear prior to stepping on site, rubber boots will be provided from the office. Special exemptions may be given in the instances of unexpected inspections, large group tours, or if the visitor(s) are low risk and will not be handling fish or involved in farming operations. All visitors must wear a PFD provided by the office while on site, and the use of footbaths and proper hygiene is mandatory. Section **5.4.2 People Interactions** contains further information regarding biosecurity.

Refer to sections **5.1.2 Pleasure Craft and Commercial Vessels** and **5.3.2.1 Right to Navigation** for additional information.

8.2.3 Shellfish and Atlantic Salmon Aquaculture

Shellfish aquaculture is currently absent on the Digby Neck. Any establishment of future shellfish farm around Brier Island would not cause concern for either industry as there are no direct interactions between shellfish and Atlantic-salmon aquaculture, specifically related to disease transfer.

LIST OF CONTACTS

Table 25. Contacts

Contact Name	Affiliation	E-mail	Phone	Date of Contact	Reason for Contact
Alex Campbell	DFO – Policy & Economics	CommercialData.XMAR@dfo-mpo.gc.ca	(902) 399-8507	Apr 28, 2021	Landing data (Fisheries)
Dave Eberhard	DFO - Commercial Data, Policy & Economics	CommercialData.XMAR@dfo-mpo.gc.ca	(902) 440-0392	Feb 22, 2022	Landings data (Fisheries)
Andrew Hicks	Environment Canada	Andrew.Hicks@ec.gc.ca	(506) 364-5138	Apr 28, 2021	Bird Surveys
Justin Huston	NSDFA	hustonje@gov.ns.ca	(902) 424-2996	May 11, 2007	Rockweed harvesting
Carl MacDonald	DFO	Carl.MacDonald@dfo-mpo.gc.ca	(902) 426-1488	Sep 28, 2011	Fisheries
Colin O'Neil	DFO – Policy & Economics	Colin.ONeil@dfo-mpo.gc.ca	(902) 426-6296	Oct 18, 2016	Fisheries
[redacted]	University of New Brunswick, Canadian Rivers Institute, & Fundy Salmon Recovery Project	[redacted]	[redacted]	March 2022	Wild Atlantic salmon
Wendy Vissers	NSDFA	Wendy.Vissers@novascotia.ca	(902) 526-3617	Jun 8, 2021	Rockweed licences
Sean Weseloh McKeane	Communities, Culture and Heritage	Sean.WeselohMcKeane@novascotia.ca	(902) 424-6475	Jun 12, 2016	Archaeological resources

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APPENDIX A
Public Engagement Materials

Cooke Aquaculture

Boundary Amendment: Brier Island #0742

Report on Brier Island Public Engagement July 20th, 2022

1.0 Introduction

Kelly Cove Salmon Ltd. is the farming division of Cooke Aquaculture which has been operating in Atlantic Canada for 30 years. Kelly Cove Salmon began with a single marine cage site containing 5,000 salmon. Over the years, the company has expanded its facilities, product lines, and distribution networks to become fully integrated within its aquaculture operations.

Kelly Cove Salmon has been operating in Nova Scotia for almost 18 years. The company currently holds 13 leases and by 2017 had expanded its production to almost $100 million. Cooke Aquaculture has always been committed to working with local suppliers. In 2017, Cooke purchased approximately $231,000,000 of goods and services from 1269 local small, medium, and large businesses in Atlantic Canada, 309 of which were Nova Scotian companies.

Kelly Cove Salmon Ltd. is currently undertaking a boundary amendment for the Brier Island marine farm #0742. While public engagement is a requirement of the boundary amendment process, engaging with stakeholders and having an open dialogue in the communities where we operate is very important to KCS.

An open-house meeting was held at the Oddfellows Hall, Westport on July 20, 2021, to engage stakeholders and provide information on KCS' boundary amendment plans. Due to Covid-19 Public Health guidelines at the time the event was planned, anyone wishing to attend the open house needed to pre-register, and were able to do so through the www.aquaculturegrowsns.ca website or by calling the KCS office in Bridgewater. The open house was scheduled from 1:00 PM - 8:00 PM, with time slots given each hour for a 45-minute period with a maximum of 20 people each slot.

This report will discuss the format and outcome of the public-engagement strategy put forth by Kelly Cove Salmon Ltd.

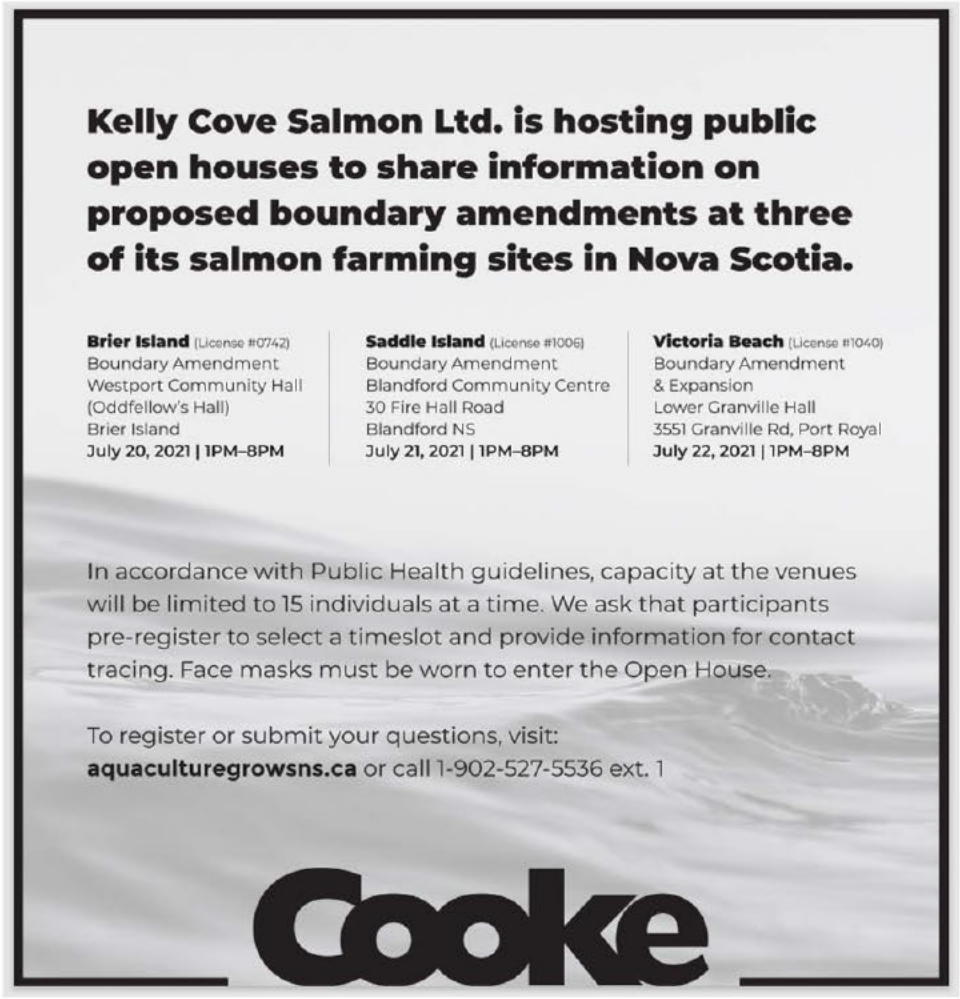
2.0 Public Meeting

On Tuesday, July 20, 2021, Kelly Cove Salmon held a public open-house meeting at the Brier Island Oddfellows Hall located in the village of Westport. The open house took place from 1:00 PM - 8:00 PM. There were seven participants who preregistered and four without registration who attended the event.

2.1 Community Open House Advertising

The open house was publicized by radio broadcasting on CKDY on-air in Digby. Kelly Cove Salmon purchased four 30-second advertising spots each day during the period of July 12 -18, 2021. There were newsprint ads published in the Tri-County Vanguard on July 7 & 14 and The Chronicle Herald on July 10, 14 and 17.

Figure 2.1.1 Cooke Aquaculture Community Open House ad published in the Vanguard & Chronicle Herald.



Three weeks prior to the open house, signs were posted throughout the Villages of Westport and Freeport detailing the Cooke Aquaculture Community Open House. These notices were posted at the local post offices, general stores, and gas stations. (See appendix A for illustrations).

2.2 Open House Structure

Kelly Cove Salmon had representatives from its Saltwater Operations, Environmental Monitoring, Public Relations, Compliance, Human Resources, and Business Development departments. Tables were set up with posters illustrating the proposed boundary amendment, a model cage was on site, and job applications and reading materials on salmon farming and Cooke's global operations were available to take home.

2.3 Public Feedback from Open House

In accordance with the Aquaculture Licence and Lease Regulations for Nova Scotia made under Section 64, Chapter 25 of the Acts of 1996, the *Fisheries and Coastal Resources Act*, scoping is required for new marine applications and boundary amendments. During the scoping process all information collected must be collated on the eight factors to be considered in decisions related to marine aquaculture sites:

(a) The optimum use of marine resources.
(b) The contribution of the proposed operation to community and Provincial economic development.
(c) Fishery activity in the public waters surrounding the proposed aquaculture operation.
(d) The oceanographic and biophysical characteristics of the public waters surrounding the proposed aquaculture operation.
(e) The other users of the public waters surrounding the proposed aquacultural operation.
(f) The public right of navigation.
(g) The sustainability of wild salmon; and
(h) The number and productivity of other aquaculture sites in the public waters surrounding the proposed aquaculture operation.

The following table outlines the questions, concerns and comments from the attendees of the public meeting:

Table 2.3.1 Questions and comments expressed during the Open House

Questions	Factors to be Considered	Response
Why can't the site be moved to deeper water with more tide?	D	The site can't be moved to deeper water due to the tidal patterns in this area.

Comments

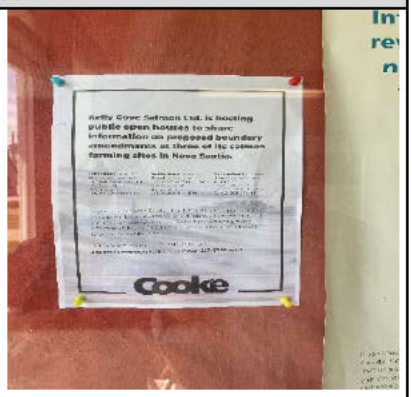
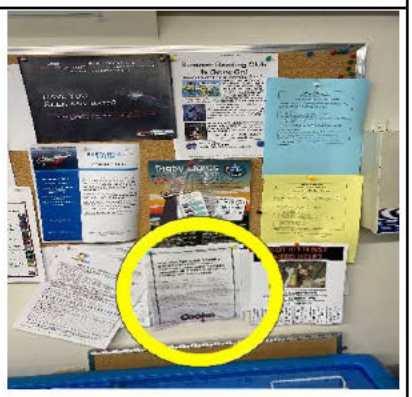
- The increase to 10 ha is too big, a lot going on in this harbour. There are turbines going in and a potential coast guard wharf. The farm takes up too much space, don't agree with it I'm afraid KCS will add more cages and fish.
- Fish being harvested by Christmas, smolts in Spring, not long enough time in between fallow periods.
- Resident had concerns on past smolt die off. Manager at that time did not respond to her questions.
- Can see things have improved but don't agree to the 10 ha and wants a longer fallow period.
- Possible Coast guard wharf going into the southwest corner.

3.0 Aquaculture Grows Nova Scotia

October 11, 2018, Cooke Aquaculture activated www.aquaculturegrowsns.ca as a means of making information about expansions, boundary amendments, and upcoming open houses available to the public. The site includes background information on Cooke Aquaculture, maps of the proposed expansions, boundary amendments, and a FAQ section that addressed some of the questions posed to Cooke Aquaculture from the public, and a "contact us" form for the public to submit questions, comments, or concerns.

The URL to this site was included on the newspaper ad and promotional posters that were developed for the open house. Following the open house there has been no additional questions or comments received on this link concerning the Brier Island boundary amendment.

Appendix A

Location	Public Notice
Canada Post Westport, Brier Island	 
R E Robicheau Ltd General Store Westport	 
Brier Island Whale Watching Gift Shop Located main street Westport	 

Canada Post Village of Freeport, Long Island		
General Store Village of Freeport, Long Island		

APPENDIX B
Brier Island Baseline Assessment Report

Baseline Assessment Report

Site #0742
Brier Island

Westport Harbour
Digby County
Nova Scotia

May 4, 2022

Prepared for:
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SIMCorp File #SW2016-058

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May 4, 2022

SIMCorp File #SW2016-058

Jeff Nickerson
P.O. Box 33
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Dear Mr. Nickerson,

Reference: **Brier Island (#0742) Baseline Report**

Please find enclosed the above-noted report and attached video footage for the baseline assessment of aquaculture site #0742 in Westport Harbour, N.S. Video footage has been made available to the client through Citrix ShareFile and to the Nova Scotia Department of Fisheries and Aquaculture (NSDFA) through their online Secure File Transfer Service.

If you have any questions or comments on the above-noted report, please do not hesitate to contact me at [redacted].

[redacted]
Senior Marine Environmental Biologist
Atlantic Region
Sweeney International Marine Corp.
[redacted]

cc: [redacted] (SIMCorp)
Ed Parker (DFO)
Robert Ceschiutti (NSDFA)
[redacted] (KCS)
[redacted] (KCS)
[redacted] (KCS)

The following outlines the regulatory requirements of baseline assessments for the province of Nova Scotia and lists where the associated information can be found within this report.

	Regulatory Requirement	Sections of Regulation	Baseline Report Section
Depositional modeling	Modeled predicted contours of 1, 5, and 10 g C m^{-2} d^{-1}	AAR Paragraph 8(1)(a)	6.3, Figure 12
	Use of an aquaculture waste depositional model	AAR Paragraph 8(1)(a)	6.1
	Model inputs of food and fecal waste as accepted international standard values	AAR Paragraph 8(1)(a)	6.2, Appendix J
	Particle resuspension is not applicable	AAR Paragraph 8(1)(a)	6.1
Fish and Fish Habitat Survey	Survey of Fish and Fish Habitat within a grid that covers the lease, 1 g C m^{-2} d^{-1} depositional contour, and reference station	AAR Paragraph 8(1)(b)	7.2, Figure 14
	Species ≥ 1 cm in length are identified	AAR Paragraph 8(1)(b)	7.3
	All fish habitat and substrate types are identified	AAR Paragraph 8(1)(b)	7.3, Appendix K, Appendix L
	In lieu of a bathymetry survey, chart data with minimum resolution of 10 m contours were used to generate depth profiles within the 1 g C m^{-2} d^{-1} depositional contour, lease, and reference station	AAR Paragraph 8(1)(c)	4.0
Benthic Substrate Monitoring	Collected samples of the benthic substrate at each corner of the lease boundary, the site center, and a reference station	AAR Paragraph 8(1)(d); NSDFA SOP's Section 2	3.1
	Samples meet all quality criteria	AAR Paragraph 8(1)(d); NSDFA SOP's Section 5.0 & Section 2	3.2, Appendix A, Appendix C
	Information concerning seabed and sediment samples is recorded	AAR Paragraph 8(1)(d); NSDFA SOP's Section 2	3.2, Appendix A, Appendix D, Appendix E, Appendix F
	Concentration of free sulfide was determined within 36 hours	AAR Paragraph 8(1)(d)	3.3, Table 19
	Subsamples were kept cool until analysis	AAR Paragraph 8(1)(d); NSDFA SOP's Section 2	3.2, Appendix B
	A designated meter and probe combination were selected for sulphide measurements	NSDFA SOP's Section 2	3.4, Appendix G
	Sulphide probe was calibrated using five serial dilutions of a standard sulfide solution beginning with the most dilute	AAR Paragraph 8(1)(d); NSDFA SOP's Section 2	3.4, Appendix G
	Grain size distribution measurements recorded according to he Wentwor h grain size scale	AAR Paragraph 8(1)(d); NSDFA SOP's Section 2	3.2, Appendix F
	Redox measurements conducted as specified	AAR Paragraph 8(1)(d); NSDFA SOP's Section 2	3.3, Appendix D
Video Monitoring	Video monitoring procedures were conducted as specified	AAR Paragraph 11(2)(a), (b), and (c); NSDFA SOP's Section 2	3.5, 7.2
	Video monitoring was conducted at the same locations as benthic substrate samples	AAR Paragraph 11(2)(a), (b), and (c); NSDFA SOP's Section 2	3.5, Appendix A, Appendix H
	A 150-meter video transect required by NSDFA was omitted after communications with NSDFA deemed it unnecessary when a fish habitat survey is also conducted.	NSDFA SOP's Section 2	3.1
	Sampling coordinates are collected by GPS and recorded degrees minutes decimal minutes (3 digits following decimal point) using NAD83	AAR Paragraph 11(2)(a), (b), and (c); NSDFA SOP's Section 2	Table 3, 3.5, 7.2
ADCP Measurements	Tidal current measurements were collected for a minimum of 30 days as close to the lease center as possible	NSDFA SOP's Section 2	5..1, Appendix I

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1.0 INTRODUCTION

The following baseline report and attached video have been prepared by Sweeney International Marine Corp. (SIMCorp) for Kelly Cove Salmon Ltd. (KCS) to summarize the findings of a formal baseline environmental survey of Brier Island (#0742). Marine aquaculture site #0742 is on the eastern side of Brier Island in Westport Harbour, in Digby County (Fig. 1). This area is shown on CHS chart #4118. The current lease has dimensions of approximately 150 x 100 m, with an area of approximately 1.52 ha (Table 1). At the time of sampling, Brier Island was stocked. The purpose of this baseline assessment is to support a boundary amendment application, which will bring all above-water and below-water gear into the lease boundaries.

Figure 1. Current Brier Island (#0742) location in Westport Harbour

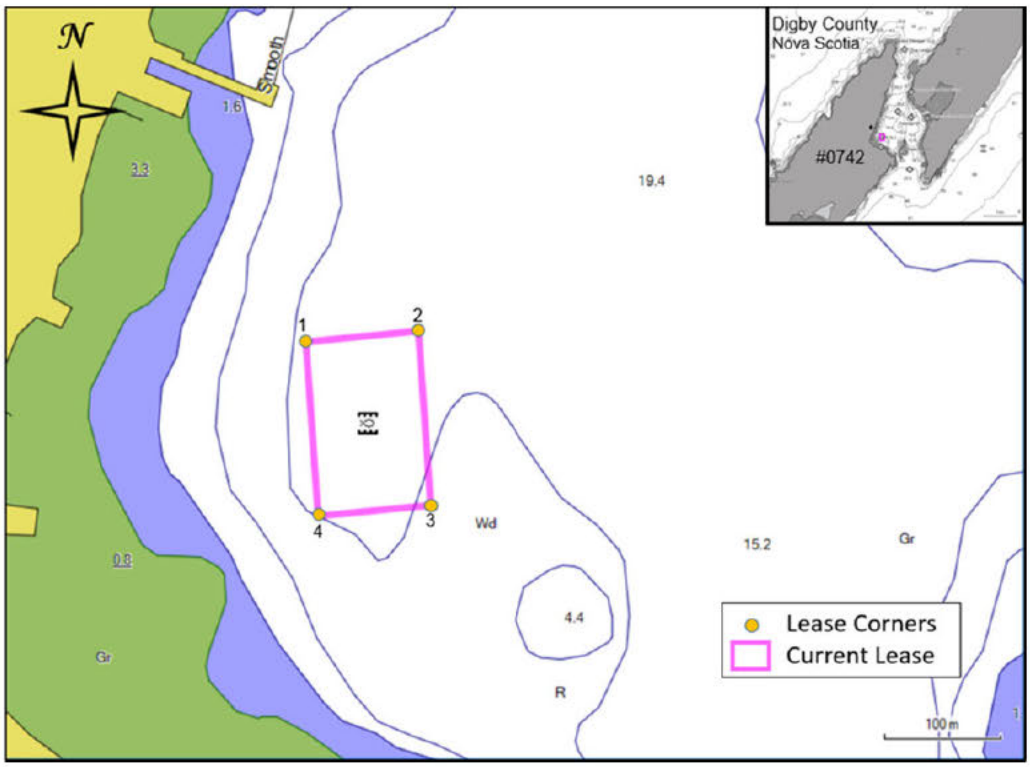

Table 1. Current boundary and center coordinates of Brier Island (#0742)

SITE COORDINATES (NAD 83)		
Corner	**Latitude**	**Longitude**
1	44° 15.727'	66° 20.858'
2	44° 15.732'	66° 20.782'
3	44° 15.650'	66° 20.775'
4	44° 15.647'	66° 20.850'
Site Center	44° 15.688'	66° 20.817'

The proposed boundary amendment extends the lease boundaries to accommodate all below-surface gear. The dimensions of the proposed lease are approximately 215 x 382 x 302 x 267 x 144 m, with an area of approximately 11.04 ha. (Fig. 2, Table 2).

Figure 2. Proposed boundary location for Brier Island (#0742)

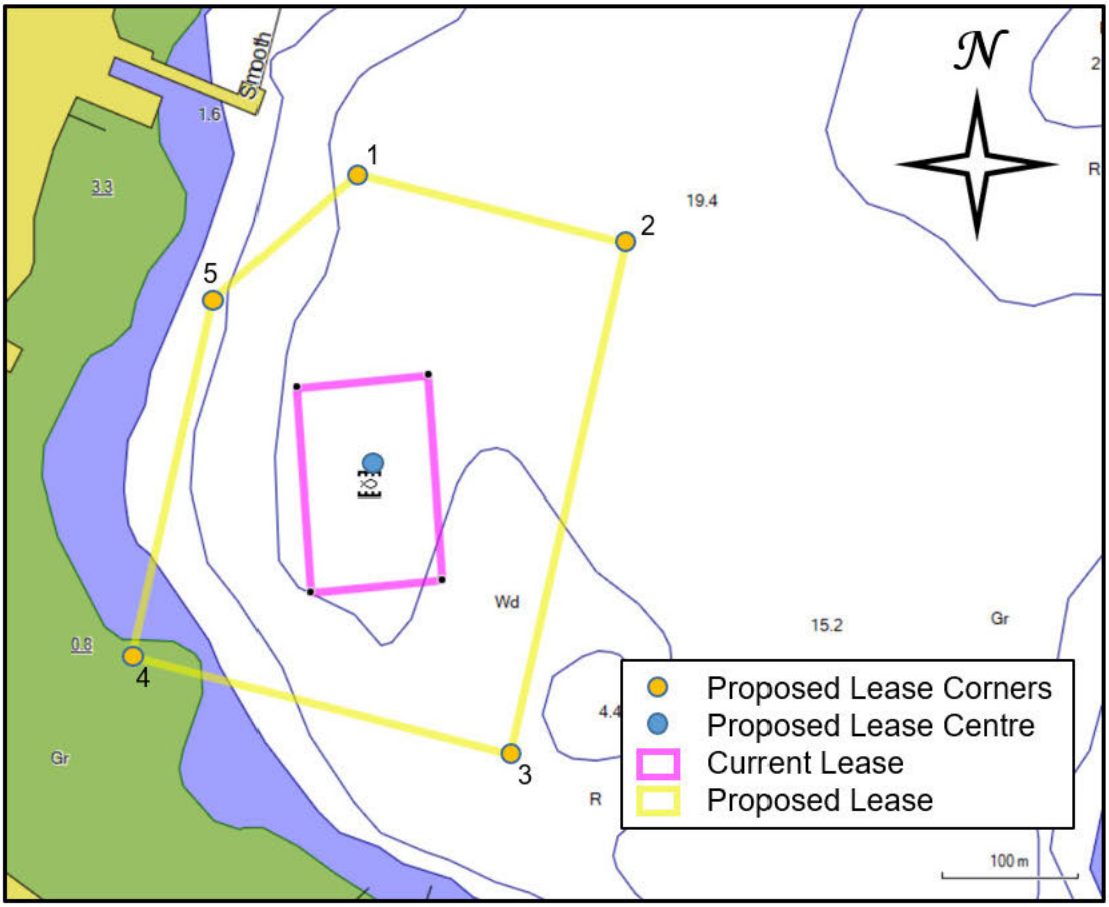

Table 2. Proposed boundary and center coordinates of Brier Island (#0742)

SITE COORDINATES (NAD 83)		
Corner	**Latitude**	**Longitude**
1	44° 15.811'	66° 20.823'
2	44° 15.784'	66° 20.666'
3	44° 15.583'	66° 20.734'
4	44° 15.622'	66° 20.954'
5	44° 15.762'	66° 20.907'
Site Center	44° 15.697'	66° 20.815'

2.0 CONTACT INFORMATION

Proponent:

Company Name:	Kelly Cove Salmon Ltd.
Principal Contact:	Mr. Jeff Nickerson
Mailing Address:	P.O. Box 33 Bridgewater, Nova Scotia B4V 2W6
E-mail:	jnickerson@cookeaqua.com

Project Management:

Company Name:	Sweeney International Marine Corp.
Principal Contact:	[redacted]
Mailing Address:	46 Milltown Blvd. St. Stephen, New Brunswick, E3L 1G3
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Cellular:	[redacted]
Facsimile:	(506) 467-9503
E-mail:	[redacted]

3.0 BENTHIC SUBSTRATE SAMPLING

3.1 *Sampling Locations*

The methods employed to conduct the seafloor sediment-condition analyses were adapted, in consultation with Nova Scotia's Department of Fisheries and Aquaculture (NSDFA) officials, Appendix B of the NSDFA *Standard Operating Procedures for the Environmental Monitoring of Marine Aquaculture in Nova Scotia* (NSDFA 2018a), as well as the *Aquaculture Activities Regulations* (AAR) Guidance Document (Department of Fisheries and Oceans Canada 2018a) and Monitoring Standard (Department of Fisheries and Oceans Canada 2018b). At the time of finalization and submission of this report, updated procedures from NSDFA were available. However, there were no significant changes to baseline requirements. Any further references in this report to sections of the SOPs refer to the 2021 version. Further details are available in the subsequent sections of this report.

To satisfy the NSDFA and the AAR benthic substrate sampling criteria, a total of eight (8) stations were investigated for the purpose of this baseline survey (Fig. 3). The eight (8) stations represent five (5) stations at the corners of the proposed lease, one (1) at the site center, and two (2) reference stations. Two (2) attempts were made to locate a suitable reference station between 100 and 300 m away from the lease in the direction of the dominant current. However, acceptable sediment samples could not be collected at either reference station, thus a video transect was surveyed via camera drops at 100, 150, 200, 250, and 300 m away from the lease. A baseline video transect line originated at the lease boundary and consisted of 2-minute camera drops in 25-m increments towards the site centre for a total of 150 m. Data from this transect has been included in this report. However, during subsequent conversations, NSDFA deemed the baseline transect unnecessary when a fish and fish habitat survey (referenced in section 8.0) is also conducted. The sampling

station coordinates are present in Table 3. Seafloor characteristics for each station are presented in Tables 5 – 18.

Figure 3. Baseline sampling stations at Brier Island (#0742)

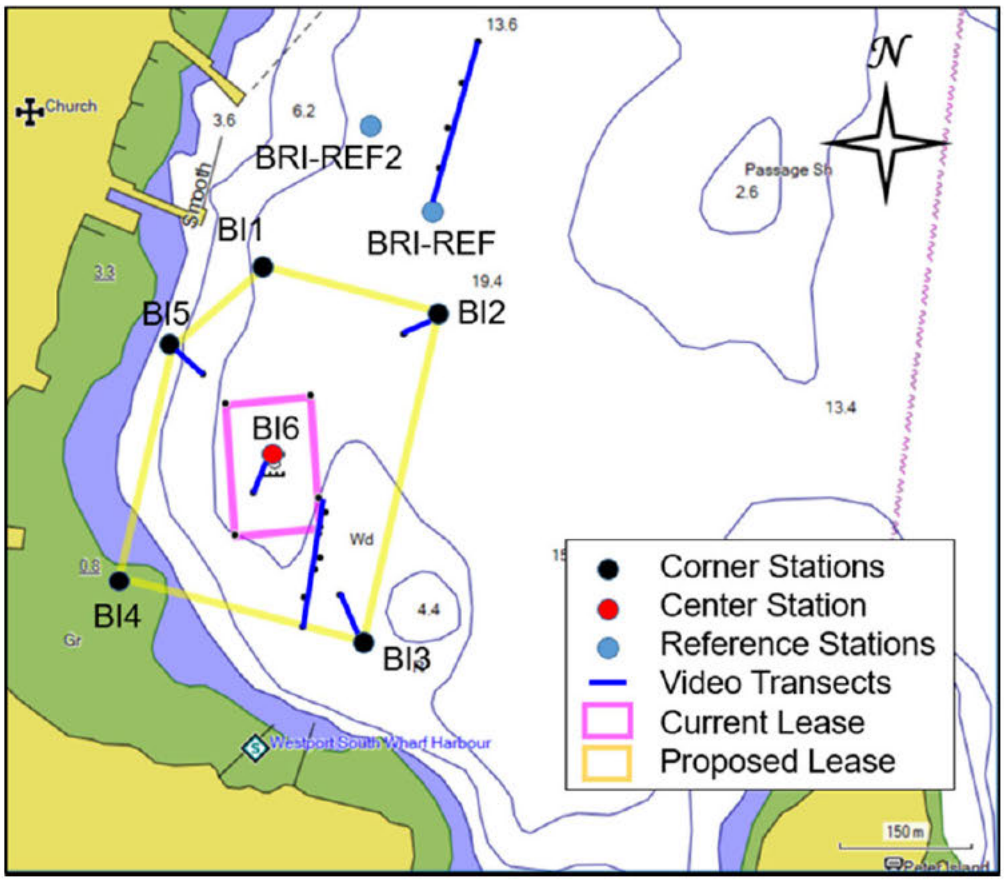

Table 3. Baseline Sampling Coordinates at Site #0742, Westport Harbour

SITE COORDINATES (NAD 83)			
Station	**Location**	**Latitude**	**Longitude**
BI1	NW corner	44° 15.812'	66° 20.823'
BI2	NE corner	44° 15.782'	66° 20.668'
BI3	SE corner	44° 15.580'	66° 20.737'
BI4	SW corner	44° 15.620'	66° 20.955'
BI5	WNW corner	44° 15.763'	66° 20.908'
BI6	Site centre	44° 15.697'	66° 20.818'
BRI-REF	Reference station	44° 15.813'	66° 20.673'
BRI-REF2	Reference station	44° 15.895'	66° 20.727'
Baseline Transect	0 m	44° 15.592'	66° 20.788'
Baseline Transect	25 m	44° 15.608'	66° 20.788'
Baseline Transect	50 m	44° 15.625'	66° 20.778'
Baseline Transect	75 m	44° 15.633'	66° 20.773'

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Baseline Transect	100 m	44° 15.648'	66° 20.773'
Baseline Transect	125 m	44° 15.662'	66° 20.768'
Baseline Transect	150 m	44° 15.670'	66° 20.773'

3.2 *Sediment Sample Collection*

Benthic field data to satisfy the benthic substrate sampling component of the Brier Island (#0742) baseline assessment was carried out by SIMCorp Field Supervisor and Senior Marine Environmental Biologist [redacted], BSc, EP, Marine Environmental Biologist [redacted], BSc, EP, and field technician [redacted] on December 5, 2018. High tide was at 9:30 (5.8 m), and low tide was at 15:51 (0.3 m).

A 25-kg OSIL Van Veen grab was used to collect sediment samples from all the baseline stations. This grab type was selected due to its weight and size, being sufficient to ensure vertical decent and meet the requirements outlined in section 4(c) of the AAR monitoring standard. After deployment, the grab was pulled aboard and placed on the deck. When present, the overlying water in the grab was removed via siphon and a picture was taken of the contents (Appendix A). At the time of sampling, the time setting on the camera was not corrected for daylight saving time and all the time stamps are behind by 1 hour. Notes were recorded on time, location, sediment type, colour, depth, odour, flora, and fauna, etc. Sediment subsamples were collected from the top 2 cm of the grab samples with 10-mL syringes that were sealed with Parafilm M® and capped to form an airtight seal until analyzed. The remaining top 2 cm of sediment was placed in 2-oz Whirl-Paks for use in grain-size analysis according to the Wentworth grain-size scale. Syringes and Whirl-Paks were labelled and placed in a plastic cooler with ice. Samples were kept cool until analyzed for redox, sulphide, porosity, percent organic matter, and grain size.

Sample temperatures during collection, transport, and analysis were recorded using HOBO ProV2 temperature loggers. Temperatures recorded from inside the sample cooler are presented graphically in Appendix B.

All reasonable efforts were made to conform to the provincial and federal regulatory requirements, to maintain storage temperature of samples, to collect samples that were as undisturbed as possible (see Appendix C for details), and to preserve the integrity of the samples until analyzed.

3.3 *Sediment Sample Analysis*

Sample storage temperatures were below freezing during the period of collection. This can be attributed to below-freezing air temperatures. Ambient air temperatures as measured at the Brier Island weather station (Government of Canada 2022) were averaged for the period during which the fieldwork was conducted. The mean air temperature was -3.5°C. The sample storage temperature graph is in Appendix B.

All sediment samples were analyzed within 25 hours of collection for redox potential and sulphide ion concentration (Table 19, Fig. 4). Temperatures were taken for each sample and

redox readings in mV were adjusted for temperature to produce mV readings relative to the normal hydrogen electrode (mV_{NHE}). Sulphide samples were brought to the same temperature at which the sulphide probe was calibrated before a reading was taken. Redox and sulphide measurements were made on the 0-to-2-cm-deep portion of the grab samples. These results can be related to the Environmental Quality Definitions for Nova Scotia Marine Aquaculture Monitoring (Table 4, NSDFA, 2021b). A copy of the laboratory data sheet for the redox and sulphide results is presented in Appendix D.

Sediment samples from each station were sent to the SIMCorp Environmental Sciences Lab (formerly SIMCorp Marine Benthic Sediments Laboratory) for analysis of porosity, total organic content, and grain size. The results of these analyses are presented in Table 20 and Appendices E and F.

Table 4. Environmental Quality Definitions for Nova Scotia Marine Aquaculture Monitoring

	Sediment Classification		
Measurement	**Oxic**	**Hypoxic**	**Anoxic**
Sediment colour	Tan to depth > 0.5 cm	Tan to < 0.5 cm with some black sediments at surface	Surface sediments black
Microbial presence	No *Beggiatoa*-like bacteria present	Patchy *Beggiatoa*-like bacteria	Widespread *Beggiatoa*-like bacterial mats
Macrofaunal Assemblage	Wide array of infauna and epifauna	Mixed group of mostly small infauna	Small infauna only
Sulfide, µM	**≤ 749 (A) 750 to 1499 (B)**	**1500 to 2999 (A) 3000 to 5999 (B)**	**≥ 6000**
Redox (Eh), mV_{NHE}	>100 (A) 100 to -50 (B)	-50 to -100 (A) -100 to -150 (B)	< -150
Organic matter, %	<= reference*	1.5 to 2X ref.	> 2X reference
Porosity, %	<= reference*	1 to 10X ref.	> 10X reference

3.4 *Lab Equipment and Calibrations*

Redox measurements were taken using a combination meter (Fisher Accumet AP125) and probe [Orion Epoxy Sure-Flow Combination Redox/ORP Electrode (Cat. No. 9678BNW)], which was checked for electrical function just prior to use [Orion ORP standard (Cat. No. 967901)] using a ORP standard solution to ensure the probe read 220 +/- 3.0 mV at 25°C. Redox readings were taken according to the NSDFA Standard Operating Procedures (SOP) and immediately followed by sulphide measurements (NSDFA 2018a, 2021a).

Sulphide measurements were taken using a calibrated combination meter (Fisher Accumet AP125) and probe [Orion Sure-Flow Combination Silver/Sulphide Electrode (Cat No.

9616BNWP)]. Meter and sulphide probe calibrations took place in accordance with NSDFA SOP protocols at 8:30 on December 6, 2018. One probe was calibrated and used to analyze the samples. The results of the five-point calibration are in Appendix G. The calibration temperature was 21.8°C.

3.5 *Video Surveillance Methods*

Video footage was recorded using a J.W. Fisher Camera System, which was mounted perpendicular to the seafloor in an aluminum frame. The seafloor was illuminated with mountable Kraken torch lights. A 0.25-m^2 quadrat was visible in the field of view as a size reference. Appropriate weight was added to the camera frame to allow for stable movement through the water column. The video camera frame includes a scale bar demarcated with 5-cm segments, which aids in the identification of organisms greater than 1 cm. Live video footage from the underwater camera was recorded using a J.W. Fishers digital video recorder (DVR) built into a VRM-1 video recorder and monitor system with a GPS interface, which allowed coordinate positions to be overlaid onto the video.

Video recording of each sampling station started at the surface with the viewing of a placard showing collection location information, followed by a 360° pan of the area at the sampling station, and then continued with the underwater footage. The recording continued uninterrupted for the duration of the underwater surveillance and was concluded only after the camera was returned to the vessel at the surface. Footage coverage included the camera's descent, impact with the sediment surface, and a minimum of 5 m^2 of seafloor over a minimum duration of two minutes. Screen shots of the seafloor for each sample location were taken and are presented in Appendix H. All on-site visual assessments have been recorded in the field notes and video assessments supplement the field data included in this report. Raw video files have been submitted to NSDFA and are also available upon request.

3.6 *Results and Observations*

Table 5. BI3 Benthic Log

Sampling Date:	December 5th, 2018
Water Body:	Westport Harbour
Lease Name and Number:	Brier Island #0742
Water Temperature (°C)	5°C
Wind Direction and Speed:	NW 15-20 knots and NW 10 knots later in the day
Wave Action:	Light swells
Current Direction & Speed:	Moderate N <-> S
Tide Schedule:	High @ 9:30 (5.8m); Low @ 15:51 (0.3m)
Vessel:	Carolina Skiff

Lease # or Reference Site:	#0742	**Station Comments:** Only 1 acceptable grab sample could be collected at this station therefore a video transect was also conducted.
Video Start Time:	8:36 AM/9:06 AM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:** Hard packed brown sand, mud, pebbles, cobble; scallop shells; rock crab; coralline algae; kelp; acid kelp; sea lettuce; mixed Rhodophyta; detritus (prevalent); shell debris (some)
Sampling Station ID:	BI3	
Gear Present on Bottom	N/A	
Dist. and Dir. from Waypoint:	5 m @ 220°	
Sampling Coordinates:	N44 15.581 W66 20.736	**Benthic Descriptor Key:** [1] *e.g.* Gas bubbles, feed, faeces, sediment: colour, type, and consistency [2] *e.g.* Strong, slight, none [3] *e.g.* Eel grass, kelp, lobster, starfish, *Beggiatoa* , polycheates, etc.
Station Depth (m):	16.3	
Video (Y/N):	Y	
Number of Collection Attempts:	5	

Sample/Collection method	Ascension Speed (m/s)	Sample (Y/N)	Sample ID	Sediment Description[1]	Odour[2]	Sediment Sample Depth (cm)	Flora/Fauna[3]
Benthic Replicate 1 (10 mL) 12 L Van Veen Grab	0.53	Y	BI3 (1)	Brown mud, sand	None	10	
Benthic Replicate 2 (10 mL) 12 L Van Veen Grab		N					
Benthic Replicate 3 (10 mL) 12 L Van Veen Grab		N					

Table 6. BI4 Benthic Log

Lease # or Reference Site:	#0742						**Station Comments:** All samples collected came from acceptable grabs. This is a soft bottom station.
Video Start Time:	9:34 AM						
Recorder Name(s):	[redacted]						
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **yringe Sampler:** [redacted]						**Video Notes:** Hard packed brown sand, pebbles, cobble; eel grass ; shell debris (rare); detritus (some)
Sampling Station ID:	BI4						
Gear Present on Bottom	N/A						
Dist. and Dir. from Waypoint:	3 m @ 213.2°						
Sampling Coordinates:	N44 15.620 W66 20.956						**Benthic Descriptor Key:**
Station Depth (m):	5.4						[1] *e.g.* Gas bubbles, feed, faeces, sediment: colour, type, and consistency
Video (Y/N):	Y						[2] *e.g.* Strong, slight, none
Number of Collection Attempts:	5						[3] *e.g.* Eel grass, kelp, lobster, starfish, *Beggiatoa*, polycheates, etc.
Sample/Collection method	**Ascension Speed (m/s)**	**Sample (Y/N)**	**Sample ID**	**Sediment Description[1]**	**Odour[2]**	**Sediment Sample Depth (cm)**	**Flora/Fauna[3]**
Benthic Replicate 1 (10 mL) 12 L Van Veen Grab	0.42	Y	BI4 (1)	Brown sand, pebbles	None	6	Worm tubes
Benthic Replicate 2 (10 mL) 12 L Van Veen Grab	0.45	Y	BI4 (2)	Brown sand	None	5.5	Worm tubes
Benthic Replicate 3 (10 mL) 12 L Van Veen Grab	0.42	Y	BI4 (3)	Brown sand	None	11	Worm tubes, detritus

Table 7. BI5 Benthic Log

Lease # or Reference Site:	#0742						**Station Comments:** Only 1 acceptable grab sample could be collected at this station therefore a video transect was also conducted.
Video Start Time:	10:07 AM/10:32 AM						
Recorder Name(s):	[redacted]						
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]						**Video Notes:** Hard packed brown sand, pebbles, cobble, boulder; scallop shells; rock crab; sea lettuce; kelp; acid kelp; mixed Rhodophyta; coralline algae; detritus (rare); shell debris (prevalent)
Sampling Station ID:	BI5						
Gear Present on Bottom	N/A						
Dist. and Dir. from Waypoint:	5 m @ 321.9°						
Sampling Coordinates:	N44 15.764 W66 20.909						**Benthic Descriptor Key:**
Station Depth (m):	10.5						[1] e.g. Gas bubbles, feed, faeces, sediment: colour, type, and consistency
Video (Y/N):	Y						[2] e.g. Strong, slight, none
Number of Collection Attempts:	6						[3] e.g. Eel grass, kelp, lobster, starfish, *Beggiatoa*, polycheates, etc.
Sample/Collection method	**Ascension Speed (m/s)**	**Sample (Y/N)**	**Sample ID**	**Sediment Description[1]**	**Odour[2]**	**Sediment Sample Depth (cm)**	**Flora/Fauna[3]**
Benthic Replicate 1 (10 mL) 12 L Van Veen Grab	0.46	Y	BI5 (1)	Brown sand, pebbles, shell debris	None	5.5	Worm tubes
Benthic Replicate 2 (10 mL) 12 L Van Veen Grab		N					
Benthic Replicate 3 (10 mL) 12 L Van Veen Grab		N					

Table 8. BI1 Benthic Log

Lease # or Reference Site:	#0742						**Station Comments:** All samples collected came from acceptable grabs. This is a soft bottom station.
Video Start Time:	10:52 AM						
Recorder Name(s):	[redacted]						
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]						**Video Notes:** Hard packed brown sand, pebbles, cobble; rock crab; scallop shell; acid kelp; kelp; coralline algae; mixed Rhodophyta; quahog; shell debris (some)
Sampling Station ID:	BI1						
Gear Present on Bottom	N/A						
Dist. and Dir. from Waypoint:	3 m @ 353.2°						
Sampling Coordinates:	N44 15.812 W66 20.823						**Benthic Descriptor Key:** [1] e.g. Gas bubbles, feed, faeces, sediment: colour, type, and consistency
Station Depth (m):	17.5						[2] e.g. Strong, slight, none
Video (Y/N):	Y						[3] e.g. Eel grass, kelp, lobster, starfish, *Beggiatoa*, polycheates, etc.
Number of Collection Attempts:	5						
Sample/Collection method	**Ascension Speed (m/s)**	**Sample (Y/N)**	**Sample ID**	**Sediment Description[1]**	**Odour[2]**	**Sediment Sample Depth (cm)**	**Flora/Fauna[3]**
Benthic Replicate 1 (10 mL) 12 L Van Veen Grab	0.52	Y	BI1 (1)	Brown pebbles	None	5	
Benthic Replicate 2 (10 mL) 12 L Van Veen Grab	0.5	Y	BI1 (2)	Brown sand, pebbles, shell debris	None	7	
Benthic Replicate 3 (10 mL) 12 L Van Veen Grab	0.52	Y	BI1 (3)	Brown gravel	None	5	

Table 9. BRI-REF Benthic Log

Lease # or Reference Site:	#0742						**Station Comments:** No acceptable grab samples could be collected. A video transect was conducted instead and a second attempt at a reference station took place at the end of the day.
Video Start Time:	11:33 AM						
Recorder Name(s):	[redacted]						
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]						**Video Notes:** Hard packed brown sand, pebbles, cobble; *Flustra;* coralline algae; mixed Rhodophyta; eel grass; detritus (some); shell debris (prevalent);
Sampling Station ID:	BRI-REF (this station also doubled as BRI-REF 100m)						
Gear Present on Bottom	N/A						
Dist. and Dir. from Waypoint:	N/A						
Sampling Coordinates:	N44 15.813 W66 20.673						**Benthic Descriptor Key:**
Station Depth (m):	24.4						[1] *e.g.* Gas bubbles, feed, faeces, sediment colour, type, and consistency
Video (Y/N):	Y						[2] *e.g.* Strong, slight, none
Number of Collection Attempts:	5						[3] *e.g.* Eel grass, kelp, lobster, starfish, *Beggiatoa*, polycheates, etc.
Sample/Collection method	**Ascension Speed (m/s)**	**Sample (Y/N)**	**Sample ID**	**Sediment Description[1]**	**Odour[2]**	**Sediment Sample Depth (cm)**	**Flora/Fauna[3]**
Benthic Replicate 1 (10 mL) 12 L Van Veen Grab		N					
Benthic Replicate 2 (10 mL) 12 L Van Veen Grab		N					
Benthic Replicate 3 (10 mL) 12 L Van Veen Grab		N					

Table 10. BI6 Benthic Log

Lease # or Reference Site:	#0742						**Station Comments:** Only 1 acceptable grab sample could be collected at this station therefore a video transect was also conducted.
Video Start Time:	12:41 PM/1:11 PM						
Recorder Name(s):	[redacted]						
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]						**Video Notes:** Hard packed brown sand, pebbles, cobble, boulder; insignificant *Beggiatoa*-like bacteria; coralline algae; mixed Rhodophyta; kelp; shell debris (prevalent); detritus (rare)
Sampling Station ID:	BI6						
Gear Present on Bottom	Metal plate (trash)						
Dist. and Dir. from Waypoint:	4 m @ 267.4°						
Sampling Coordinates:	N44 15.697 W66 20.818						**Benthic Descriptor Key:**
Station Depth (m):	16.5						[1] e.g. Gas bubbles, feed, faeces, sediment: colour, type, and consistency
Video (Y/N):	Y						[2] e.g. Strong, slight, none
Number of Collection Attempts:	6						[3] e.g. Eel grass, kelp, lobster, starfish, *Beggiatoa*, polycheates, etc.
Sample/Collection method	**Ascension Speed (m/s)**	**Sample (Y/N)**	**Sample ID**	**Sediment Description[1]**	**Odour[2]**	**Sediment Sample Depth (cm)**	**Flora/Fauna[3]**
Benthic Replicate 1 (10 mL) 12 L Van Veen Grab	0.5	Y	BI6 (1)	Brown sand, pebbles	Moderate	8	
Benthic Replicate 2 (10 mL) 12 L Van Veen Grab		N					
Benthic Replicate 3 (10 mL) 12 L Van Veen Grab		N					

Table 11. BI2 Benthic Log

Lease # or Reference Site:	#0742						**Station Comments:** Only 1 acceptable grab sample could be collected at this station therefore a video transect was also conducted.
Video Start Time:	1:34 PM/2:01 PM						
Recorder Name(s):	[redacted]						
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]						**Video Notes:** Hard packed brown sand, pebbles, cobble, boulder; scallop shells; sponge; *Flustra;* coralline algae; knotted wrack weed; kelp; mixed Rhodophyta; mussel shells; shell debris (prevalent); detritus (prevalent)
Sampling Station ID:	BI2						
Gear Present on Bottom	N/A						
Dist. and Dir. from Waypoint:	5 m @ 221.3°						
Sampling Coordinates:	N44 15.782 W66 20.668						**Benthic Descriptor Key:**
Station Depth (m):	21.4						[1] *e.g.* Gas bubbles, feed, faeces, sediment: colour, type, and consistency
Video (Y/N):	Y						[2] *e.g.* Strong, slight, none
Number of Collection Attempts:	5						[3] *e.g.* Eel grass, kelp, lobster, starfish, *Beggiatoa*, polycheates, etc.
Sample/Collection method	**Ascension Speed (m/s)**	**Sample (Y/N)**	**Sample ID**	**Sediment Description[1]**	**Odour[2]**	**Sediment Sample Depth (cm)**	**Flora/Fauna[3]**
Benthic Replicate 1 (10 mL) 12 L Van Veen Grab	0.55	Y	BI2 (1)	Brown sand, shell debris	None	6	
Benthic Replicate 2 (10 mL) 12 L Van Veen Grab		N					
Benthic Replicate 3 (10 mL) 12 L Van Veen Grab		N					

Table 12. BRI-REF2 Benthic Log

Lease # or Reference Site:	#0742						**Station Comments:** No acceptable grab samples could be collected.
Video Start Time:	2:28 PM						
Recorder Name(s):	[redacted]						
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]						**Video Notes:**
Sampling Station ID:	BRI-REF2						Hard packed brown sand, pebbles, cobble; coralline algae; mixed Rhodophyta; kelp; knotted wrack weed; scallop shells; detritus (some); shell debris (prevalent);
Gear Present on Bottom	None						
Dist. and Dir. from Waypoint:	N/A						
Sampling Coordinates:	N44 15.896 W66 20.727						**Benthic Descriptor Key:**
Station Depth (m):	13.6						[1] e.g. Gas bubbles, feed, faeces, sediment: colour, type, and consistency
Video (Y/N):	Y						[2] e.g. Strong, slight, none
Number of Collection Attempts:	5						[3] e.g. Eel grass, kelp, lobster, starfish, *Beggiatoa*, polycheates, etc.
Sample/Collection method	**Ascension Speed (m/s)**	**Sample (Y/N)**	**Sample ID**	**Sediment Description[1]**	**Odour[2]**	**Sediment Sample Depth (cm)**	**Flora/Fauna[3]**
Benthic Replicate 1 (10 mL) 12 L Van Veen Grab		N					
Benthic Replicate 2 (10 mL) 12 L Van Veen Grab		N					
Benthic Replicate 3 (10 mL) 12 L Van Veen Grab		N					

Table 13. BI3 Transect Benthic Log

Station ID: BI3	0m	10m	20m	30m	40m	50m
Location (NAD 83)	N44 15.581 W66 20.736	N44 15.589 W66 20.737	N44 15.581 W66 20.741	N44 15.595 W66 20.743	N44 15.605 W66 20.747	N44 15.612 W66 20.755
Depth (m)	16.3	16	16	14.7	13	12.2
Time	8:38	9:07	9:11	9:17	9:21	9:25
Approximate Sediment Thickness (cm)	0.5	0.5	0.5	0.5	0.5	0.5
Sediment Colour	Brown	Brown	Brown	Brown	Brown	Brown
Sediment Consistency	Sand, mud, pebbles, cobble	Sand, pebbles, cobble	Sand, pebbles, cobble	Sand, mud, pebbles, cobble	Sand, mud, pebbles	Sand, mud, pebbles
Sediment Surface Consolidation	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed
Gas Bubbles	None	None	None	None	None	None
Estimation of *Beggiatoa*-like Species	0%	<5%	0%	0%	0%	0%
Estimation of OPC Coverage	0%	0%	0%	0%	0%	0%
Barrenness due to Aquaculture	None	None	None	None	None	None
Presence of Feed	None	None	None	None	None	None
Presence of Feces	None	None	None	None	None	None
Macrofauna	Scallop shells, rock crab	Scallop shells	Scallop shells	Scallop shells	Scallop shells	Rock crab, lobster, scallop shells
Macroflora % Coverage	Coralline algae (<5%), kelp (10%), acid kelp (5%), sea lettuce (<5%) Rhodophyta (<5%)	Kelp (10%), acid kelp (5%), sea lettuce (<5%), Rhodophyta (<5%)	Kelp (<5%), Rhodophyta (<5%), sea lettuce (<5%), acid kelp (<5%), eel grass (<5%)	Kelp (5%), acid kelp (5%), sea lettuce (<5%), Rhodophyta (5%), coralline algae (<5%)	Kelp (<5%), acid kelp (<5%), sea lettuce (<5%)	Kelp (<5%), acid kelp (5%)
Presence of Gear on Bottom	None	None	None	None	Lobster trap	Tubing/pipe
Detritus & Fouling	Detritus (prevalent)	Detritus (some)	Detritus (some)	Detritus (some)	Detritus (prevalent); mussel shells (rare)	Detritus (some); mussel shells (rare)
Shell Debris	Some	Some	Some	Some	Some	Prevalent
Notes						

Table 14. BI5 Transect Benthic Log

Station ID: BI5	0m	10m	20m	30m	40m	50m
Location (NAD 83)	N44 15.764 W66 20.909	N44 15.758 W66 20.902	N44 15.756 W66 20.895	N44 15.751 W66 20.891	N44 15.745 W66 20.887	N44 15.745 W66 20.879
Depth (m)	10.5	11	11.7	12.3	12.6	14.2
Time	10:08	10:32	10:36	10:39	10:43	10:47
Approximate Sediment Thickness (cm)	0.5	0.5	0.5	0.5	0.5	0.5
Sediment Colour	Brown	Brown	Brown	Brown	Brown	Brown
Sediment Consistency	Sand, pebbles, cobble, boulder	Sand, pebbles, boulder	Sand, pebbles, boulder	Sand, pebbles, cobble, boulder	Sand, pebbles, cobble, boulder	Sand, pebbles, cobble, boulder
Sediment Surface Consolidation	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed
Gas Bubbles	None	None	None	None	None	None
Estimation of *Beggiatoa*-like Species	0%	0%	0%	0%	0%	0%
Estimation of OPC Coverage	0%	0%	0%	0%	0%	0%
Barrenness due to Aquaculture	None	None	None	None	None	None
Presence of Feed	None	None	None	None	None	None
Presence of Feces	None	None	None	None	None	None
Macrofauna	Scallop shells, rock crab	Scallop shells	Scallop shells, rock crab	Scallop shells	Rock crab; scallop shells	Rock crab; scallop shells
Macroflora % Coverage	Sea lettuce (<5%), kelp (5%), acid kelp (<5%), Rhodophyta (<5%), coralline algae (<5%)	Eel grass (<5%), kelp (15%), Rhodophyta (<5%), acid kelp (10%), sea lettuce (<5%), coralline algae (<5%)	Kelp (10%), sea lettuce (<5%), Rhodophyta (10%), eel grass (<5%), coralline algae (<5%); acid kelp (5%)	Eel grass (<5%), kelp (20%), Rhodophyta (5%), coralline algae (<5%), sea lettuce (<5%), acid kelp (<5%)	Eel grass (5%), coralline algae (<5%), kelp (10%), Rhodophyta (10%), sea lettuce (<5%), acid kelp (<5%)	Kelp (10%), Rhodophyta (10%), eel grass (5%), coralline algae (<5%), sea lettuce (<5%), acid kelp (<5%)
Presence of Gear on Bottom	None	None	None	None	None	None
Detritus & Fouling	Detritus (rare)	Detritus (rare)	Detritus (rare)	Detritus (rare)	Detritus (rare)	Detritus (rare)
Shell Debris	Prevalent	Prevalent	Prevalent	Some	Some	Some
Notes						

Table 15. BRI-REF Transect Benthic Log

Station ID: BRI-REF	**100m**	**150m**	**200m**	**250m**	**300m**
Location (NAD 83)	N44 15.843 W66 20.673	N44 15.871 W66 20.666	N44 15.895 W66 20.658	N44 15.922 W66 20.646	N44 15.947 W66 20.631
Depth (m)	24.4	22.5	20	18.6	17.8
Time	11:35	12:01	12:07	12:12	12:19
Approximate Sediment Thickness (cm)	0.5	0.5	0.5	0.5	0.5
Sediment Colour	Brown	Brown	Brown	Brown	Brown
Sediment Consistency	Sand, pebbles	Sand, pebbles, cobble	Sand, pebbles, cobble, boulder	Sand, pebbles, cobble	Sand, pebbles, cobble
Sediment Surface Consolidation	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed
Gas Bubbles	None	None	None	None	None
Estimation of *Beggiatoa*-like Species	0%	0%	0%	0%	0%
Estimation of OPC Coverage	0%	0%	0%	0%	0%
Barrenness due to Aquaculture	None	None	None	None	None
Presence of Feed	None	None	None	None	None
Presence of Feces	None	None	None	None	None
Macrofauna	*Flustra*, scallop shells	*Flustra*, scallop shells, lobster	*Flustra*, lobster, scallop shells	Scallop shells	Scallop shells, *Flustra*, lobster
Macroflora % Coverage	Coralline algae (15%), Rhodophyta (5%), eel grass (<5%)	Coralline algae (20%), Rhodophyta (<5%), eel grass (<5%); kelp (<5%); knotted wrack weed (<5%)	Knotted wrack weed (5%), Rhodophyta (5%), kelp (<5%), coralline algae (10%)	Coralline algae (25%), kelp (<5%), knotted wrack weed (5%), Rhodophyta (5%)	Coralline algae (40%), kelp (<5%), knotted wrack weed (5%), Rhodophyta (<5%)
Presence of Gear on Bottom	None	None	None	Rope	None
Detritus & Fouling	Mussel shells (rare); detritus (prevalent)	Mussel shells (rare); detritus (prevalent)	Mussel shells (rare); detritus (some)	Mussel shells (rare); detritus (some)	Detritus (some)
Shell Debris	Some	Prevalent	Prevalent	Prevalent	Prevalent
Notes	GPS battery died during the final camera drop.				

Table 16. BI6 Transect Benthic Log

Station ID: BI6	0m	10m	20m	30m	40m	50m
Location (NAD 83)	N44 15.697 W66 20.818	N44 15.697 W66 20.823	N44 15.684 W66 20.830	N44 15.681 W66 20.830	N44 15.682 W66 20.835	N44 15.673 W66 20.834
Depth (m)	16.5	15.4	14.7	14.7	14.4	13.2
Time	12:42	13:12	13:16	13:20	13:23	13:27
Approximate Sediment Thickness (cm)	0.5	0.5	0.5	0.5	0.5	0.5
Sediment Colour	Brown	Brown	Brown	Brown	Brown	Brown
Sediment Consistency	Sand, pebbles, cobble, boulder	Sand, pebbles, cobble, boulder	Sand, pebbles, cobble, boulder	Sand, pebbles, cobble, boulder	Sand, pebbles, cobble, boulder	Sand, pebbles, cobble
Sediment Surface Consolidation	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed
Gas Bubbles	None	None	None	None	None	None
Estimation of *Beggiatoa*-like Species	<5%	<5%	5%	<5%	5%	<5%
Estimation of OPC Coverage	0%	0%	0%	0%	0%	0%
Barrenness due to Aquaculture	None	None	None	None	None	None
Presence of Feed	None	None	None	Rare	None	None
Presence of Feces	None	None	None	None	None	None
Macrofauna	Lobster, scallop shells	Scallop shells	Scallop shells, rock crabs	Rock crab, scallop shells, barnacles	Rock crab, lobster, scallop shells	Sculpin, hermit crab, lobster, scallop shell, rock crab
Macroflora % Coverage	Coralline algae (<5%), Rhodophyta (<5%), kelp (<5%)	Coralline algae (<5%), Rhodophyta (<5%)	Coralline algae (<5%), Rhodophyta (<5%), knotted wrack weed (<5%), kelp (<5%)	Coralline algae (<5%), Rhodophyta (<5%), kelp (<5%), acid kelp (<5%)	Coralline algae (<5%), kelp (<5%), Rhodophyta (<5%)	Rhodophyta (<5%), eel grass (<5%), acid kelp (<5%), coralline algae (<5%)
Presence of Gear on Bottom	Metal plate (trash)	None	None	None	None	Strap, other trash
Detritus & Fouling	Detritus (rare)	Detritus (rare)	Detritus (rare)	Detritus (rare)	Mussel shells (rare); detritus (some)	Detritus (some)
Shell Debris	Prevalent	Prevalent	Prevalent	Prevalent	Prevalent	Prevalent
Notes	This transect runs inside of the cage array					

Table 17. BI2 Transect Benthic Log

Station ID: BI2	0m	10m	20m	30m	40m	50m
Location (NAD 83)	N44 15.782 W66 20.668	N44 15.780 W66 20.670	N44 15.777 W66 20.672	N44 15.773 W66 20.685	N44 15.772 W66 20.689	N44 15.770 W66 20.698
Depth (m)	21.4	21.3	19.8	18.2	17	16.3
Time	13:35	14:03	14:07	14:12	14:17	14:22
Approximate Sediment Thickness (cm)	0.5	0.5	1	0.5	0.5	0.5
Sediment Colour	Brown	Brown	Brown	Brown	Brown	Brown
Sediment Consistency	Sand, pebbles, cobble, boulder	Sand, pebbles, cobble	Sand, pebbles	Sand, pebbles	Sand	Sand, pebbles, cobble
Sediment Surface Consolidation	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed
Gas Bubbles	None	None	None	None	None	None
Estimation of *Beggiatoa*-like Species	0%	0%	0%	0%	0%	0%
Estimation of OPC Coverage	0%	0%	0%	0%	0%	0%
Barrenness due to Aquaculture	None	None	None	None	None	None
Presence of Feed	None	None	None	None	None	None
Presence of Feces	None	None	None	None	None	None
Macrofauna	Scallop shells, sponge, *Flustra*	Scallop shells, *Flustra*	None	Scallop shells	*Flustra*	Scallop shells
Macroflora % Coverage	Coralline algae (5%), knotted wrack weed (5%), kelp (<5%), Rhodophyta (5%)	Coralline algae (<5%), knotted wrack weed (5%), Rhodophyta (<5%), kelp (<5%)	Coralline algae (<5%), kelp (<5%), Rhodophyta (<5%)	Coralline algae (<5%), knotted wrack weed (<5%), Rhodophyta (5%), sea lettuce (<5%), kelp (<5%)	Knotted wrack weed (<5%), Rhodophyta (<5%), kelp (<5%), coralline algae (<5%)	Rhodophyta (10%), kelp (<5%), coralline algae (<5%), knotted wrack weed (5%)
Presence of Gear on Bottom	None	None	None	None	Rope, possible anchor	None
Detritus & Fouling	Mussel shells (rare); detritus (prevalent)	Mussel shells (rare); detritus (prevalent)	Mussel shells (some); detritus (some)	Mussel shells (some); detritus (some)	Detritus (rare)	Mussel shells (some); detritus (some)
Shell Debris	Prevalent	Prevalent	Prevalent	Some	Some	Some
Notes						

Table 18. Baseline Transect Benthic Log

Station ID: Baseline Transect	**0m**	**25m**	**50m**	**75m**	**100m**	**125m**	**150m**
Location (NAD 83)	N44 15.591 W66 20.789	N44 15.609 W66 20.788	N44 15.626 W66 20.778	N44 15.633 W66 20.773	N44 15.648 W66 20.774	N44 15.661 W66 20.768	N44 15.670 W66 20.774
Depth (m)	8.9	7.6	9.2	9.8	11	11	12.6
Time	14:59	15:03	15:06	15:09	15:13	15:17	15:21
Approximate Sediment Thickness (cm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sediment Colour	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Sediment Consistency	Sand, pebbles, cobble	Sand, pebbles, cobble	Sand, pebbles, cobble	Sand, pebbles	Sand, pebbles, cobble	Sand, pebbles, cobble	Sand, pebbles, cobble
Sediment Surface Consolidation	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed	Hard packed
Gas Bubbles	None	None	None	None	None	None	None
Estimation of *Beggiatoa*-like Species	0%	0%	0%	10%	15%	<5%	<5%
Estimation of OPC Coverage	0%	0%	0%	0%	0%	0%	0%
Barrenness due to Aquaculture	None	None	None	None	None	None	None
Presence of Feed	None	None	None	Rare	None	None	None
Presence of Feces	None	None	None	None	None	None	None
Macrofauna	Scallop shells	Scallop shells	Scallop shells	Scallop shells, flounder	Scallop shells, rock crab	Scallop shells, lobster, flounder	Scallop shells
Macroflora % Coverage	Kelp (10%), acid kelp (<5%), sea lettuce (<5%)	Kelp (5%), acid kelp (5%), knotted wrack weed (<5%), sea lettuce (<5%)	Kelp (5%), acid kelp (5%), knotted wrack weed (<5%), sea lettuce (<5%), Rhodophyta (<5%)	Kelp (10%), acid kelp (5%), eel grass (<5%), knotted wrack weed (<5%), Rhodophyta (5%)	Kelp (<5%), acid kelp (<5%), Rhodophyta (<5%)	Kelp (<5%), acid kelp (<5%)	Rhodophyta (<5%), kelp (<5%), knotted wrack weed (<5%), sea lettuce (<5%)
Presence of Gear on Bottom	Bottle (trash)	None	None	Glove	None	Lobster trap	None
Detritus & Fouling	Detritus (some)	Detritus (some)	Mussel shells (some); detritus (some)	Detritus (prevalent)	Mussel shells (rare); detritus (prevalent)	Mussel shells (rare); detritus (rare)	Mussel shells (rare); detritus (rare)
Shell Debris	Prevalent	Some	Some	Some	Prevalent	Prevalent	Prevalent
Notes							

Table 19. 2018 redox and sulphide results for baseline sampling from site #0742

Site #0742 – Brier Island

Sample Collection: December 5, 2018 8:30 – 15:25
Sample Analysis: Redox: December 6, 2018 8:32 - 8:55
Sulphides: December 6, 2018 8:37 - 9:07

Sample I.D.		Core Sample Temp	Redox	Redox	Sulphide	
Station	ID #	°C	mV	mVNHE	µM	mV
BRI-REF	1	NS	NS	NS	NS	NS
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		NS	NS	**NS**	**NS**	NS
BRI-REF2	1	NS	NS	NS	NS	NS
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		NS	NS	**NS**	**NS**	NS
BI1	1	10.7	222.2	435.5	2	-800.7
	2	7.6	129.3	345.7	9	-824.2
	3	8.7	132.5	347.8	1	-798.7
		9.0	161.3	**376.3**	**4**	-807.9
BI2	1	3.5	181.5	402.0	5	-811.1
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		3.5	181.5	**402.0**	**5**	-811.1
BI3	1	5.6	37.3	255.7	221	-866.1
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		5.6	37.3	**255.7**	**221**	-866.1
BI4	1	7.2	119.9	336.7	4	-811.8
	2	6.8	143.2	360.4	2	-799.7
	3	7.8	129.0	345.2	22	-834.8
Means		7.3	130.7	**347.4**	**9**	-815.4
BI5	1	6.3	145.2	362.9	22	-834.7
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		6.3	145.2	**362.9**	**22**	-834.7
B 6	1	7.5	103.7	320.2	85	-853.1
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		7.5	103.7	**320.2**	**85**	-853.1

Redox Test Solution
Prior to analysis: 221.8 mV @ 25°C
Post analysis: 221.0 mV @ 25°C

Sulphide Probe Calibration:

Standard	mV
100	-853.6
500	-875.2
1000	-883.9
5000	-903.8
10000	-911.9

Sulphide Probe Calibration Temperature: 21.8°C

Sample met all grab quality criteria
Sample did not meet all quality criteria
Reference stations
NS = No Sample

Figure 4. Graph of mean redox and sulphide values for baseline sampling at site #0742

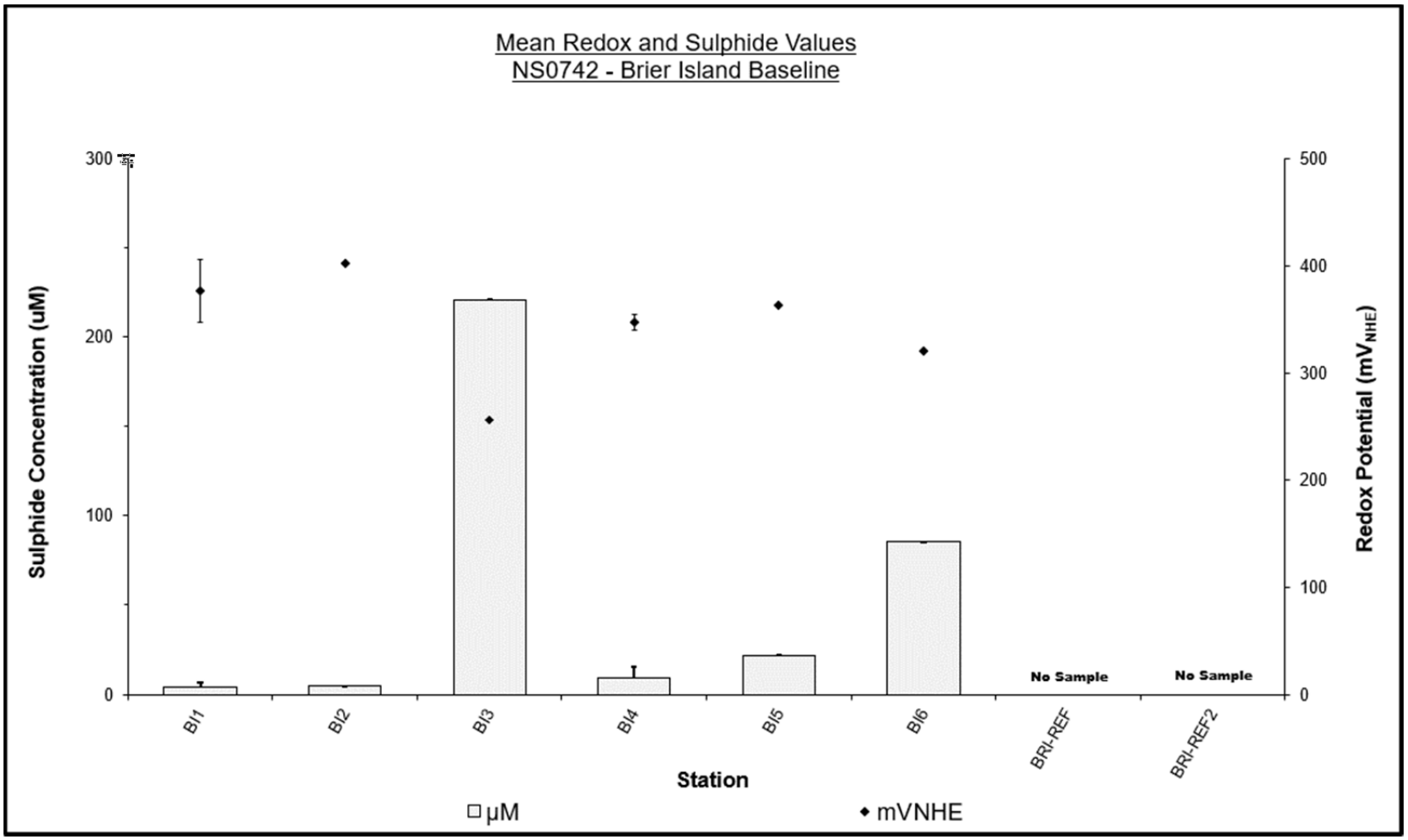


Table 20. 2018 porosity and percent organic matter results for baseline sampling from site #0742

Station	Sample #	Porosity Value (%)	% Organic Matter
BRI-REF1	1	NS	NS
BRI-REF1	2	NS	NS
BRI-REF1	3	NS	NS
BRI-REF2	1	NS	NS
BRI-REF2	2	NS	NS
BRI-REF2	3	NS	NS
BI1	1	15.00	1.25
BI1	2	22.00	1.47
BI1	3	19.40	1.74
BI2	1	23.90	1.60
BI2	2	NS	NS
BI2	3	NS	NS
BI3	1	34.00	3.10
BI3	2	NS	NS
BI3	3	NS	NS
BI4	1	16.20	0.64
BI4	2	18.10	0.81
BI4	3	23.90	1.31
BI5	1	20.80	1.31
BI5	2	NS	NS
BI5	3	NS	NS
BI6	1	20.30	1.28
BI6	2	NS	NS
BI6	3	NS	NS

Notes: samples in turquoise are from reference stations

3.7 *Benthic Observations and Analysis*

Review of the video footage and grab observations collected from the proposed Brier Island #0742 lease area in Westport Harbour revealed rare waste feed at video stations BI6-30m, and BaselineTransect-75m. The substrate beneath site #0742 consisted mainly of hard-packed sand, pebbles, and cobble. Grain-size analysis results are presented in Appendix F and further support these observations.

Flora and fauna observed in the video footage and in grab samples included rock crabs, lobster, *Flustra*, sculpin, worm tubes, coralline algae, kelp, wrack weed, sea lettuce, and mixed Rhodophyta. While macroalgae were commonly observed, the actual quantities were relatively small, and some existed as unattached detritus. A thin bed of eel grass was observed at station BI4. *Beggiatoa*-like bacteria were observed in significant quantities along the video transect at station BI6 and along the baseline transect. Scallop shells and other shell debris were common.

Since site #0742 is characterized by courser sediment types only two (2) of the stations sampled allowed for a full compliment of sediment samples to be collected (BI1 and BI4). Analysis of the sulphide concentration and redox potential of the sediment samples from

these stations revealed oxic conditions at each station. The highest sulphide concentration obtained during the baseline assessment was 221 µM at station BI3, located at the southeast corner of the lease. Stations BI2, BI3, BI5, and BI6 only yielded one acceptable sediment sample each. No sediment samples could be collected at either reference station.

4.0 BATHYMETRIC PROFILING

Bathymetric profiling of the existing lease area was carried out on October 6, 2016. The data gathered during the scanning was then compiled and a three-dimensional surface map (Fig. 6) and a two-dimensional contour diagram (Fig. 5) were produced by interpolation. Scanning of the Brier Island area began at the southwest boundary of the proposed lease. Parallel transects were run the length of the proposed lease area, separated by approximately 50 m. The maps illustrate the basic bathymetry of the scanned area and can serve to aid in the planning and placement of marine farm infrastructure such as grid anchors and other moorings. Additional bathymetry was collected from CHS chart data.

Under the *Standards for Hydrographic Surveys* (CHS 2013), accuracy requirements vary by survey works and area and are categorized into Orders. Order 1b is described as "*Areas shallower than 100 metres where under-keel clearance is not considered to be an issue for the type of surface shipping expected to transit the area.*" and further defined as a survey which only requires a general description of the seafloor which "*… is sufficient to ensure there are no obstructions on the seafloor that will endanger the type of vessel expected to transit or work the area.*"

A Garmin Transom Mount 200/50 kHz Dual Frequency Depth/Temperature Transducer, mounted onto a custom-built towfish, was used to conduct the bathymetric survey. The georeferenced depth data was collected with the use of a Humminbird Helix 5 SI GPS and a Humminbird ASGR50 antenna. A secondary transducer, mounted permanently to the vessel and installed as per the manufacturer's specifications, was also used, independently, during the survey to validate data recordings from the above-mentioned system and to account for any instrumental errors (like a bar-check calibration). Weather, wind, and wave conditions are always taken into consideration when selecting dates for bathymetric data collection as, light winds and low wave height are necessary for accurate data collection. Vessel speed was also kept below 5 knots to ensure accurate data collection throughout the survey.

Figure 5. Interpolated 2-D bathymetric profile of site #0742 at Brier Island

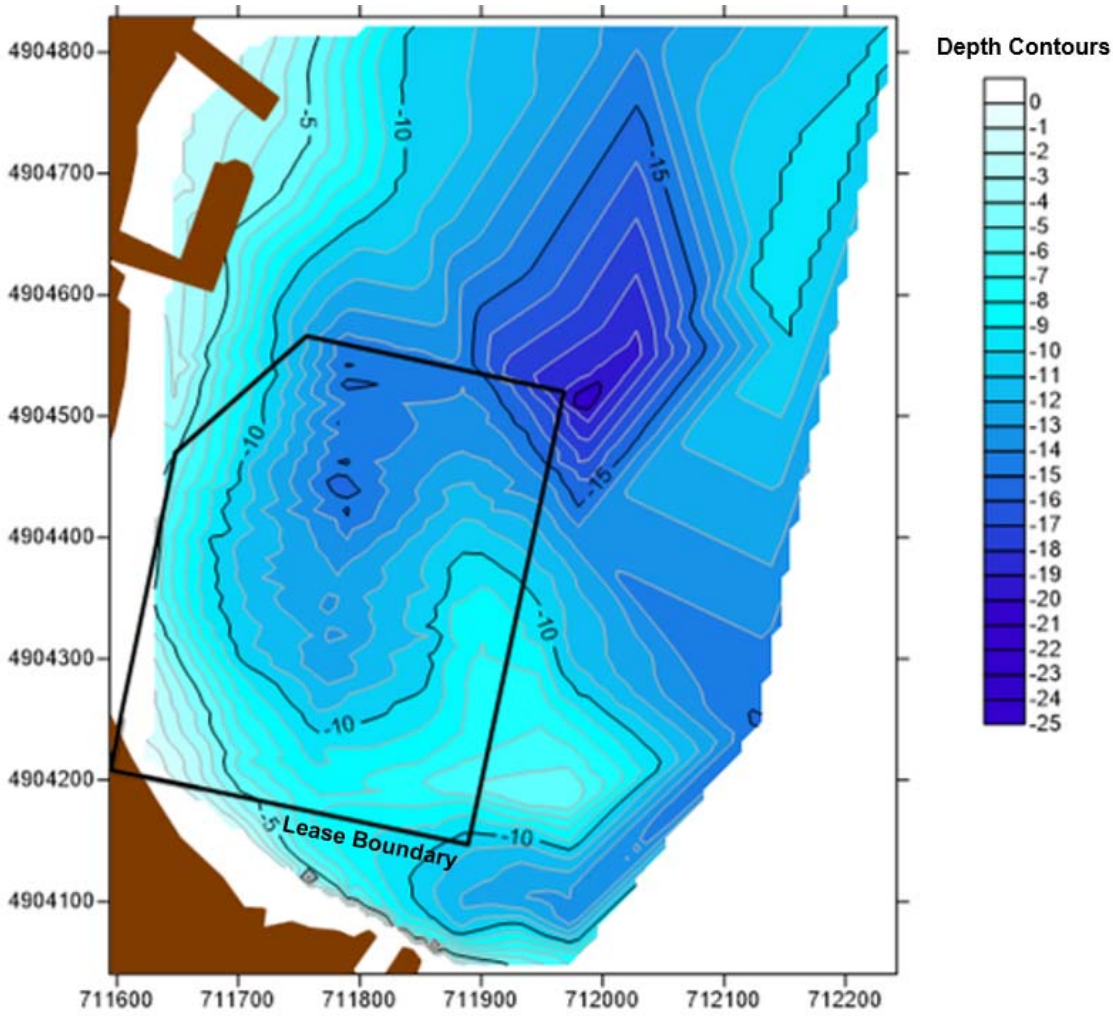
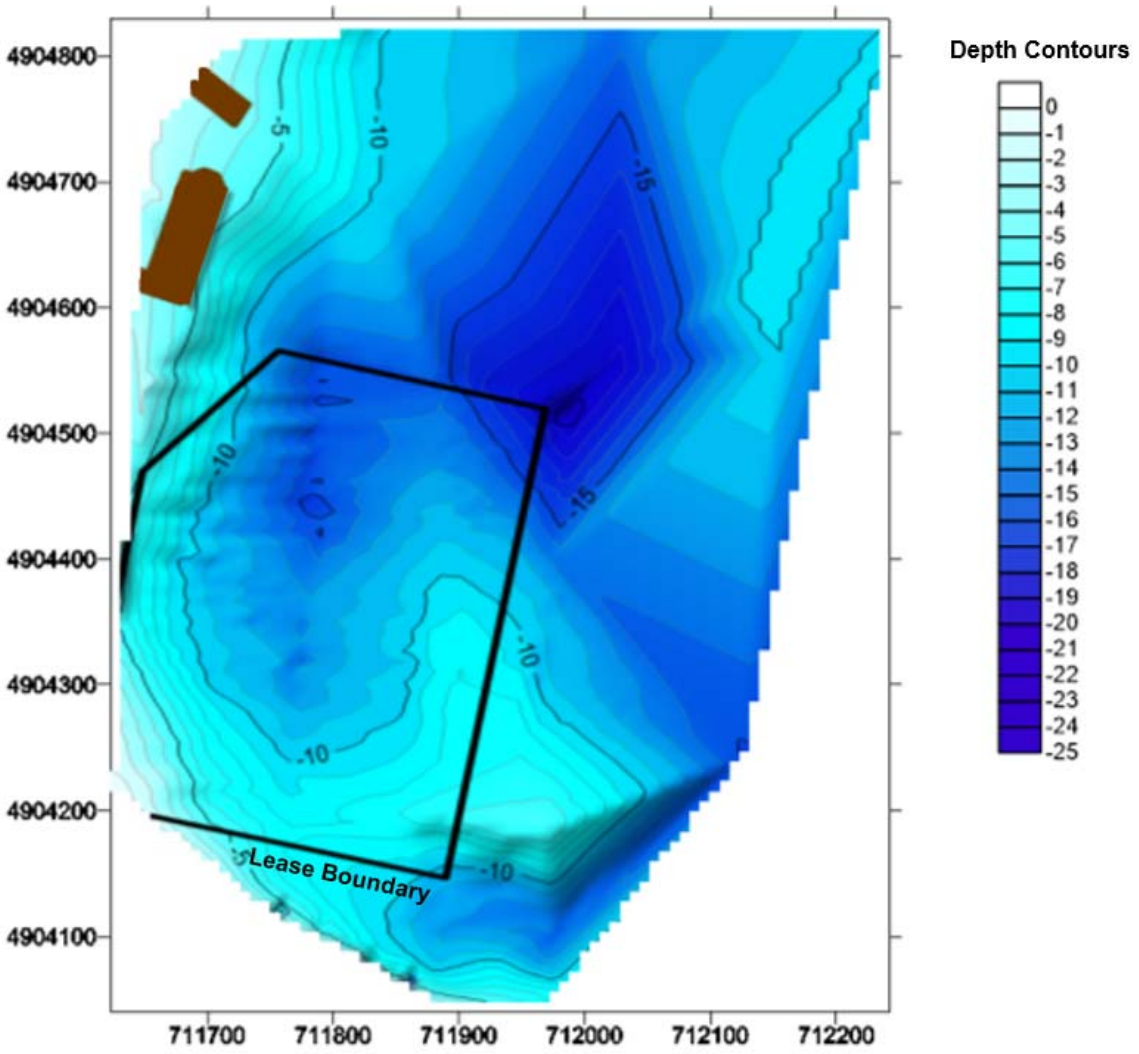


Figure 6. Interpolated 3-D bathymetric profile of site #0742 at Brier Island

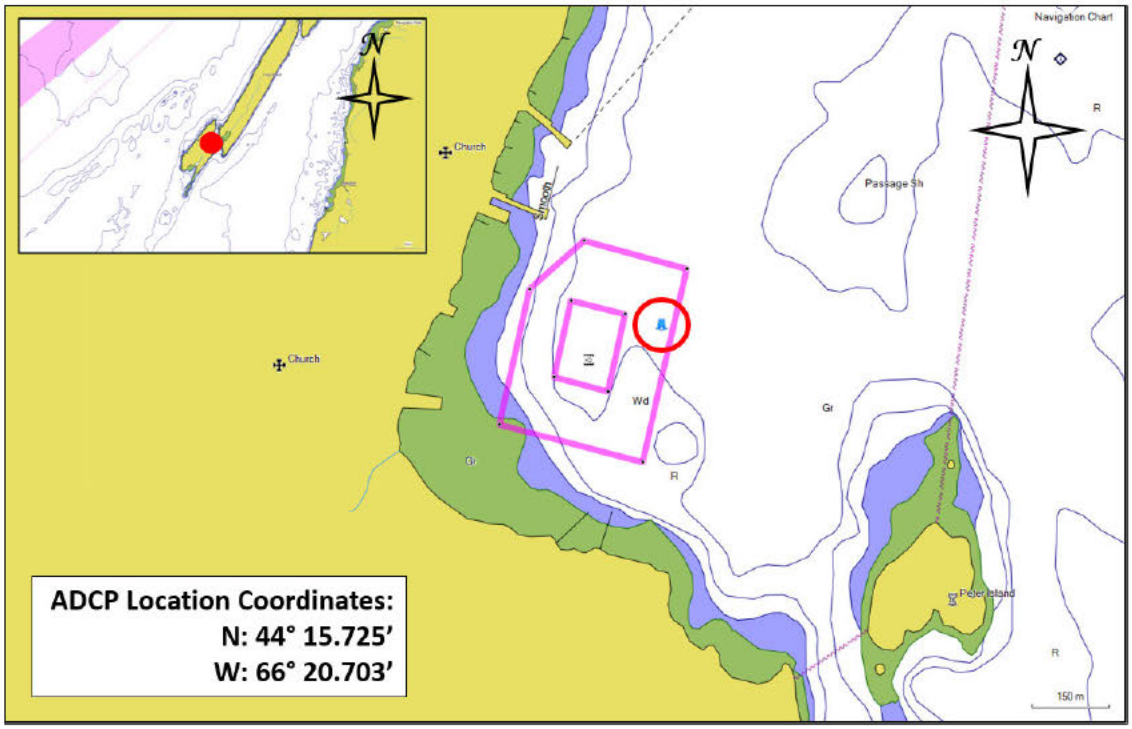


5.0 ACCOUSTIC DOPPLER CURRENT PROFILER

5.1 *Deployment Location*

Measurements of the current speed and direction were collected at Brier Island (#0742) using a 600-kHz Teledyne RDI Workhorse Sentinel Acoustic Doppler Current Profiler (ADCP) unit deployed by NSDFA (Fig. 7). The meter was deployed in Westport Harbour in approximately 15 m of water. The current meter was deployed at coordinates N44° 15.725' W66° 20.703', which was greater than 100 m away from the nearest aquaculture site gear to avoid distortion of data.

Figure 7. Location of ADCP Deployment at Brier Island #0742, Westport Harbour, NS



5.2 *Data Collection*

Current meter data is included to satisfy, in part, baseline survey requirements as per Section 8(1)(a) of the federal Department of Fisheries and Oceans Canada (DFO) *Aquaculture Activities Regulations* (DFO 2018a) by following I. Survey for Baseline Information for New Sites and Expansion of Existing Sites to satisfy conditions under "Predicted Contours" in the AAR Monitoring Standard (DFO 2018b).

The ADCP unit was deployed on October 24 and retrieved on November 24 of 2017 for a total deployment period of 30 days (Fig. 7).

5.3 *Deployment Setup and Procedures*

The ADCP was configured to record the current speed and direction of the water column in 1-m bins, collecting a profile every fifteen (15) minutes. Once the unit was recovered, the data was downloaded and analyzed by NSDFA and processed by SIMCorp Marine Environmental Biologist [redacted]. Graphs and figures illustrating the frequency distribution of both current speed and direction are presented in Appendix I and raw current speed and direction data are included in the supplementary material submitted with this report (*Raw Brier Island.xlsx*).

5.4 *Current Speed and Direction Results*

The petals on the current rose diagrams indicate the direction in which the current was flowing (i.e., if the broad ends of the petals point north, then the current was flowing to the north). The primary directions of water movements displayed by the current roses for all available depths at the Brier Island location were like the depth-averaged current. Throughout the entire water column, the most common directions of flow were in southeast to south directions, with the most-common categorical mode being 165 to 175 degrees (Table 21).

The depth-averaged current speed was 27.3 cm/s (Fig. 8). Mean current speeds were 26.3 cm/s near bottom and 27.9 cm/s near the surface. The most frequently observed speed class, throughout the water column, was 21.0 - 28.0 cm/s. Current velocities below 7.0 cm/s were observed 6.5% of the time. Current velocities above 56.0 cm/s were only observed 1.4% of the time, with the highest maximum recorded current speeds of 69.3 cm/s present at 7 m above the seafloor (Appendix I, Table 21). Average and maximum current velocities recorded in each depth cell are illustrated in Figure 9. Figure 10 gives a view of the overall current profile of the deployment location.

Water currents are one of many essential factors to consider during the site-selection process as it directly and indirectly relates to the carrying and assimilative capacities of the aquaculture facility and the surrounding environment (Benetti *et al.*, 2010). Beveridge (1987) reported that current speeds between 10 cm/s and 60 cm/s are best for marine fish farming, as indicated in Table 22; and Pennell (1992) reported that near surface currents of less than 2 cm/s would be considered poor. As such, the overall current dynamics at Brier Island are classed as an ideal energy system, with few measurements at the low or high ranges (Table 22).

Figure 8. Depth-averaged frequency distribution of current speed and direction at Brier Island #0742, Westport Harbour, NS

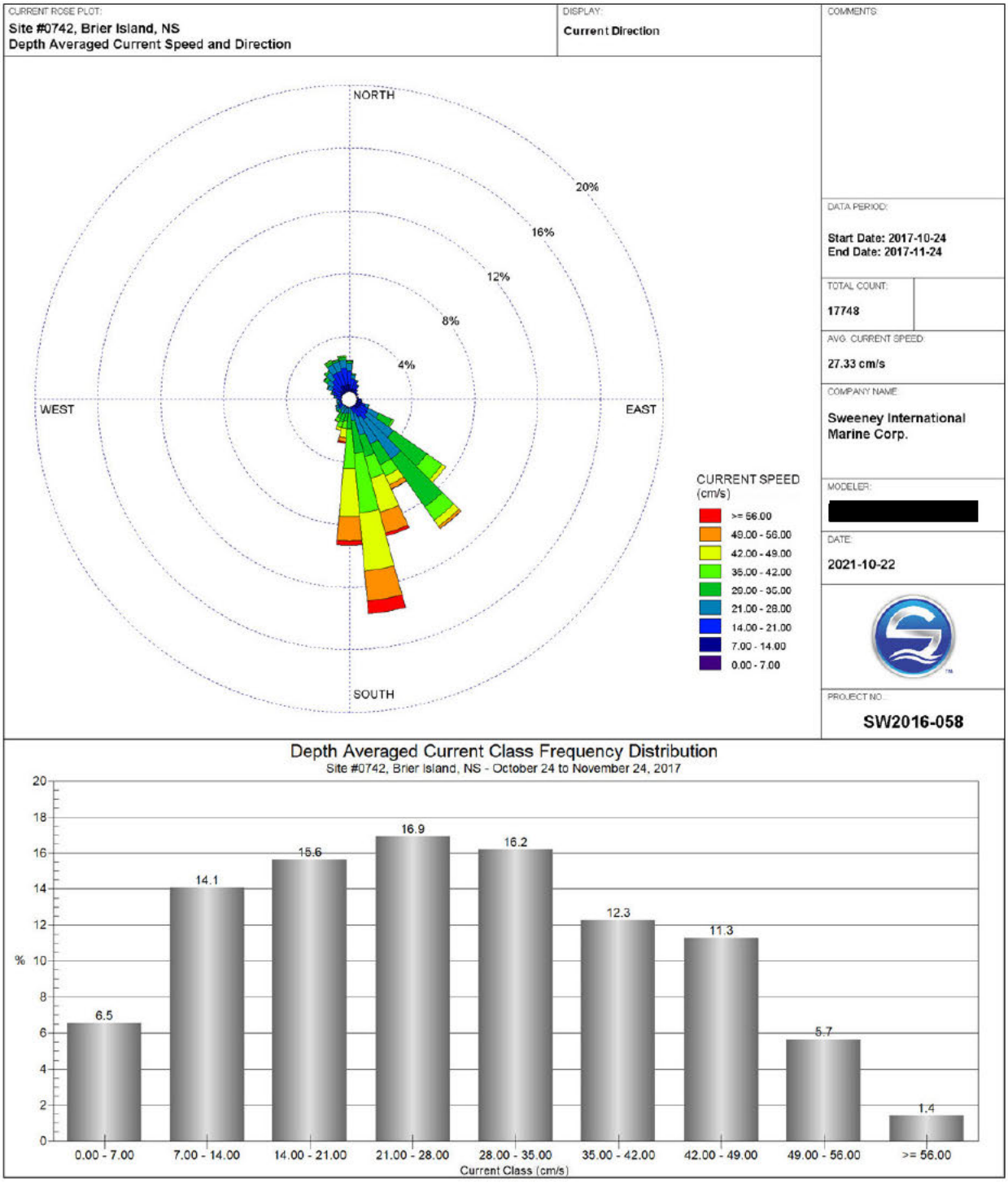


Table 21. Summary of current velocities and directions recorded in each depth cell throughout the water column at Brier Island #0742, Westport Harbour, NS

		Speed							Direction
Distance from Bottom (m)	Distance from Surface (m)	Most Frequent (cm/s)	Minimum (cm/s)	Average (cm/s)	Maximum (cm/s)	< 7.0 cm/s (%)	< 35.0 cm/s (%)	> 56.0 cm/s (%)	Highest Frequency (°)
3	10	21.0 - 28.0	0.4	26.3	62.6	6.7	71.5	0.5	165-175
4	9	28.0 - 35.0	0.4	27.1	65.1	6.6	69.8	1.0	165- 175
5	8	28.0 - 35.0	0.1	27.4	66.8	6.5	69.2	1.5	165-175
6	7	21.0 - 28.0	0.1	27.7	68.3	6.7	68.4	1.7	165-175
7	6	21.0 - 28.0	0.4	27.7	69.3	6.5	68.6	1.7	165-175
8	5	21.0 - 28.0	0.6	27.9	68.3	6.4	68.5	2.0	165-175
Depth Averaged		**21.0 - 28.0**	**0.1**	**27.3**	**69.3**	**6.5**	**69.3**	**1.4**	**165-175**

Figure 9. Average and maximum current velocities recorded in each depth cell throughout the water column at Brier Island #0742, Westport Harbour, NS

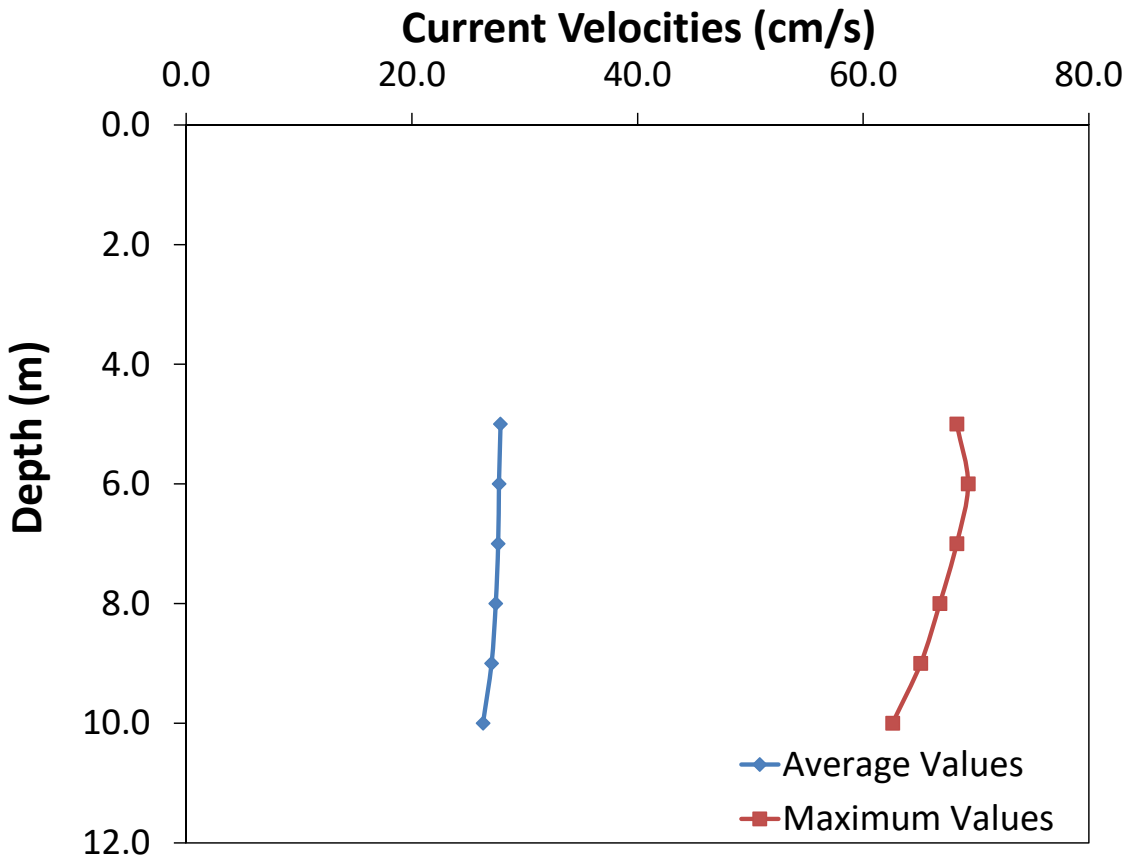


Figure 10. Summary of depth-averaged current speeds and directions at Brier Island #0742, Westport Harbour, NS

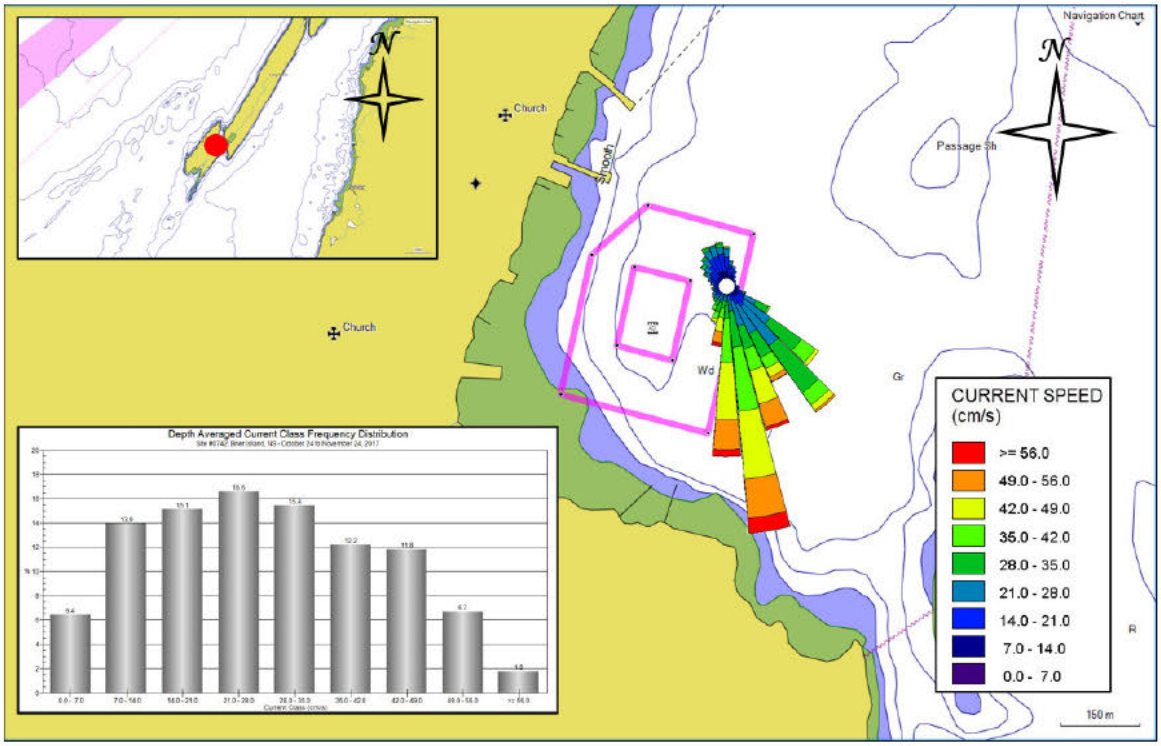


Table 22. Current speed ranges and designations for salmon farming

Rating	Current Speed (cm/s)
Minimum	5.0
Low	< 10.0
Ideal Range	10.0 – 35.0
Acceptable Range	10.0 – 60.0
High	> 60.0

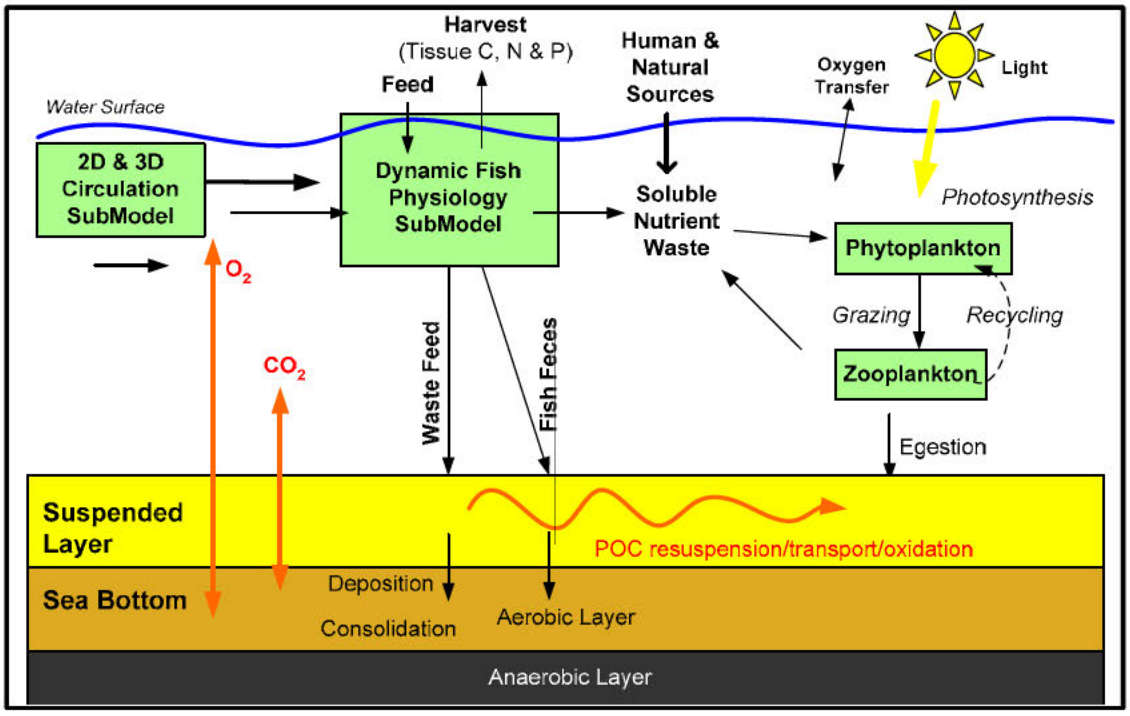
6.0 DEPOSITIONAL MODELING

6.1 *Introduction*

AquaModel is a computational tool for planning and evaluating proposed aquaculture sites, acquiring permits, and assessing investment risks and opportunities. It runs on a standard PC and provides a simple interface to enter environmental and operational information. Graphical outputs map the distribution over time of key parameters including water temperature, oxygen, particulate-organic and dissolved-nutrient wastes, algal and plankton effects, and dozens of other environmental and fish cultural/management parameters. AquaModel is also a full-fledged Geographic Information System (GIS), fully compatible with leading stand-alone GIS systems.

AquaModel is a true dynamic model, not a look-up spreadsheet-based model but one where the fish eat, grow, swim, and excrete at rates based on the well-established science for Atlantic Salmon (and 11 other species of fish) as shown in the figure below. The developers of AquaModel include scientists with decades of fish-farm experience involving sediment-effects monitoring and research as well as fish physiology and nutrient effects on algae and microalgae.

Figure 11. Schematic of the dynamic processes in AquaModel



AquaModel has been used numerous times in Atlantic Canada by Sweeney International Marine Corp. (SIMCorp) and the developers of the model, and so it has a custom Atlantic-salmon submodel designed and validated for both accurate growth and food conversion ratio results in Atlantic Canada.

Resuspension in AquaModel does not affect the modeling of the rate of deposition of total organic carbon (TOC). Resuspension occurs after deposition and is used in the calculation of the estimated TOC that accumulates in the sediment, a parameter not required under the AARs, and is thus not applicable to this report.

Further information on AquaModel can be found at http://www.aquamodel.net/. For information on model validation, see http://www.aquamodel.net/Validation.html.

6.2 *Model Inputs and Assumptions*

6.2.1 Species

The 2-D mode was selected for analyzing the depositional rate at the Brier Island #0742 aquaculture site. The 2-D mode is used for analysis at an individual farm level whereas the 3-D mode is used for bay-wide scales and can include multiple farm inputs. The Atlantic-salmon submodel “AtlanticSalmonNS”, designed and validated for both accurate growth and food conversion ratio results in Atlantic Canada, was selected.

6.2.2 Bathymetry

Bathymetry was entered as a simple text file (BrierBathy2.txt) with longitude, latitude, and depth arranged in x, y, z format (i.e., three columns of data). Detailed bathymetry is available in section **4.0 Bathymetric Profiling** of this report. Bathymetry was collected by side-scan sonar. The shoreline was based on user-collected data using Google Earth.

6.2.3 Currents

Current meter data was input with a simple Excel file (BrierCurrentsV1.xlsx). One lunar cycle (i.e., 29.5 days) of ADCP data was used to inform the model.

6.2.4 Events Files

For operational effects, an events Excel file (BrierEventsV1.xlsx) was compiled for inputs of estimated mortality and harvesting. Mortalities were based on a 10% loss throughout the production cycle. Beginning in January of the final year of production, harvests were simulated. Approximately 10,000 fish were removed per harvest with 20 harvest events between January 1 and January 31.

Temperature and dissolved oxygen data from the Brier Island #0742 lease during operations were used to simulate a full year of environmental data for the model. The one year of data was extended to cover the entire simulated production period (BrierDOTempV1.xlsx), which was from May 1, 2022 to February 15, 2024.

6.2.5 Pen Parameters

The cage centers were entered through the menu, and other simple factors such as fish size at introduction (i.e., 150 g) and stocking density (i.e., 0.5760 kg m^{-3}) were specified. Circular cages with a length and width of 28.21 m (i.e., the square root of the cage area) were entered. This is equivalent to a cage with a circumference of 100 m. Net depth was set to 9 m. The introductory fish weights and the initial densities were set based on estimates of proposed production.

6.2.6 Feed Parameters

Under the Operations tab, the optimal feed rate option was selected, and a waste feed rate (3%) was entered. The carbon fraction of the feed as a dry weight was set at 51.5% and the water fraction of the bulk feed was set at 5.5%. The faecal settling rate was set at 3 cm/s and the feed settling rate was set at 9 cm/s, based on best available literature.

6.2.7 Other Inputs

Under the Benthic menu tab of the model, the initial value of the TOC fraction of the seafloor was set to 0.0010 (fraction dry weight = 0.1%), which assumes a seafloor composition of predominantly medium-coarse sand. The particle deposition threshold was set to 6 cm/s (fecal) and 8 cm/s (pellet). The particle erosion threshold was set to 8 cm/s (fecal) and 12 cm/s (pellet) and the erosion factor to 1.0 g C m^{-2} d^{-1} (both fecal and pellet). Ambient TOC deposition was assumed to be 0.02 g C m^{-2} d^{-1}. The TOC deposition moving average was set to 1 day and the seston TOC oxidation rate/day at 0.02. All these factors were set based on prior experience with Atlantic Canada and other location salmon farms including use of sensitivity analyses.

Under the Array menu tab, the plankton model was turned off, but the physiology and benthic models were enabled with the organic matter type set to TOC.

Under Drifter Processing Type, the no drifters option was selected.

Under the Conditions menu tab, the ambient value of dissolved oxygen was set to 8.0 mg L^{-1} and the surface (mixed) layer depth was set to 40 m for both winter and summer. This depth is greater than the actual water depth, so assumes no stratification of the water column.

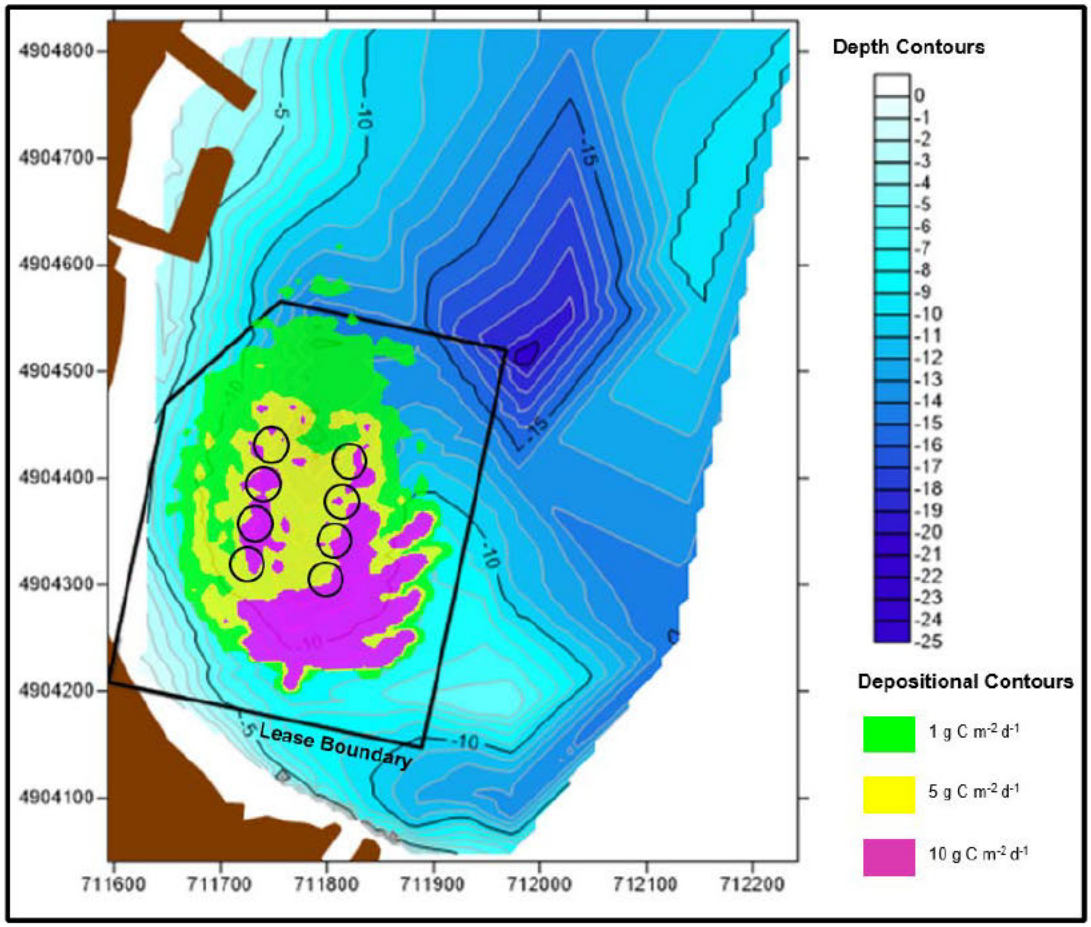
6.3 Model Output

For the purposes of the AAR, only contours generated to represent TOC deposition at the predicted time of peak feed use are required.

The model was run with a start date of May 1, 2022 and the first harvest occurring January 1, 2024. The date of highest feed use was calculated to occur in September of the second year of production (i.e., 2023). The map of the contours showing the predicted sediment TOC rate of deposition (1, 5, and 10 g C m^{-2} d^{-1}) was captured for

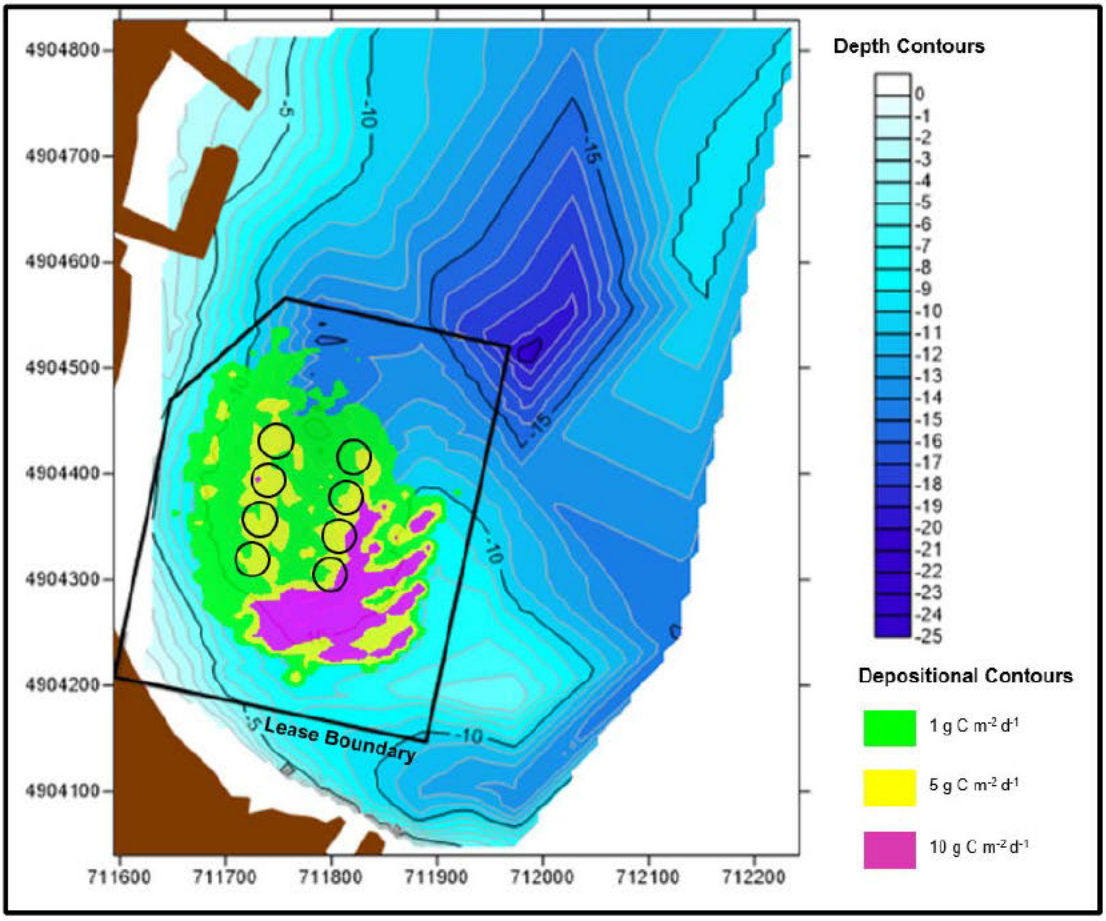
this time and is included in Figure 12 below. The 1 g C m^{-2} d^{-1} contour (green) falls directly under and around the cage array, with the highest rate of deposition (pink) occurring to the southeast in the direction of the dominant current. The model shows the contour to extend slightly beyond the lease's northern boundary. Cage positions are represented by black circles.

Figure 12. Predicted TOC rate of deposition for September 25, 2023 (peak feeding)



For comparison, April 27, 2023 was selected to represent the TOC deposition rate during a period of mean feed usage. A map of the depositional contours for this time is shown in Figure 13. The 1 g C m^{-2} d^{-1} contour falls under and around the cage array, as for the peak-feed scenario. The depositional contours remained within the lease at the time of mean feed usage. The biggest difference between peak and mean feed usage is the smaller area covered by the 5 and 10 g C m^{-2} d^{-1} contours at the time of mean feed use.

Figure 13. Predicted TOC rate of deposition for April 27, 2023 (time of mean feed usage)



6.4 *Aquamodel Settings*

The screen shots of Appendix J illustrate the inputs and settings used to run the model for Brier Island aquaculture site #0742. The current meter, bathymetry, temperature / oxygen, and mortality / harvest data files are included as supplementary material to this report.

7.0 FISH AND FISH HABITAT SURVEY

7.1 *Summary*

A benthic visual survey was undertaken to collect qualitative data of the physical and biological characteristics of fish and fish habitat within the Brier Island (#0742) lease. Following the AAR requirements, the presence and relative abundance of dominant substrate type and flora and fauna were documented within the vicinity of the lease to provide a qualitative evaluation of the physical and biological characteristics of fish and fish habitat.

Benthic data to satisfy the fish and fish habitat component of the baseline assessment were collected by SIMCorp Field Supervisor and Senior Marine Environmental Biologist [redacted] BSc, EP, Marine Environmental Biologist [redacted], BSc, EP, and field technician [redacted] on December 10, 2018. High tide was at 13:07 (5.4 m), and low tide was at 19:30 (0.6 m).

The fish and fish habitat survey carried out at the proposed Brier Island #0742 site revealed:

- Prevalent shell debris, with scallop shells at approximately half of the stations sampled
- Beds of eel grass at three (3) of the stations surveyed
- No sensitive species were observed
- No species at risk were observed

7.2 *Video Surveillance Methods*

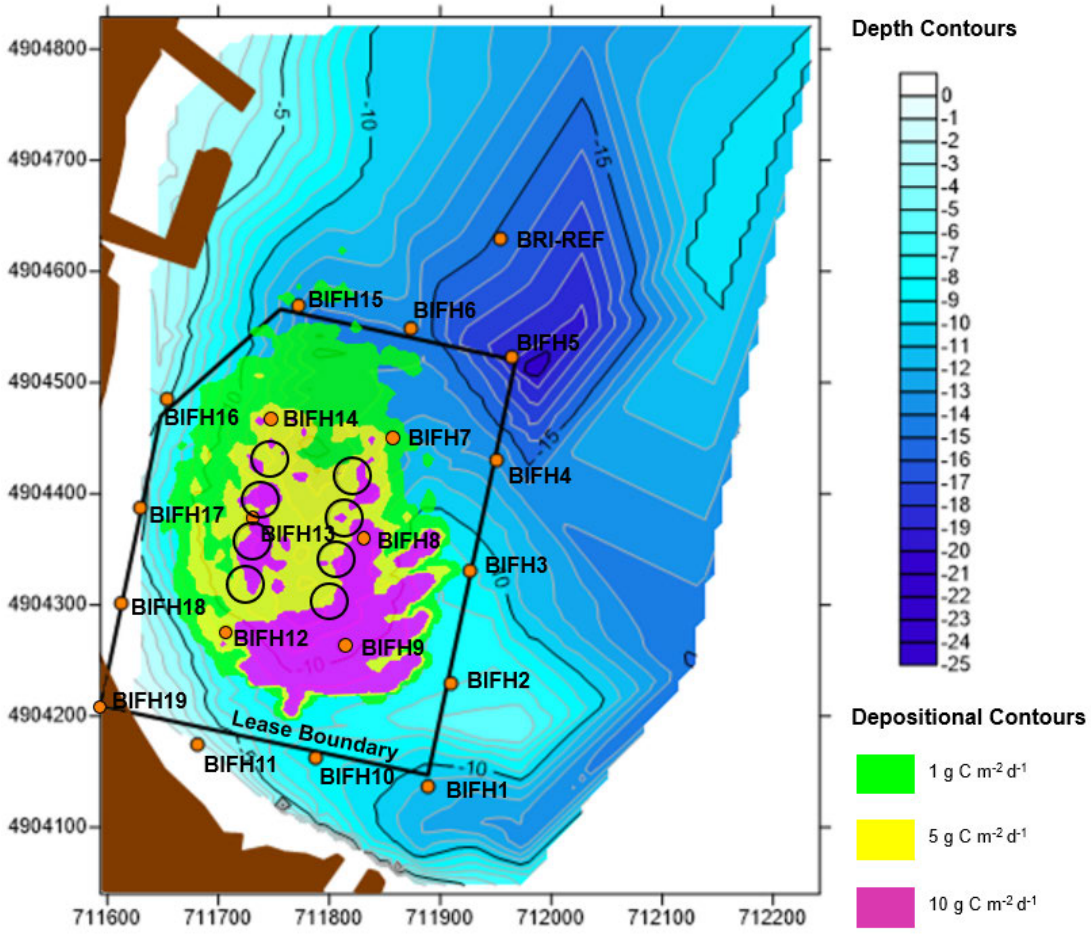
The fish and fish habitat survey was carried out by SIMCorp to collect underwater video footage at pre-determined stations within the lease using a combination of a J.W. Fishers underwater video camera and a VRM-1 video recorder with a GPS interface, which allowed coordinate positions to be overlaid onto the video. Surveying of the reference station by video occurred during the benthic substrate sampling on December 5, 2018

The video footage was reviewed and analyzed by SIMCorp, noting observations of substrate type, fauna, and flora at each station. Seafloor observations from the video stations were used to conduct the fish and fish habitat survey. Observations were compiled in pictorial form to produce a habitat map of the seafloor characteristics as required in the AAR for baseline surveys. The habitat map is in Appendix K.

A total of twenty (20) video stations were arranged in a grid pattern for the purpose of the fish and fish habitat survey (Fig. 14) and were recorded for at least 2 minutes of bottom time. The video stations were spaced approximately 100 m apart across the entire proposed Brier Island (#0742) lease area, which included the 1 g C m^{-2} d^{-1} depositional area as identified by AquaModel (Section 6.0). In addition, a reference station was located 105 m from the lease boundaries. Analyses of the substrate type, benthic indicators, flora, and fauna were conducted. Abundance estimates were

recorded as number of individuals, percent coverage, or relative estimates, depending on the organism being assessed.

Figure 14. Brier Island video station locations surveyed on December 5, and December 10, 2018



7.3 *Results*

The substrate at the proposed Brier Island lease area and inside the 1 g C m^{-2} d^{-1} depositional area consisted of mostly mixed substrates. Most of the area surveyed (78%) was characterized by hard-packed finer substrates such as sand, mud, and silt. Most stations also had gravel and cobble in small quantities, while three stations also showed larger substrate types such as cobbles and boulders. Shell debris was prevalent.

Eel grass beds of varying densities were observed at three (3) of the stations sampled at the west-southwest edges of the proposed lease boundaries. Various red, brown, and green macroalgal species were observed. No significant quantities of fauna were noted. Faunal species observed included flounder, bryozoan, lobster, rock crab, and sculpin.

Scallop shells were present in eleven (11) of the twenty (20) stations surveyed (55%). *Beggiatoa*-like bacteria were observed at one (1) of the twenty (20) stations surveyed.

Screen shots of the seafloor at each station are available in Appendix L. Table 23 provides a list of flora and fauna species (or higher taxonomic level) observed during the benthic survey. A more detailed and comprehensive species list over the entire survey area is available in Appendix M. Tables 24 and 25 include the substrate and benthic indicator observations from the baseline sampling stations as required in the AAR. Raw video footage has been provided to NSDFA with this report and is also available upon request.

Table 23. List of species (or higher taxonomic level) observed during the fish and fish habitat survey of Brier Island (#0742)

List of Species Observed		
Acid Kelp	Flounder	Mixed Rhodophyta
Algae (Coralline)	*Flustra*	Rock Crab
Algae (Encrusting)	Kelp	Sculpin
Eel Grass	Lobster	Sea Lettuce

Table 24. Baseline video observations of substrate type from the Brier Island survey, December 5 and December 10, 2018

Station	Latitude (dd mm mmm)	Longitude (dd mm mmm)	Depth (m)	Time	Video Quality	Figure #	Substrate											Comments and Observations
							Primary [1.]	Descriptors										
							> 50% (hard/soft)	Rockwall	Bedrock	Boulders	Rubble	Cobble	Gravel	Sand	Silt/Mud	Organic	Floc	
BIFH1	44 15.578	66 20.734	16.2	12:22	4	L-1	Soft			Trace			25%	75%				
BIFH2	44 15.627	66 20.716	12.2	12:28	4	L-1	Soft							100%				
BIFH3	44 15.682	66 20.701	14.4	12:33	4	L-1	Soft							100%				
BIFH4	44 15.735	66 20.680	19.3	12:39	4	L-1	Soft							100%				
BIFH5	44 15.785	66 20.667	25.7	12:45	4	L-1	Soft							100%				Prevalent shell debris
BIFH6	44 15.800	66 20.736	20.3	12:54	4	L-1	Soft						40%	60%				Prevalent shell debris
BIFH7	44 15.748	66 20.750	18.0	12:59	4	L-1	Soft					Trace	10%	90%				Prevalent shell debris
BIFH8	44 15.699	66 20.772	18.2	13:06	4	L-1	Soft					5%	5%	90%				
BIFH9	44 15.647	66 20.788	17.0	13:15	4	L-2	Soft						5%	95%				
BIFH10	44 15.593	66 20.810	13.7	13:20	4	L-2	Hard					Trace	65%	35%				
BIFH11	44 15.602	66 20.889	7.7	13:29	4	L-2	Soft							100%				
BIFH12	44 15.656	66 20.867	13.8	13:34	4	L-2	Soft				Trace		10%	90%				
BIFH13	44 15.710	66 20.848	18.1	13:39	4	L-2	Soft			Trace	Trace	5%	5%	90%				
BIFH14	44 15.759	66 20.832	18.1	13:44	4	L-2	Hard			10%	5%	25%	25%	35%				Prevalent shell debris
BIFH15	44 15.813	66 20.811	18.0	13:50	4	L-2	Hard			Trace		5%	85%	10%				
BIFH16	44 15.770	66 20.902	10.2	13:56	4	L-2	Soft			15%	10%	10%	10%	55%				
BIFH17	44 15.718	66 20.923	11.0	14:01	4	L-3	Soft			5%	5%	5%		85%				
BIFH18	44 15.671	66 20.938	7.2	14:07	4	L-3	Soft							100%				
BIFH19	44 15.619	66 20.958	4.5	14:11	4	L-3	Soft					5%	25%	70%				
BRI-REF	44 15.843	66 20.673	24.4	11:33	4	H-5	Soft					10%	20%	70%				

1: It is important to clarify that hard bottom is indicative of bedrock, boulder, rubble, cobble, gravel or hard packed finer substrate consisting of mud, sand or silt. Soft bottom is indicative of a softer, more loosely packed mud, sand or silt. Substrate Descriptions are visual estimations of surface coverage.

Table 25. Baseline video observations of benthic indicators from the Brier Island survey December 5 and December 10, 2018

Station	Latitude (dd mm.mmm)	Longitude (dd mm.mmm)	Depth (m)	Time	Video Quality	Figure #	Benthic Indicators					Other Benthic Descriptors or Observations							Comments and Observations
							Bacteria		OPC		Barren (P/A)	Off Gas	Feed	Shell Debris	Mussel Shells	Sed. Color	Flora (%)	Fauna (Abundance)	
							P/A	%	P/A	%									
BIFH1	44 15 578	66 20.734	16.2	12:22	4	L-1	A		A		A	A	A	P	A	Brown	15%	Rock Crab (1)	Mixed Rhodophyta (10%); kelp (5%); sea lettuce (<5%); detritus; scallop shells
BIFH2	44 15 627	66 20.716	12.2	12:28	4	L-1	A		A		A	A	P	P	A	Brown	0%		Shells; detritus
BIFH3	44 15 682	66 20.701	14.4	12:33	4	L-1	A		A		A	A	A	P	A	Brown	0%		Detritus
BIFH4	44 15.735	66 20.680	19.3	12:39	4	L-1	A		A		A	A	A	P	P	Brown	5%		Shells; mixed Rhodophyta (5%); Kelp (<5%); detritus
BIFH5	44 15.785	66 20.667	25.7	12:45	4	L-1	A		A		A	A	A	P	A	Brown	Trace	Flounder (1)	Eel grass (<5%); shells; detritus; rope (debris)
BIFH6	44 15 800	66 20.736	20.3	12:54	4	L-1	A		A		A	A	A	P	P	Brown	10%	*Flustra* (<5%)	Eel grass (<5%); kelp (trace); sea lettuce (<5%); coralline algae (<5%); mixed Rhodophyta (<5%); shells; scallop shells; detritus
BIFH7	44 15.748	66 20.750	18.0	12:59	4	L-1	A		A		A	A	A	P	P	Brown	15%	Rock Crab (3)	Mixed Rhodophyta (5%); kelp (5%); sea lettuce (<5%); acid kelp (5%); scallop shells
BIFH8	44 15 699	66 20.772	18.2	13:06	4	L-1	A		A		A	A	P	P	A	Brown	Trace		Kelp (<5%); mixed Rhodophyta (<5%); sea lettuce (<5%); shells; detritus; scallop shells
BIFH9	44 15 647	66 20.788	17.0	13:15	4	L-2	P	15	A		A	A	P	P	P	Brown	10%	Sculpin (1), Flounder (1)	Mixed Rhodophyta (10%); glove (debris); shells; detritus; scallop shells
BIFH10	44 15 593	66 20.810	13.7	13:20	4	L-2	A		A		A	A	A	P	A	Brown	10%		Kelp (5%); acid kelp (5%); sea lettuce (<5%); eel grass (<5%); shells; detritus; scallop shells
BIFH11	44 15 602	66 20.889	7.7	13:29	4	L-2	A		A		A	A	A	A	A	Brown	55%		Eel grass (55%)
BIFH12	44 15 656	66 20.867	13.8	13:34	4	L-2	A		A		A	A	A	P	A	Brown	10%	Rock Crab (1)	Sea lettuce (5%); mixed Rhodophyta (5%); shells; detritus; scallop shells
BIFH13	44 15.710	66 20.848	18.1	13:39	4	L-2	A		A		A	A	P	P	A	Brown	15%	Lobster (1)	Coralline algae (5%); mixed Rhodophyta (5%); eel grass (<5%); Kelp (5%); shells; detritus; scallop shells
BIFH14	44 15.759	66 20.832	18.1	13:44	4	L-2	A		A		A	A	A	P	P	Brown	25%	Rock Crab (1)	Coralline algae (10%); kelp (10%); mixed Rhodophyta (5%); eel grass (<5%); tire (debris); shells; detritus; scallop shells
BIFH15	44 15 813	66 20.811	18.0	13:50	4	L-2	A		A		A	A	A	P	P	Brown	5%	Rock Crab (1)	Coralline algae (<5%); mixed Rhodophyta (<5%); kelp (<5%); eel grass (<5%); shells; detritus
BIFH16	44 15.770	66 20.902	10.2	13:56	4	L-2	A		A		A	A	A	P	A	Brown	40%		Kelp (10%); mixed Rhodophyta (20%); sea lettuce (5%); acid kelp (<5%); eel grass (<5%); coralline algae (5%); shells; detritus; scallop shells
BIFH17	44 15.718	66 20.923	11.0	14:01	4	L-3	A		A		A	A	A	P	A	Brown	50%		Eel grass (25%); sea lettuce (5%); kelp (10%); acid kelp (5%); coralline algae (<5%); encrusting algae (5%); shells; detritus; scallop shells
BIFH18	44 15 671	66 20.938	7.2	14:07	4	L-3	A		A		A	A	A	A	A	Brown	85%		Eel grass (85%); detritus
BIFH19	44 15 619	66 20.958	4.5	14:11	4	L-3	A		A		A	A	A	P	A	Brown	5%		Eel grass (5%); shells; detritus
BRI-REF	44 15 813	66 20.673	24.4	11:33	4	H-5	A		A		A	A	A	P	A	Brown	20%	*Flustra* (<5%)	Coralline algae (15%); mixed Rhodophyta (5%); eel grass (<5%); shells; detritus

Note t is important to clarify that percent coverage of Bacteria, OPC and Other Benthic Observations of Flora are visual estimations of surface coverage.

Benthic Indicators: A or "Absence" represents < 5 % coverage of OPC and / or bacteria and / or where barrenness due to aquaculture is not observed. P or "Presence" represents ≥ 5 % coverage of OPC and / or bacteria and / or where barrenness due

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APPENDIX A
Grab Photos

Pre-siphon

Post-siphon

BI3 (Continued)
Grabs that were not sampled

Pre-siphon

Post-siphon

Pre-siphon

Post-siphon

BI5

Pre-siphon

Post-siphon

Grabs that were not sampled

BI5 (Continued)
Grabs that were not sampled

Pre-siphon

Post-siphon

Pre-siphon

Post-siphon

BRI-REF
Grabs that were not sampled

BRI-REF (Continued)
Grabs that were not sampled

Pre-siphon

Post-siphon

Grabs that were not sampled

BI6 (Continued)
Grabs that were not sampled

BI2

Pre-siphon

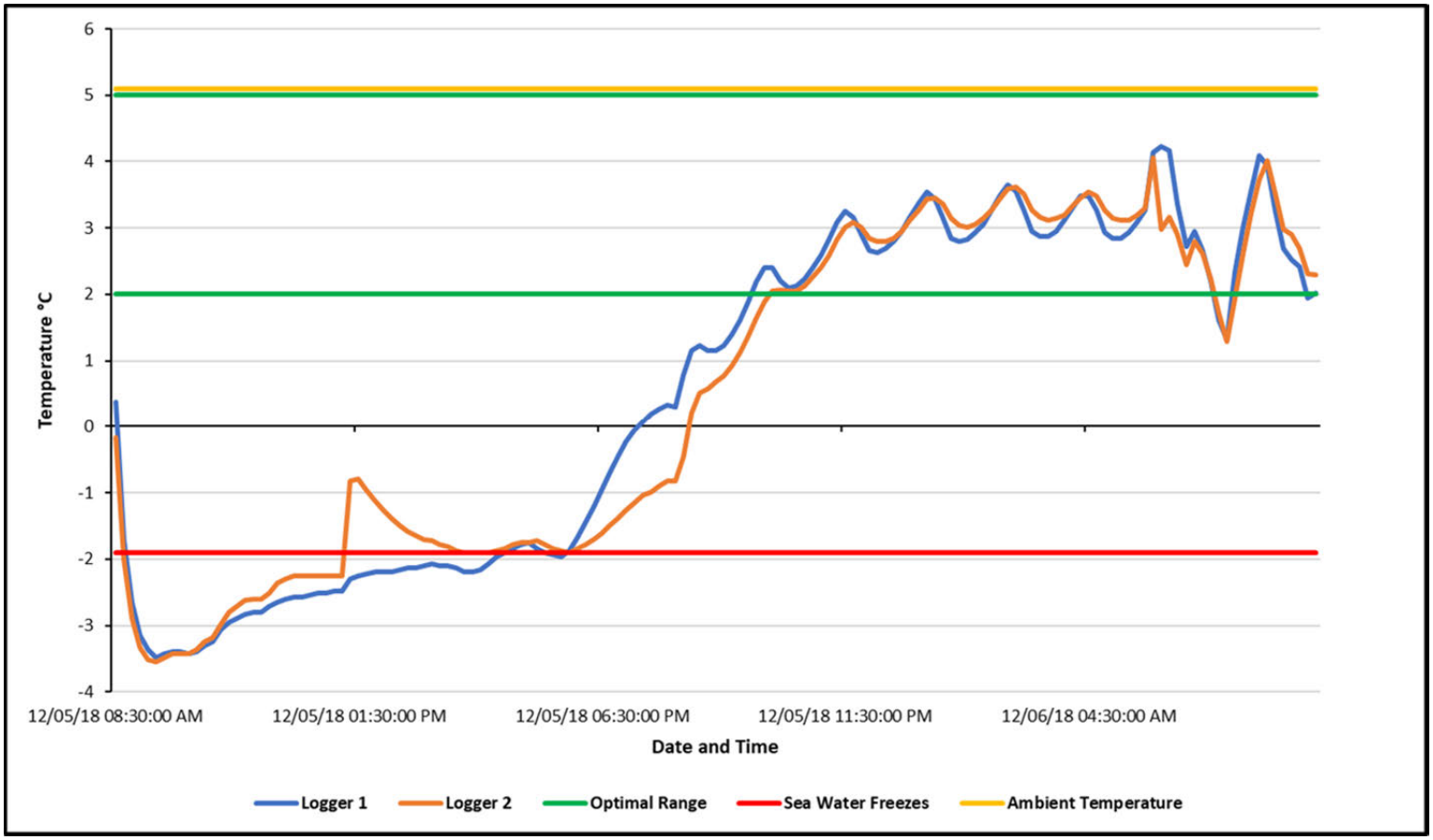
Post-siphon

BI2 (Continued)
Grabs that were not sampled

BRI-REF2
Grabs that were not sampled

BRI-REF2 (Continued)
Grabs that were not sampled

APPENDIX B
Sample Storage Temperatures


6
5
4
3
2
1
0
-1
-2
-3
-4
Temperature °C
12/05/18 08:30:00 AM
12/05/18 01:30:00 PM
12/05/18 06:30:00 PM
12/05/18 11:30:00 PM
12/06/18 04:30:00 AM
Date and Time
Logger 1
Logger 2
Optimal Range
Sea Water Freezes
Ambient Temperature

APPENDIX C
Grab Sample Acceptability Criteria

Station	Grab attempts	Grabs that were subsampled	Grab retrieval speeds (cm/s)	Flap position	Sediment depths (cm)	Reason for rejecting grab	Free-falls
BI3	5	3	53	Down	10	1 - grab leaked 2 - grab leaked 4 - grab leaked 5 - grab leaked	No
BI4	5	1, 2, 5	42, 45, 42	Down	6, 5.5, 11	3 - grab leaked 4 - grab leaked	No
BI5	6	5	46	Down	5.5	1 - < 5 cm depth 2 - < 5 cm depth 3 - grab leaked 4 - grab leaked 6 - grab leaked	No
BI1	5	1, 3, 5	52, 50, 52	Down	5, 7, 5	2 - grab leaked 4 - grab leaked	No
BRI-REF	5	None	N/A	N/A	N/A	1 - grab leaked 2 - grab leaked 3 - grab leaked 4 - grab leaked 5 - grab leaked	No
BI6	6	5	50	Down	8	1 - grab leaked 2 - < 5 cm depth 3 - grab leaked 4 - < 5 cm depth 6 - grab leaked	No
BI2	5	4	55	Down	6	1 - grab leaked 2 - grab leaked 3 - grab leaked 5 - < 5 cm depth	No
BRI-REF2	5	None	N/A	N/A	N/A	1 - grab leaked 2 - grab leaked 3 - < 5 cm depth 4 - < 5 cm depth 5 - < 5 cm depth	No

Station	Grab Attempt					
	Grab 1	Grab 2	Grab 3	Grab 4	Grab 5	Grab 6
BI3	VV	VV	VV	VV	VV	-
BI4	VV	VV	VV	VV	VV	-
BI5	VV	VV	VV	VV	VV	VV
BI1	VV	VV	VV	VV	VV	-
BRI-REF	VV	VV	VV	VV	VV	-
BI6	VV	VV	VV	VV	VV	VV
BI2	VV	VV	VV	VV	VV	-
BRI-REF2	VV	VV	VV	VV	VV	-

PP = Petite Ponar
SP = Standard Ponar
VV = 25 kg Van Veen
Grabs there were subsampled are highlighted in green

APPENDIX D
Redox and Sulphide Data Sheets

NRC-IMB Research Facilities
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Halifax, NS
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(902) 492-0359
Fax: (902) 492-7734

Redox and Sulphide Test Report

Site #: Brier Is. (#0742) Baseline
Redox Start: 8:32am on 6-Dec-18
Sulphide Start: 8:37am on 6-Dec-18
Sample Collection: 5-Dec-18
Redox Stop: 8:55am on 6-Dec-18
Sulphide Stop: 9:07am on 6-Dec-18

Sample I.D.		Temp	Redox	Sulphide		
Station	ID #	°C	mV	unadjusted µM	mV	adjusted µM
BI1	1	10.7	222.2	0.180	-800.7	1.80
	2	7.6	129.3	0.925	-824.2	9.25
	3	8.7	132.5	0.148	-798.7	1.48
BI2	1	3.5	181.5	0.473	-811.1	4.73
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
BI3	1	5.6	37.3	22.1	-866.1	221
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
BI4	1	7.2	119.9	0.410	-811.8	4.10
	2	6.8	143.2	0.153	-799.7	1.53
	3	7.8	129.0	2.17	-834.8	21.7
BI5	1	6.3	145.2	2.19	-834.7	21.9
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
BI6	1	7.5	103.7	8.53	-853.1	85.3
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS

Field Crew: [redacted]

Analysis Crew: [redacted]

Redox Check (mV):
Prior to analy 221.8 mV @ 25°C
Post analysis 221.0 mV @ 25°C

Sulphide Temp: 21.8°C

NS	No Sample
	Redox reading at 2 minutes
	Exceeds calibra ion limit
	Less than Repor ing Limit (RL)

Equipment:

Sulphide Analysis		Redox Analysis	
Probe kit:	NSLAB008	**Meter number:**	487142
Sulphide probe:	2173509	**Redox probe:**	RO10
Temperature probe:	T014	**Temperature probe:**	T007

SAOB + L-AA mixture

Addition: 8:30am **Expiration:** 11:30am

Signed off by:

[redacted]
Senior Laboratory Manager

APPENDIX E
Porosity and Percent Organic Matter Data Sheets

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Date: 9-Dec-18
File No.: SW2018-153
Site Name/#: Brier Is. (#0742) Baseline
Province: Nova Scotia

Station	Sample Number	% Porosity Value	% Organic Matter
BI 1	1	15.0	1.25
BI 1	2	22.0	1.47
BI 1	3	19.4	1.74
BI 2	1	23.9	1.60
BI 2	2	NS	NS
BI 2	3	NS	NS
BI 3	1	34.0	3.10
BI 3	2	NS	NS
BI 3	3	NS	NS
BI 4	1	16.2	0.635
BI 4	2	18.1	0.808
BI 4	3	23.9	1.31
BI 5	1	20.8	1.31
BI 5	2	NS	NS
BI 5	3	NS	NS
BI 6	1	20.3	1.28
BI 6	2	NS	NS
BI 6	3	NS	NS

NS No Sample

Signed off by:

[redacted]
[redacted].
Senior Laboratory Manager

APPENDIX F
Sediment Grain-size Analysis

NRC-IMB Research Facilities
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Suite 367-368
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Tel: (902) 492-7865
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Date: 27-Nov-18
File No.: SW2018-153
Site Name/#: Hartz Point (#1192)
Province: Nova Scotia

Grain Size Analysis

			% Fraction			
		mm	BI 1-1	BI 1-2	BI 1-3	BI 1 Average
Gravel	Pebble	>4	71.45	9.26	50.63	43.78
	Granule	2-4	11.10	12.15	16.02	13.09
Sand	Very Coarse	1-2	3.39	10.77	6.74	6.97
	Coarse	0.5-1	2.98	16.10	5.07	8.05
	Medium	0.25-0.5	6.09	33.91	8.29	16.10
	Fine	0.125-0.25	2.96	13.25	3.86	6.69
	Very Fine	0.063-0.125	0.77	2.14	0.95	1.29
Mud	Silt	0.040 - 0.063	0.33	0.66	0.36	0.45
	Clay	0.004 - 0.040	0.93	1.77	0.88	1.19
% Gravel			82.55	21.41	66.65	56.87
% Sand			16.19	76.16	24.90	39.09
% Mud			1.26	2.43	1.24	1.64

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Grain Size Analysis

			% Fraction			
		mm	BI 2-1	BI 2-2	BI 2-3	BI 2 Average
Gravel	Pebble	>4	71.45	N/S	N/S	71.45
	Granule	2-4	11.10	N/S	N/S	11.10
Sand	Very Coarse	1-2	3.39	N/S	N/S	3.39
	Coarse	0.5-1	2.98	N/S	N/S	2.98
	Medium	0.25-0.5	6.09	N/S	N/S	6.09
	Fine	0.125-0.25	2.96	N/S	N/S	2.96
	Very Fine	0.063-0.125	0.77	N/S	N/S	0.77
Mud	Silt	0.040 - 0.063	0.33	N/S	N/S	0.33
	Clay	0.004 - 0.040	0.93	N/S	N/S	0.93
% Gravel			82.55	N/S	N/S	82.55
% Sand			16.19	N/S	N/S	16.19
% Mud			1.26	N/S	N/S	1.26

Note: One acceptable replicate analyzed at station BI 2 due to grab sampling criteria
N/S = No Sample

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Grain Size Analysis

			% Fraction			
		mm	BI 3-1	BI 3-2	BI 3-3	BI 3 Average
Gravel	Pebble	>4	8.82	N/S	N/S	8.82
	Granule	2-4	1.37	N/S	N/S	1.37
Sand	Very Coarse	1-2	0.86	N/S	N/S	0.86
	Coarse	0.5-1	3.01	N/S	N/S	3.01
	Medium	0.25-0.5	14.87	N/S	N/S	14.87
	Fine	0.125-0.25	36.76	N/S	N/S	36.76
	Very Fine	0.063-0.125	19.04	N/S	N/S	19.04
Mud	Silt	0.040 - 0.063	6.72	N/S	N/S	6.72
	Clay	0.004 - 0.040	8.55	N/S	N/S	8.55
% Gravel			10.20	N/S	N/S	10.20
% Sand			74.54	N/S	N/S	74.54
% Mud			15.26	N/S	N/S	15.26

Note: One acceptable replicate analyzed at station BI 3 due to grab sampling criteria
N/S = No Sample

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Grain Size Analysis

			% Fraction			
		mm	BI 4-1	BI 4-2	BI 4-3	BI 4 Average
Gravel	Pebble	>4	15.97	12.02	2.46	10.15
	Granule	2-4	7.98	6.23	3.79	6.00
Sand	Very Coarse	1-2	8.68	5.77	5.11	6.52
	Coarse	0.5-1	15.71	13.22	11.93	13.62
	Medium	0.25-0.5	40.02	45.02	42.42	42.49
	Fine	0.125-0.25	10.40	15.54	25.97	17.30
	Very Fine	0.063-0.125	0.41	0.94	3.83	1.73
Mud	Silt	0.040 - 0.063	0.02	0.29	2.19	0.83
	Clay	0.004 - 0.040	0.80	0.97	2.30	1.36
% Gravel			23.95	18.24	6.25	16.15
% Sand			75.23	80.49	89.26	81.66
% Mud			0.82	1.26	4.49	2.19

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Grain Size Analysis

			% Fraction			
		mm	BI 5-1	BI 5-2	BI 5-3	BI 5 Average
Gravel	Pebble	>4	4.03	N/S	N/S	4.03
	Granule	2-4	1.46	N/S	N/S	1.46
Sand	Very Coarse	1-2	2.65	N/S	N/S	2.65
	Coarse	0.5-1	6.80	N/S	N/S	6.80
	Medium	0.25-0.5	32.15	N/S	N/S	32.15
	Fine	0.125-0.25	30.57	N/S	N/S	30.57
	Very Fine	0.063-0.125	13.96	N/S	N/S	13.96
Mud	Silt	0.040 - 0.063	4.60	N/S	N/S	4.60
	Clay	0.004 - 0.040	3.78	N/S	N/S	3.78
% Gravel			5.49	N/S	N/S	5.49
% Sand			86.13	N/S	N/S	86.13
% Mud			8.37	N/S	N/S	8.37

Note: One acceptable replicate analyzed at station BI 5 due to grab sampling criteria
N/S = No Sample

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Grain Size Analysis

			% Fraction			
		mm	**BI 6-1**	**BI 6-2**	**BI 6-3**	**BI 6 Average**
Gravel	Pebble	>4	8.82	N/S	N/S	8.82
	Granule	2-4	1.37	N/S	N/S	1.37
Sand	Very Coarse	1-2	0.86	N/S	N/S	0.86
	Coarse	0.5-1	3.01	N/S	N/S	3.01
	Medium	0.25-0.5	14.87	N/S	N/S	14.87
	Fine	0.125-0.25	36.76	N/S	N/S	36.76
	Very Fine	0.063-0.125	19.04	N/S	N/S	19.04
Mud	Silt	0.040 - 0.063	6.72	N/S	N/S	6.72
	Clay	0.004 - 0.040	8.55	N/S	N/S	8.55
% Gravel			10.20	N/S	N/S	10.20
% Sand			74.54	N/S	N/S	74.54
% Mud			15.26	N/S	N/S	15.26

Note: One acceptable replicate analyzed at station BI 6 due to grab sampling criteria
N/S = No Sample

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Grain Size Analysis

			% Fraction			
		mm	BRI-REF 1	BRI-REF 2	BRI-REF 3	BRI-REF Average
Gravel	Pebble	>4	N/S	N/S	N/S	N/S
	Granule	2-4	N/S	N/S	N/S	N/S
Sand	Very Coarse	1-2	N/S	N/S	N/S	N/S
	Coarse	0.5-1	N/S	N/S	N/S	N/S
	Medium	0.25-0.5	N/S	N/S	N/S	N/S
	Fine	0.125-0.25	N/S	N/S	N/S	N/S
	Very Fine	0.063-0.125	N/S	N/S	N/S	N/S
Mud	Silt	0.040 - 0.063	N/S	N/S	N/S	N/S
	Clay	0.004 - 0.040	N/S	N/S	N/S	N/S
% Gravel			N/S	N/S	N/S	N/S
% Sand			N/S	N/S	N/S	N/S
% Mud			N/S	N/S	N/S	N/S

Note: Samples were absent from station BRI-REF due to grab sampling criteria
N/S = No Sample

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Grain Size Analysis

			% Fraction			
		mm	BRI-REF2 1	BRI-REF2 2	BRI-REF2 3	BRI-REF2 Average
Gravel	Pebble	>4	N/S	N/S	N/S	N/S
	Granule	2-4	N/S	N/S	N/S	N/S
Sand	Very Coarse	1-2	N/S	N/S	N/S	N/S
	Coarse	0.5-1	N/S	N/S	N/S	N/S
	Medium	0.25-0.5	N/S	N/S	N/S	N/S
	Fine	0.125-0.25	N/S	N/S	N/S	N/S
	Very Fine	0.063-0.125	N/S	N/S	N/S	N/S
Mud	Silt	0.040 - 0.063	N/S	N/S	N/S	N/S
	Clay	0.004 - 0.040	N/S	N/S	N/S	N/S
% Gravel			N/S	N/S	N/S	N/S
% Sand			N/S	N/S	N/S	N/S
% Mud			N/S	N/S	N/S	N/S

Note: Samples were absent from station BRI-REF due to grab sampling criteria
N/S = No Sample

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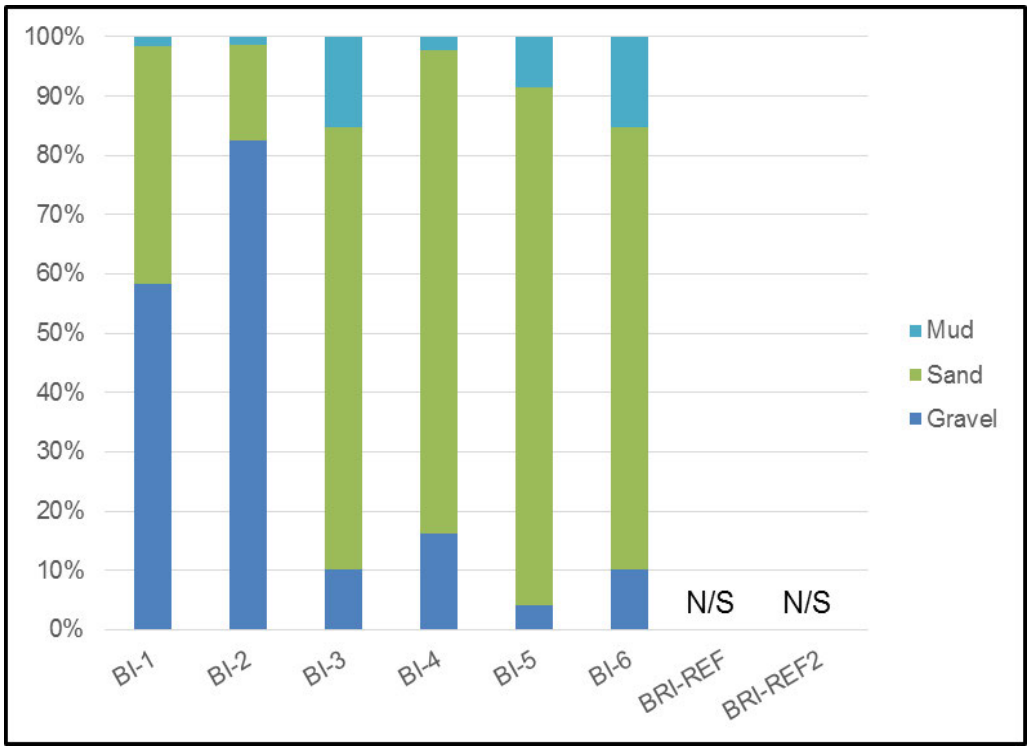
Figure 1: Grain Size Distribution



Signed off by:

[redacted]

[redacted]

Senior Laboratory Manager

APPENDIX G
Sulphide Probe Calibration Certificates

Calibration Report

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Suite 367-368
Halifax, NS
B3H 3Z1
Tel: (902) 492-7865
(902) 492-0359
Fax: (902) 492-7734

Date: 6-Dec-18
Meter: 2173509
Sulfide Probe ID: SS1-15402

Project: SW2018-153 Brier Is. (#0742) Baseline

5-point calibration using 100, 500, 1000, 5 000 and 10 000 µM sulphide standards.

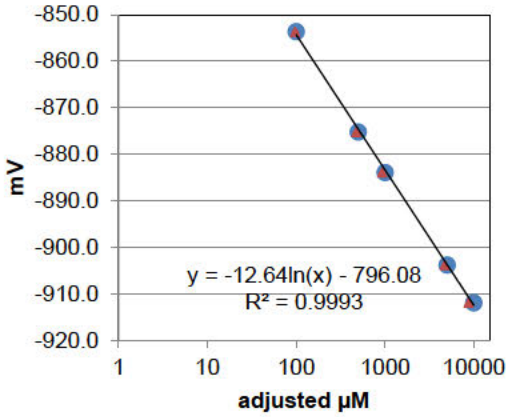
Date calibration performed: 6-Dec-18
Time calibration completed: 8:30am **Expiration time:** 11:30pm
Calibration performed by: [redacted]

Calibration Temperture: 21.8°C

Calibration -

After calibration the standards were re-measured to verify calibration.

10 µM (really 100 µM)	set at	-853.6 mV	read at	9.71 µM at	-853.3 mV
50 µM (really 500 µM)	set at	-875.2 mV	read at	47.5 µM at	-875.4 mV
100 µM (really 1000 µM)	set at	-883.9 mV	read at	93 µM at	-882.9 mV
500 µM (really 5 000 µM)	set at	-903.8 mV	read at	470 µM at	-902.8 mV
1 000 µM (really 10 000 µM)	set at	-911.9 mV	read at	875 µM at	-910.2 mV



Final slope (meter) = -30.9 mV

10 fold slope (validation)

500 to 5 000 µM: -28.6 mV
1000 to 10 000 µM: -28.0 mV

Calibration meets final slope range of -27 to -33 mV and 10-fold slope of -25 to -30 mV.

Signed off by:

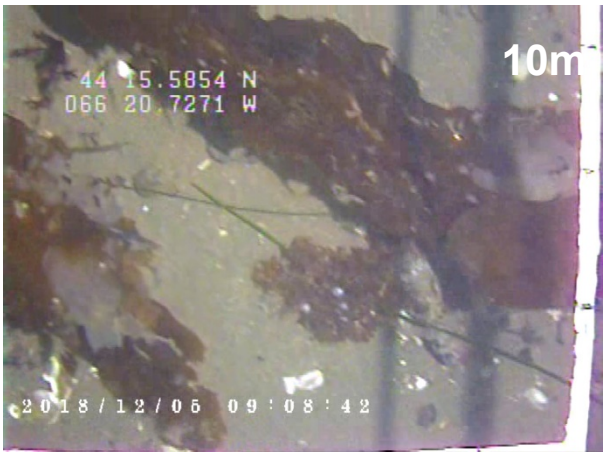
[redacted]

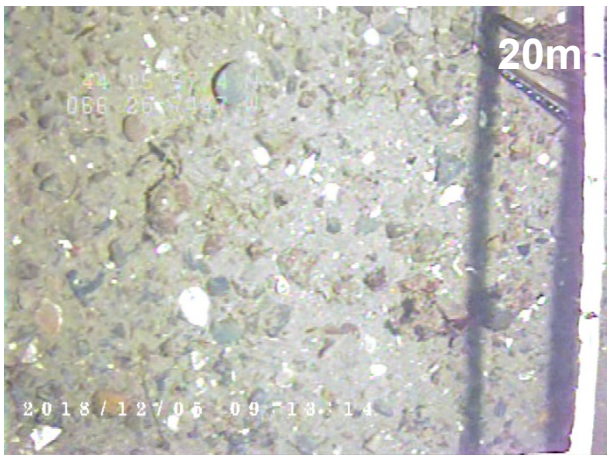
[redacted]
Senior Laboratory Manager

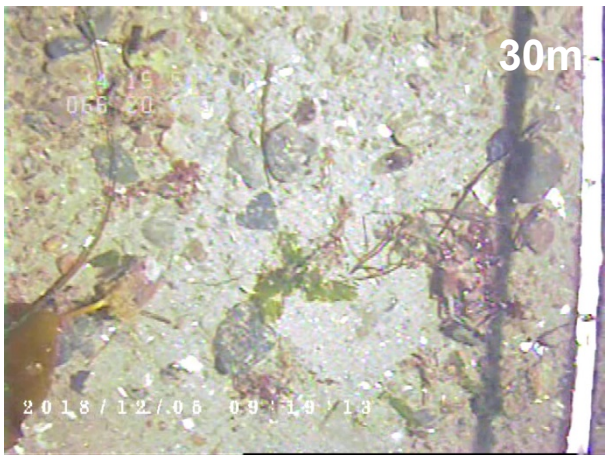
APPENDIX H
Baseline Survey Screen Captures of the Seafloor

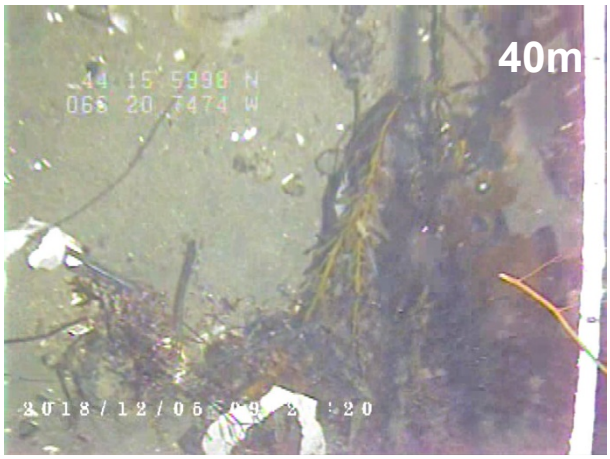
H1 - BI3

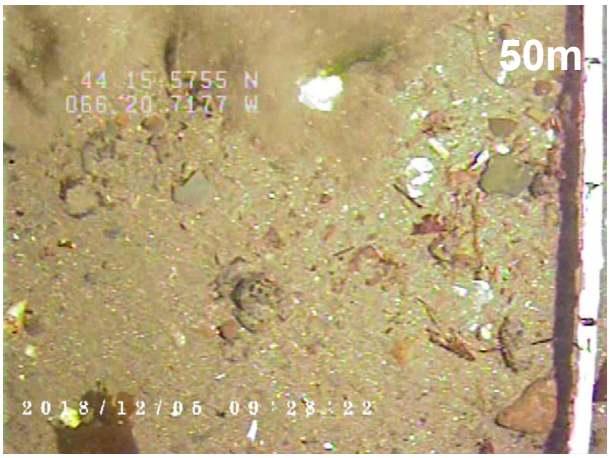

0m
2018/12/05 08:39:25


10m
44 15.5854 N
066 20.7271 W
2018/12/05 09:08:42


20m
2018/12/05 09:13:14

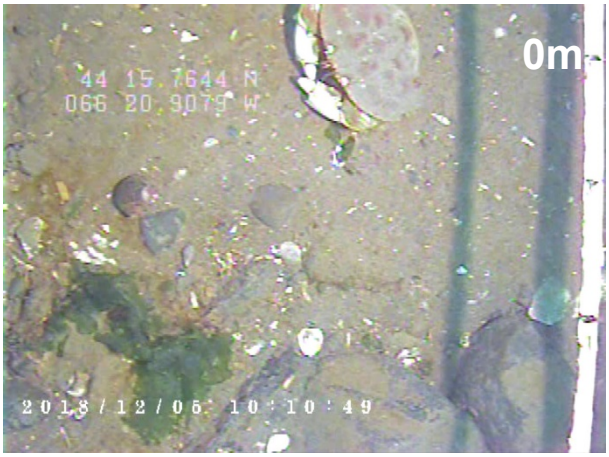

30m
2018/12/05 09:19:13

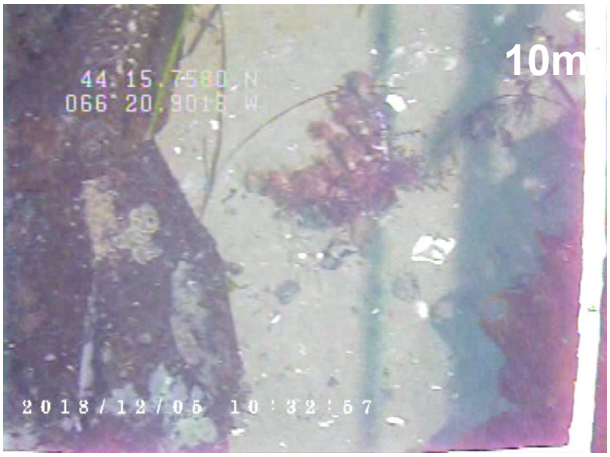

40m
2018/12/05 09:21:20

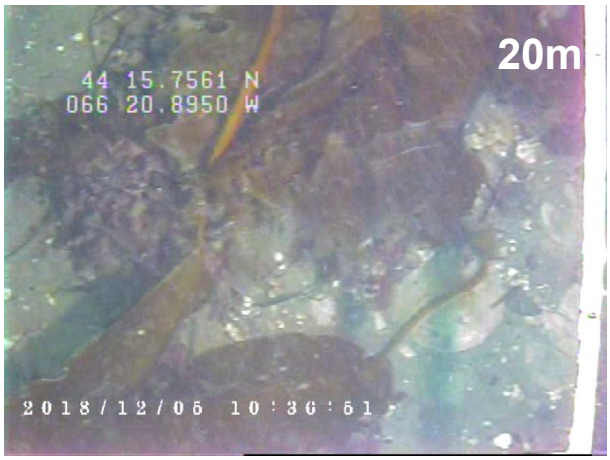

50m
44 15.5755 N
066 20.7177 W
2018/12/05 09:23:22

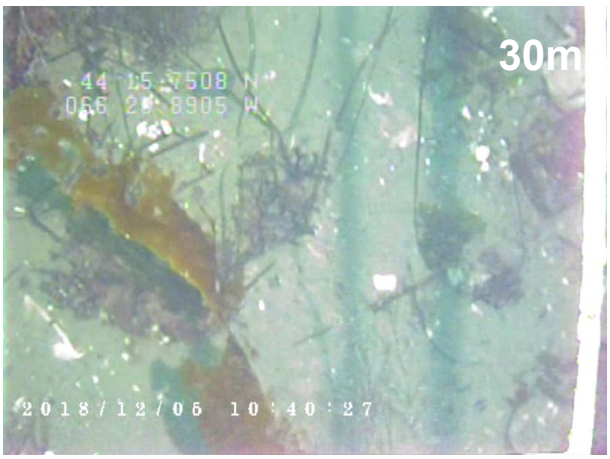
H2 - BI4

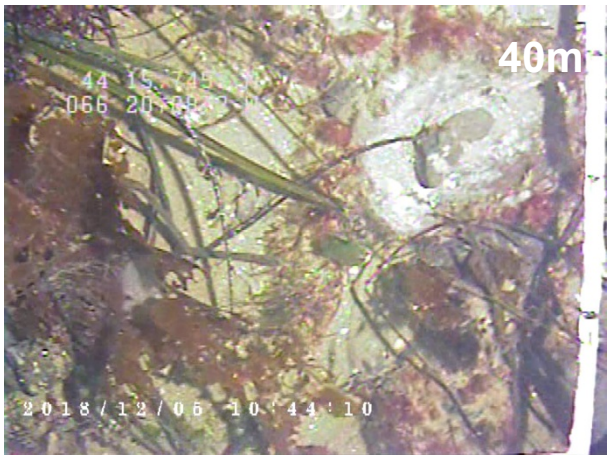
H3 - BI5

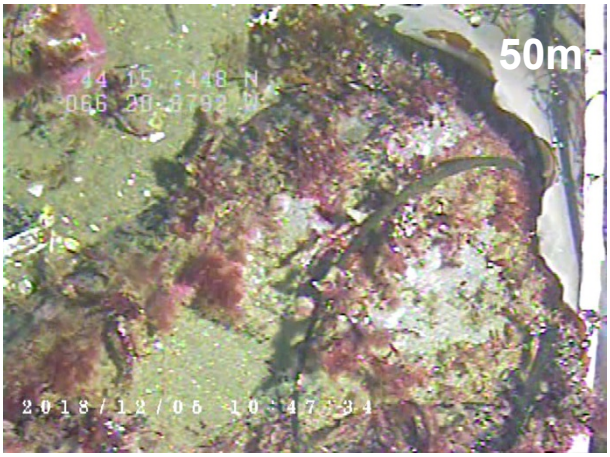

0m
44 15.7644 N
066 20.9079 W
2018/12/06 10:10:49


10m
44 15.7580 N
066 20.9018 W
2018/12/06 10:32:57

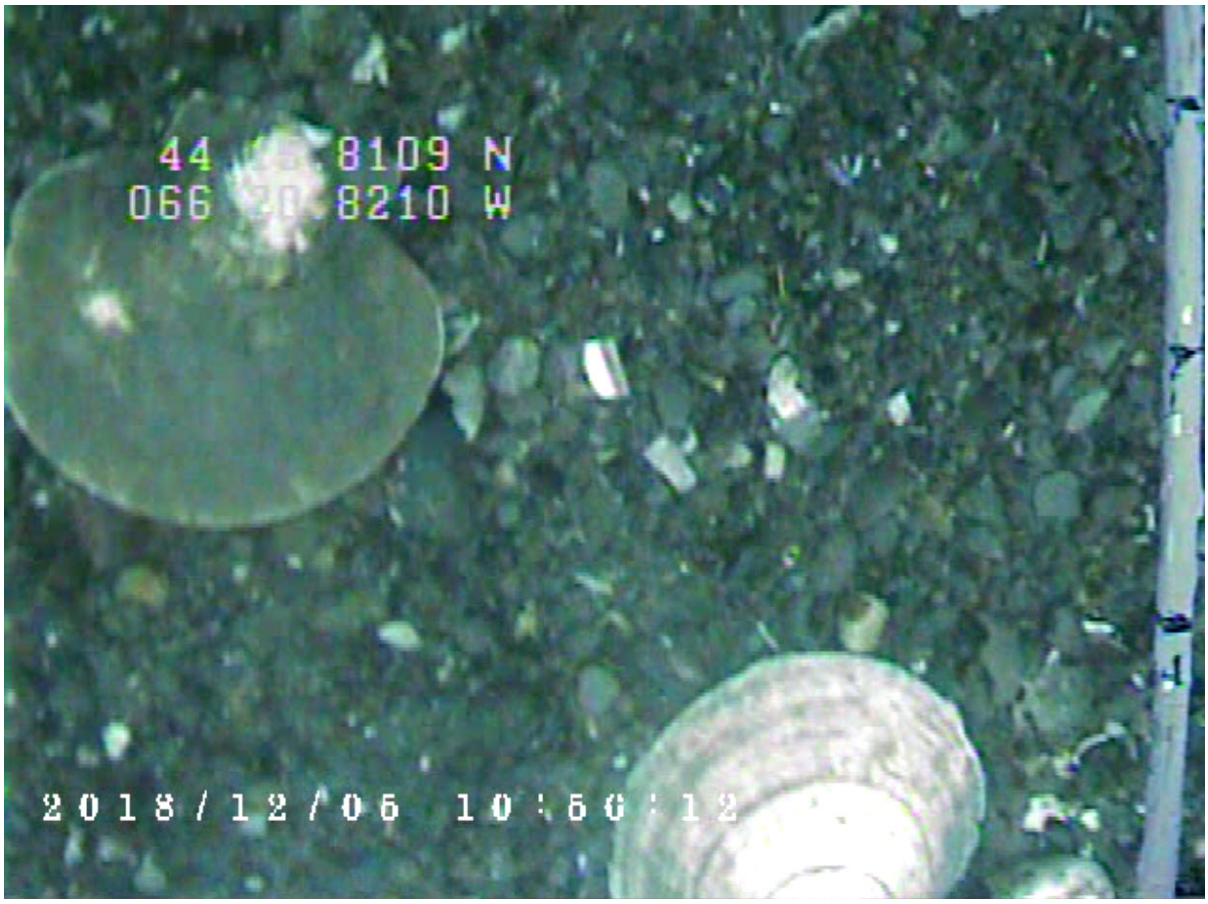

20m
44 15.7561 N
066 20.8950 W
2018/12/06 10:36:51


30m
44 15.7508 N
066 20.8905 W
2018/12/06 10:40:27


40m
2018/12/06 10:44:10

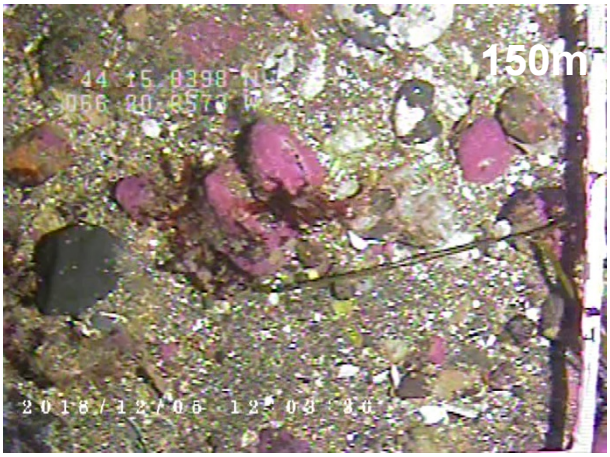

50m
2018/12/06 10:47:34

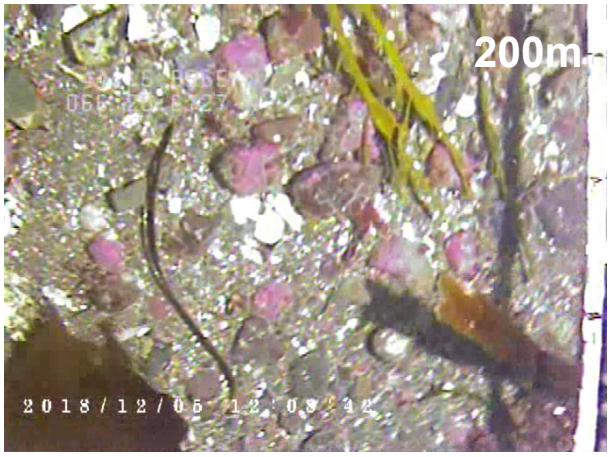
H4 - BI1

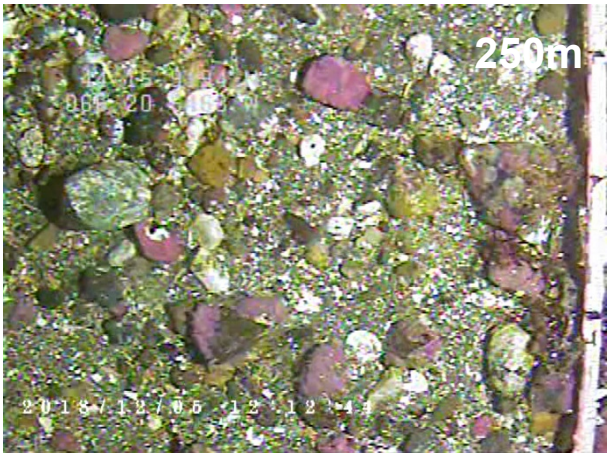


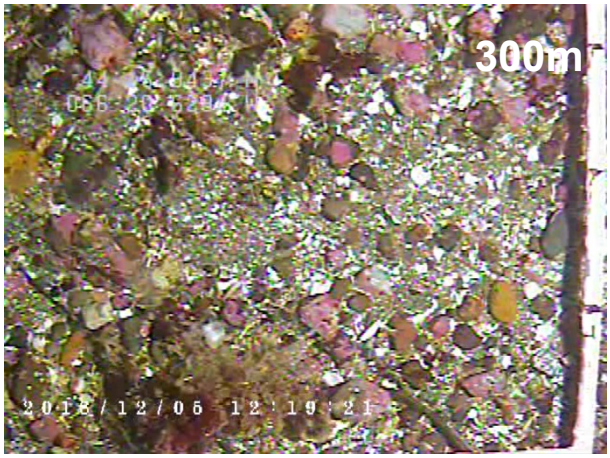
H5 - BRI-REF


100m
44 15.8401 N
066 20.6128 W
2018/12/05 11:36:52

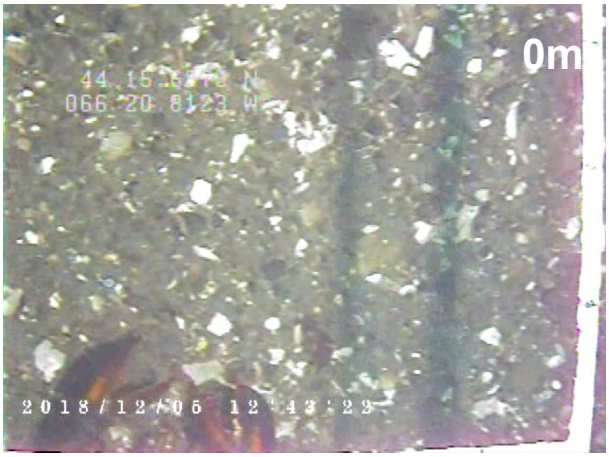

150m
2018/12/05 12:03:36

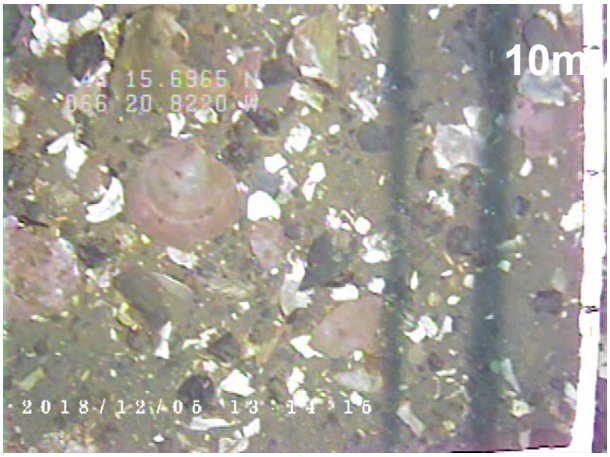

200m
2018/12/05 12:08:42

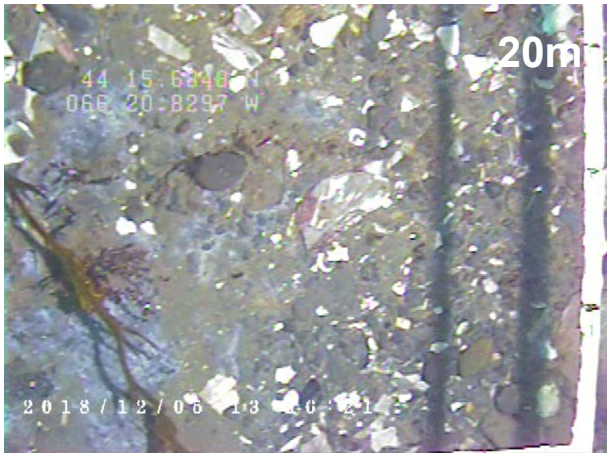

250m
2018/12/05 12:12:44

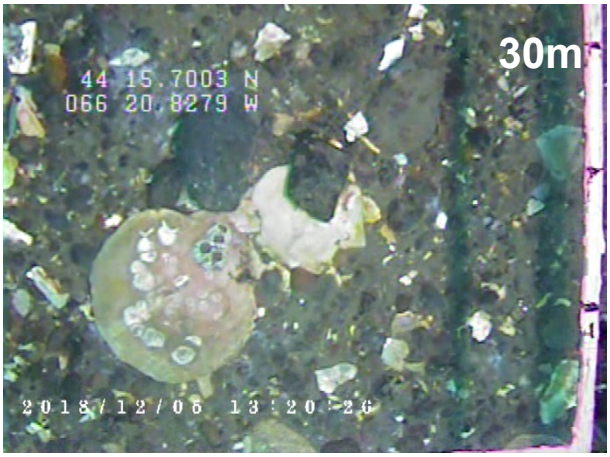

300m
2018/12/05 12:19:21

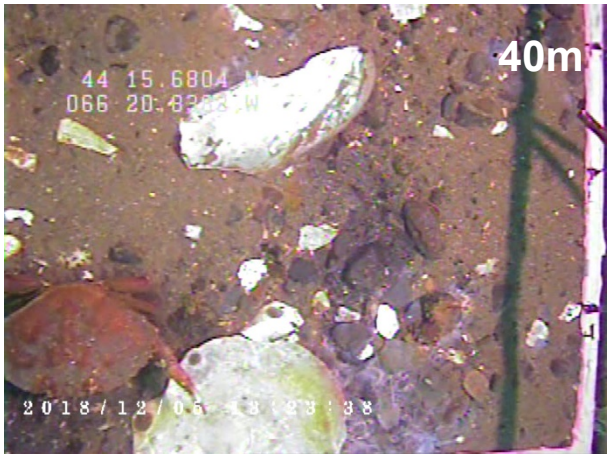
H6 - BI6

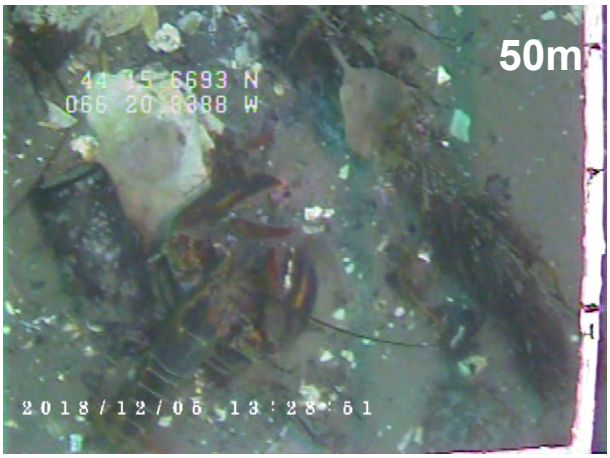

0m
066 20.8123 W
2018/12/05 12:43:23


10m
066 20.8220 W
2018/12/05 13:14:16

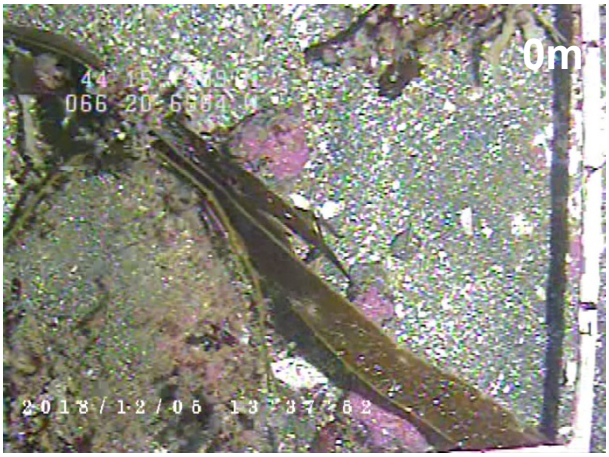

20m
066 20.8297 W

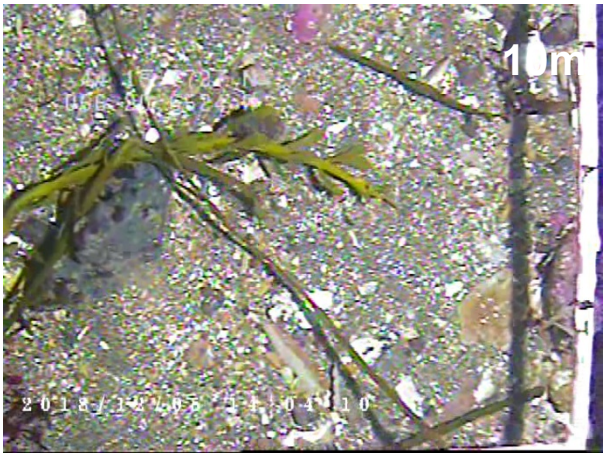

30m
44 15.7003 N
066 20.8279 W
2018/12/05 13:20:26

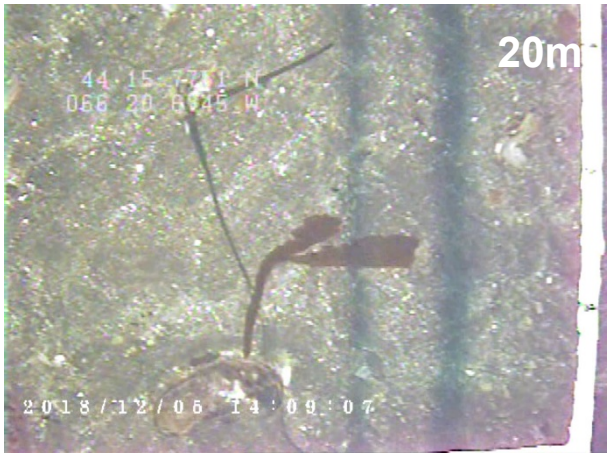

40m
44 15.6804 N

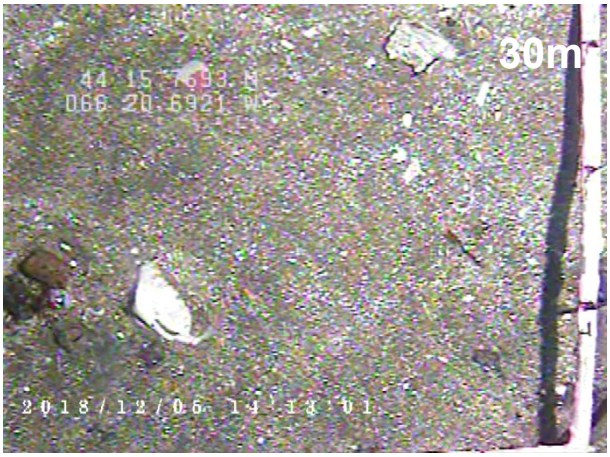

50m
44 15.6693 N
066 20.8388 W
2018/12/05 13:28:51

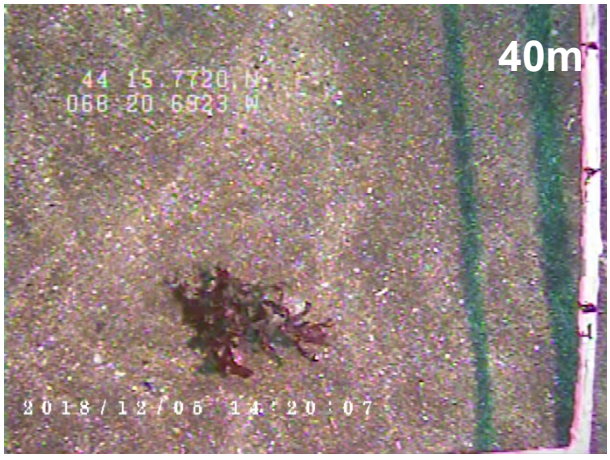
H7 - BI2

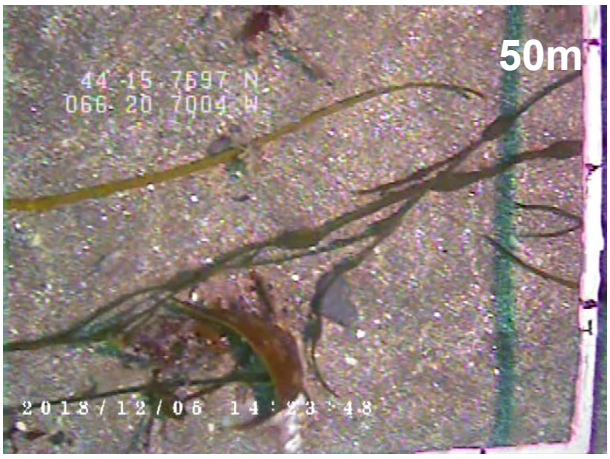

0m
2018/12/06 13:37:26


10m

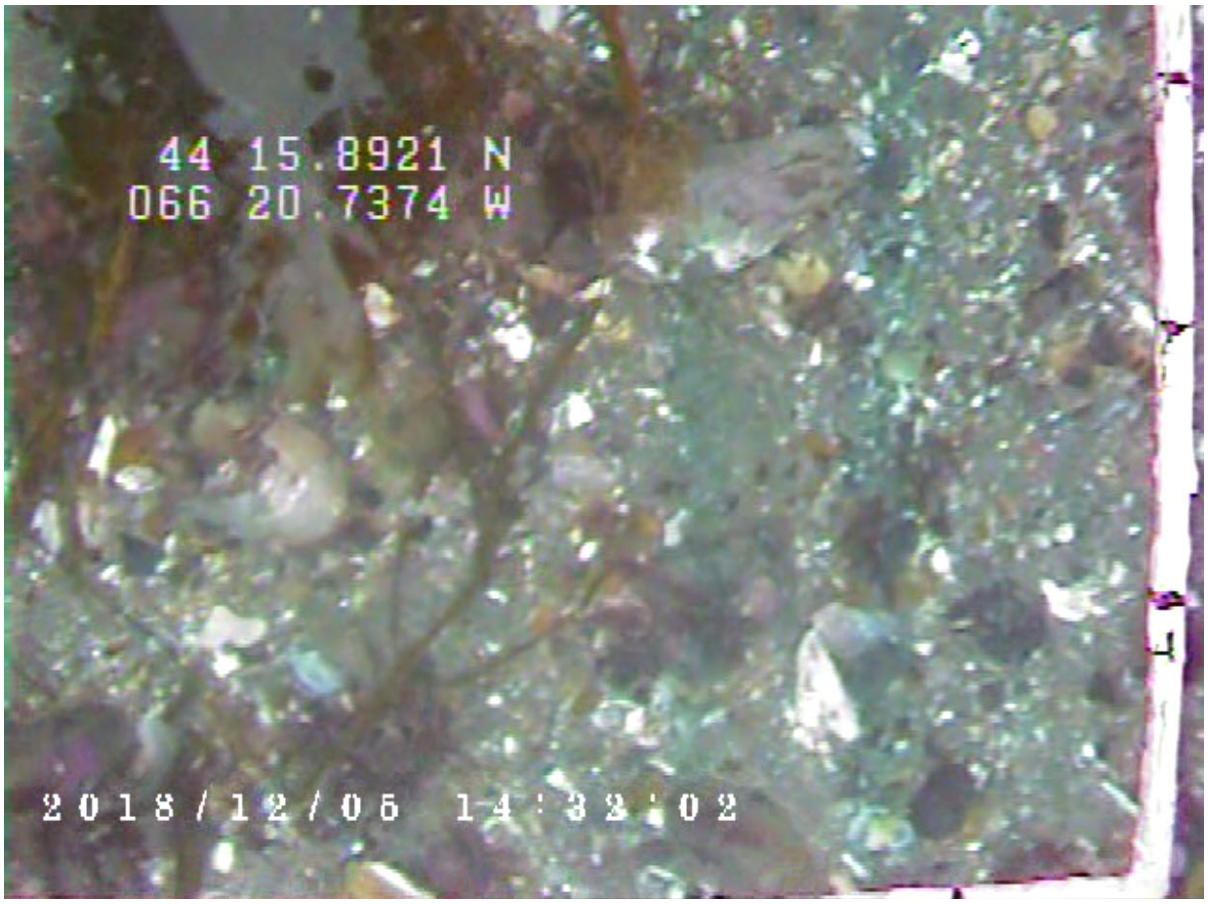

20m
2018/12/06 14:09:07


30m
2018/12/06 14:13:01

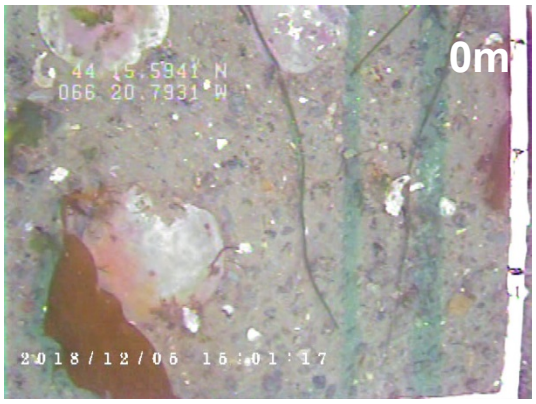

40m
2018/12/06 14:20:07

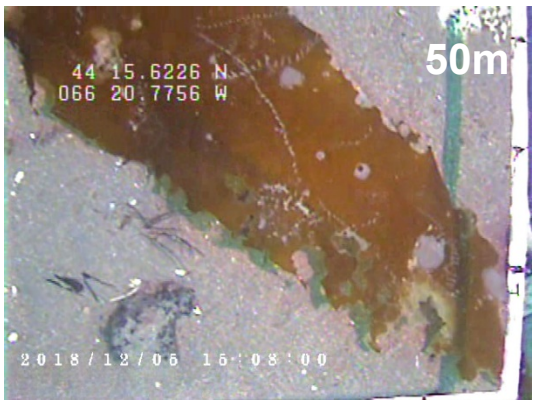

50m
2018/12/06 14:23:48

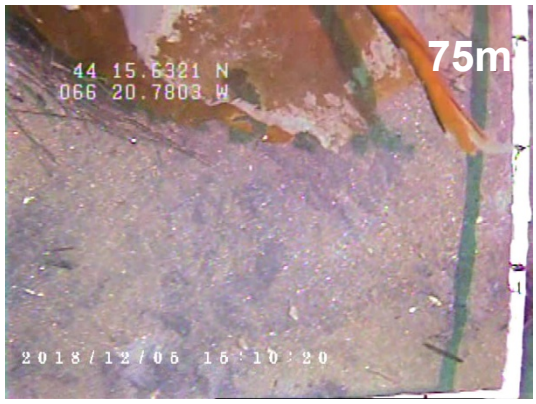
H8 - BRI-REF2

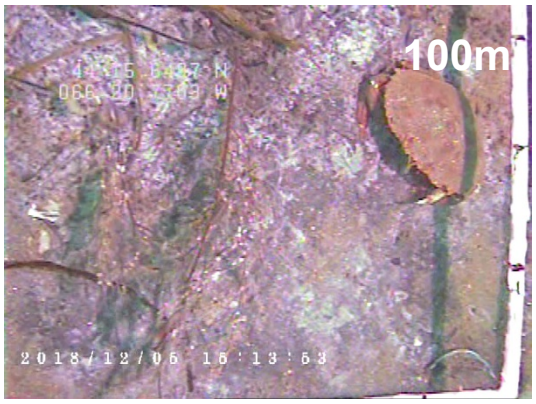


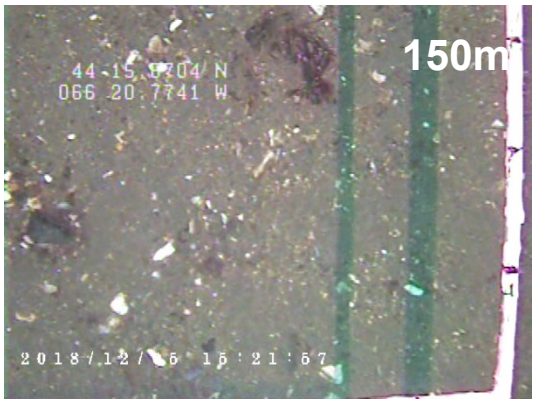
H9 - Baseline Transect







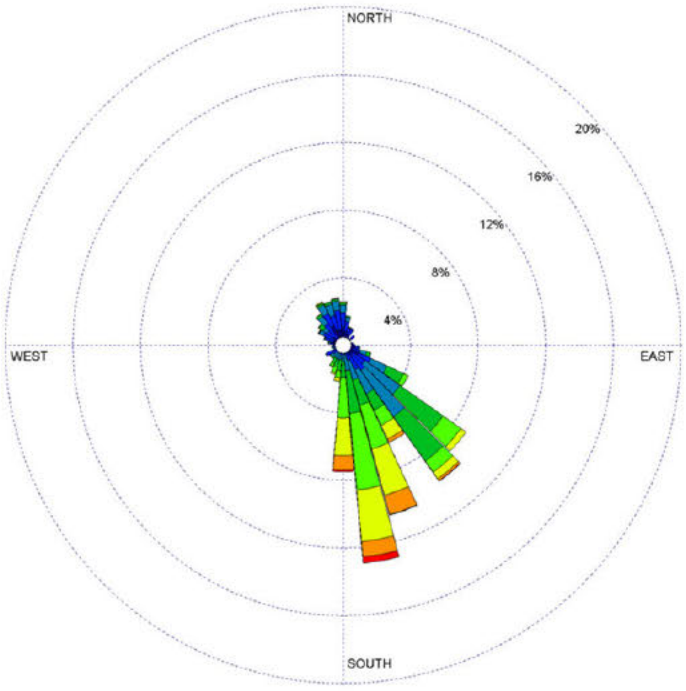




APPENDIX I
ADCP Data

CURRENT ROSE PLOT:

Site #0742, Brier Island, NS
Current Speed and Direction - 3m Above Bottom



CURRENT SPEED (cm/s)

- >= 56.0
- 49.0 - 56.0
- 42.0 - 49.0
- 35.0 - 42.0
- 28.0 - 35.0
- 21.0 - 28.0
- 14.0 - 21.0
- 7.0 - 14.0
- 0.0 - 7.0

COMMENTS:

DATA PERIOD:

Start Date: 2017-10-24
End Date: 2017-11-24

PROFILE COUNT:

2958

AVG. CURRENT SPEED:

26.29 cm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

[redacted]

DATE:

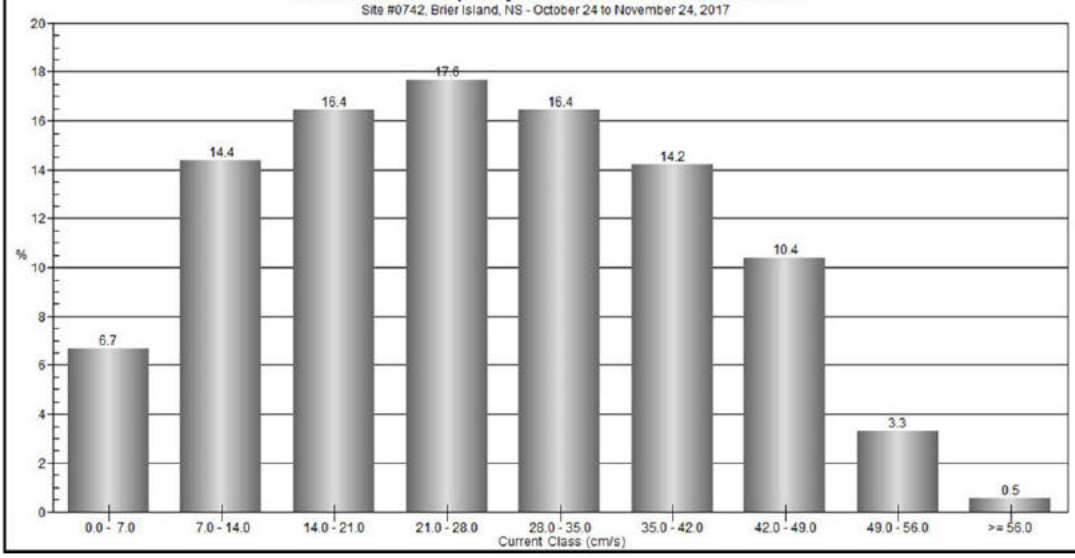
2017-12-05

PROJECT NO.:

SW2016-058

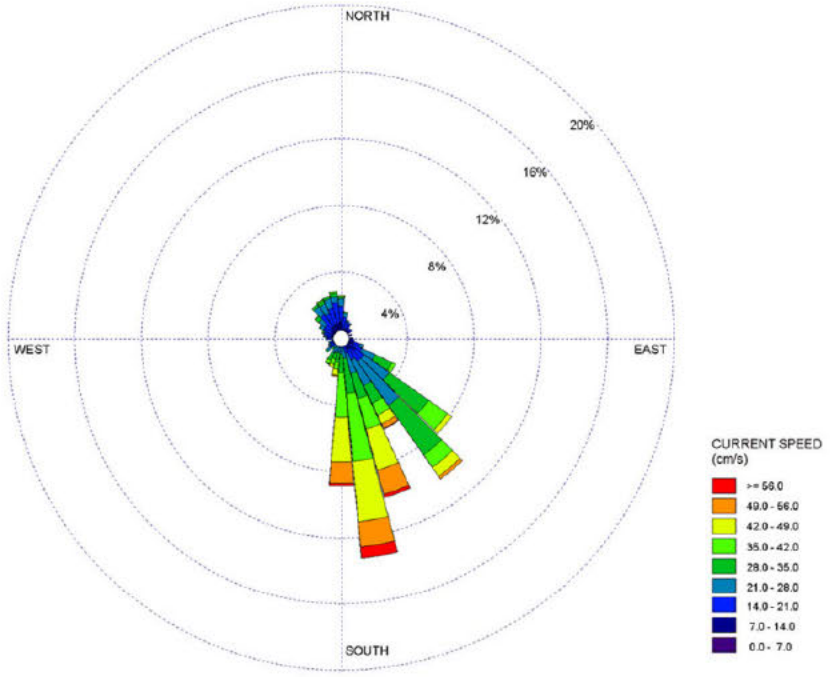
Current Class Frequency Distribution - 3m Above Bottom

Site #0742, Brier Island, NS - October 24 to November 24, 2017



CURRENT ROSE PLOT:

Site #0742, Brier Island, NS
Current Speed and Direction - 4m Above Bottom



COMMENTS:

DATA PERIOD:
Start Date: 2017-10-24
End Date: 2017-11-24

PROFILE COUNT:
2958

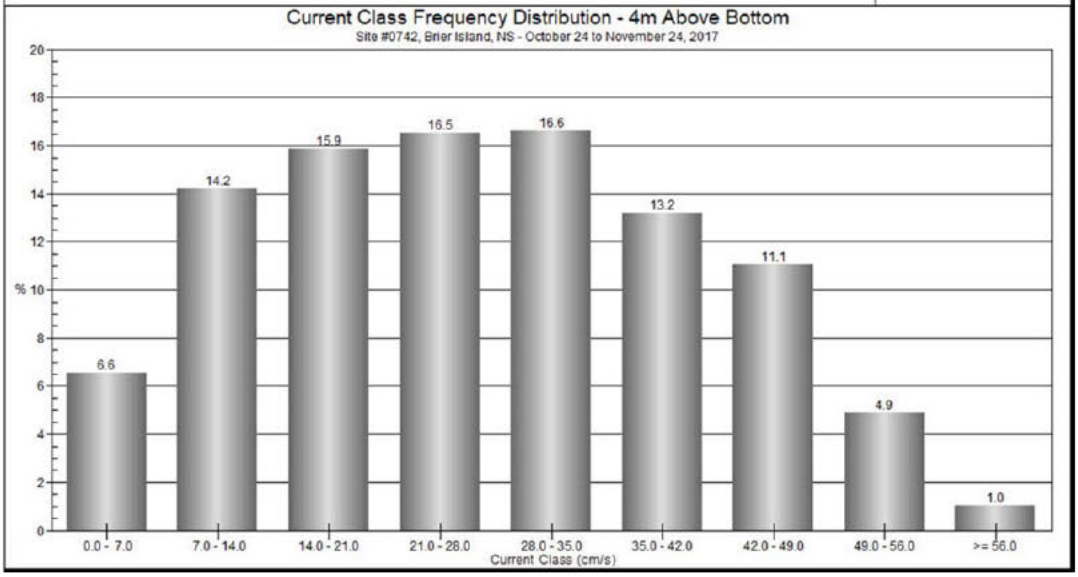
AVG. CURRENT SPEED:
27.05 cm/s

COMPANY NAME:
Sweeney International Marine Corp.

MODELER:
[redacted]

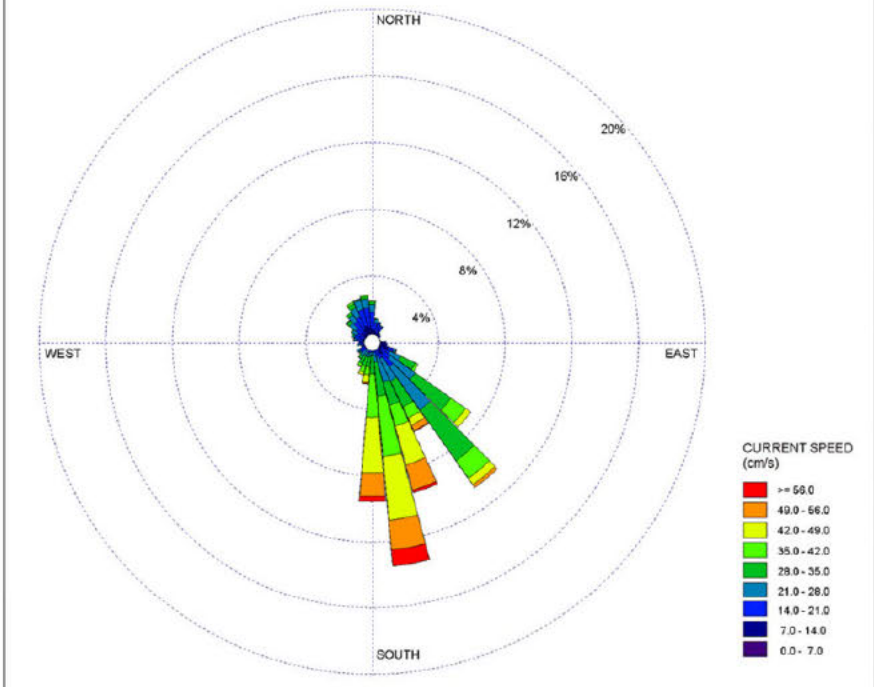
DATE:
2017-12-05

PROJECT NO.:
SW2016-058



CURRENT ROSE PLOT:

Site #0742, Brier Island, NS
Current Speed and Direction - 5m Above Bottom



COMMENTS:

DATA PERIOD:
Start Date: 2017-10-24
End Date: 2017-11-24

PROFILE COUNT:
2958

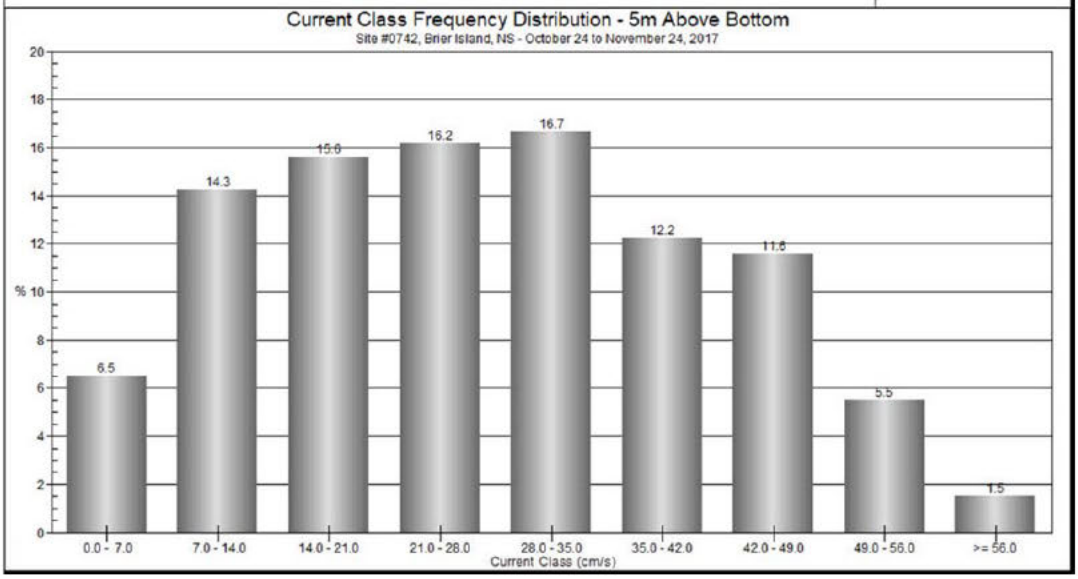
AVG. CURRENT SPEED:
27.43 cm/s

COMPANY NAME:
Sweeney International Marine Corp.

MODELER:
[redacted]

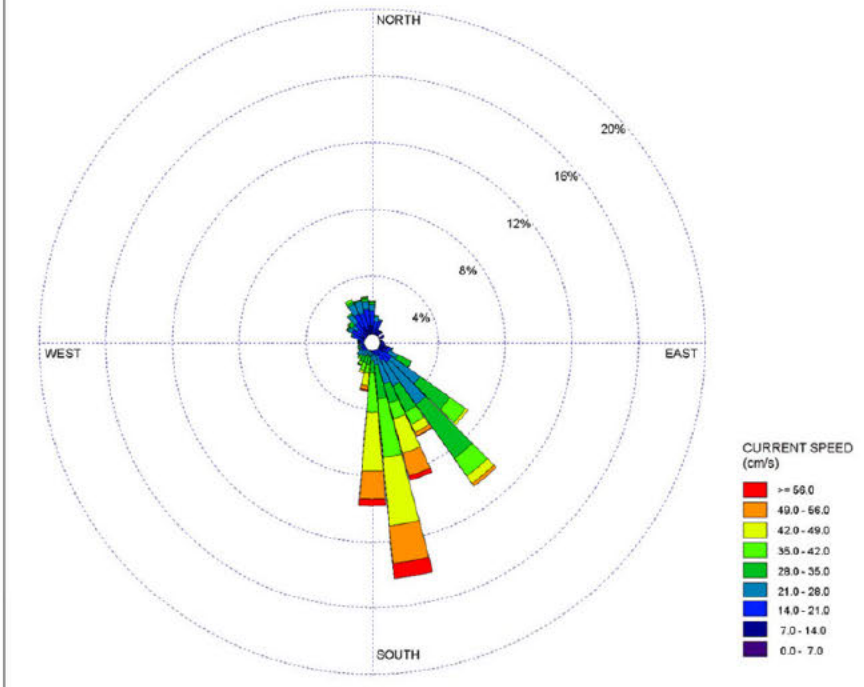
DATE:
2017-12-05

PROJECT NO.:
SW2016-058



CURRENT ROSE PLOT:

Site #0742, Brier Island, NS
Current Speed and Direction - 6m Above Bottom



COMMENTS:

DATA PERIOD:
Start Date: 2017-10-24
End Date: 2017-11-24

PROFILE COUNT:
2958

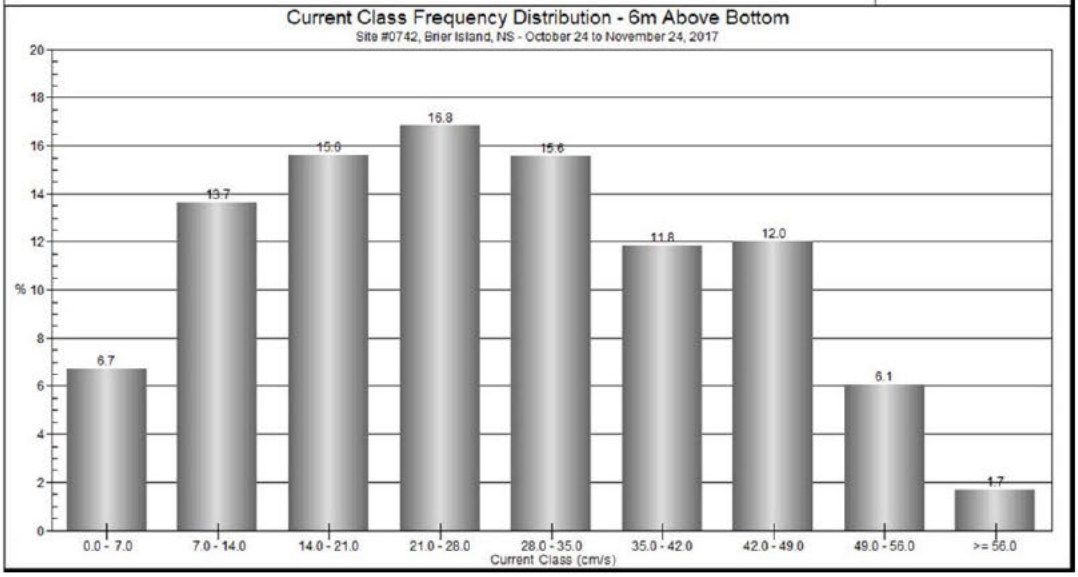
AVG. CURRENT SPEED:
27.65 cm/s

COMPANY NAME:
Sweeney International Marine Corp.

MODELER:
[redacted]

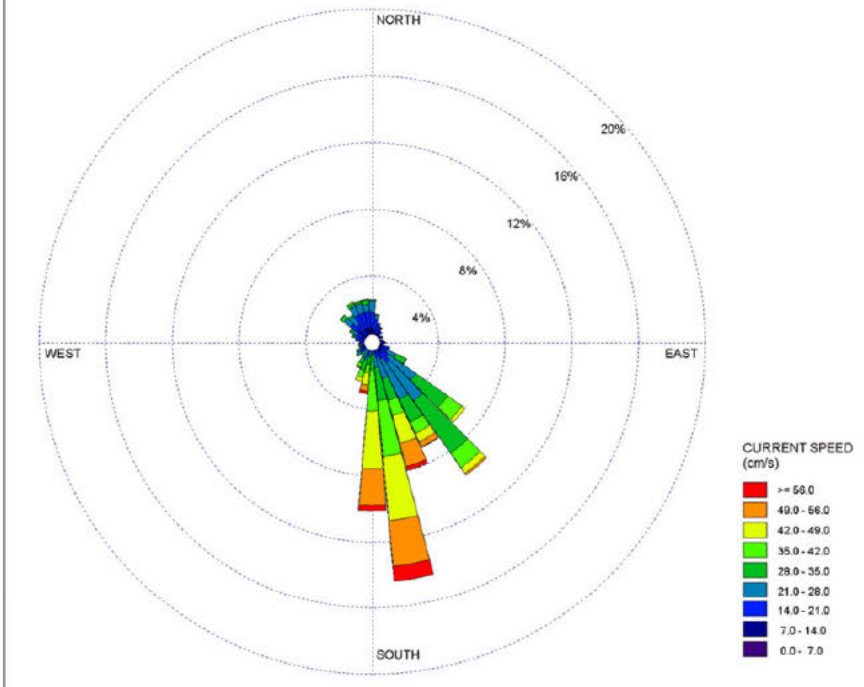
DATE:
2017-12-05

PROJECT NO.:
SW2016-058



CURRENT ROSE PLOT:

Site #0742, Brier Island, NS
Current Speed and Direction - 7m Above Bottom



COMMENTS:

DATA PERIOD:
Start Date: 2017-10-24
End Date: 2017-11-24

PROFILE COUNT:
2958

AVG. CURRENT SPEED:
27.72 cm/s

COMPANY NAME:
Sweeney International Marine Corp.

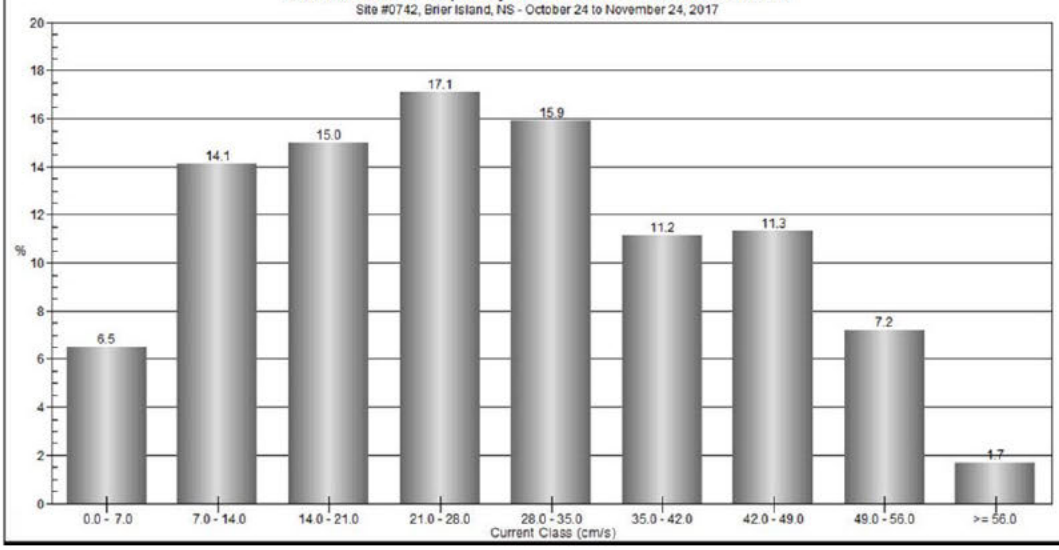
MODELER:
[redacted]

DATE:
2017-12-05

PROJECT NO.:
SW2016-058

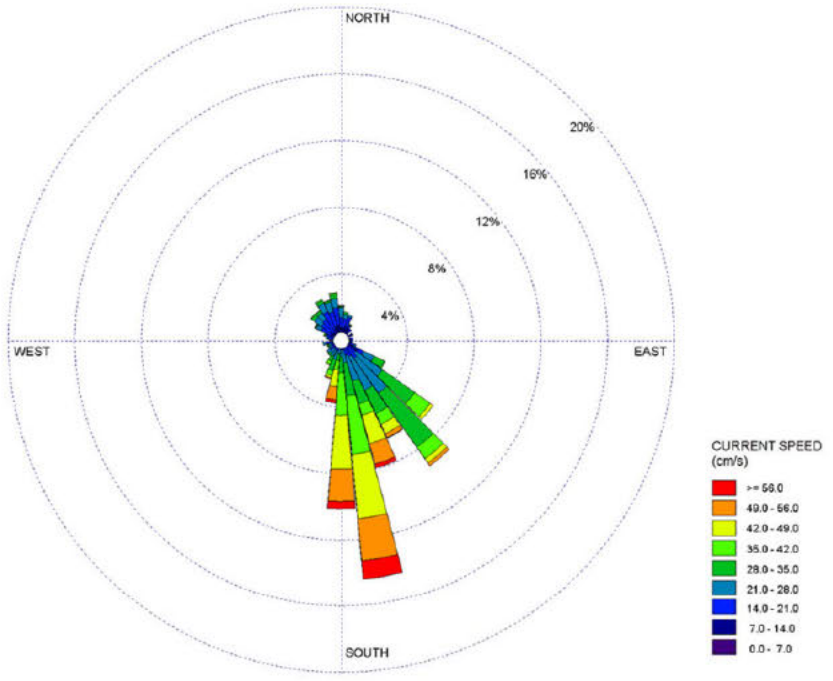
Current Class Frequency Distribution - 7m Above Bottom

Site #0742, Brier Island, NS - October 24 to November 24, 2017



CURRENT ROSE PLOT:

Site #0742, Brier Island, NS
Current Speed and Direction - 8m Above Bottom



COMMENTS:

DATA PERIOD:
Start Date: 2017-10-24
End Date: 2017-11-24

PROFILE COUNT:
2958

AVG. CURRENT SPEED:
27.85 cm/s

COMPANY NAME:
Sweeney International Marine Corp.

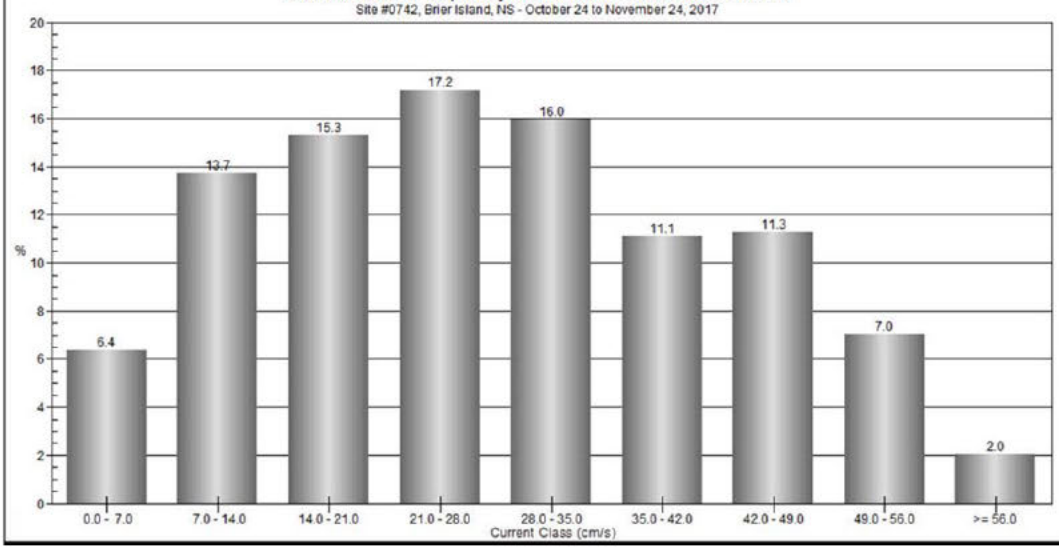
MODELER:
[redacted]

DATE:
2017-12-05

PROJECT NO.:
SW2016-058

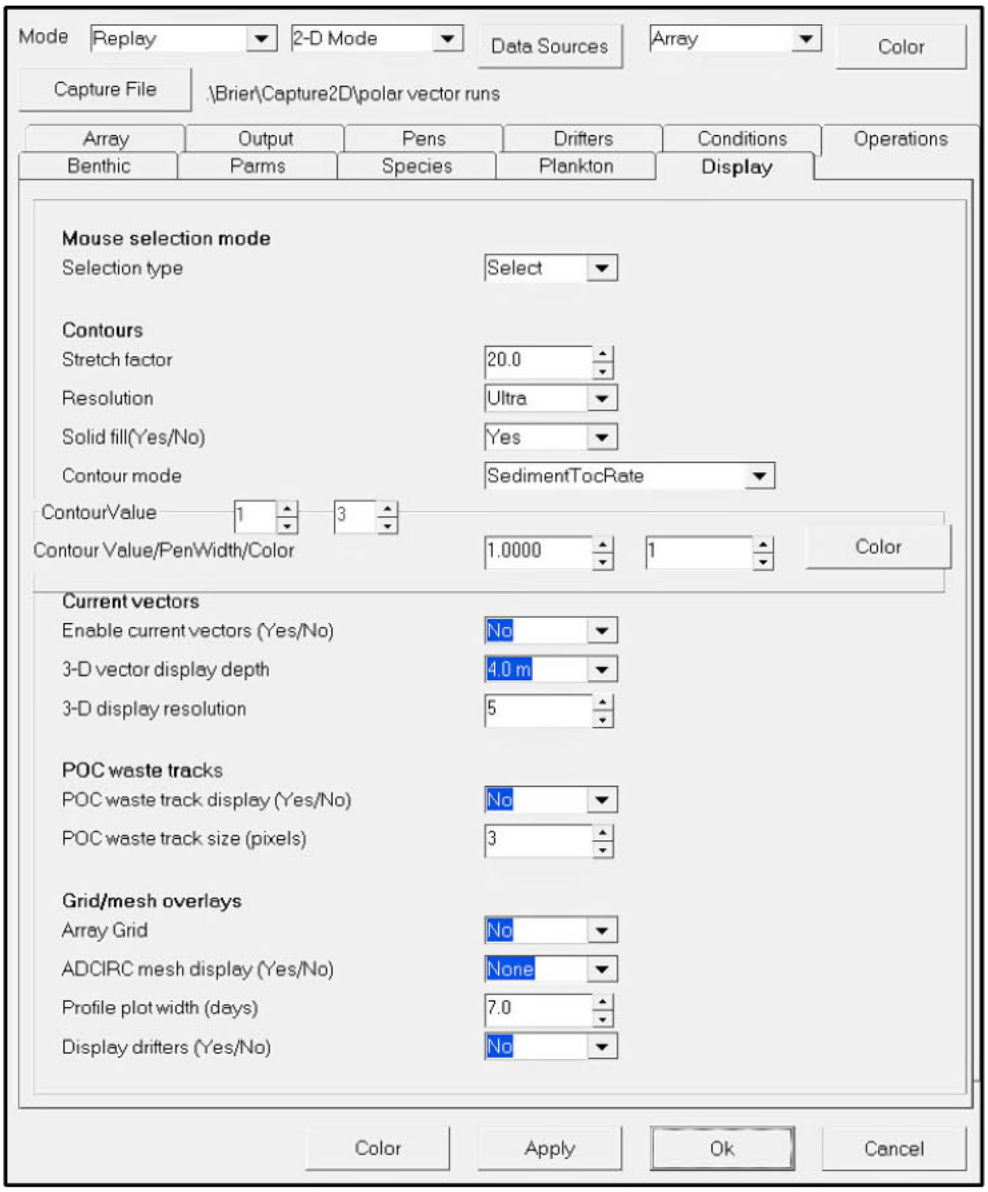
Current Class Frequency Distribution - 8m Above Bottom

Site #0742, Brier Island, NS - October 24 to November 24, 2017



APPENDIX J
AquaModel Settings

Project Options



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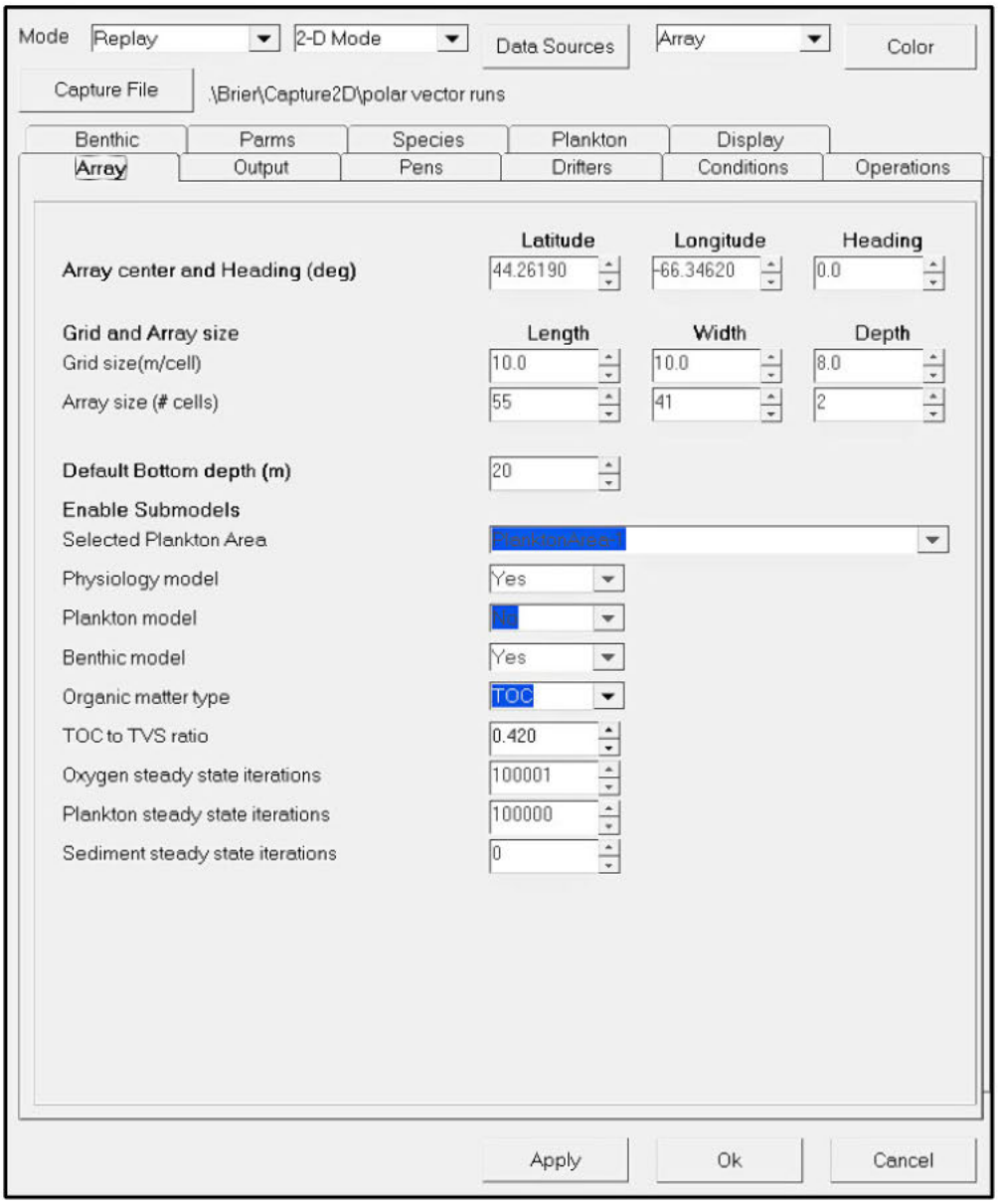

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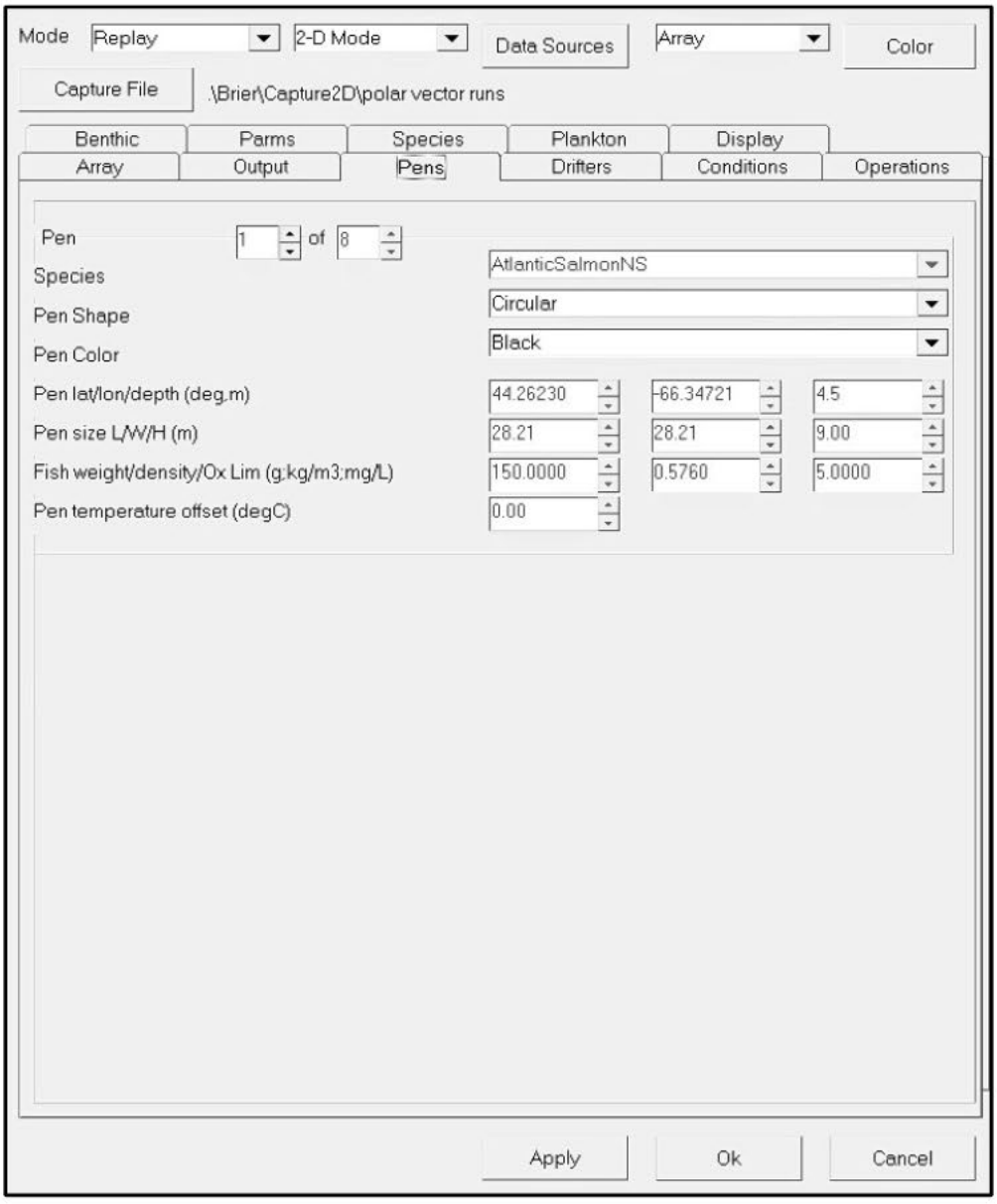

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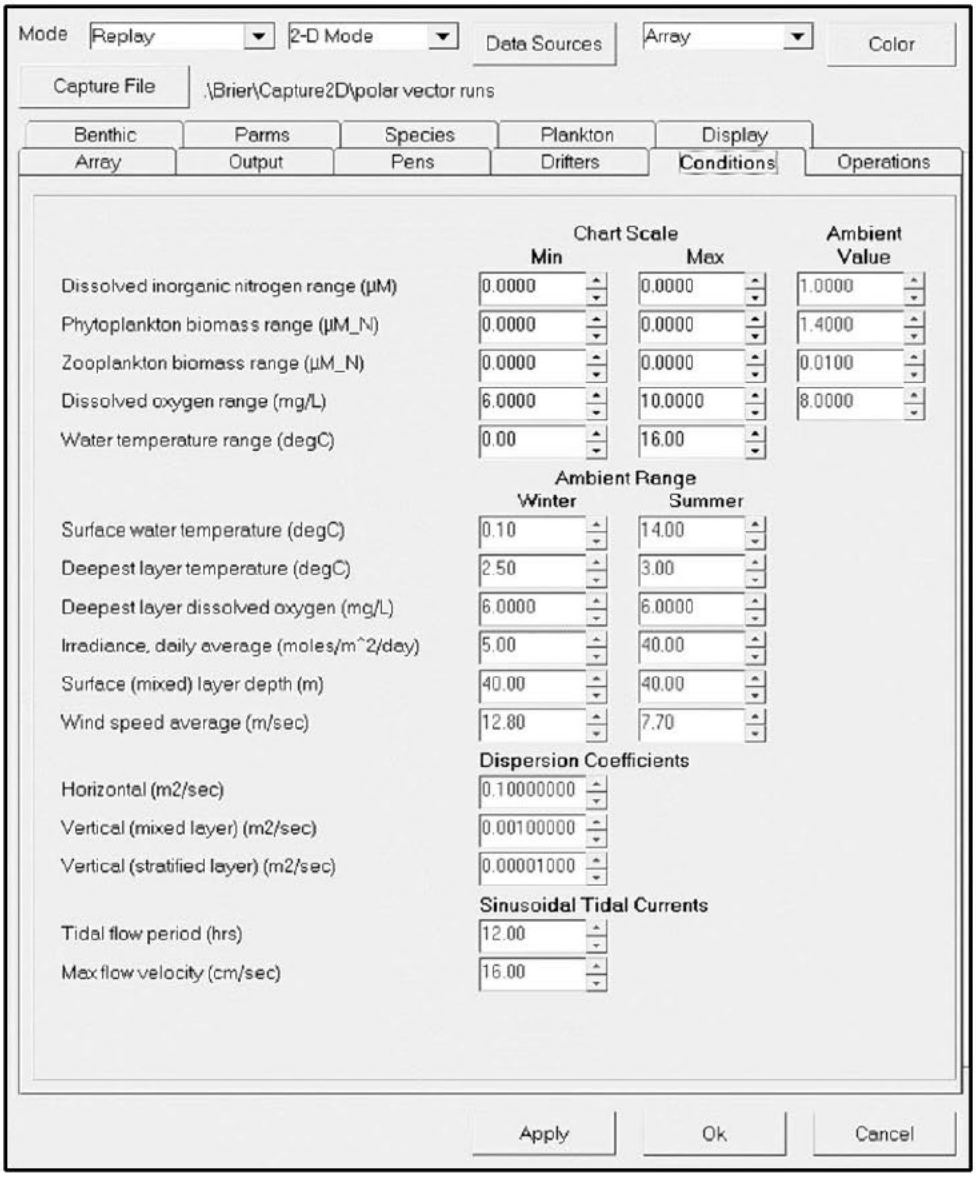

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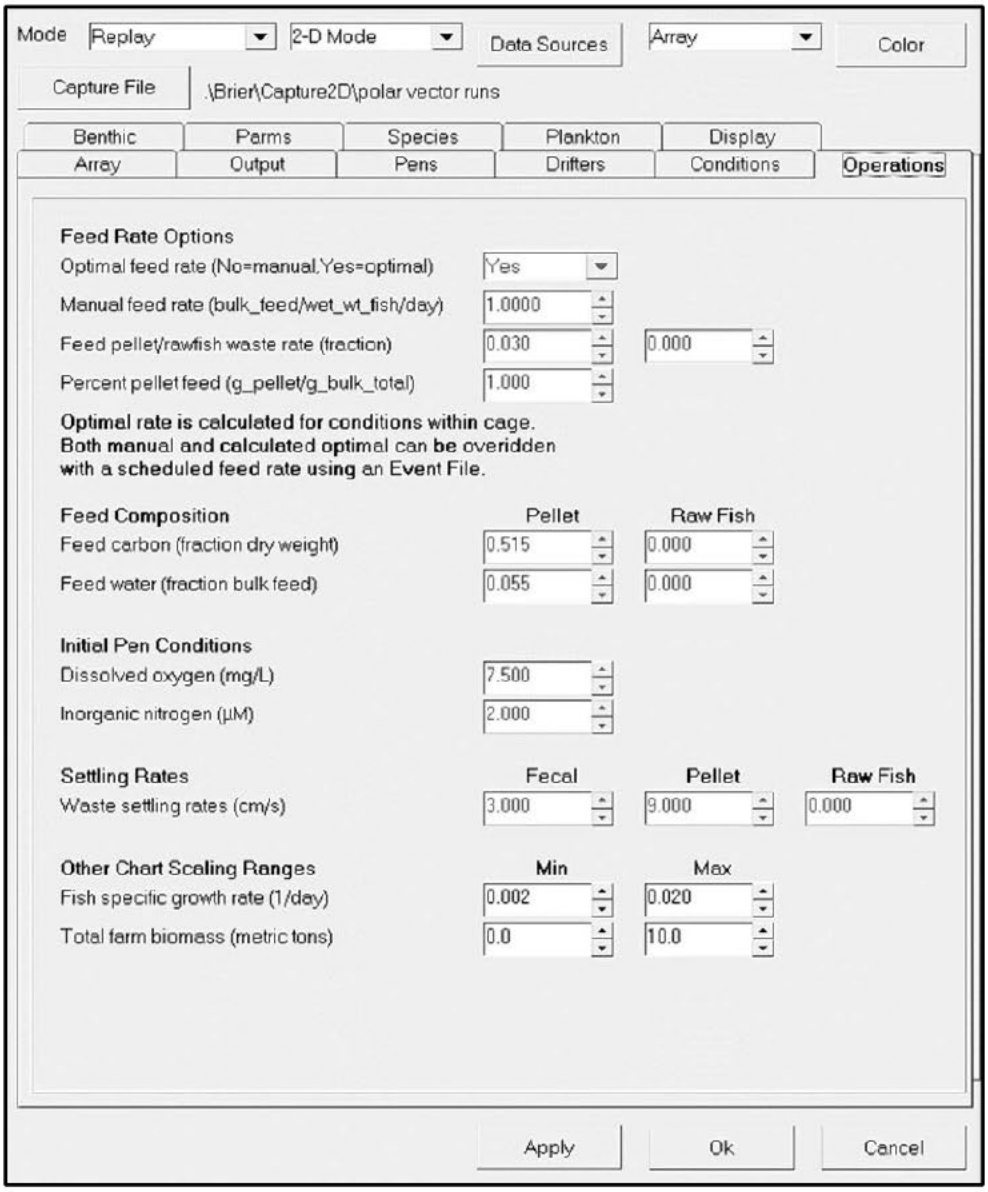

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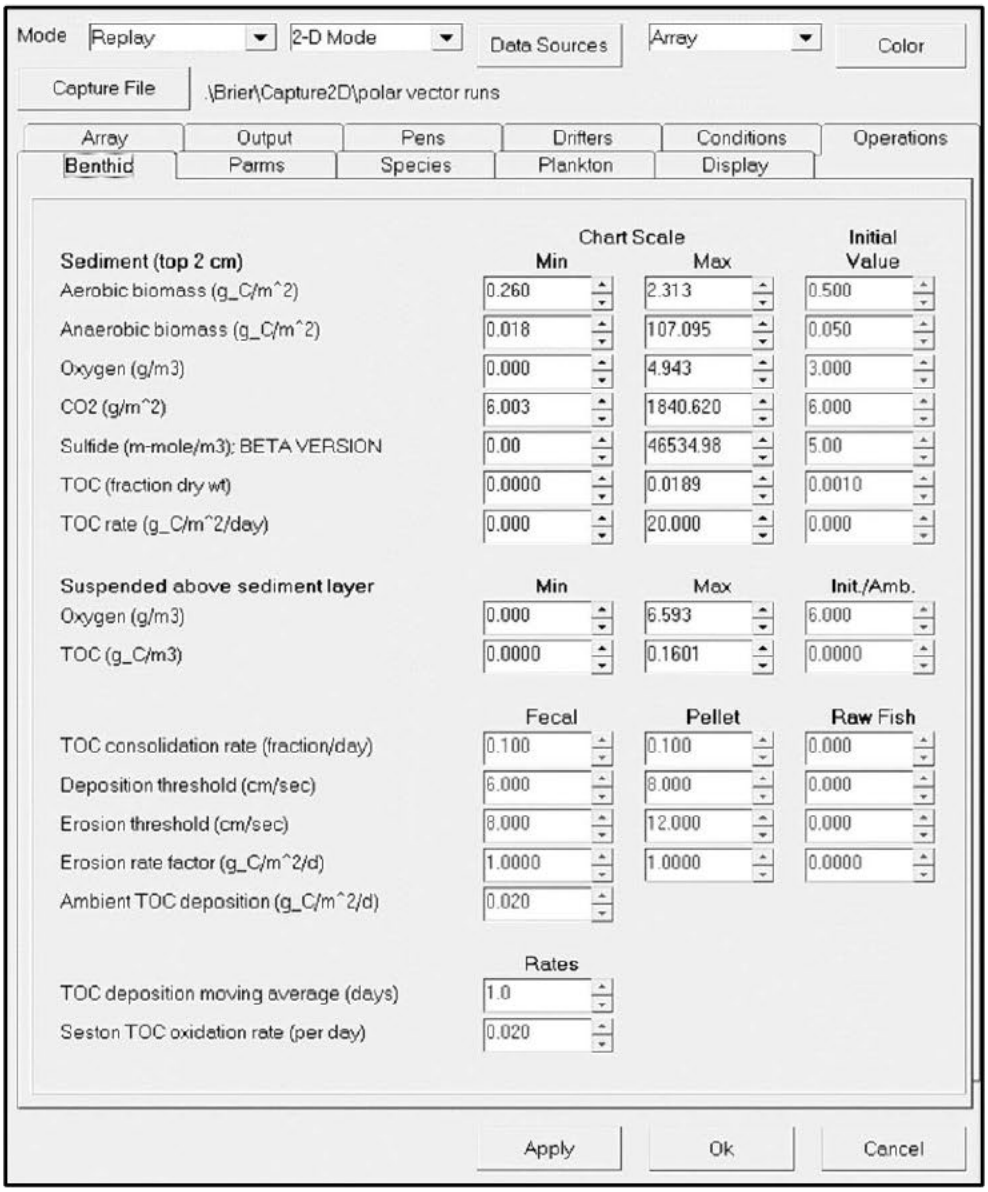

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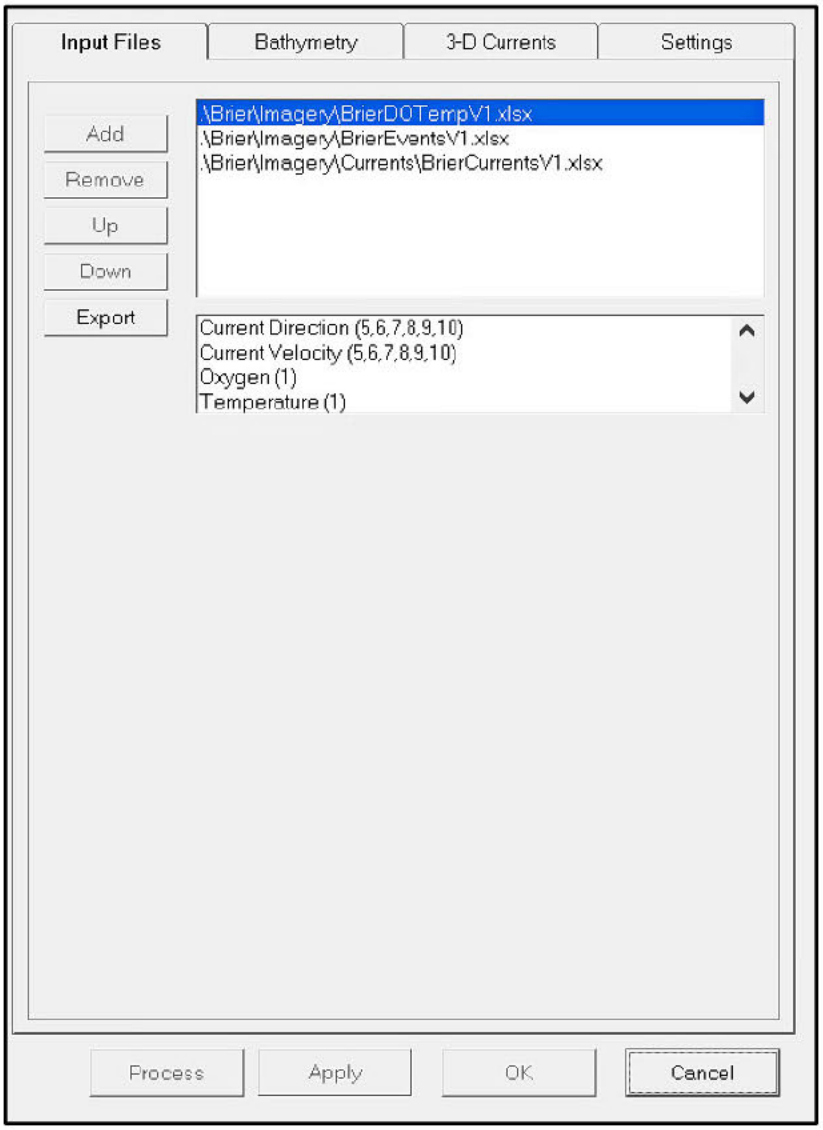

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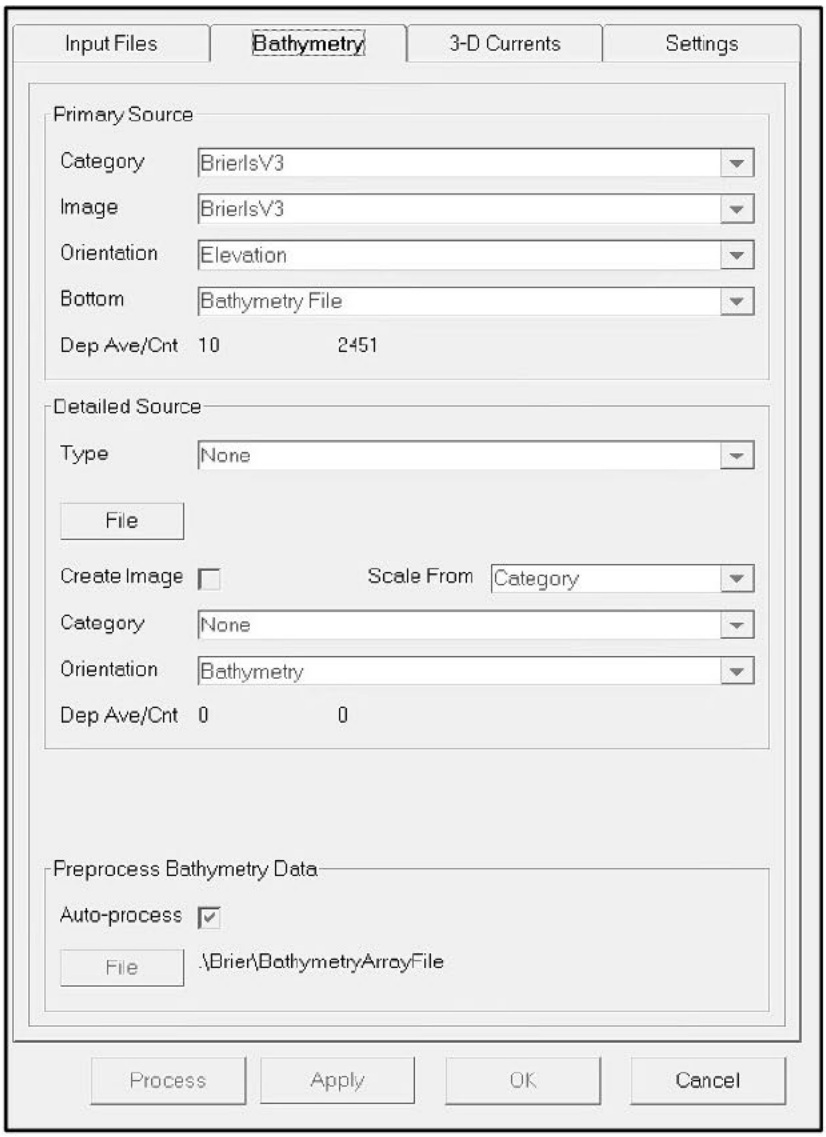

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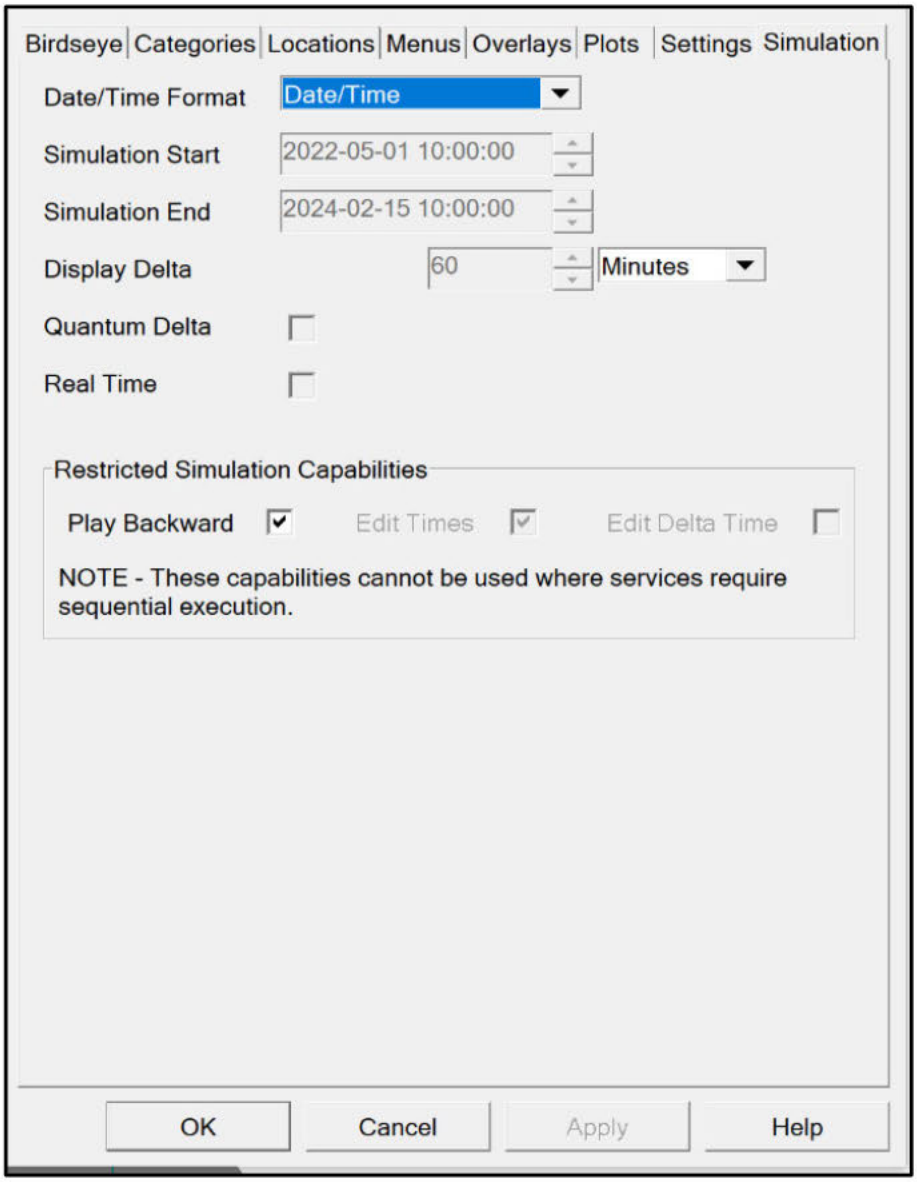

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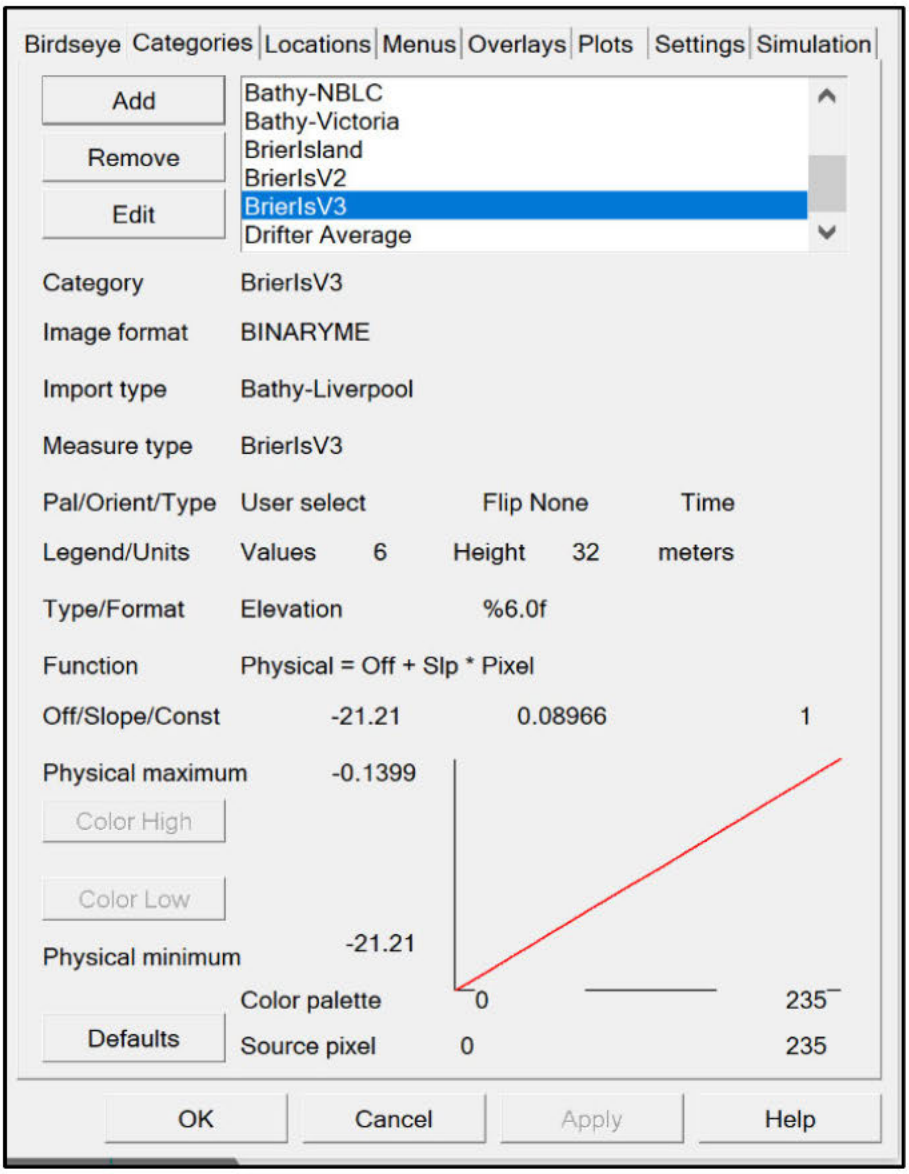

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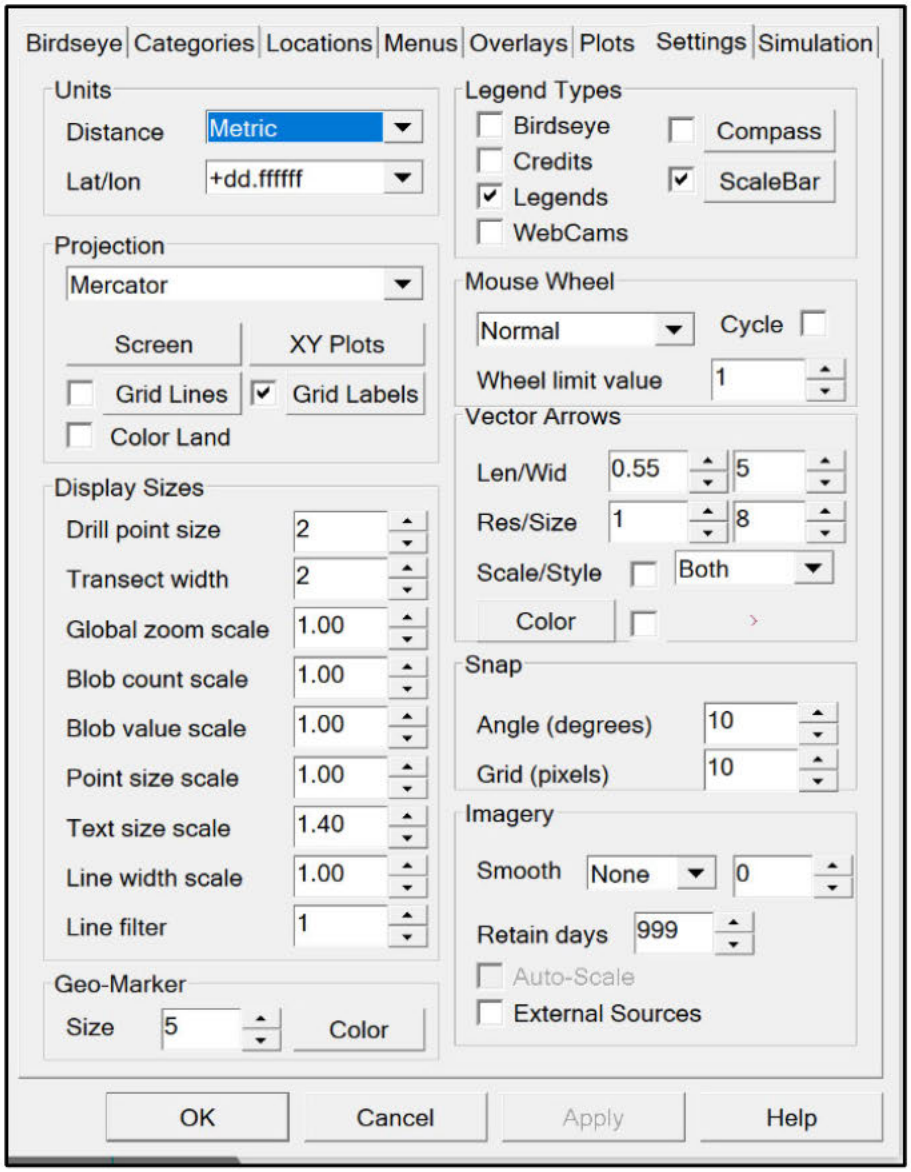
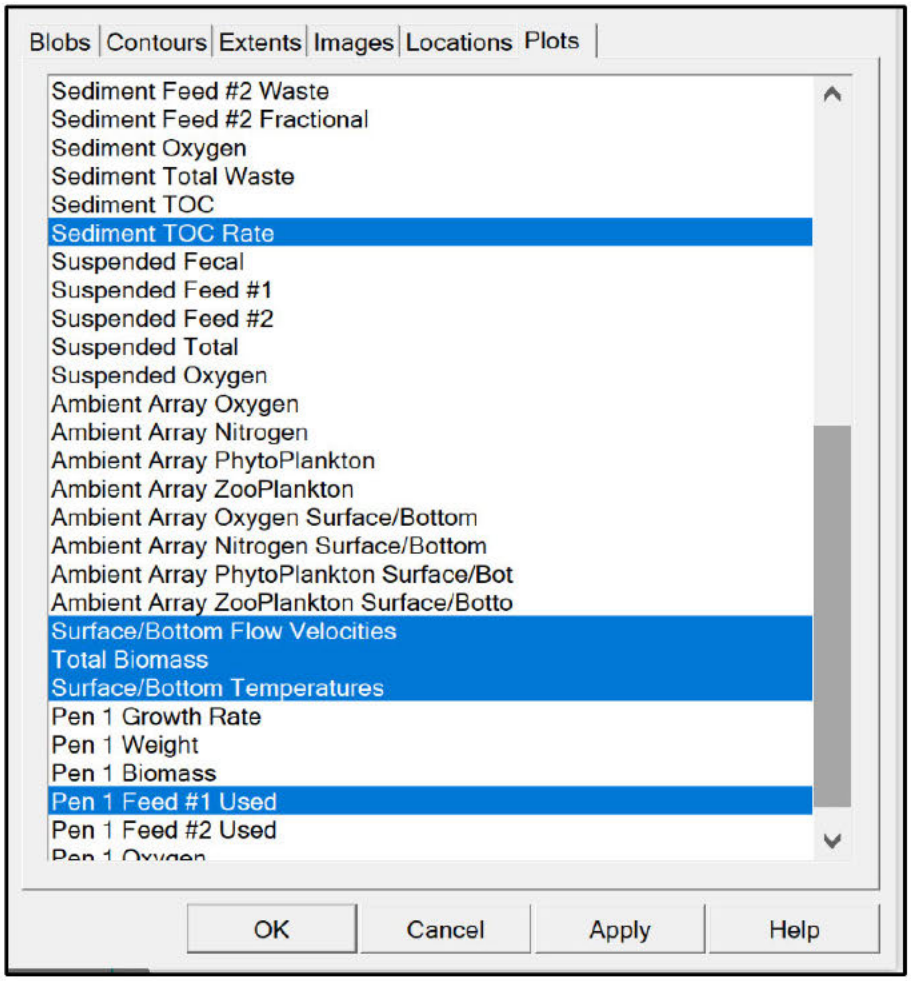
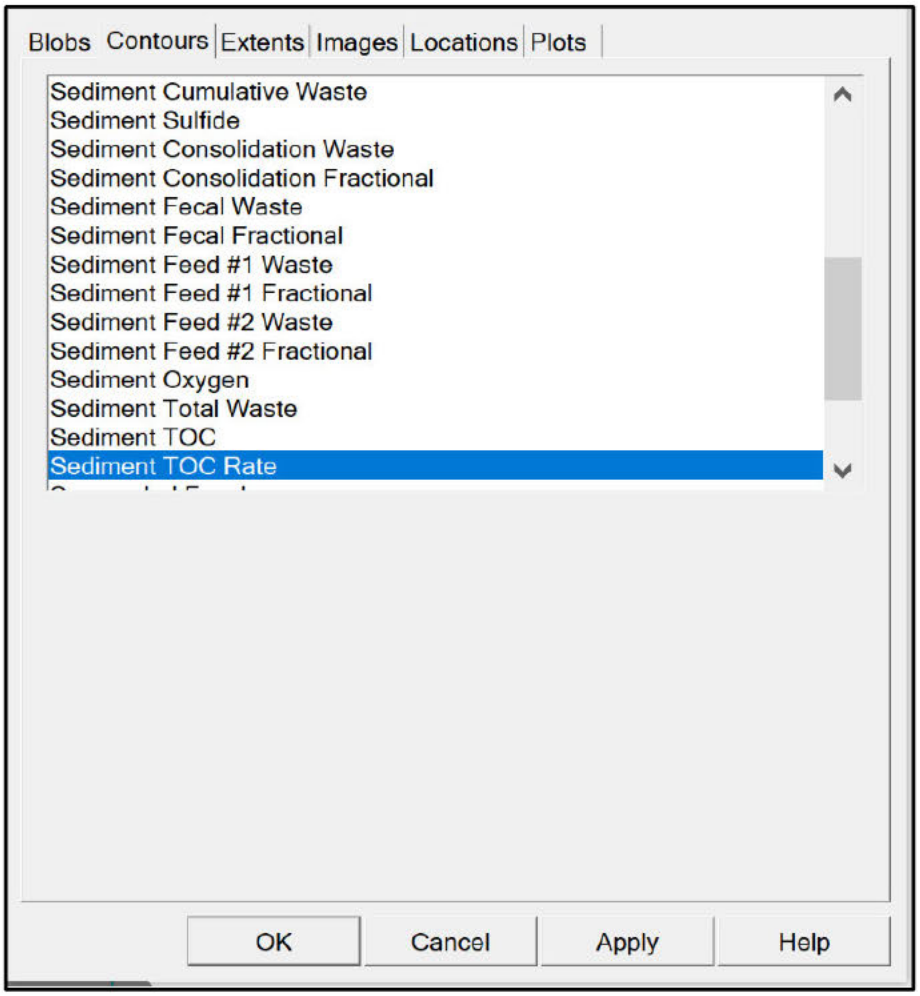
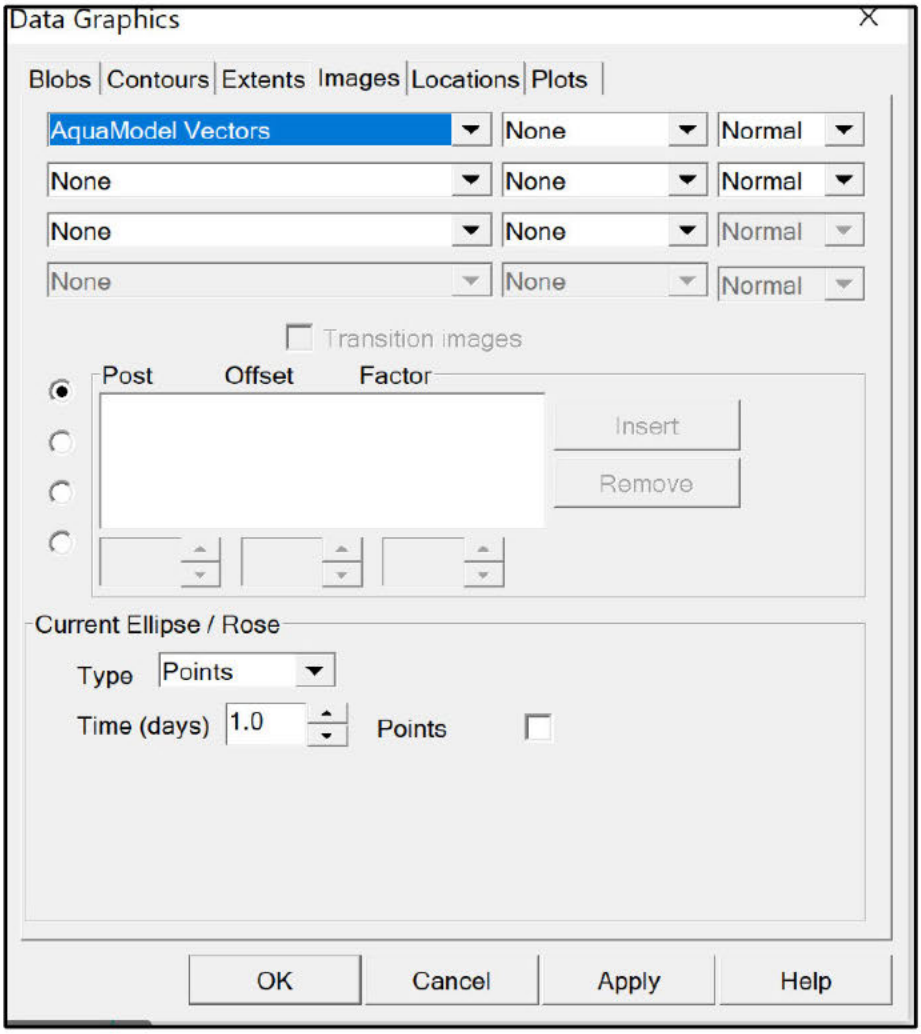


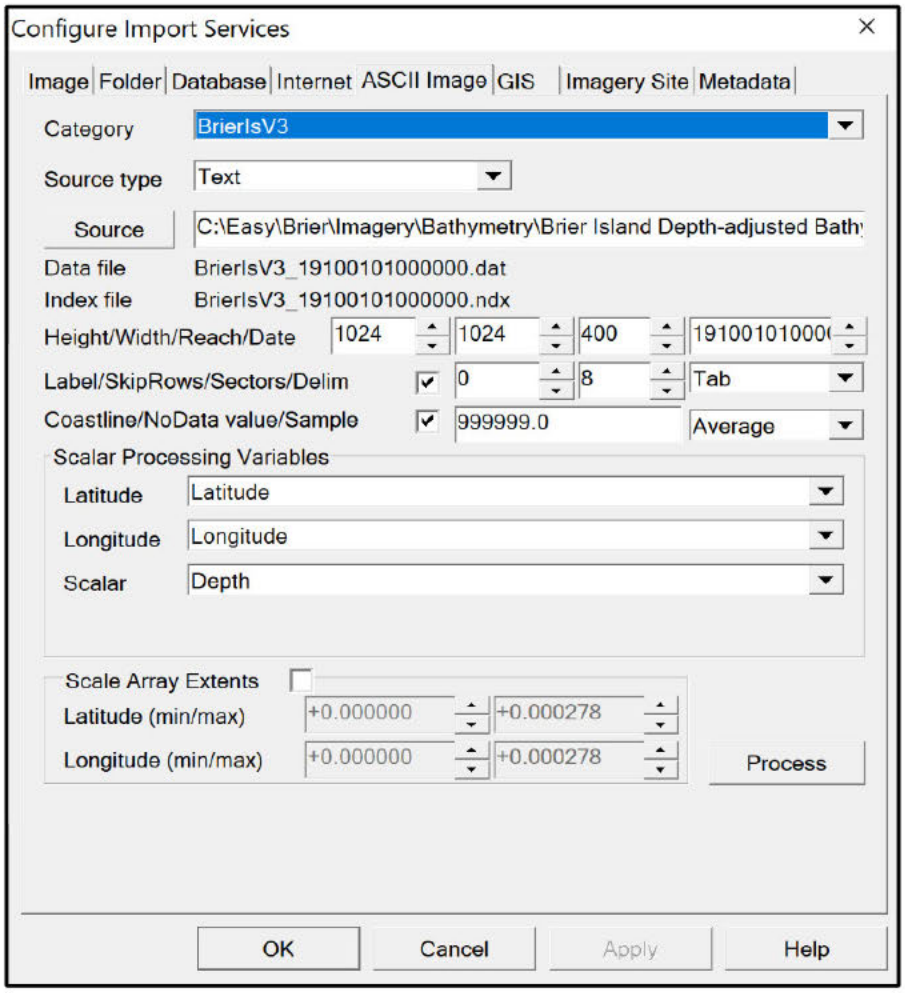

Blobs
Contours
Extents
Images
Locations
Plots
Sediment Feed #2 Waste
Sediment Feed #2 Fractional
Sediment Oxygen
Sediment Total Waste
Sediment TOC
Sediment TOC Rate
Suspended Fecal
Suspended Feed #1
Suspended Feed #2
Suspended Total
Suspended Oxygen
Ambient Array Oxygen
Ambient Array Nitrogen
Ambient Array PhytoPlankton
Ambient Array ZooPlankton
Ambient Array Oxygen Surface/Bottom
Ambient Array Nitrogen Surface/Bottom
Ambient Array PhytoPlankton Surface/Bot
Ambient Array ZooPlankton Surface/Botto
Surface/Bottom Flow Velocities
Total Biomass
Surface/Bottom Temperatures
Pen 1 Growth Rate
Pen 1 Weight
Pen 1 Biomass
Pen 1 Feed #1 Used
Pen 1 Feed #2 Used
OK
Cancel
Apply
Help


Blobs
Contours
Extents
Images
Locations
Plots
Sediment Cumulative Waste
Sediment Sulfide
Sediment Consolidation Waste
Sediment Consolidation Fractional
Sediment Fecal Waste
Sediment Fecal Fractional
Sediment Feed #1 Waste
Sediment Feed #1 Fractional
Sediment Feed #2 Waste
Sediment Feed #2 Fractional
Sediment Oxygen
Sediment Total Waste
Sediment TOC
Sediment TOC Rate
OK
Cancel
Apply
Help

Data Graphics



Configure Import Services



APPENDIX K
Habitat Map of Seafloor Characteristics of Brier Island (#0742)

KELLY COVE SALMON LTD.

Sweeney International Marine Corp.

T: (506) 467-9014
F: (506) 467-9503

46 Milltown Blvd
St. Stephen, NB
E3L 1G3

Project #: SW2016-058

Drawn By: [redacted]
Marine Environmental Biologist

Date: January 16, 2019

Nova Scotia Grid North

HABITAT MAP OF MARINE AQUACULTURE SITE

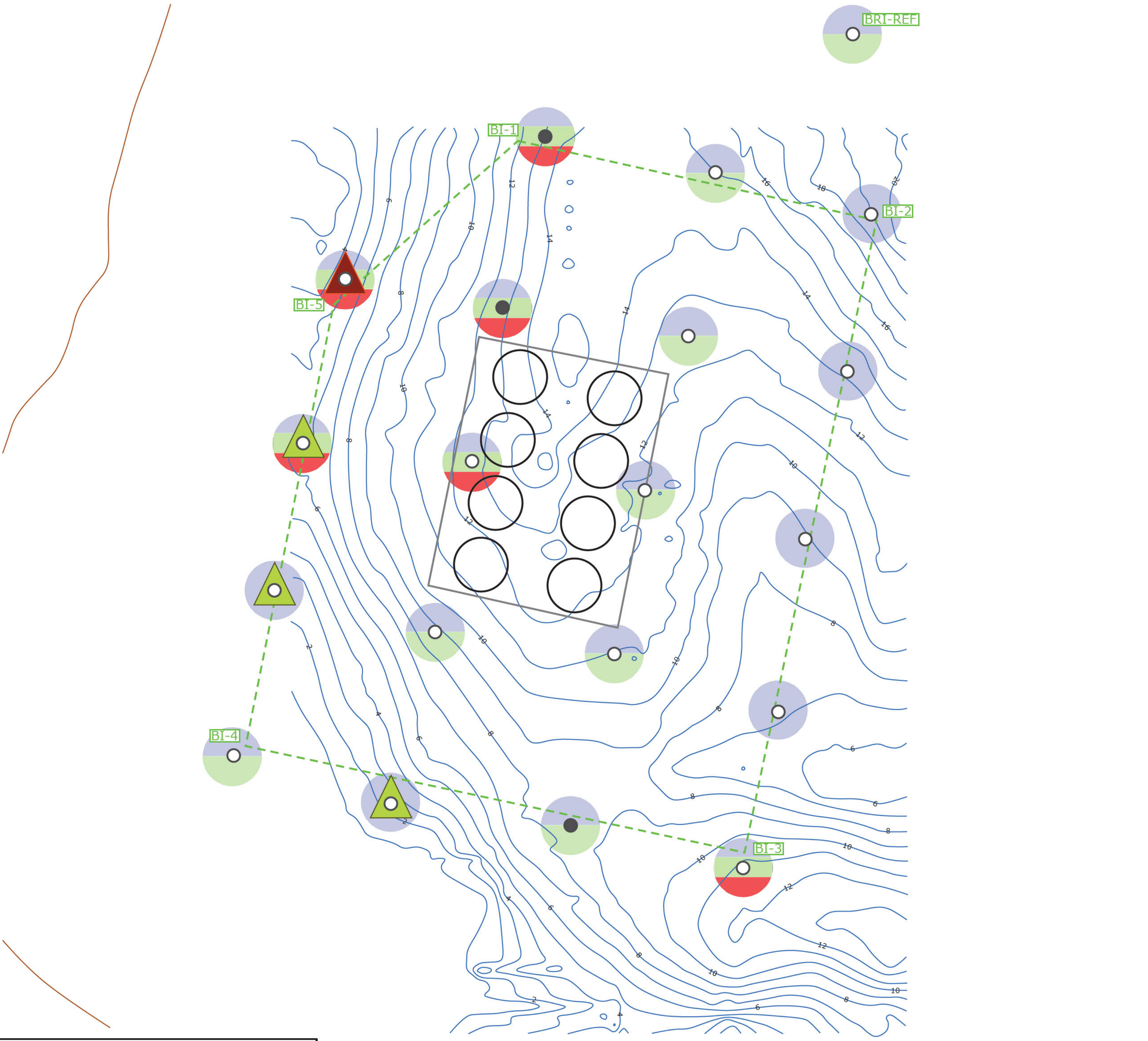
BRIER ISLAND #0742

WESTPORT HARBOUR
DIGBY COUNTY
PROVINCE OF NOVA SCOTIA
2019

Scale 1 : 1500

25 0 25 50 75 100 125 150

meters



LEGEND

- Bedrock/Boulder/Rockwall Sediment Type
- Rubble/Cobble/Gravel Sediment Type
- Sand/Silt/Mud Sediment Type
- Sand/Silt/Mud Over Bedrock Sediment Type
- Rubble/Cobble/Gravel Over Bedrock Sediment Type
- Sand/Silt/Mud Over Rubble/Cobble/Gravel Sediment Type
- All Sediment Types Present
- Ordinary High Water Mark
- Bathymetry Depth Contour
- Lease Corner GPS Coordinates
- Proposed Cage Array
- 100 m Plastic Circular Cage
- Hard-Bottomed Video Observation Station
- Soft-Bottomed Video Observation Station
- Eel Grass Bed
- Small Mixed Red Algae Bed

Proposed Cage Array Approximate GPS Coordinates (NAD83)

NW	N44° 15.750'	W66° 20.843'
NE	N44° 15.736'	W66° 20.760'
SE	N44° 15.656'	W66° 20.786'
SW	N44° 15.671'	W66° 20.869'

Proposed Lease Approximate GPS Coordinates (NAD83)

BI-1	N44° 15.812'	W66° 20.823'
BI-2	N44° 15.783'	W66° 20.665'
BI-3	N44° 15.583'	W66° 20.733'
BI-4	N44° 15.622'	W66° 20.953'
BI-5	N44° 15.762'	W66° 20.907'

Revisions

1	Final Version	January 16, 2019

THIS MAP HAD THE UTM GRID USE THE BATHYMETRIC CHART FOR THE EXACT MAGNETIC DECLINATION.

ALL LATITUDE AND LONGITUDE ARE DEGREE-DECIMAL MINUTES.

SEDIMENT TYPE MARKERS SERVE ONLY AS VISUAL REPRESENTATIVES OF THE CHARACTERISTICS FOUND AT EACH VIDEO OBSERVATION STATION.

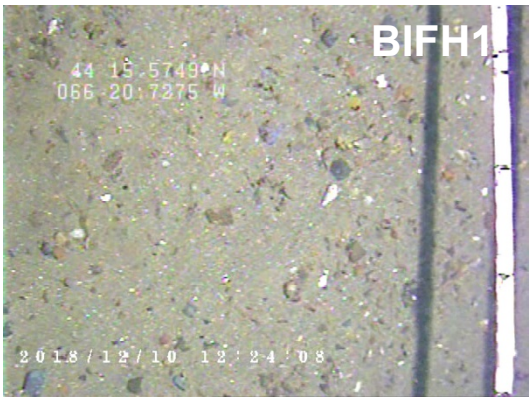
BATHYMETRY DATA FOR THE DEPTH CONTOURS WERE PROVIDED BY SIMCORP FIELD CREW ON OCTOBER 6, 2016 BETWEEN 7:35AM AND 9:11AM USING A HUMMINBIRD HELIX 5 SIDE SCANNING UNIT. BATHYMETRY DATA FOR DEPTH CONTOURS EXTENDED FOR REFERENCE STATION WAS PROVIDED BY HOMEPORT MAPPING SOFTWARE AND GARMIN BLUECHART DATA: HXCA015R-CANADA G2 HD v2016.0

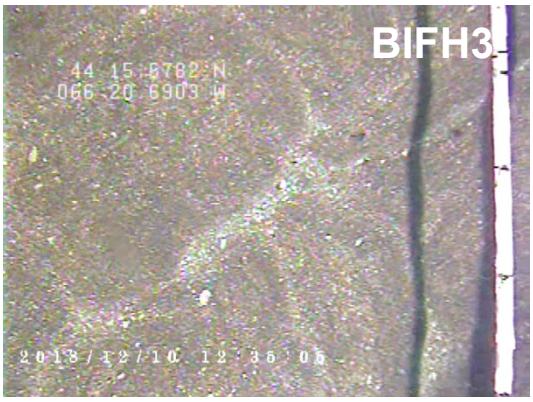
OBSERVATIONAL DATA FOR HABITAT SURVEY WERE PROVIDED BY SIMCORP FIELD CREW ON DECEMBER 10, 2018. OBSERVATIONAL DATA FOR REFERENCE STATION WAS PROVIDED BY SIMCORP FIELD CREW ON DECEMBER 5, 2018.

DIGITAL CHART #: CA476027
PAPER CHART #: 4118
UTM NAD83
ZONE: 20

APPENDIX L
Fish and Fish Habitat Survey Screen Captures of the Seafloor

Figure L-1: BIFH1 – BIFH8 video screen captures





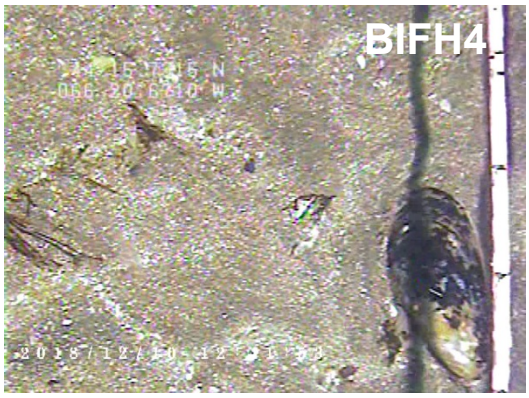
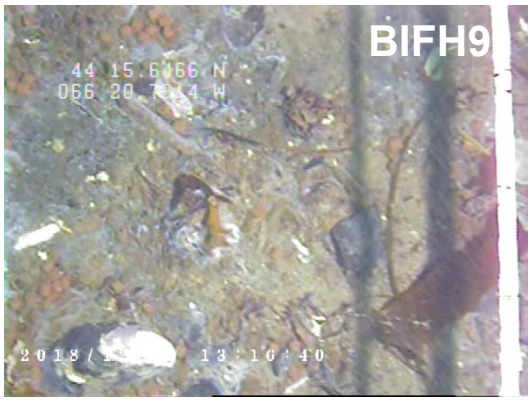
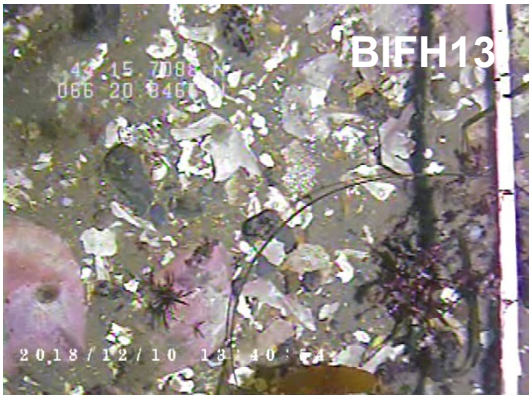
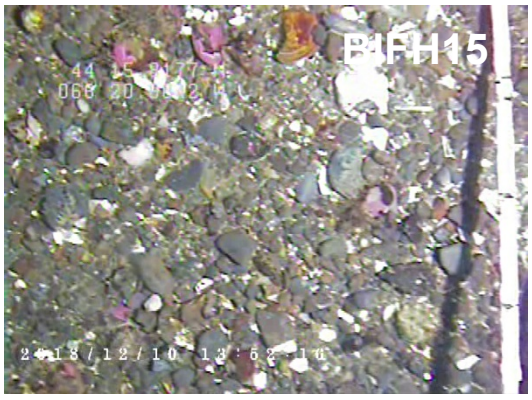


Figure L-2: BIFH9 – BIFH16 video screen captures







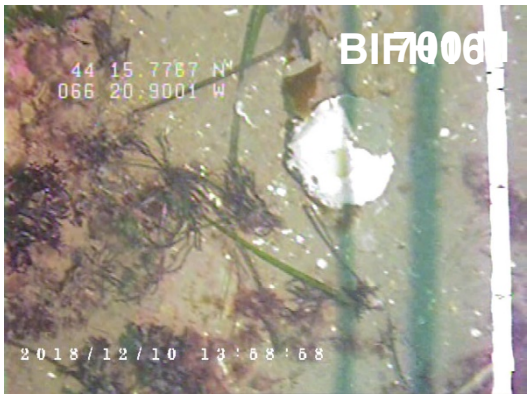
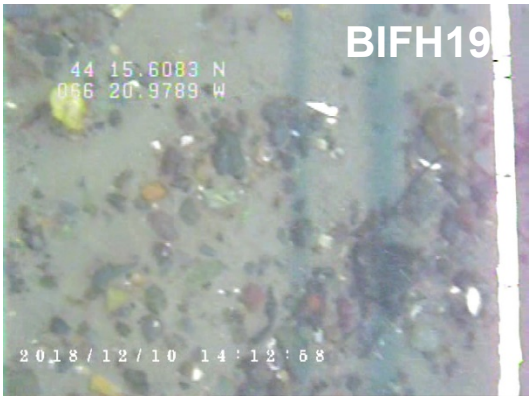


Figure L-3: BIFH17 – BIFH19 video screen captures



APPENDIX M
Comprehensive Species List from the Fish and Fish Habitat Survey of Brier Island (#0742)

Common Name	Station																			
	BIFH1	BIFH2	BIFH3	BIFH4	BIFH5	BIFH6	BIFH7	BIFH8	BIFH9	BIFH10	BIFH11	BIFH12	BIFH13	BIFH14	BIFH15	BIFH16	BIFH17	BIFH18	BIFH19	BRI-REF
Acid Kelp							5%			5%						<5%	5%			
Coralline Algae						<5%							5%	10%	<5%	5%	<5%			15%
Eel Grass					<5%	<5%				<5%	55%		<5%	<5%	<5%	<5%	25%	85%	5%	<5%
Encrusting Algae																	5%			
Flounder					1				1											
Flustra						<5%														<5%
Kelp	5%			<5%		<5%	5%	<5%		5%			5%	10%	<5%	10%	10%			
Lobster													1							
Mixed Rhodophyta	10%			5%		<5%	5%	<5%	10%			5%	5%	5%	<5%	20%				5%
Rock Crab	1						3					1		1	1					
Sculpin									1											
Sea Lettuce	<5%					<5%	<5%	<5%		<5%		5%				5%	5%			

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St. Stephen, NB
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SIMCorp Environmental Sciences Lab
120 Milltown Blvd.
St. Stephen, NB
E3L 1G6

APPENDIX C
Wildlife Interaction Plan

Wildlife Interaction Plan

for Marine Salmonid Farms on the East Coast of North America

Version 22.04-07

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Appendices

Agrilaser® Handheld User Manual
CAF Safe Operation Agreement: Bird Control Group Agrilaser® Handheld 200/500

Maine
USFWS: Maine Coastal Islands National Wildlife Refuge Complex

New Brunswick
NB Protected Wildlife ID Chart

Newfoundland
NL Protected Wildlife ID Chart

Nova Scotia
NS Protected Wildlife ID Chart

SECTION 1 - Local Laws and Regulations for Wildlife Management and Protection

1.1 Canadian Federal Legislation

- **Aquaculture Activities Regulations (AAR), 2015** - Fisheries and Oceans Canada has developed the Aquaculture Activities Regulations, to clarify conditions under which aquaculture operators may treat their fish and deposit organic matter, while ensuring the protection of fish and fish habitat and sector sustainability.
- **Canadian Environmental Assessment Act, 2012** - CEAA is an environmental assessment focused on potential adverse environmental effects that are within federal jurisdiction, including: fish and fish habitat; other aquatic species; migratory birds; federal lands; effects that cross provincial or international boundaries; effects that impact on Aboriginal peoples, such as their use of lands and resources for traditional purposes; changes to the environment that are directly linked to or necessarily incidental to any federal decisions about a project. If there is a Provincial requirement for an environmental assessment or review, the applicant has an exemption form the CEAA.
- **Canadian Environmental Protection Act, 1999** - an Act respecting pollution prevention and the protection of the environment and human health to contribute to sustainable development.
- **Fisheries Act, 1985** - established to manage and protect Canada's fisheries resources. It applies to all fishing zones, territorial seas and inland waters of Canada and is binding to federal, provincial, and territorial governments.
- **Marine Mammal Regulations, 1993** - regulations that govern the fishing and hunting and in effect treatment of marine mammals in Canada[1].
- **Migratory Birds Convention Act, 1994** - protecting and conserving migratory birds.
- **Oceans Act, 1997** - Canada made a legal commitment to conserve, protect, and develop the oceans in a sustainable manner.
- **Species at Risk Act (SARA), 2002** - the purposes of this Act are to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered, or threatened because of human activity and to manage species of special concern to prevent them from becoming endangered or threatened.

1.2 Canadian Provincial Legislation

1.2.1 New Brunswick

- **Fish and Wildlife Act, 1980** - *policies and programs created under this Act help to maintain diversity of wildlife species in New Brunswick. Among other things, it enables the provincial government to create wildlife refuges and wildlife management areas, it regulates hunting, fishing, possession, and sale of wildlife in the province, and it establishes the provincial Wildlife Fund.*
- **Species at Risk Act (SARA), 2012** - *the purposes of this Act are to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered, or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened.*

[1] Previously, Nuisance Seal Licences (NSL) were issued by the Department of Fisheries and Oceans (DFO) to aquaculture sites which allowed farmers to intentionally kill a nuisance seal. In March 2019, the Minister of Fisheries, Oceans, and the Coast Guard issued a statement that that the DFO has ceased the issuance of the licence in efforts to meet the requirements of the US Marine Mammal Protection Act, Import Provisions scheduled to come into force on January 1, 2022. The Minister also stated that the "DFO will undertake regulatory amendments to the Marine Mammal Regulations (MMR) to either amend or repeal provisions respecting the issuance of NSLs for aquaculture purposes. https://www.dfo-mpo.gc.ca/fisheries-peches/consultation/mmr-par-rmm-rap-eng.html

1.2.2 Nova Scotia

- **Fisheries and Coastal Resources Act**, **1996** - *this Act revises the outstanding fisheries law and promotes programs to encourage the development of a sustainable fishery. It sets standards for aquaculture, harvesting, and fish processing, and expands the recreational fishery. It also outlines the requirements for administration, and enforcement.*
- **Endangered Species Act, 1998** - *the purpose of this Act is to provide for the protection, designation, recovery, and other relevant aspects of conservation of species at risk in the province, including habitat protection.*

1.2.3 Newfoundland

- **Endangered Species Act, 2001** - p*rovides special protection for plant and animal species considered to be endangered, threatened, or vulnerable in the province.*
- **Wilderness and Ecological Reserves Act, 1990** - *an act to provide for the natural areas in the province to be set aside for the benefit, education, and enjoyment of the people of the province.*

1.3 United States Federal Legislation

- **Endangered Species Act of 1973** (16 U.S.C 1531 et seq.) - requires federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the U.S National Oceanic and Atmosphere Administration (NOAA) Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species.
- **Clean Water Act of 1972 (Formerly the Federal Water Pollution Control Act of 1948)** (33 U.S.C 1251 et seq.) - under this Act, it is unlawful for any person to discharge any pollutant from a point of source into navigable waters, unless a permit is obtained under its provisions.
- **Migratory Bird Treaty Act of 1918** (16 U.S.C 703-712) - protecting and conserving migratory birds, or the parts, nests, or eggs of such birds.
- **Marine Mammal Protection Act of 1972** - prohibits the hunt, harassment, capture or killing of any marine mammal or attempts to do so. Also prohibits the import and export of marine mammals, in whole or parts. Three federal entities share responsibility for implementation of the Act: NOAA, USFWS and the Marine Mammal Commission.

1.4 US State Legislation

1.4.1 Maine

- **Maine Endangered Species Act, 1975** – *the Department of Inland Fisheries and Wildlife administers the Act (MESA) and is responsible for monitoring resident inland fish and wildlife (including invertebrates). The Department, through scientific studies, determines whether a species should be listed as endangered or threatened.*
- **Maine Marine Endangered Species Act, 2003** – *enacted to separate marine species from the inland species, the Act (MMESA) is administered by the Maine department of Marine resources.*
- **Maine Coastal Management Program, 1978** - *led by the Maine Department of Agriculture, Conservation, and Forestry. The coastal management program consists of a network of 19 state laws with four state agencies working in cooperation with local governments, nonprofit organizations, private businesses, and the public to improve management of coastal resources. Maine's coastal zone extends to the inland boundary of all towns bordering tidal waters and includes all coastal islands.*

SECTION 2 - Operating Permit Considerations for Wildlife Management and Protection

2.1 Maine

2.1.1 DMR Lease

The Department of Marine Resources (DMR) Rule Chapter 2.37; Area Resources (Essential Habitats/Endangered Species) – under the Maine Endangered Species Act a state agency or municipal government shall not permit, license, fund or carry out projects occurring partly or wholly within the Essential Habitat, without the approval of the Commissioner of Maine Department of Inland Fisheries and Wildlife (MDIFW). Applicants are required to provide a signed statement to confirm the proposed lease either does not fall within the boundary of an Essential Habitat or that the applicant has contacted MDIFW, and preliminary review will grant approval for the Maine DMR to issue an aquaculture lease within part or the entire boundary of a designated Essential Habitat. No nuisance shall be permitted to exist on the leased premises. Lessee shall not operate in a manner as to be detrimental to public health, personal property or marine resources, or as to create a serious threat to the marine environment.

2.1.2 ACOE Permit

Appendix C: Special Conditions which are intended to minimize potential impact to Atlantic salmon, Atlantic salmon critical habitat, other fisheries, benthic habitat, and local water quality.

2.1.3 DEP MEPDES Permit

Refer to the Atlantic Salmon Aquaculture General Permit PART II, Section I. Protection of Atlantic Salmon. In summary, only salmon of North American strain are permitted, and fish must be marked to identify their origin.

2.2 New Brunswick

2.2.1 Commercial Aquaculture Licence

Schedule A – Operating Terms and Conditions; this licence may be suspended or revoked should the licensee fail to acquire or comply with any approvals, permits or licences which may be required under the *Clean Water Act,* the *Clean Environment Act*, the *Canadian Navigable Waters Act*, the Federal *Fisheries* Act or the *Crown Lands and Forests Act*, the *Public Health Act,* the *Seafood Processing Act*, the *Fish and Wildlife Act,* or any other applicable law.

2.2.2 Approval to Operate

Schedule A – Terms and Conditions (E); the Approval Holder operate the Facility in accordance with the most recent version of the *Environmental Management Program for the Marine Finfish Cage Aquaculture Industry in New Brunswick,* issued by the Department of Environment and Local Government. The Approval Holder shall ensure that all chemicals are stored in a manner such that any spill is contained and not released to the environment.

2.3 Newfoundland

2.3.1 Lease for Aquaculture

Schedule C; the use of the demised premises will, for its intended purpose, be subject to and in accordance with all provincial acts and regulations respecting the promotion of efficient aquaculture and environmental control. The Lessee agrees that upon cancellation or non-renewal of this Lease, the demised premises shall be restored to a condition satisfactory to the Minister, which restoration shall include the removal of all buoys, mooring lines, anchors, floating structures, and any other items placed or installed in or on the demised premises.

2.3.2 Aquaculture Licence

Licence Conditions: Licensees must ensure that all required plans are approved by the department. These plans include but are not limited to: Environmental and Waste Management Plan; Integrated Pest Management Plan; Biosecurity Plan; and Fish Health Management Plan.

2.3.3 Marine Aquaculture Water Use Licence

Appendix A – Terms and Conditions: The Licensee/Holder shall not impair, pollute, or cause to be polluted the quality of water. In the event that the site is no longer being used during the term created by this Licence, the Licencee/Holder shall remove the aquaculture gear and other work(s)/system(s) associated with and restore all areas affected by this facility to a state that resembles local natural conditions.

2.4 Nova Scotia

2.4.1 Lease

The Lessee must adhere to the Farm Management Plan, as it is in effect for this lease from time to time, and any failure to adhere to the Farm Management Plan is a breach of the lease. The Lessee agrees to comply with any permits, protocols, approvals, licences, or permissions (the “licencing requirements”) which may be required under the laws of the relevant municipality, the Province or Canada. The Lessee is responsible for confirming any licencing requirements and ensuring compliance with them.

2.4.2 Licence

The Licencee must adhere to the Farm Management Plan, as it is in effect for this licence from time to time, and any failure to adhere to the Farm Management Plan is a breach of the licence. The Licencee agrees to comply with any permits, protocols, approvals, licences, or permissions (the “licencing requirements”) which may be required under the laws of the relevant municipality, the Province or Canada. The Lessee is responsible for confirming any licencing requirements and ensuring compliance with them.

SECTION 3 - Ecologically and Biologically Sensitive and Significant Areas

An Ecologically and Biologically Sensitive Area (EBSA or EBSAs) is an area that has been determined to be of high ecological or biological significance and as such, should receive a higher level of risk aversion when activities are occurring to avoid disruption of the overall ecosystem and structure. It is important that employees are aware of areas that are in proximity to their farm and avoid impacting these areas intentionally and follow company protocols regarding garbage containment, proper fuel and chemical storage, equipment maintenance, among others to reduce the risk of unintentional damage.

3.1 Atlantic Canada EBSAs

Both the DFO and the Convention on Biological Diversity (CBD) have criteria for evaluating areas. These criteria consider biological functions, physical oceanography, structural habitat features and biodiversity. Criteria established by DFO to rank an area are uniqueness; aggregation; fitness consequences, plus 2 additional modifying criteria: resilience and naturalness. Criteria established by the CBD are uniqueness or rarity; special importance for life history stages of species; importance for threatened, endangered or declining species and/or habitats; vulnerability, fragility, sensitivity, or slow recovery; biological diversity and naturalness. Both the DFO and CBD criteria were used to establish the EBSAs.

There are three sub-regions within the DFO Maritimes Region in which EBSAs were identified: the Bay of Fundy, the Atlantic coast of Nova Scotia and the offshore Scotian Shelf.

The Bay of Fundy forms a significant part of the Gulf of Maine. A total of 16 areas (**Fig.1**) were identified (DFO[2]) as EBSAs with the Bay of Fundy, Gulf of Maine. There is no formal list of Ecologically Sensitive Species (ESS) in the Bay of Fundy yet, but there is the presence of potential ESS and the reason that some areas have been established as an EBSA.

In the Atlantic coast sub-region, Cape St. Mary's to Cape North, a total of 38 areas (**Fig. 2**) were identified (DFO[3]) as EBSAs.

[2] 2014. DFO CSAS Research Document 2013/065. Identification and Review of Ecologically and Biologically Significant Areas in the Bay of Fundy.
[3] 2014. DFO Canadian Technical Report of Fisheries and Aquatic Sciences 3107. Ecologically and Biologically Significant Areas in the Atlantic Coastal Region of Nova Scotia.

Figure 1. Location of identified Bay of Fundy EBSAs – boundaries represent a best approximation of where a significant feature or features exist.

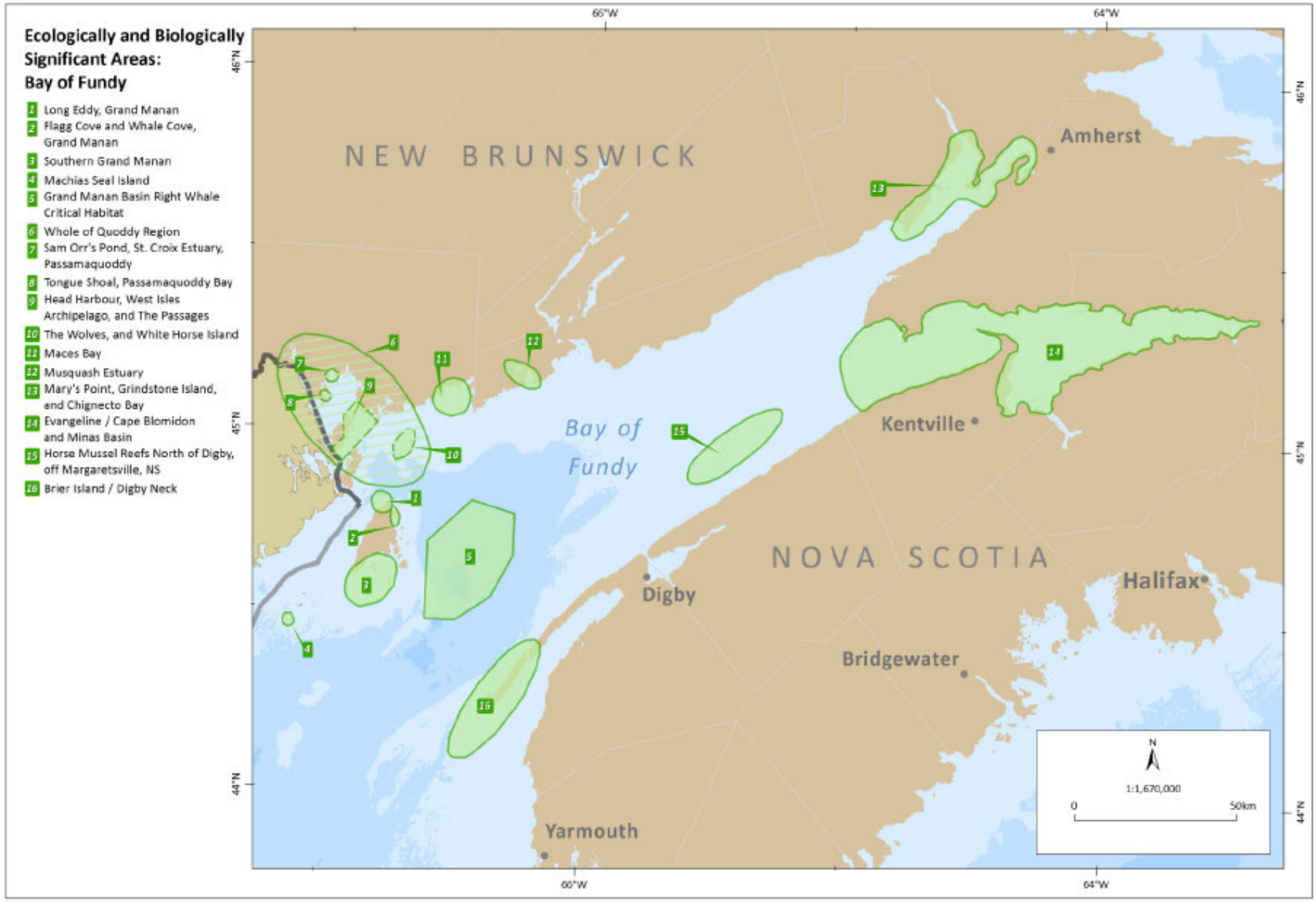
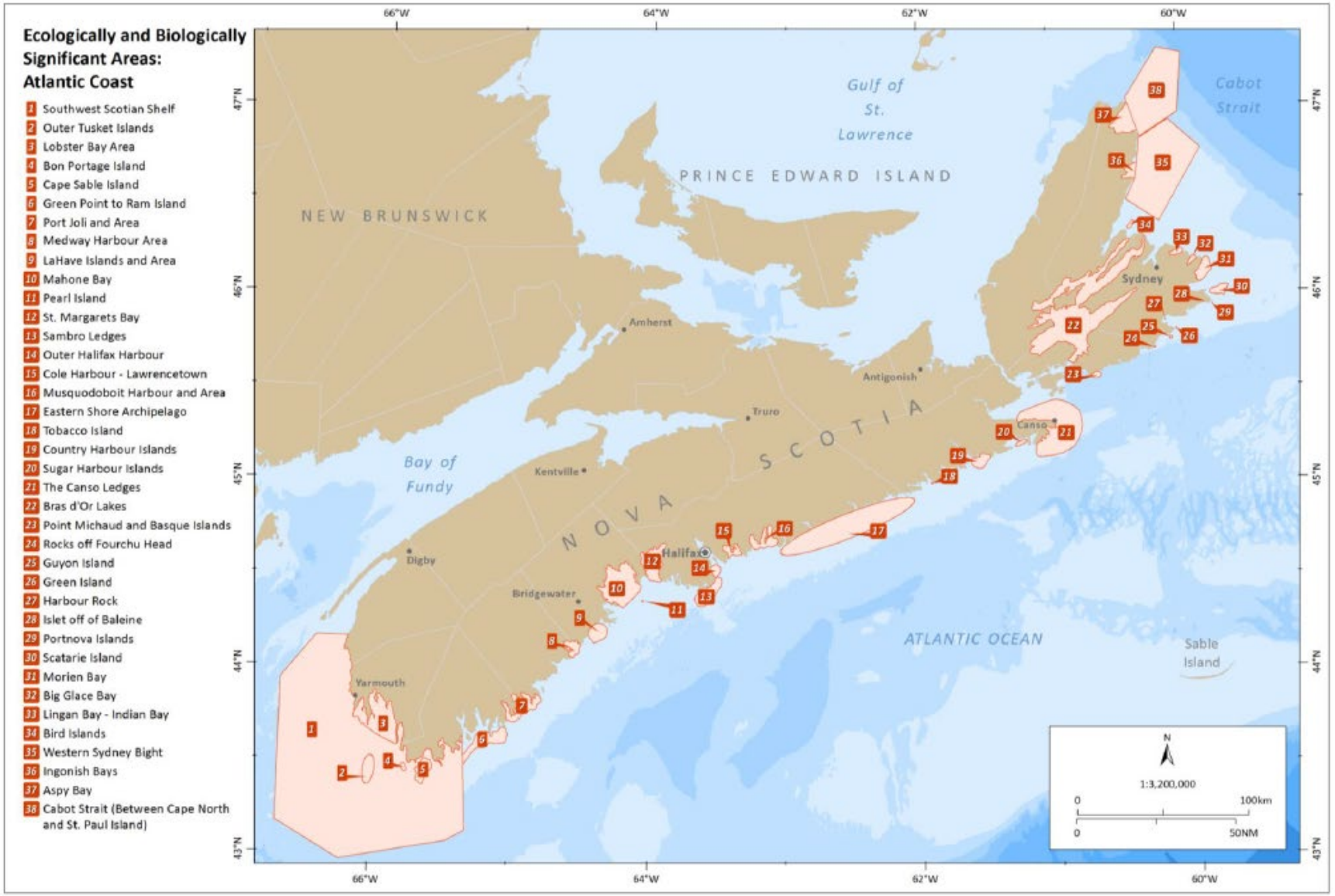
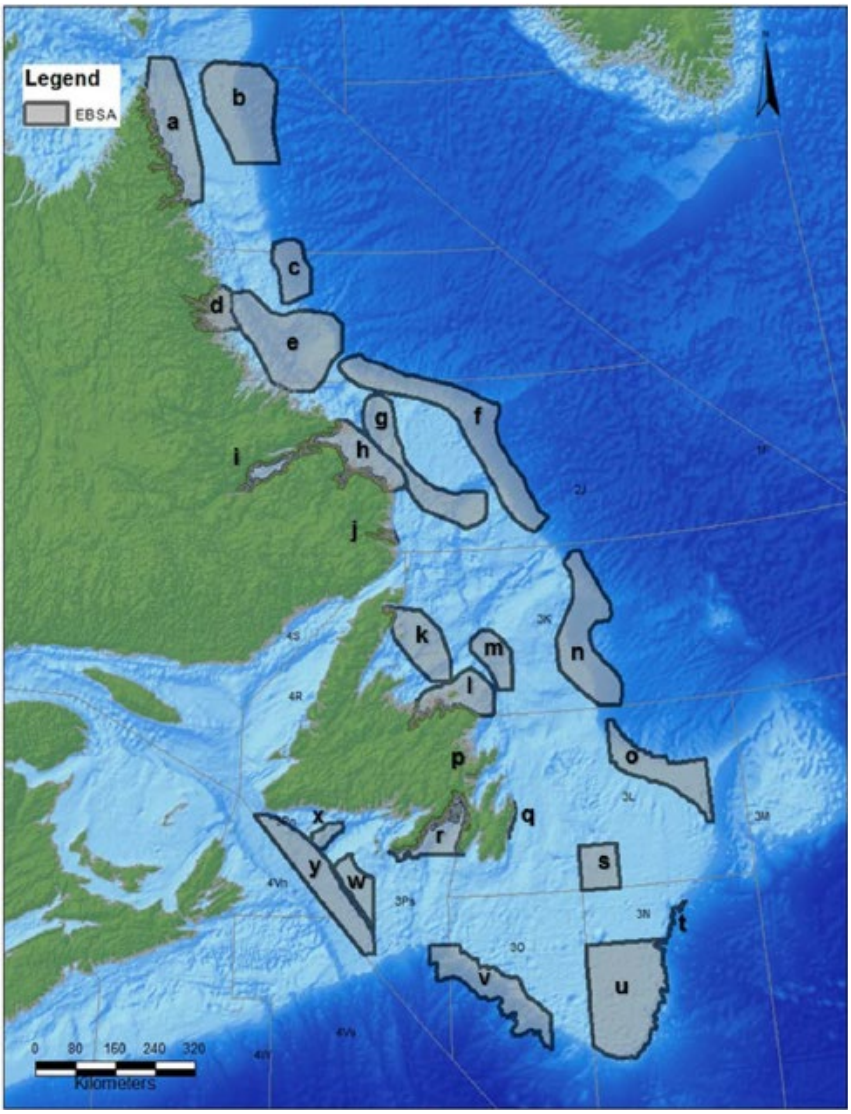


Figure 2. Location of identified Atlantic coast sub-region EBSAs – boundaries represent a best approximation of where a significant feature or features exist.



Within the DFO Newfoundland and Labrador Region 26 EBSAs have been identified in the Newfoundland and Labrador Shelves Bioregion since 2007 (**Fig. 3**)[4]. One of the 26 EBSAs is a transitory EBSA that encompasses the southern extent of pack ice. Unlike other EBSAs, the location of the southern pack ice is transitory and varies both within and among years, as it is influenced by winds and currents. However, it is usually located south of Hamilton Inlet, as far south as Notre Dame Bay. Although it cannot be defined by rigid boundaries, the southern pack ice is an area that is highly productive and ecologically important within the Newfoundland shelf ecosystem and the North Atlantic.

Figure 3. EBSAs in the Newfoundland and Labrador Bioregion: a) Northern Labrador, b) Outer Shelf Saglek Bank, c) Outer Shelf Nain Bank, d) Nain Area, e) Hopedale Saddle, f) Labrador Slope, g) Labrador Marginal Trough, h) Hamilton Inlet, i) Lake Melville, j) Gilbert Bay, k) Grey Islands, l) Fogo Shelf m) Notre Dame Channel, n) Orphan Spur, o) Northeast Shelf and Slope, p) Smith Sound, q) Eastern Avalon, r) Placentia Bay Extension, s) Virgin Rocks, t) Lilly Canyon-Carson Canyon, u) Southeast Shoal and Tail of the Banks, v) Southwest Shelf Edge and Slope, w) St. Pierre Bank, x) Burgeo Bank, and y) Laurentian Channel.



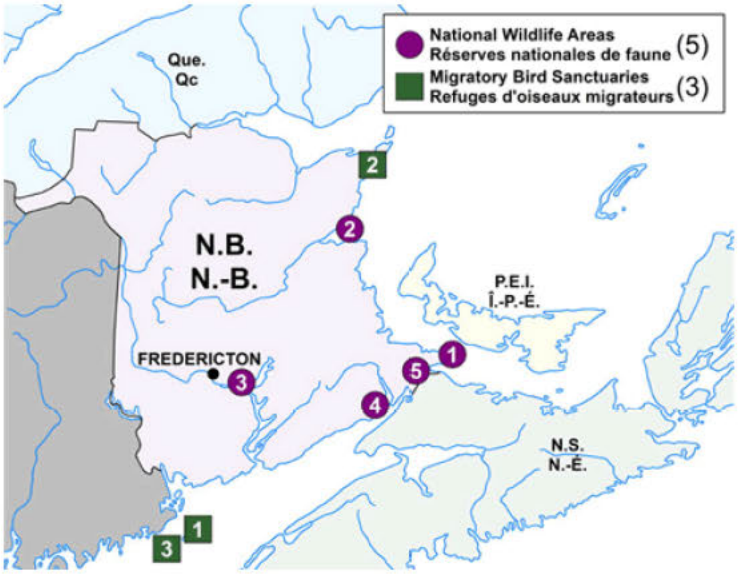
[4] DFO. 2016. Refinement of Information Relating to Ecologically and Biologically Significant Areas (EBSAs) Identified in the Newfoundland and Labrador (NL) Bioregion. DFO Can. Sci. Advis. Sec. Sci. Resp. 2016/032.

3.1.1 National Wildlife Areas and Migratory Bird Sanctuaries

According to the Canada Wildlife Act, National Wildlife Areas are created and managed for the purposes of wildlife conservation, research, and interpretation. There are currently 55 National Wildlife Areas across Canada containing nationally significant habitats for animals or plants. The National Wildlife Areas managed by Environment and Climate Change Canada (ECCC) protect over 2.1 million hectares of habitat with over 75% of that area protecting marine habitat[5].

Migratory Bird Sanctuaries (MBS) are listed under the Schedule in the Migratory Bird Sanctuary Regulations, which prescribe rules and prohibitions regarding the taking, injuring, destruction or molestation of migratory birds or their nests or eggs in the sanctuaries. Hunting of listed species under the Act is not permitted in any Migratory Bird Sanctuary. At present, there are 92 MBS across Canada, comprising almost 11.5 million hectares of migratory bird habitat that provides safe refuge for migratory birds in the terrestrial and marine environment. The Canadian Wildlife Service of Environment Canada is the agency responsible for MBS, although the sanctuaries can be located on federal, provincial, or private land[6].

Figure 4. National Wildlife Areas and Migratory Bird Sanctuaries in New Brunswick.

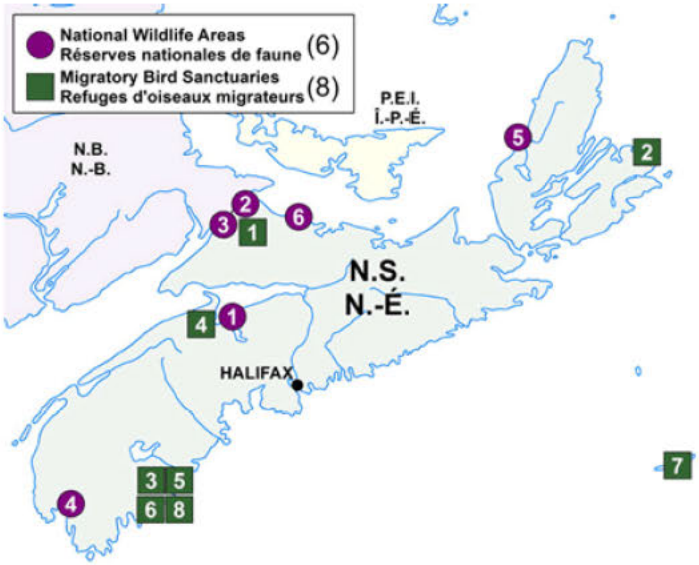


National Wildlife Areas			
No.	**Name**	**Year Established**	**Size in Hectares**
1	Cape Jourimain	1980	654
2	Portage Island	1979	349
3	Portobello Creek	1995	3,011
4	Shepody	1980	1,062
5	Tintamarre	1977	1,970

Migratory Bird Sanctuaries			
No.	**Name**	**Year Established**	**Size in Hectares**
1	Grand Manan MBS	1931	433
2	Inkerman MBS	1998	16
3	Machias Seal Island MBS	1944	1,046

[5] https://www.canada.ca/en/environment-climate-change/services/national-wildlife-areas/locations.html
[6] https://www.canada.ca/en/environment-climate-change/services/migratory-bird-sanctuaries/locations.html

Figure 5. National Wildlife Areas and Migratory Bird Sanctuaries in Nova Scotia.



National Wildlife Areas			
No.	**Name**	**Year Established**	**Size in Hectares**
1	Boot Island	1979	107
2	Chignecto	1982	409
3	John Lusby Marsh	1978	552
4	Sand Pond	1977	531
5	Sea Wolf Island	1982	76
6	Wallace Bay	1980	701
#	Isle Haute	In Progress	80

Migratory Bird Sanctuaries			
No.	**Name**	**Year Established**	**Size in Hectares**
1	Amherst Point	1947	433
2	Big Glace Bay Lake	1939	393
3	Port Herbert	1941	346
4	Kentville	1939	506
5	Port Joli	1941	397
6	Sable River	1941	313
7	Sable Island	1977	3,100
8	Haley Lake	1980	95

There are no designated National Wildlife Areas in Newfoundland and Labrador, however, there are 3 designated Migratory Bird Sanctuaries. The first two are located near Belle Isle, off the northeast coast of Newfoundland, the third is in the Bonavista Bay region of northeastern Newfoundland, adjacent to Terra Nova Provincial Park.

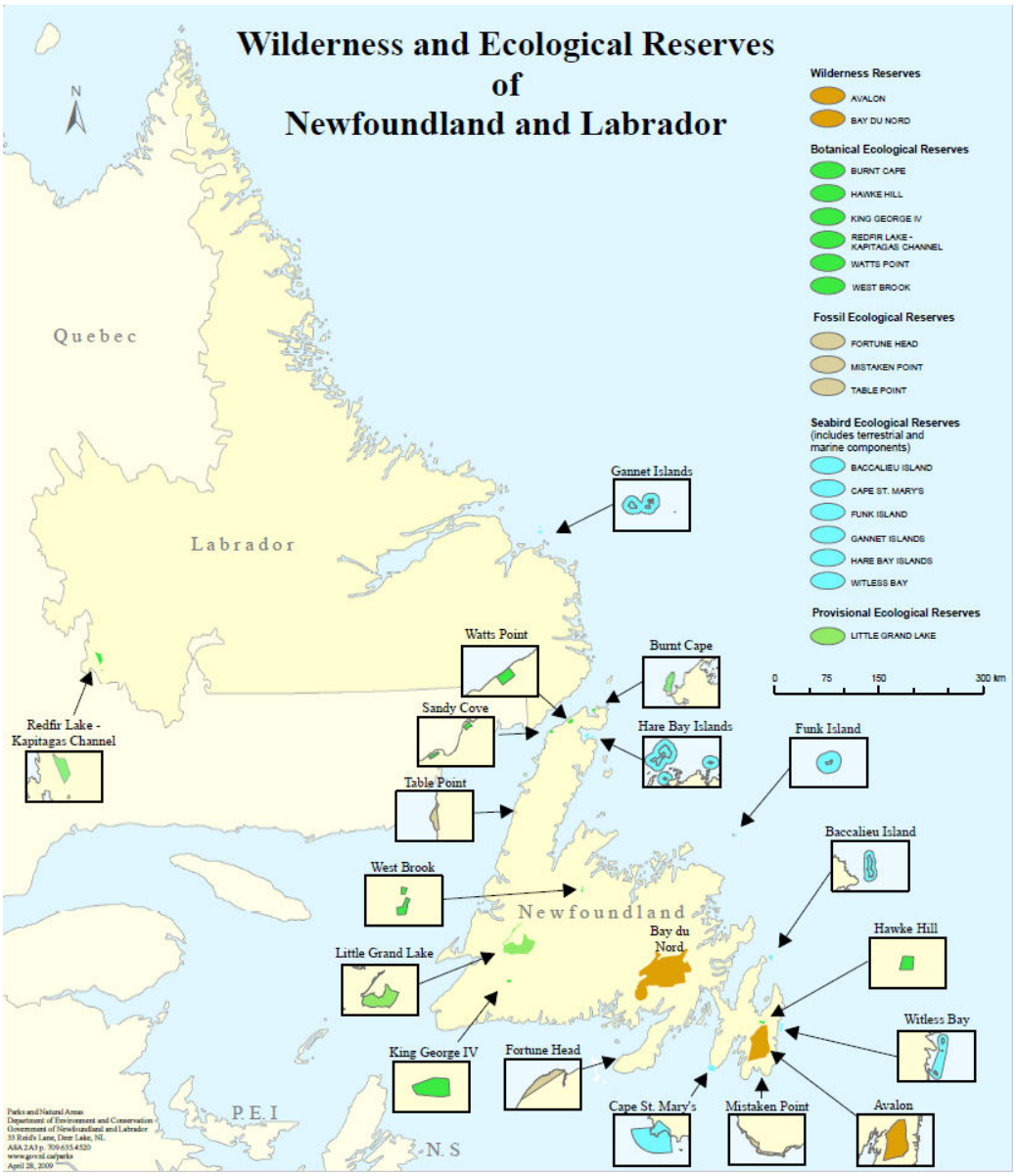
Table 1. Migratory Bird Sanctuaries in Newfoundland and Labrador.

Migratory Bird Sanctuaries			
No.	**Name**	**Year Established**	**Size in Hectares**
1	Shepherd Island	1991	18
2	Ile aux Canes	1991	162
3	Terra Nova	1967	1,178

The government of Newfoundland and Labrador has designated 18 wilderness and ecological reserves (**Fig. 6**)[7] which protect wide-ranging caribou herds, diverse seabird colonies, globally important fossil sites, and habitat for endangered or threatened plants and animals. Several protected areas are representative examples of the province's natural regions. Wilderness reserves are large, protected areas (greater than 1,000 km^2) that are designed to protect significant natural features and landscapes. There are two wilderness reserves in Newfoundland - the Avalon and the Bay du Nord and none in Labrador which were created primarily to protect the habitat and range of a caribou herd. Ecological reserves are protected areas (less than 1,000 km^2) that were created for two main purposes: a) to protect representative examples of ecosystems or ecoregions, or b) to protect unique, rare, or endangered plants, animals, or other elements of our natural heritage.

Most of the reserves in the second category are divided into three general types-botanical, fossil, and seabird ecological reserves.

Figure 6. Wilderness and Ecological Reserves of Newfoundland and Labrador.



[7] Department of Environment and Conservation. 2006. A Guide to our Wilderness and Ecological Reserves – Newfoundland and Labrador.

3.1.2 Marine Protected Areas

Marine Protected Areas (MPAs) are defined geographic areas dedicated to and managed for the long-term conservation of nature. The Department of Fisheries and Oceans (DFO) Canada establishes and manages MPAs under the Oceans Act in order to conserve numerous aspects which include, but are not limited to, commercial and non-commercial fishery resources, endangered or threatened marine species, unique habitats and other marine resources, or habitats necessary to fulfill the DFOs mandate of scientific research.

As of February 2022, there are 14 MPAs designated across Canada[8], **8 of these are in the Atlantic Ocean.**

- Anguniaqvia niqiqyuam – located in the Northwest Territories, within the Inuvialuit Settlement Region, as defined by the Western Artic Claim – Inuvialuit Final Agreement, Western Artic Bioregion.
    - To maintain the integrity of the marine environment offshore of the Cape Parry Migratory Bird Sanctuary so that it is productive and allows for higher trophic level feeding.
    - To maintain the habitat to support populations of key species (such as beluga whales, Arctic char, and ringed and bearded seals).
- **Banc-des-Américans** – located off the eastern tip of the Gaspé Peninsula, Estuary, and the Gulf of St. Lawrence bioregion.
    - Conserve and protect benthic (seabed) habitats.
    - Conserve and protect pelagic (water column) habitats and forage species (prey).
    - Promote the recovery of at-risk whales and wolffish.
- **Basin Head** – located off the eastern tip of Prince Edward Island, Estuary and Gulf of St. Lawrence Bioregion.
    - Maintain the quality of the marine environment and the physical structures of the ecosystem supporting the *Chondrus crispus* variety of Irish Moss.
    - Maintain the health (biomass and coverage) of the Basin Head *Chondrus crispus*.
    - Maintain the overall ecological integrity of the Basin Head lagoon and inner channel, including avoidance of excessive Ulva growth, maintenance of adequate oxygen levels, and diversity of indigenous flora and fauna.
- **Eastport** – located off the northeast coast of Newfoundland; Newfoundland-Labrador Shelves Bioregion.
    - Maintain a viable population of American lobster through the conservation, protection, and sustainable use of resources and habitats within the Eastport Peninsula Lobster Management Area (EPLMA); and
    - Ensure the conservation and protection of threatened or endangered species.
- Endeavour Hydrothermal Vents – located on the Juan de Fuca Ridge, British Columbia, Offshore Pacific Bioregion.
    - Conserve the biological diversity, productivity, structural habitat, and ecosystem function of the hydrothermal vents.
- **Gilbert Bay** – located off the southeast coast of Labrador; Newfoundland-Labrador Shelves Bioregion.
    - Conservation and protection of the Gilbert Bay cod and its habitats.
    - Conservation and protection of the Gilbert Bay ecosystem.
    - Facilitation of scientific research opportunities in the Gilbert Bay ecosystem.
    - Promotion of public awareness, education, and support of the Gilbert Bay MPA.
- **The Gully** – located east of Nova Scotia's Sable Island, Scotian Shelf Bioregion.
    - Minimize harmful impacts from human activities on cetacean populations and their habitats.
    - Minimize the disturbance of seafloor habitat and associated benthic communities caused by human activities.
    - Maintain and monitor the quality of water and sediments of the Gully; and
    - Manage human activities to minimize impacts on other commercial and non-commercial living resources.
- Hecate Strait/Queen Charlotte Sound Glass Sponge Reefs – located north and south of the entrance to Douglas Channel, British Columbia, Northern Shelf Bioregion.
    - Conserve the biological diversity, structural habitat, and ecosystem function of the glass sponge reefs.

[8] http://www.dfo-mpo.gc.ca/oceans/mpa-zpm/index-eng.html

- **Laurentian Channel** – located off the southwest coast of Newfoundland and Labrador, Newfoundland, and Labrador Shelves Bioregion.
    - Protect corals, particularly significant concentrations of sea pens, from harm due to human activities (e.g., fishing, oil and gas exploratory drilling, submarine cable installation and anchoring) in the Laurentian Channel.
    - Protect Black Dogfish from human induced mortality (e.g., bycatch in the commercial fishery) in the Laurentian Channel.
    - Protect Smooth Skate from human induced mortality (e.g., bycatch in the commercial fishery) in the Laurentian Channel.
    - Protect Porbeagle sharks from human induced mortality (e.g., bycatch in the commercial fishery, seismic activities) in the Laurentian Channel.
    - Promote the survival and recovery of Northern Wolffish by minimizing risk of harm from human activities (e.g., bycatch in the commercial fishery) in the Laurentian Channel.
    - Promote the survival and recovery of Leatherback Sea Turtles by minimizing risk of harm from human activities (e.g., entanglement in commercial fishing gear, seismic activities) in the Laurentian Channel.
- **Musquash Estuary** – Bay of Fundy, New Brunswick; Scotian Shelf Bioregion.
    - Maintain productivity of harvested species.
    - Maintain biodiversity of individual species, communities, and populations within the different ecotypes.
    - Safeguard habitat, including the physical and chemical properties of the ecosystem, by maintaining water and sediment quality.
- SGaan Kinghlas-Bowie Seamount - located 180 kilometers offshore and to the west of Haida Gwaii (formerly known as Queen Charlotte Islands) in the northeast Pacific, off the coast of British Columbia. The seamount rises from a depth of 3,000 meters to within 24 meters of the surface.
    - Conserve and protect the unique biodiversity and biological productivity of the area's marine ecosystem, which includes the SGaan Kinghlas-Bowie, Hodgkins and Davidson seamounts and the surrounding waters, seabed, and subsoil.
- **St. Anns Bank** – located east of Cape Breton Island, Nova Scotia, Scotian Shelf Bioregion.
    - Conserve and protect all major benthic, demersal (i.e., close to the sea floor) and pelagic (i.e., in the water column) habitats within the MPA, along with their associated physical, chemical, geological, and biological properties and processes.
    - Conserve and protect marine areas of high biodiversity at the community, species, population, and genetic levels within the MPA.
    - Conserve and protect biological productivity across all trophic levels so that they can fulfill their ecological role in the ecosystems of the MPA.
- Tarium Niryutait – located in the Mackenzie River Delta and estuary in the Beaufort Sea, Western Artic Bioregion.
    - To conserve and protect beluga whales and other marine species (anadromous fish, waterfowl, and seabirds), their habitats and their supporting ecosystem.
- Tuvaijuittuq – located off the northwest coast of Ellesmere Island, Nunavut in the Arctic Ocean, encompasses areas within the Artic Basin and Arctic Archipelago Bioregions.
    - To contribute to the conservation, protection and understanding the natural diversity, productivity, and dynamism of the High Arctic Sea ice ecosystem.
        - Tuvaijuittuq is the first MPA to be designated for interim protection by ministerial order under the *Oceans Act*, limiting human activities in the area for up to five years.

3.2 Maine Natural Areas Program

Ecological Reserves are lands specifically set aside to protect and monitor the State of Maine's natural ecosystems. These lands are managed by the Bureau of Parks and Public Lands, and the Maine Natural Areas Program oversees the long-term ecological monitoring plan. As of 2013, Maine has designated more than 90,000 acres of Ecological Reserves on 17 public land units. The purposes of the Reserves are:

1. To maintain one or more natural community types or native ecosystem types in a natural condition and range of variation and contribute to the protection of Maine's biological diversity,
2. To act as a benchmark against which biological and environmental change may be measured, as a site for ongoing scientific research, long-term environmental monitoring, and education, and
3. To protect sufficient habitat for those species whose habitat needs are unlikely to be met on lands managed for other purposes.

Reserves were designated following a multi-year inventory and assessment project coordinated by the Maine Forest Biodiversity Project, with staff assistance from The Nature Conservancy, the Maine Natural Areas Program, and the Bureau of Parks and Public Lands. In total, there are 17 Maine Ecological Reserves as of July 2018 - ranging in size from 775 acres at Wassataquoik Stream to over 11,000 acres at Nahmakanta.

Factsheets on each of the reserves are available through the Maine Department of Agriculture, Conservation and Forestry website[9].

- Big Spencer Mountain
- Bigelow Preserve
- Chamberlain Lake/Lock Dam
- Cutler Preserve
- Deboullie
- Duck Lake
- Gero Island
- Great Heath
- Mahoosucs Unit
- Mt. Abraham
- Nahmakanta
- Number Five Bog
- Rocky Lake
- Salmon Brook Lake
- St. John Ponds
- Tunk Lake Area, including Donnell Pond and Spring River Lake
- Wassataquoik Stream

[9] https://www.maine.gov/dacf/mnap/reservesys/index.htm

SECTION 4 - Risk Assessment

4.1 Atlantic Canada Aquaculture Sites and the Species at Risk Act (SARA)

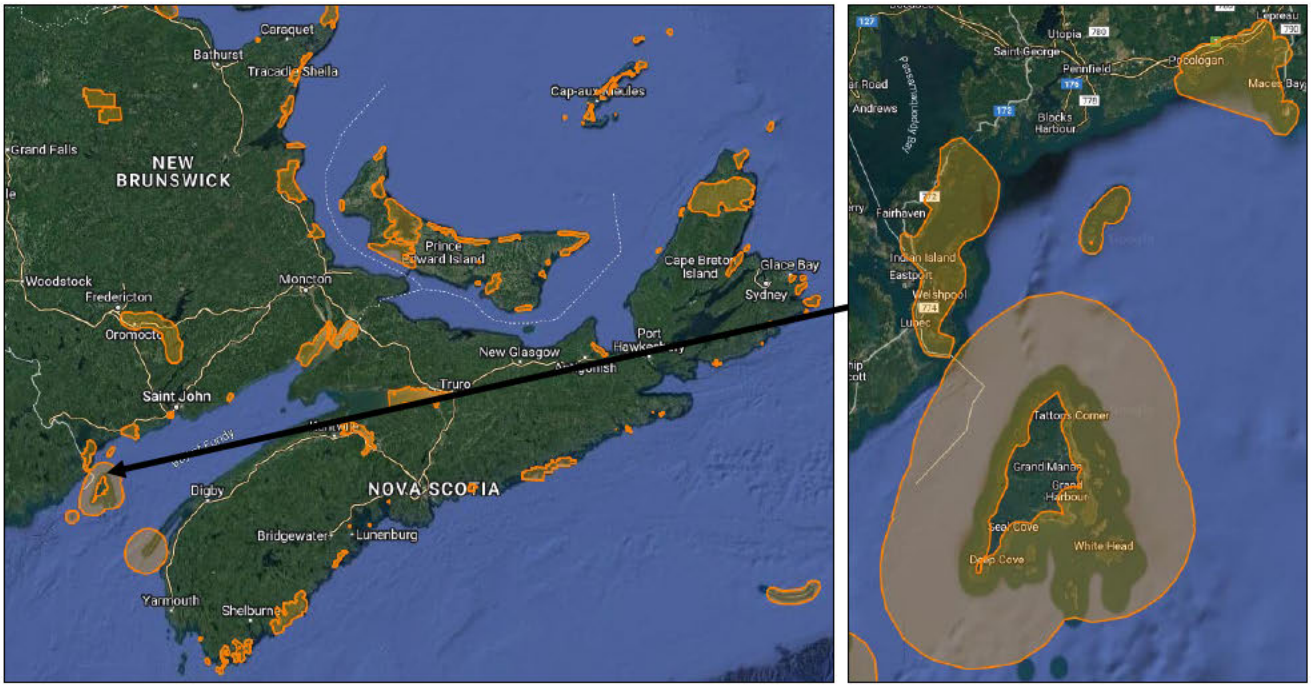
The SARA is a key federal government commitment *"to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened"*. SARA provides for the legal protection of wildlife species and the conservation of their biological diversity.

When scoping new sites or proposing boundary amendments for pre-existing farms, endangered, at risk and threatened species that have been or may be found within the proposed area must be identified. Species identified that are listed under the SARA designation must be protected and considered within the proposal. Applicants must provide mitigation plans for those species regarding how the operation will strive to not impede or otherwise cause harm. Applicants must also consider those species identified by regional conservation strategies, including Provincial Species at Risk Acts or Endangered Species Acts.

4.1.1 Important Birds and Biodiversity Areas (IBA)

Important Bird Areas (IBAs)[10] are discrete sites that support specific groups of birds: threatened birds, large groups of birds, and birds restricted by range or by habitat. When bird species occur at a site in sufficient numbers during one or more seasons (winter; migration; breeding), they become known as trigger species, and the site at which they are found is designated as an IBA. IBAs range in size from very tiny patches of habitat to large tracts of land or water. They may encompass private or public land, and they may or may not overlap partially or entirely with legally protected sites, such as EBSAs, National Wildlife Areas, Migratory Bird Sanctuaries and Wilderness and Ecological Reserves mentioned previously. While there are no IBAs located near our marine farms in Newfoundland, there are several identified within New Brunswick and Nova Scotia (**Fig. 7**).

Figure 7. IBAs in the Maritimes Region, with focus of Grand Manan Island, Passamaquoddy Bay and Maces Bay, NB.



[10] https://www.ibacanada.org/index.jsp?lang=en

4.2 Maine Aquaculture Sites and the Endangered Species Act (ESA)

The ESA aims to conserve, protect, and recover imperiled species and the ecosystems upon which they depend. The National Oceanic and Atmospheric Administration (NOAA) Fisheries is responsible for the protection, conservation, and recovery of endangered and threatened marine and anadromous species under the ESA.

Generally, NOAA Fisheries manages the marine and anadromous species including whales, corals, sea turtles, and salmon. The US Fish and Wildlife Service (USFWS) manages terrestrial and freshwater species such as polar bears, sea otters, and manatees.

The Maine Endangered Species Act (MESA) provides the Maine Department of Inland Fisheries and Wildlife (MDIFW) with a mandate to conserve all the species of fish and wildlife found in the State, as well as the ecosystems upon which they depend. Under the MESA, as stated in Maine aquaculture site Department of Marine Resources (DMR) Leases, a state agency or municipal government shall not permit, licence, fund or carry out projects occurring partly or wholly within the essential habitat, without the approval of the Commissioner of MDIFW.

Applicants are required to provide a signed statement to confirm the proposed lease either does not fall within the boundary of an essential habitat or that the applicant has contacted MDIFW, and preliminary review will grant approval for the Maine Department of Marine Resources (MDMR) to issue an aquaculture lease within part or all the boundary of a designated Essential Habitat.

SECTION 5 - Local Endangered or Threatened Species

5.1 Atlantic Canada

The following species are listed as endangered or threatened in Atlantic Canada[11] (excluding Prince Edward Island as well as terrestrial plants and animals) either under the Federal Species at Risk Act (SARA) and/or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and may be seen in the vicinity of our marine farms:

E = Endangered under the SARA and listed by the COSEWIC
T = Threatened under the SARA and listed by the COSEWIC
s = Special Concern under the SARA and listed by the COSEWIC
c = COSEWIC Designation, no SARA Status

Birds

1 Bank Swallow (*Riparia riparia*) **T**
2 Barn Swallow (*Hirundo rustica)* **T**
3 Barrow's Goldeneye (*Bucephala islandica*) **s**
4 Bicknell's Thrush (*Catharus bicknelli*) **T**
5 Bobolink (*Dolichonyx oryzivorus*) **T**
6 Canada Warbler (*Wilsonig anadensis*) **T**
7 Chimney Swift (Chaetura pelagica) **T**
8 Common Nighthawk (*Chordeiles minor*) **T**
9 Eastern Meadowlark (*Sturnella magna*) **T**
10 Eastern Whip-poor-will (*Antrostomus vociferus*) **T**
11 Eastern Wood Pewee (*Contopus virens*) **c**
12 Eskimo Curlew (*Numenius borealis*) **E – LIKELY EXTINCT**
13 Evening Grosbeak (*Coccothraustes vespertinus*) **s**
14 Harlequin Duck (*Histrionicus histrionicus*) **s**
15 Horned Grebe – Western population (*Podiceps auratus*) **s**[12]
16 Hudsonian Godwit (*Limosa haemastica*) **c**
17 Ipswich Sparrow (*Passerculus sandwichensis princeps*) **s**
18 Ivory Gull (*Pagophila eburnean*) **E**
19 Leach's Storm-Petrel (*Oceanodroma leucorhoa*) **c**
20 Least Bittern (*Ixobrychus exilis*) **T**
21 Lesser Yellowlegs (*Tringa flavipes*) **c**
22 Olive-sided Flycatcher (*Contopus cooperi*) **T**
23 Peregrine Falcon – Anatum Subspecies (*Falco peregrinus anatum*) **s**
24 Piping Plover (*Charadrius melodus*) **E**
25 Red Crossbill percna (*Loxia curvirostra percna*) **T**
26 Red Knot Rufa (*Calidris canutus rufa*) **E**
27 Red-necked Phalarope (*Phalaropus lobatus*) **s**
28 Roseate Tern (*Sterna dougallii*) **E**
29 Ross's Gull (*Rhodostethia rosea*) **T**
30 Rusty Blackbird (*Euphagus carolinus*) **s**
31 Savannah Sparrow princeps (*Passerculus sandwichensis princeps*) **s**
32 Short-eared Owl (*Asio flammeus*) **s**
33 Wood Thrush (*Hylocichla mustelina*) **T**
34 Yellow Rail (*Coturnicops noveboracensis*) **s**

[11] https://species-registry.canada.ca/index-en.html#/species?ranges=15,9,7,8&taxonomyId=4,5,2&sortBy=commonNameSort&sortDirection=asc&pageSize=10 (Filtered by NB, NL, NS, Atlantic Ocean; Birds, Fishes (Marine), Mammals)
[12] The Western population is recognized by the Province of New Brunswick under the provincial Species at Risk Act, though the SARA Registry does not consider New Brunswick as a range of the species. Due to its listing on the provincial list, it is included here.

Fish

1 Acadian Redfish (*Sebastes fasciatus*) **c**
2 American Eel (*Anguilla rostrata*) **T**
3 American Plaice (*Hippoglossoides platessoides*) **c**
4 Atlantic Bluefin Tuna (*Thunnus thynnus*) **c**
5 Atlantic Cod – Newfoundland and Labrador, Laurentian North and South, Southern populations (*Gadus morhua*) **c**
6 Atlantic Salmon – Eastern Cape Breton, Gaspe-Southern Gulf of St. Lawrence, Outer Bay of Fundy, Nova Scotia Southern Upland, South Newfoundland populations (*Salmo salar*) **c**
7 Atlantic Salmon – Inner Bay of Fundy (*Salmo salar*) **E**
8 Atlantic Sturgeon – Maritime population (*Acipenser oxyrinchus*) **c**
9 Atlantic Whitefish (*Coregonus huntsman*) **E**
10 Atlantic Wolffish (*Anarhichas lupus*) **s**
11 Basking Shark (*Cetorhinus maximus*) **c**
12 Cusk (*Brosme brosme*) **c**
13 Lumpfish (*Cyclopterus lumpus*) **c**
14 Northern Wolffish (*Anarhichas denticulatus*) **T**
15 Porbeagle (*Lamna nasus)* **c**
16 Shortfin Mako – Atlantic population (*Isurus oxyrinchus*) **c**
17 Shortnose Sturgeon (*Acipenser brevirostrum*) **s**
18 Smooth Skate – Lauranian-Scotian population (*Malacoraja senta*) **c**
19 Spiny Dogfish (*Squalus acanthias*) **c**
20 Spotted Wolffish (*Anarhichas minor*) **T**
21 Striped Bass – Bay of Fundy, Southern Gulf of St. Lawrence Population (*Morone saxitilis*) **c**
22 Thorny Skate (*Amblyraja radiata*) **c**
23 White Shark (*Carcharodon Carcharias*) **E**
24 White Hake (*Urophycis tenuis*) **c**
25 Winter Skate – Georges Bank, Western Scotian Shelf, Bay of Fundy populations (*Leucoraja ocellate*) **c**

Mammals

26 Beluga Whale (*Delphinapterus leucas*) **c**
27 Blue Whale (*Balaenoptera musculus*) **E**
28 Fin Whale (*Balaenoptera physalus*) **s**
29 Harbour Porpoise - Northwest Atlantic Population (*Phocoena phocoena*) **c**
30 Killer Whale – Northwest Atlantic population (*Orcinus orca*) **c**
31 North Atlantic Right Whale (*Eubalaena glacialis*) **E**
32 Northern Bottlenose Whale – Scotian Shell population (*Hyperoodon ampullatus*) **E**
33 Polar Bear (*Ursus maritimus*) **s**
34 Ringed Seal (*Pusa hispida*) **c**
35 Sowerby's Beaked Whale (*Mesoplodon bidens*) **s**

Turtles

36 Leatherback Sea Turtle – Atlantic population (*Dermochelys coriacea*) **E**
29 Loggerhead Sea Turtle (*Caretta caretta*) **E**

5.1.1. New Brunswick

In addition to the Federal SARA Registry, the following species are listed under Schedule A of the New Brunswick *List of Species at Risk Regulations - Species at Risk Act*[13] and may be seen within the vicinity of our marine farms:

E = **Endangered Species**
T = **Threatened Species**
S = **Species of Special Concern**

Birds

1 Bald Eagle (*Haliaeetus leucocephalus*) **E**

Fish

2 Blue Shark – Atlantic population (*Prionace glauca*) **S**
3 Rainbow Smelt – Lake Utopia Large-Bodied, Small-Bodied populations (*Osmerus mordax*) **T**
4 Winter Skate – Southern Gulf of St. Lawrence population (*Leucoraja ocellata*) **E**

5.1.2 Newfoundland

Newfoundland and Labrador's Endangered Species Act provides special protection for plant and animal species considered to be endangered, threatened, or vulnerable in the province. The Act considers species and populations that are native to the province but does not include marine fish. The following species are additional species relevant to those listed under the Federal SARA Registry and are listed under the Newfoundland and Labrador Endangered Species Act[14]:

E = Endangered
T = Threatened
V = Vulnerable

Birds

1 Newfoundland Gray-cheeked Thrush (*Catharus minimus minimus*) **T**

5.2 Maine

Endangered and threatened marine species in the state of Maine are listed under the Marine Endangered Species Act[15]. Endangered and threatened inland fish and wildlife species in Maine are listed either under Maine's Endangered Species Act[16], the US Endangered Species Act[17], or both. The following species are listed as endangered or threatened in Maine and may be seen in the vicinity of our marine farms:

F = Federally Endangered under the U.S. Endangered Species Act
f = Federally Threatened under the U.S. Endangered Species Act
S = State Endangered under the Maine Endangered Species Act
s = State Threatened under the Maine Endangered Species Act
M = State Endangered under the Maine Marine Endangered Species Act
m = State Threatened under the Maine Marine Endangered Species Act

[13] https://laws.gnb.ca/en/showdoc/cr/2013-38
[14] https://www.gov.nl.ca/ffa/wildlife/endangeredspecies/
[15] http://www.mainelegislature.org/legis/statutes/12/title12sec6975.html
[16] https://www.maine.gov/ifw/fish-wildlife/wildlife/endangered-threatened-species/listed-species.html
[17] https://www.fisheries.noaa.gov/species-directory/threatened-endangered?title=&species_category=any&species_status=any&regions=1000001111&items_per_page=25&sort=#

Birds

1. American Pipit (*Anthus rubescens*) (Breeding population only) **S**
2. Arctic Tern (*Sterna paradisaea*) **s**
3. Atlantic Puffin (*Fratercula arctica*) **s**
4. Barrow's Goldeneye (*Buchephala islandica*) **s**
5. Black-crowned Night Heron (*Nycticorax nycticorax*) **S**
6. Black Tern (*Chlidonias niger*) **S**
7. Common Gallinule (*Gallinula chloropus*) **s**
8. Giant Manta Ray (*Manta birostris*) **f**
9. Golden Eagle (*Aquila chrysaetos*) **S**
10. Grasshopper Sparrow (*Ammodramus savannarum*) **S**
11. Great Cormorant – Breeding population (*Phalacrocorax carbo*) **s**
12. Harlequin Duck (*Histrionicus histrionicus*) **s**
13. Least Bittern (*Lxobrychus exilis*) **S**
14. Least Tern (*Sterna antillarum)* **S**
15. Peregrine Falcon – Breeding population (*Falco peregrinus*) **S**
16. Piping Plover (*Charadrius melodus*) **S f**
17. Razorbill (*Alca torda*) **s**
18. Red Knot (*Calidris canutus rufa*) **f**
19. Roseate Tern (*Sterna dougallii*) **S F**
20. Sedge Wren (*Cistothorus platensis*) **S**
21. Short-eared Owl (*Asio flammeus*) (Breeding population only) **s**
22. Upland Sandpiper (*Bartramia longicauda*) **s**

Fish

23. Atlantic Salmon (*Salmo salar*) **F**
24. Atlantic Sturgeon (*Acipenser oxyrinchus*) **f**
25. Shortnose Sturgeon (*Acipenser brevirostrum*) **F M**
26. Oceanic Whitetip Shark (*Carcharhinus longimanus*) **f**

Mammals

27. Blue Whale *(Balaenoptera musculs)* **F**
28. Fin Whale (*Balaenoptera physalus*) **F M**
29. Humpback Whale (*Megaptera novaeangliae*) **M**
30. North Atlantic Right Whale (*Eubalaena glacialis*) **F M**
31. Sei Whale (*Balaenoptera borealis*) **F M**
32. Sperm Whale (*Physeter catodon*) **F M**

Turtles

33. Atlantic (Kemp's) Ridley Turtle (*Lepidochelys kempi*) **F M**
34. Green Turtle (*Chelonia mydas*) **f**
35. Leatherback (*Dermochelys coriacea*) **F M**
36. Loggerhead (*Caretta caretta*) **f m**

SECTION 6 - Control Measures

From the careful selection of farm sites and investment in the best technology in everything from cage and net construction to feeding systems, to regular monitoring and sampling of sediment under cage sites, we ensure that all the necessary steps to safeguard the health of our salmon and of the surrounding areas are taken. Any measures taken to protect fish from predators are always carried out in a manner that considers predator welfare and does not endanger the predator population; however, if a predator cannot be deterred and is threatening human safety or the security of the containment, it may be dispatched with Saltwater Management consent AND in accordance with Provincial, State or Federal Regulations.

6.1 Passive Control Measures

The primary containment net will be protected from predators using a predator net as needed. The predator net mesh size will be consistent with that utilized in the area for controlling access by predators. Bird nets shall be present over top of each containment net when fish are present and only pulled back to allow access to the cage. During daily inspections, bird nets are checked for damage and pulled tight. 150m cages may require additional support lines to reduce sagging. In winter months, bird nets should be simmed to main nets.

6.2 Active Control Measures

Non-lethal, visual, or audible surface deterrent devices may be used on sites to discourage birds from landing on the cages. Use of audible deterrents must take into effect proximity to other users and abide by noise regulations in the respective area and as described in the operational licences and permits.

Visual active controls include the use of handheld lasers, specifically the Agrilaser® Handheld 200/500 developed by Bird Control Group. The beam produced is classified as a 3B Laser with an effective range of 2,500m. Birds see the laser beam differently than humans and see the beam as a physical danger. The goal is that after consistent use, the birds will perceive the farm as unsafe and will not return. Range of the laser is highly dependent upon weather conditions, with the longest range seen on dark or cloudy days. Sites designated to use this deterrent require specific training and must completed a Safe Use Agreement prior to being assigned a laser.

For predatory marine mammals, Acoustic Deterrent Devices (ADDs) may deployed underneath the water to deter the animals away from our cages. The use of ADDs has drastically reduced in recent years largely due in part to the advances in passive control systems, such as the use of the steel-core nets, redesign of our grid systems and other technologies. ADDs may only be used if:

- The use of an ADD has been first communicated with and approved by the respective Area and/or Production Manager to ensure that all other preventative measures have been taken.
- Other factors such as the legality to use such devices or the requirements of certification programs need to be referred to prior to deployment and your Compliance Manager (or similar) and/or Production Manager are your best resources to answer these questions.
- To ensure that non-target species are not negatively impacted, the use of any ADDs is limited during periods of high population densities. As such, the use of ADDs will NOT BE PERMITTED during the months of June through September – any ADDs must be physically removed from the water during this time.

For smaller marine predators, such as the mink. active measures to control or remove these predators is the use of traps. Traps are only permitted to be used under permit, such as the Nuisance Animal Control Permit in New Brunswick or through those who hold a valid licence, such as the Nuisance Wildlife Control Operator Licence or utilizing the services of local Wildlife Control Officers.

6.3 Lethal Control Measures

Lethal control measures for predators are prohibited unless there is a permit in place and actions are carried out according to said permit under the instructions and guidance of Senior Management. In most instances, marine mammals, primarily seals, found inside cages can be removed by lowering the net to allow the animal to remove themselves. Birds should never require the use of lethal control measures and only require intervention if entangled, entrapped or to aid, refer to *General Predator Interactions*.

6.4 Daily Inspections

Each day crews are to inspect the farm to check water quality, inspect cages and netting and to make general observations of the fish and fish activity from the surface. Any debris that could cause harm to the fish and/or damage netting should be removed from around or in the cages including garbage, large sticks, and excessive amounts of kelp or rockweed. Any garbage shall be removed from the water and placed in site garbage to be disposed properly.

Inspections on the cages and netting should include infrastructure inspections, such as:

- Checking for waterlines or handrail ties that are untied, missing, broken, or chaffed. Any lines that are untied must be retied; all others shall be replaced as soon as possible.
- Inspecting netting and the water surface inside of the cage for any entangled or entrapped wildlife. When possible, to do so without handling the wildlife, all attempts shall be made to release the wildlife without additional harm. Any species found deceased should be removed from the structure.
- Inspecting netting and cage for any damage. For larger repairs, such as broken, chaffed, or missing bridals, weight ring ropes or camera lines should be reported to the Site Manager as these types of repairs may require the use of divers, maintenance vessels, or plastic welders. Any holes discovered in the netting should immediately be repaired, if able, or reported to the Site Manager so that divers can be called in to assess and check for signs of fish escapement.

SECTION 7 - Special Requirements

7.1 Newfoundland Species at Risk; Bald Eagles and Miawpukek First Nation

Interactions between wildlife and aquaculture facilities are bound to occur from time to time. Therefore, our activities should be conducted with respect and care for the local wildlife, ensuring that harmful encounters are minimized. In cases where we do encounter entangled birds, other wildlife, and marine mammals on our sites, whether alive or dead, we are obligated to contact the following authorities for their information and action.

- Report any sightings of species listed on the Newfoundland and Labrador Species at Risk to the Department of Environment and Conservation – Endangered Species and Biodiversity, Wildlife Division at (709) 637-2026.
- Birds and other wildlife: notify the local Conservation Officer, Department of Environment and Conservation (in the Bay D'Espoir area the phone number is (709) 882-2200). If the animal in question is an eagle, we will also contact the Miawpukek First Nation Council, located in Conne River, at (709) 882-2470.
- Marine mammals and fish (tuna, etc.): contact the local Department of Fisheries and Oceans Canada Conservation and Protection Officer in your community.

In the case of wild animals that are alive, the province's Department of Environment and Conservation has a "Wildlife Care and Rehabilitation Program" at Salmonier Nature Park. The local Conservation Officer will be able to determine if the animal in question should be sent to the Salmonier Park.

If a dead animal is encountered, it should be retrieved where possible, treated respectfully, and turned over to the appropriate authority when directed to do so. In the case of deceased bald eagles, the Conservations Officer will make properly permitted arrangements to turn them over to the Miawpukek First Nation Council for respectful burial at Conne River.

7.2 Maine Coastal Islands National Wildlife Refuge Complex

Established between 1972 and 1980, the US Fish and Wildlife Service (USFWS) oversees the Maine Coastal Islands National Wildlife Refuge Complex, which were established for the protection of migratory birds, principally colonial nesting seabirds, The Complex, containing more than 73 offshore islands and 4 coastal parcels, is comprised of five individual refuges which span the coast of Maine and support an incredible diversity of habitats including coastal islands, forested headlands, estuaries, and freshwater wetlands. **Refer to APPENDIX USFWS: Maine Coastal Islands National Wildlife Refuge Complex**[18]

The Cross Island marine farm (MACH CI2), located just inside Northwest Harbour off Cross Island in Machias Bay, is positioned near the Cross Island National Wildlife Refuge. A "line of impasse" is described within the Army Corp of Engineers Permit for MACH CI2 (1989) in which the permit states that no aquaculture gear can be placed south of this line.

7.3 National (US) Bald Eagle Management Guidelines

Bald Eagles were removed from the US endangered species list in August 2007 due to sufficient population recovery, however both bald eagles and golden eagles are still protected by the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act. The National Bald Eagle Management Guidelines[19] were developed by the USFWS to advise individuals who share public and private lands with bald eagles about when and under what circumstances the protective provisions of the Eagle Act may apply to their activities.
The Guidelines are intended to help people minimize such impacts to bald eagles, particularly where they may constitute "disturbance" which is prohibited by the Eagle Act.

[18] fws.gov/refuge/maine-coastal-islands-complex
[19] https://www.fws.gov/media/national-bald-eagle-management-guidelines-0

Due to the farms proximity to Stone Island, the Stone Island marine farm (MACH ST), located in Machias Bay, must comply with the Guidelines to minimize disturbance of nesting eagles on Stone Island. Such guidelines include sensitive periods (**Table 1**) within various ranges across the US, such as the Northern US which includes Maine.

Table 1. Chronology of typical reproductive activities of Bald Eagles for the Northern U.S., including Maine.

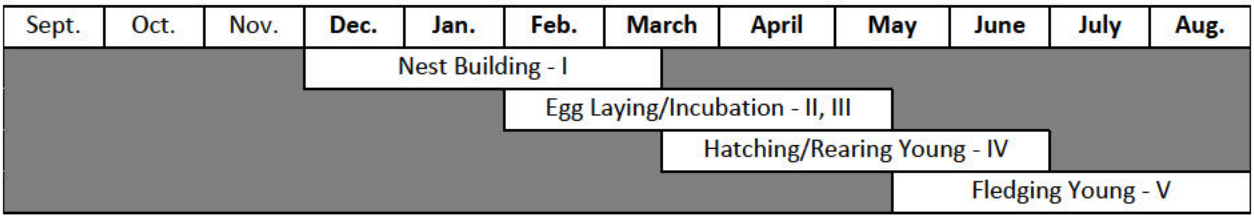


Table 2. Nesting Bald Eagle sensitivity to human activities.

Phase	Activity	Sensitivity to Human Activity	Comments
I	Courtship and Nest Building	Most Sensitive	Most critical time period. Disturbance is manifested in nest abandonment. Bald eagles in newly established territories are more prone to abandon nest sites.
II	Egg Laying	Very Sensitive	Human activity of even limited duration may cause nest desertion and abandonment of territory for the breeding season.
III	Incubation and Early Nestling Period (up to 4 weeks)	Very Sensitive	Adults are less likely to abandon the nest near and after hatching. However, flushed adults leave eggs and young unattended; eggs are susceptible to cooling, loss of moisture, overheating, and predation; young are vulnerable to elements.
IV	Nestling period, 4 to 8 weeks	Moderately Sensitive	Likelihood of nest abandonment and vulnerability of the nestlings to elements somewhat decreases. However, nestlings may miss feedings, affecting their survival.
V	Nestlings 8 weeks through fledging	Very Sensitive	Gaining flight capacity, nestlings 8 weeks and older may flush from the nest prematurely due to disruption and die.

7.4 Coffin Island, Nova Scotia

Coffin Island is used for nesting by colonial birds, including the Roseate Tern, which are particularly vulnerable to the effects of human disturbance. The period spent at the colony prior to egg-laying is very important for seabirds, disturbance prior to egg-laying may cause birds to abandon historical colony locations. Meanwhile, disturbances during the breeding season can cause these birds to abandon their nests or young, or to use valuable energy reserves for defense, instead of incubating eggs and feeding their young. The presence of humans in close proximity to nests may prevent parent birds from returning to protect and feed their young, and expose eggs or chicks to predation, and to the lethal effects of heat, cold and rain.

The Liverpool marine farm (NS-1205) is located in close proximity to Coffin Island, which is pending designation as a 50-hectare Nature Reserve in Nova Scotia[20]. Although not officially designated under the IBAs program, the surrounding beaches and flats at East Berlin, West Berlin, Eagle Head, Beach Meadows, and Western Head all host

[20] https://novascotia.ca/parksandprotectedareas/plan/interactive-map/

small populations of migrant shorebirds as well in late summer and early fall. Given the distance from the marine farm to the surrounding beaches and flats, there is no anticipated interaction with these areas.

There is concern for potential negative interactions with sensitive species, therefore it is important that mitigation measures, such as the following, be implemented to avoid/minimize adverse effects on migratory birds in the vicinity of Coffin Island:

- Marine travel should take place at steady speeds, moving parallel to the shore, rather than approaching Coffin Island directly.
- Vessels and equipment should be well muffled, and should avoid any sharp or loud noises, should not blow horns or whistles, and should maintain constant engine noise levels.
- Radio communications should be the primary source of communication, as opposed to whistle blasts and horns.
- Marine vessels should not pursue seabirds/waterbirds swimming on the water surface and avoid concentrations of birds on the water.
- There should be no access to Coffin Island, including the intertidal zone, by employees and/or equipment. Beaches and wetlands are sensitive habitats, and these habitats shall not be used for construction, operational or decommissioning activities, with the exception of beach clean-up activities, which should be timed to not coincide with sensitive periods for breeding birds.
- Beach clean-ups should be conducted in outer Liverpool Bay (Western Head to West Berlin) but avoid the mid-March to September 30th period.
- Should equipment wash up at these sites during the courtship, nesting, and/or chick rearing seasons of colonial nesters (spring and summer), the Canadian Wildlife Service will be contacted prior to retrieval of equipment.

Farms are expected to comply with the requirements as included in the Materials, Storage Handling and Waste Disposal Plan regarding fuel and chemical storage, household, and hazardous waste as well as feed storage that may affect wildlife through contamination or through the artificial enhanced presence of avian and mammalian predators.

SECTION 8 - Reporting and Training

Farm staff have available to them a copy of this plan. All site staff, as well as management, are responsible for both implementation and compliance of this plan.

Annually all marine farm employees participate in CREW Training which is an in-house developed and delivered session that discusses the day-to-day practices and responsibilities of all employees. Topics covered include Fish Health, Waste Management, Wildlife Interactions, Spill Prevention and Reporting, Escape Prevention and Reporting. Farm staff will be trained in recognizing endangered, threatened, and protected species they may see from their farm and a system for recording and reporting such observations to farm management. A Standard Operating Procedure for Predator Interaction is also included in the Fish Health Management Plan available on each site.

An IMS Incident Record is part of the Cooke Aquaculture Integrated Management System and is to be used to report various incident types, including wildlife interactions. The form is available electronically through Pronto Forms and is also available on SharePoint and hard copy if necessary.

All records of training are recorded in Intelex.

8.1 General Predator Interactions

Due to the environment in which we operate, wildlife interactions will be unavoidable – both neutral and negative. Neutral interactions are those where no wildlife is harmed but may be sighted by employees and been seen as a positive or rewarding experience. Though there is no direct contact, some species may require management notification if the species is listed on a Species at Risk list or other similar list. Negative interactions can be further divided into two subcategories – those that affect the marine farm populations (predators) and those where the wildlife has been impacted (entangled, entrapped, death). Based on historical knowledge, negative interactions will generally identify instances of predator activity and should be noted to determine if there is an increase or decrease in activity. If a predator is persistent or there is the potential for endangerment of employees, deterrence methods may be required. Any negative interaction, including those involving non-predatory species whether intentional or accidental, in addition to those neutral interactions with at risk species, must be reported.

8.2 General Wildlife Interactions

Marine birds and mammals have the greatest likelihood for interactions with marine farms given that they share the same waters and migrate through areas where farms are located. Wildlife may become entangled, entrapped, contaminated, or oiled from gear or chemicals on an aquaculture site. The first step to preventing such emergencies is prevention. Proper installed containment and predator exclusion netting, continually checking nets for integrity and avoiding oil, gas and chemical spills is important.

8.2.1 Entanglement, Entrapment

Birds, mainly gulls, will stand atop the bird stands and bird netting, both as a form of rest and in an attempt to access feed. Occasionally other birds such as crows, herons, among other may be seen but this is generally limited to smolt entry when the fish are small. Birds interested in fish generally loose interest once the fish are larger and as long as the bird nets remain taught. Other birds may be seen as they are passing through to other destinations.

Birds may become entrapped under the bird netting if there are holes in the net or if it is not properly secured. Should a bird become entrapped, employees must roll back the bird net and allow the bird to exit. The bird net must be gathered in a manner that prevents entanglement by neither the bird nor fish while it is pulled back. Once released, the bird net must be repaired, if applicable, and/or properly secured.

Marine mammals and large fishes may enter or entangle themselves within netting or anchor lines, either through forceful entry or accidental entanglement. Should a marine mammal such as a seal enter a cage, the seal should be immediately released by lowering the net to the height of the float pipe to allow the seal to swim out. The seal should be encouraged to leave the cage from the opposite side of the cage from where the net has been dropped. Once removed, the net is to be retied and divers should immediately be contacted to perform a net inspection.

These types of interactions require the submission of a Wildlife Interaction on the IMS Incident Record.

8.2.2 Oiled Birds

If a fuel, chemical or oil spill does occur or is discovered, immediately contact the Coast Guard, and activate the Spill Prevention and Response Plan (Canada) or Spill Prevention, Control and Countermeasure Plan (Maine). If wildlife is not initially affected, efforts should be made to keep wildlife out of the affected area, if possible.

Birds that have come into contact with oil may have exhibit obvious indicators of being oiled, such as oil coating, discolored feathers, or feathers having a wet or ragged appearance. Heavily oiled birds or individuals oiled below the waterline may also appear as though they are sitting low on the water, perhaps struggling to maintain above water. As such, oiled birds are also likely to be intently focused on preening in an attempt to remove the oil, so much so that they may not exhibit a strong flight reaction upon approach. They may also stand or rest on wharves, barges, or vessels with a more solid structure than those that might usually rest on the cages or netting.

DO NOT attempt to capture the bird without first seeking advice as their handling may require the issuance of permits, depending on species. Injured and oiled birds, especially those washed ashore are extremely weak, dehydrated, and often near death. The added stress of attempted capture could cause more harm than good, perhaps even fatality. Should an oiled bird be found, alive or deceased, contact the regional Compliance Manager, or designate and complete an IMS Incident Record. If further actions are required, the regional Compliance Manager or designate will communicate any advice or recommendations provided by the appropriate authorities.

8.3 Canadian Wildlife Service Permit

Migratory birds are protected under the Migratory Birds Convention Act and some species are also protected under the Species at Risk Act (SARA); this protection can extend to the point where evening handling these species is not allowed without a Canadian Wildlife Service Permit.

Common sense must prevail in all circumstances and caution must be exercised when dealing with birds. In stressful situations, birds may react with more force to protect themselves. As well, birds can carry diseases and parasites which may be transmitted to humans. If a bird can be easily released from entrapment without handling, this may be attempted by site workers. Employees should not touch birds, regardless of the situation. If an incident cannot be resolved, employees must contact the Compliance Manager or designate and provide information regarding the incident such as the cause of the incident (entanglement, oil spill, etc.), wildlife involved and the location of the incident - good directions and/or coordinates are essential to help experts arrive in time. Canadian Wildlife Services should be contacted, (506)-364-5068 or ec.scfatlpermis-cwsatlpermits.ec@canada.ca, for further direction. A permit may become necessary to handle and transport the bird to a rehabilitation facility. If a bird must be handled, clean work gloves must be worn, and the bird handled with care.

An exception to paragraph 6(b) of the Migratory Birds Regulations is currently in place and the variance will remain in effect until August 20, 2022[21]. Normally a person is not allowed to have in their possession any migratory birds, even if found dead. Under this temporary variance, a person may possess such birds if (and only if) they are in the process of delivering them to authorities for testing. This exception was granted to allow CWS to

[21] https://www.canada.ca/en/environment-climate-change/services/migratory-birds-legal-protection/public-notice-allowing-temporary-possession.html

monitor bird viruses. Once captured, keep the bird in a dark, quiet, warm location and transport to designated location as per the Regulator. DO NOT attempt to feed or clean the bird.

If crews find a dead migratory bird, the Site Manager must be informed and the Compliance Manager or designate contacted. The Compliance Manager or designated will contact the Canadian Wildlife Health Cooperative at 1-800-567-2033.

8.4 SARA Reporting

Species identified on the Provincial Protected Wildlife factsheets are protected under SARA (Species at Risk Act) and COSEWIC (Committee on the status of Endangered Wildlife in Canada) and have been or could be found in the area of aquaculture sites in Atlantic Canada.

Should you observe wildlife around aquaculture facilities identified under SARA/COSEWIC, special care should be taken to not disturb or harm the species. If able, collect a photograph and submit the details of the sighting on the IMS Incident Record, including location of the sighting. The Compliance Manager or designate will report sighting of these listed species to the species at risk hotline at 1-866-727-3467 or emailed to sightings@speciesatrisk.ca. Should the animal be found in distress, the Compliance Manager or designate will contact the Canadian Coast Guard at 1-800-565-1633.

The IMS Incident Record can be used to report both neutral and negative interactions.

8.5 Endangered Species – Federal and State

If you see a sick, injured, stranded, or dead marine mammal or sea turtle, immediately contact Northeast Marine Mammal and Sea Turtle Stranding and Entanglement Hotline at 1-866-755-NOAA (866-755-6622), or the Maine Marine Animal Reporting Hotline at 1-800-532-9551. A stranded animal is one that is dead on the beach or in the water, one that is alive on land and unable to return to the water and/or in need of medical attention, or a live animal in the water that is unable to return to its natural habitat under its own power or without assistance.

For Federally listed species, the National Oceanic and Atmospheric Administration (NOAA) – National Marine Fisheries Service (NMFS) should be contacted through David Bean, Consultation Biologist/Atlantic Salmon Team via email david.bean@noaa.gov and/or phone 1-207-866-4172.

Allied Whale is authorized by NOAA Fisheries to respond to marine mammal emergencies and strandings, covering the area from Rockland, Maine north to the Canadian border.[22] To report a marine mammal stranding contact Allied Whale at 1-207-288-5644 (office) or 1-207-266-1326 (cell).

Endangered and threatened marine species are listed under Maine's Marine Endangered Species Act or ESA. The Maine Department of Marine Resources (MDMR) has responsibility for these species. For State listed species, the MDMR, Aquaculture Division should be contacted through Marcy Nelson, Aquaculture Program Director via phone (207) 441-4681.

[22] https://www.coa.edu/allied-whale/marine-mammal-strandings/

APPENDICES

All Included in Master or Online Version Only
Applicable Regional Documents are Included in Site Reference Binders

Agrilaser® Handheld User Manual
CAF Safe Operation Agreement: Bird Control Group Agrilaser® Handheld 200/500

Maine
USFWS: Maine Coastal Islands National Wildlife Refuge Complex

New Brunswick
NB Protected Wildlife ID Chart

Newfoundland
NL Protected Wildlife ID Chart

Nova Scotia
NS Protected Wildlife ID Chart

END OF DOCUMENT

Agrilaser® Handheld

User manual EN

Mode d'emploi FR

Benutzerhandbuch DE

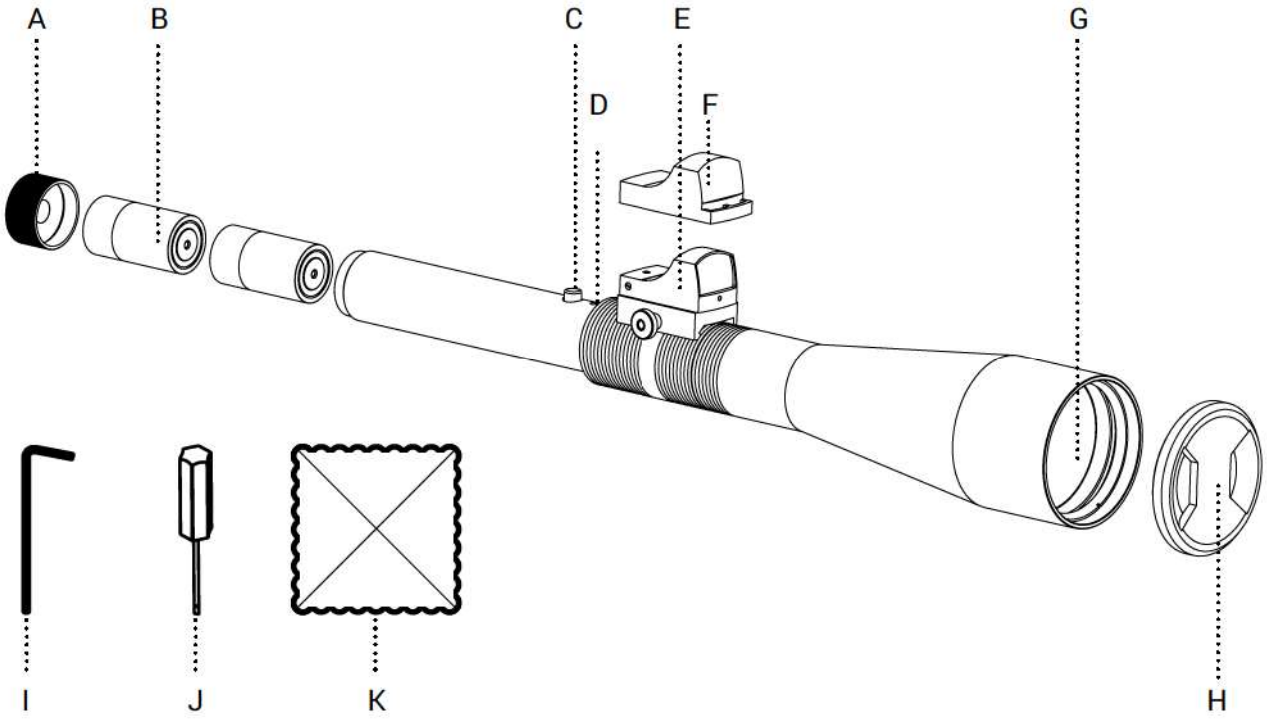
Gebruikershandleiding NL

Manual de usuario ES

Manual do usuário PT

Руководство пользователя RU

Agrilaser® Handheld V1.0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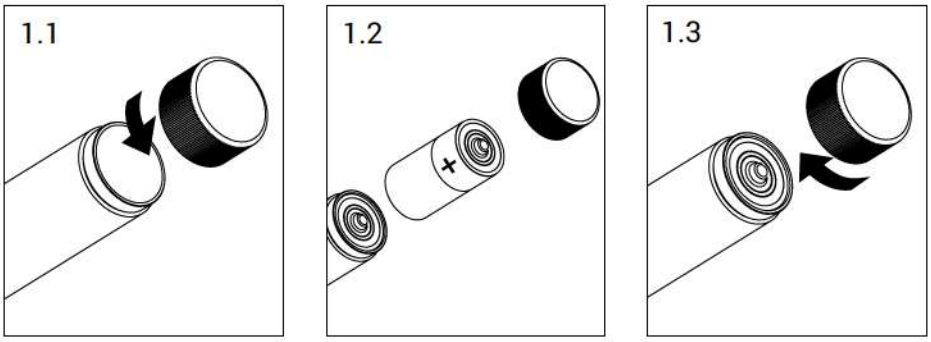
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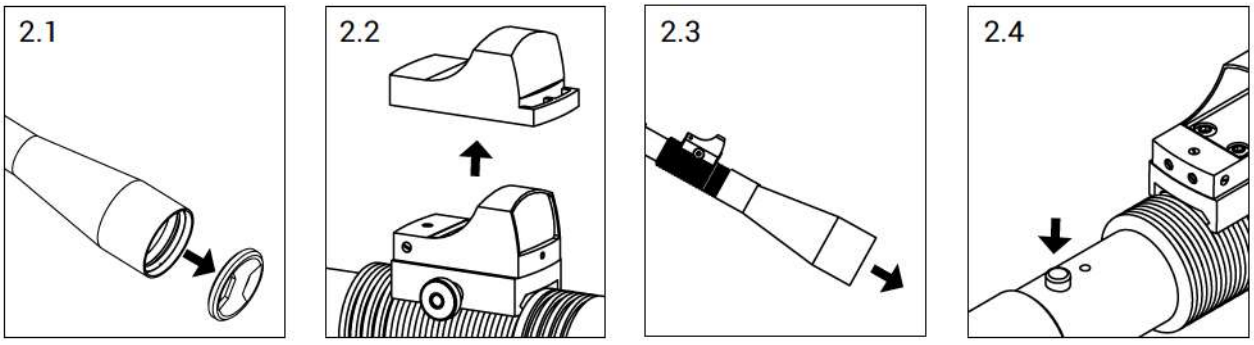
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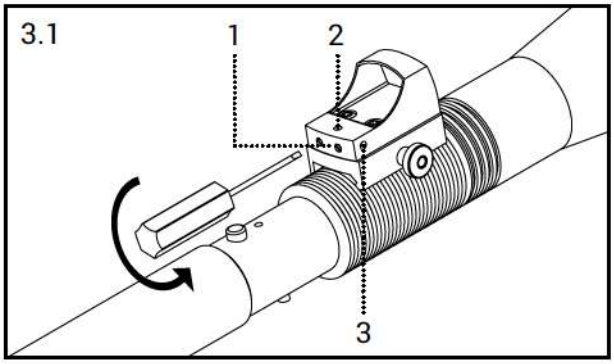
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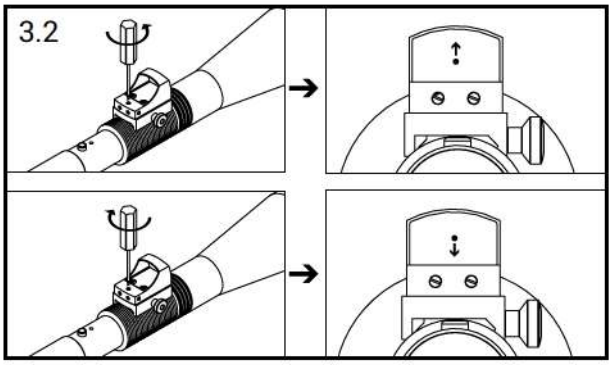
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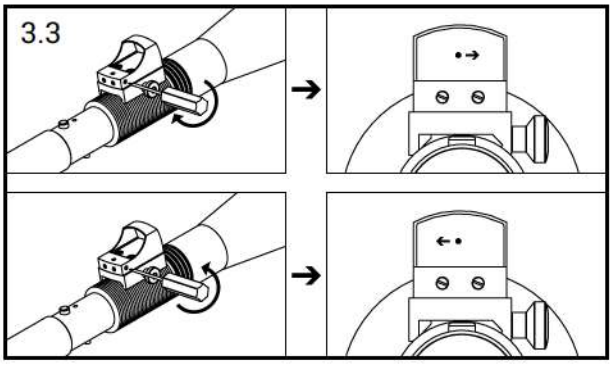
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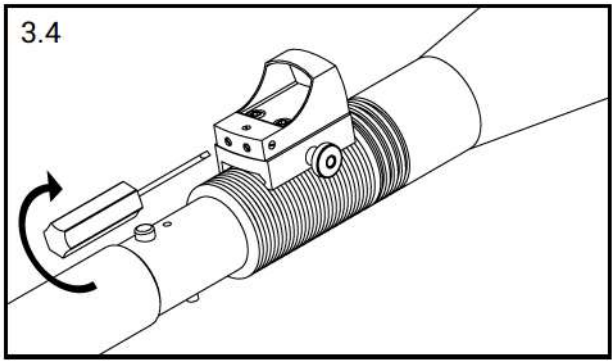
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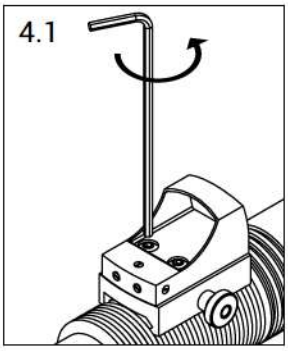
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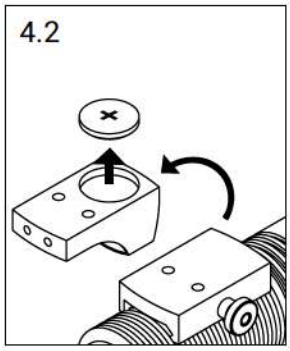
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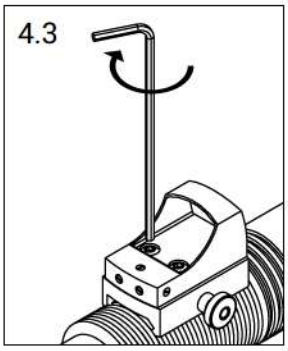
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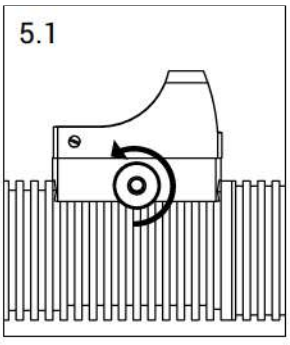
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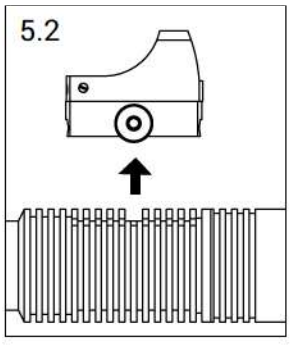
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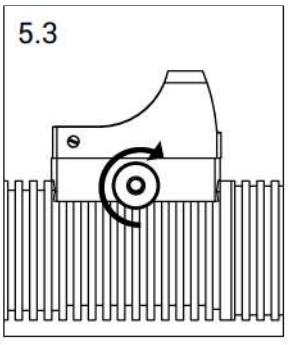
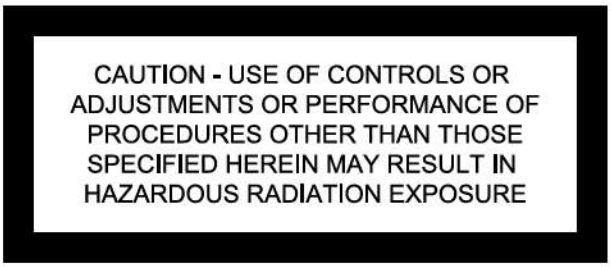

5.3

6.1


LASER RADIATION
DO NOT STARE INTO THE BEAM
OR VIEW DIRECTLY WITH
OPTICAL INSTRUMENTS
CLASS 2M LASER PRODUCT
MAXIMUM OUTPUT < 50 mW
WAVELENGTH 532 nM
CLASSIFIED TO NEN EN 60825-1:2007


CAUTION - USE OF CONTROLS OR
ADJUSTMENTS OR PERFORMANCE OF
PROCEDURES OTHER THAN THOSE
SPECIFIED HEREIN MAY RESULT IN
HAZARDOUS RADIATION EXPOSURE

ENGLISH

Explanation of general view

A	Screw cap	G	Laser aperture
B	C battery (LR14)	H	Lens cap
C	ON/OFF button	I	Hex key
D	Output indicator	J	Screw driver
E	Aiming sight	K	Cleaning cloth
F	Protection cap		

Table of contents

Thank you for your purchase of the Agrilaser® Handheld.

Agrilaser offers silent, effective and easy to use bird control products. Our patented optical technology is optimized for long distance bird repelling. Birds perceive the laser beam as an approaching physical danger and fly away in search for safer grounds. After consistent use birds will perceive the area as unsafe and will not return.

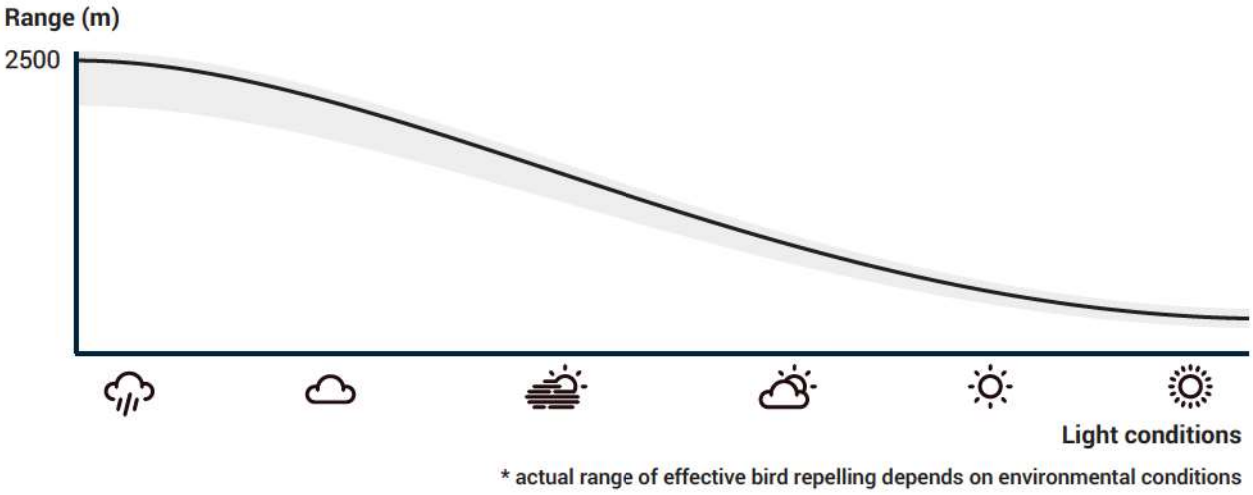
Package contents:
1x Agrilaser Handheld
1x Lens cap
2x LR14 battery
1x Aiming sight
1x Protection cap for aiming sight
1x Hex screw
1x Screw driver
1x Cleaning cloth
1x Storage case

CE The "CE" mark indicates that this product complies with the applicable European Directives which relate to health, safety, environmental and customer protection.

Technical specifications

Agrilaser® Handheld

Laser class	2M (classified according to NEN EN 60825-1:2007)
Laser beam color	Green
Service life laser source (during normal operating conditions)	5,000 h
Power source	Agrilaser Handheld: 2x C battery (LR14)
	Aiming sight: 1x CR2032 battery
Power input	3 VDC – 3.6 VDC
Energy consumption	4 W
Dimensions	424 (16.7) x 66 (2.6) x 83 (3.3) mm (in) (LxWxH)
Weight	760 g (27 oz)
Operating temperature	10 °C to 35 °C (50 °F to 95 °F)
Storage temperature	-10 °C to 50 °C (14 °F to 122 °F)



* actual range of effective bird repelling depends on environmental conditions

Safety instructions

⚠ **WARNING:** Carefully read all safety warnings and all instructions. Save all safety warnings and all instructions for future reference.

Agrilaser Handheld

⚠ **WARNING**: Staring into the beam or viewing the laser output with certain optical instruments designed for use at a distance (for example, telescopes or binoculars) may pose an eye hazard.

⚠ **WARNING**: The laser beam of the Agrilaser Handheld could cause dazzle or after images, particularly under low ambient light conditions. This may have indirect safety implications if experienced while performing safety-critical operations.

⚠ **CAUTION:**

- The Agrilaser Handheld should be used by adults only.
- The Agrilaser Handheld has no serviceable parts inside.
- To reduce risk of injury, only use the supplied batteries.
- Operate only in undamaged condition. Use of the product when damaged may result in exposure to hazardous laser radiation.

The safety labels as shown in figure 6.1 can be found on the bottom side of the Agrilaser Handheld body.

Contact your local Agrilaser dealer for any questions related to product safety.

Batteries

⚠ **CAUTION:**

- To prevent product malfunction, always insert batteries in correct orientation.
- Do not short circuit batteries.
- Misuse or abuse of batteries may result in leakage, burns, fire or explosion/disassembly causing personal injury or damage to other devices.
- Eye contact with battery contents may cause severe irritation. If battery is leaking and material contacts the eye, flush thoroughly with copious amounts of running water for 15 minutes. Seek immediate medical attention.
- Skin contact with battery contents may cause irritation. If battery is leaking and material contacts the skin, remove any contaminated clothing and flush exposed skin with copious amounts of running water. If irritation, injury or pain persists, seek medical attention.
- Inhalation of vapors or fumes released due to a large number of leaking batteries may cause respiratory and eye irritation. High concentration may cause central nervous system effects including headache, dizziness and nausea.
- Do not swallow batteries. Irritation to the internal/ external mouth area, may occur following exposure to a leaking battery. If battery is leaking, contents may be irritating to respiratory passages. Move to fresh air. If irritation persists, seek medical attention.
- In case of fire, use dry chemical, alcohol foam, water or carbon dioxide as appropriate for the surrounding fire. For incipient fires, carbon dioxide extinguishers are more effective than water. Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing. Fight fire from a distance or protected area. Cool fire exposed batteries to prevent rupture. Use caution when handling fire-exposed batteries as they may explode in heat of fire.

Functional use

Preparing for use

⚠ **CAUTION:**

- Point the laser towards to ground when inserting batteries.

- Do not drop. The product may malfunction if subjected to strong shocks or vibration.
- Avoid sudden changes in temperature: Sudden changes in temperature, such as those that occur when entering or leaving a heated building on a cold day, can cause condensation inside the device. To prevent condensation, keep the device in a storage box or plastic bag before exposing it to sudden changes in temperature.

Perform the following steps to replace the batteries of the Agrilaser Handheld:

1. Turn the end cap anti-clockwise to open the battery compartment (figure 1.1).
2. Insert the two batteries with the positive side facing the end cap (figure 1.2). Make sure the batteries are charged.
3. Turn the end cap clockwise to close the battery compartment (figure 1.3).

Only disperse birds with landowner's permission.

Never point the laser device towards aircraft, windows and vehicles.

Never point the laser device at humans.

Never point the laser device towards water or reflective surfaces such as mirrors, windows and metallic objects.

Using the Agrilaser® Handheld

⚠ **CAUTION:**

- The Agrilaser Handheld is a handheld laser device intended for bird repelling purposes only.
- When using the Agrilaser Handheld, always take into account the safety precautions as described in this document.
- The Agrilaser Handheld is not suited for continuous use. Use for short repelling actions only.

Perform the following steps to prepare the Agrilaser Handheld for active bird repelling:

1. Remove the lens cap (figure 2.1)
2. Remove the protection cap to activate the aiming sight (figure 2.2).

***Important**: To increase battery life, always replace the protection cap of the aiming sight after using the Agrilaser Handheld.*

3. Point the Agrilaser Handheld towards the ground (figure 2.3).
4. Switch on the Agrilaser Handheld by pushing the ON/OFF button (figure 2.4).
5. Project the laser dot on the ground in front of you and slowly move the dot towards the birds. Make sure no reflective objects, vehicles or people are between you and the birds. The Agrilaser Handheld should not be used like a gun, i.e. point and shoot.

Weather conditions: The Agrilaser Handheld is most effective during sunrise, sunset and overcast, rainy or foggy weather conditions. During bright weather conditions, make sure that the birds are positioned between the user and the sun. If not, bright sunlight could inhibit the repelling action.

Rain: Make sure the Agrilaser Handheld is kept out of the rain. Remove any moisture with a dry cloth.

Protected species: : Local regulations may prohibit the deterrence of certain (protected) bird species. Always consult local legislation before using the Agrilaser Handheld.

Aiming sight

Aligning the aiming sight

Applicable when the red dot is not aligned with the laser beam.

⚠ **CAUTION**: Do not stare into laser beam while aligning the aiming sight.

Step 1: Preparing for alignment

Unlock the two locking screws (number 1 on the aiming sight) at the back of the aiming sight (figure 3.1). For each locking screw, execute three full counter-clockwise rotations with the screwdriver.

Step 2: Vertical alignment.

1. Switch on the laser and project the beam on a distant object. Make sure that the green dot is visible through the aiming sight.
2. Rotate the adjustment screw (number 2 on the aiming sight) in clockwise direction to move the red dot downwards and vice versa (figure 3.2).

Continue to the horizontal alignment after the red dot is correctly aligned in vertical position.

Step 3: Horizontal alignment.

1. Project the beam on a distant object and make sure that the green dot is visible through the aiming sight.
2. Rotate the adjustment screw (number 3 on the aiming sight) in clockwise direction to move the red dot to the left and vice versa (figure 3.3).

Step 4: Securing new position

Fasten the two locking screws (number 1 on the aiming sight) in clockwise direction to secure the new alignment position (figure 3.4). Do not use excessive force.

Replacing the battery of the aiming sight

Applicable when the red dot is not visible.

1. Unscrew the two hex screws using the hex key (figure 4.1).
2. Remove the upper compartment of the aiming sight from its base to replace the CR2032 battery (figure 4.2).
3. Place the upper compartment in original position and fasten the hex screws using the hex key (figure 4.3).

Replacing the aiming sight

Applicable when the aiming sight is defective.

1. Unscrew the locknut by hand (figure 5.1).
2. Remove the aiming sight from the body of the Agrilaser Handheld (figure 5.2).
3. Place the aiming sight on the body of the Agrilaser Handheld and fasten it by hand (figure 5.3).

Maintenance

Cleaning

Body (Agrilaser Handheld and aiming sight)

Use a soft dry cloth to remove dust and dirt from the Agrilaser Handheld and the aiming sight. Do not use any liquids.

***Important**: Dust and other foreign matter inside the Agrilaser Handheld may cause damage not covered under warranty.*

Lens (Agrilaser Handheld and aiming sight)

The lenses are easily damaged. Remove dust and dirt with a soft dry cloth. To remove fingerprints and other stains, apply a small amount of lens cleaner to a soft cloth and clean with care.

Storage

When the Agrilaser Handheld is not used for an extended period, replace the lens cap and remove the batteries. To prevent mold or mildew, store the Agrilaser Handheld in a dry, well-ventilated area.

Do not store your Agrilaser Handheld in a location that is:

- poorly ventilated or subject to humidity's of over 60%.
- next to equipment that produce strong electromagnetic fields, such as televisions or radios
- exposed to temperatures above 65°C (149°F) or
- below -20°C (-4°F).

Store batteries in the original storage box together with the Agrilaser Handheld.

Disposal

Do not dispose of the Agrilaser Handheld, aiming sight or batteries together with household material. Recycle in accordance with local regulations.

Always recycle batteries.

Warranty

⚠ **CAUTION:** Disassembly attempts of the product voids warranty.

The Agrilaser Handheld is developed and produced according to the highest quality standards. Should you encounter any problems with your model, please carefully read this manual. If you encounter defects, please contact your local Agrilaser dealer. Should any defect arise as a result of production faults, free repair or replacement is guaranteed. The Agrilaser Handheld has a warranty period of 12 months, starting on the date of purchase. In case of replacement, the warranty period of the original product will remain valid.

Warranty conditions

The warranty is valid only if the Agrilaser Handheld is used according to the instructions as presented in the user manual. In addition, warranty only applies if a valid receipt is presented, showing the date of purchase, the name of dealer and the product name.

The warranty is invalid if:

- Water damage or damage due to falling or jolting occurred.
- The serial number has been removed.
- Any repairs have been carried out by unauthorized individuals.
- Any defects occurred as a result of misuse or use in environments that are not prescribed.
- The defect is due to wear of replaceable parts, such as batteries.
-

Spare parts

The following parts are available as spare parts for the Agrilaser Handheld. For requests of spare parts contact your local Agrilaser dealer.

Spare parts
Agrilaser Handheld battery (LR14 battery)
Screw cap
Lens cap
Aiming sight
Protection cap (for aiming sight)
Hex key
Screw driver
Cleaning cloth

Troubleshoot

Agrilaser Handheld

Check the following if the Agrilaser Handheld appears non-functional:

- Is the ON/OFF button activated?
- Is the lens cap removed?
- Are the batteries charged?
- Are both batteries inserted in correct orientation (as shown in figure 1.2)?

Aiming sight

Check the following if the aiming sight appears non-functional:

- Is the battery not empty?
- Is the protection cap removed?
- Are all screws sufficiently tightened?

FRANÇAIS

Explication de la vue globale

A	Capuchon à vis	G	Ouverture laser
B	Pile C (LR14)	H	Capuchon d'objectif
C	Bouton Marche/Arrêt	I	Clé hexagonale
D	Voyant de sortie	J	Tournevis
E	Viseur	K	Chiffon de nettoyage
F	Capuchon de protection		

Table des matières

Merci d'avoir acheté l'Agrilaser® Handheld.

Agrilaser offre des produits de dissuasion d'oiseaux silencieux, efficaces et faciles d'utilisation. Notre technologie optique brevetée est optimisée pour la dissuasion d'oiseaux à distance. Les oiseaux perçoivent le faisceau laser comme un danger physique en approche et s'envolent pour trouver un endroit plus sûr. Après une utilisation persistante, les oiseaux considèreront cet endroit comme peu sûr et ne reviendront pas.

Contenu du colis :
1x Agrilaser Handheld
1x capuchon d'objectif
2x piles LR14
1x viseur
1x capuche de protection du viseur
1x vis hexagonale
1x tournevis
1x chiffon de nettoyage
1x boîtier de rangement

CE La marque « CE » indique que ce produit est conforme aux directives européennes en vigueur qui ont trait à la santé, la sécurité, l'environnement et la protection des clients.

Thank You

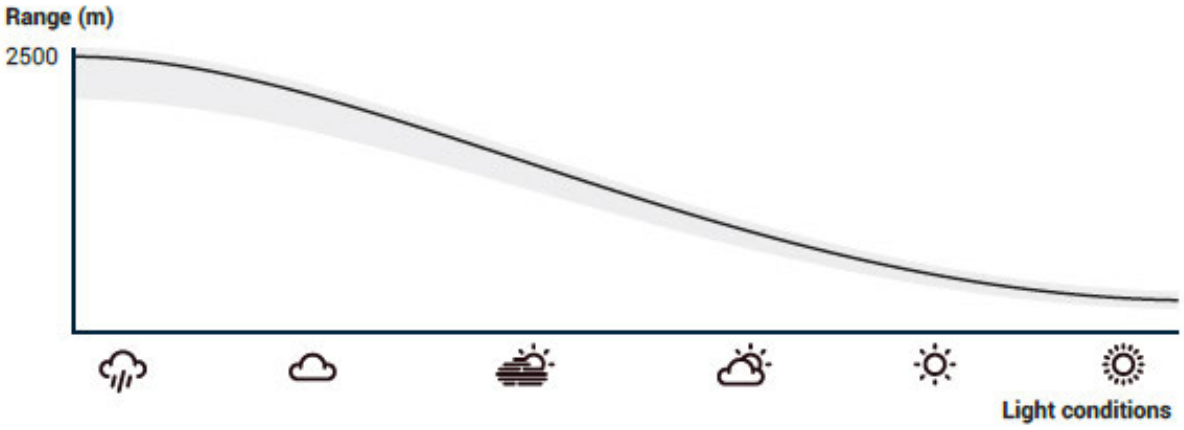
Agrilaser® Handheld

Safe Operation Agreement: Bird Control Group Agrilaser® Handheld 200/500

Background

The Agrilaser® Handheld 200 and Handheld 500 are products developed by the Bird Control Group used as an active control measure to discourage birds from landing on our cages. This product requires responsible safe handling.

The beam produced from the Agrilaser® Handheld 200/500 is classified as a 3B Laser with an effective range of 2,500m. Birds see the laser beam differently than humans and see the beam as a physical danger. The goal is that after consistent use, the birds will perceive the farm as unsafe and will not return. Range of the laser is highly dependent upon weather conditions, with the longest range seen on dark or cloudy days.



Source: Bird Control Group Agrilaser® Handheld Manual)_EN V.1.0

Safe Operations

This product is only to be used as a visual deterrent to discourage birds from landing on cages and nets. Prior to use, ensure that you have read and understood the user manual, are familiar with the local regulations and be aware of your surroundings. This product is classed as a Class 3B Laser and as such is subject to the following non-permissible actions, warnings and cautions:

Non-Permissible Actions:

- **Never** project the laser device towards **Aircraft**, **Vessels**, or **Vehicles.**
- **Never** project the laser device at **Humans.**
- **Never** project the laser device into the **"Infinite Sky"/Horizon.**
- **Never** project this laser device towards reflective surfaces such as **Mirrors**, **Windows**, or **Metallic Objects**.

Warning:

- Avoid Direct Eye exposure to the laser beam. Direct eye exposure or exposure to direct reflections can result in serious eye damage. Diffuse reflections are considered safe.
- Viewing the laser output with optical instruments designed for use at a distance (For example, telescopes, or binoculars) may pose an eye hazard.
- This Laser product is only to be used by trained personnel in a **controlled environment.**
- The Laser Beam of the handheld could cause dazzle or after images, particularly under low ambient light conditions. This may have indirect safety implications if experienced while performing safety-critical operations.
- Only operate this product in undamaged condition. Use of this product when damaged may result in in exposure to **hazardous laser radiation.**

Caution:

- To operate this laser safety training is required.
- The handheld should be used by responsible adults only.
- The handheld should be used for bird repelling only.
- The handheld has no serviceable parts inside.
- To reduce the risk of injury, use only the supplied battery.

Acknowledgement

By signing below, I acknowledge that I have read and understand this Safe Operation Agreement in its entirety. I further agree to read and understand the user manual of the Handheld 200/500 prior to its use at my site(s).

Please Print Full Name	**Inventory Control Verification**
Signature	Date Unit Given
Date Agreement Signed	Date Returned

Maine Coastal Islands National Wildlife Refuges
P.O. Box 279 (Water Street)
Milbridge, ME 04658
207/546 2124

P.O. Box 1735 (9 Water Street)
Rockland, ME 04841
207/594 0600

Hearing-impaired visitors may call the Maine Relay Center:
1 800/457 1220 (voice) or 1 800/437 1220 (TDD)

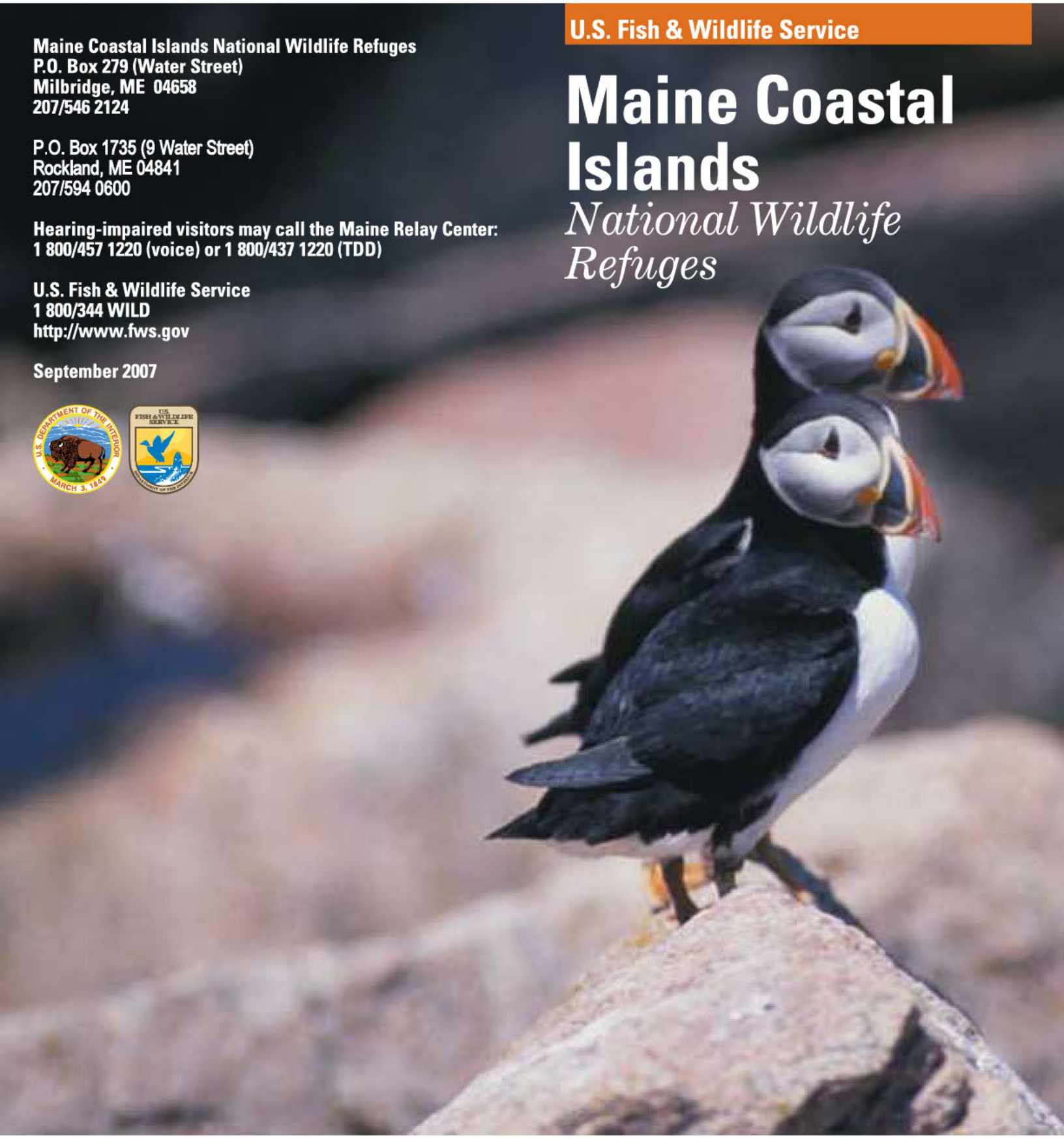
U.S. Fish & Wildlife Service
1 800/344 WILD
http://www.fws.gov

September 2007

U.S. Fish & Wildlife Service

Maine Coastal Islands

National Wildlife Refuges



Strung along the Maine coast like a strand of pearls, the islands of Maine Coastal Islands National Wildlife Refuges protect precious habitat for nesting seabirds, wading birds, and bald eagles. The refuge's mainland units complement the offshore gems by supporting migratory songbirds, shorebirds, and waterfowl.

Conserving the Nature of the Coast

This blue goose, designed by J.N. "Ding" Darling, has become a symbol of the National Wildlife Refuge System.

The Maine Coastal Islands National Wildlife Refuges span over 200 miles of Maine coastline and contain 49 offshore islands and four coastal parcels, totaling more than 8,000 acres. The refuge complex includes five national wildlife refuges — Petit Manan, Cross Island, Franklin Island, Seal Island, and Pond Island. The U.S. Fish and Wildlife Service manages the refuge complex as part of the National Wildlife Refuge System.

The Service's primary focus at Maine Coastal Islands is colonial seabird restoration and management. Refuge islands provide nesting habitat for common, Arctic, and endangered roseate terns, Atlantic puffins, razorbills, black guillemots, Leach's storm-petrels, laughing gulls, and common eiders. Over the last 25 years, the Service has worked to reverse the decline in these birds' populations. As a result, many species have returned to islands where they nested historically.

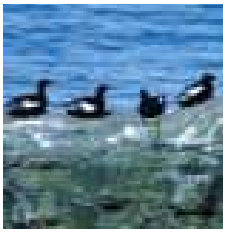
In addition to seabirds, wading birds and bald eagles nest on refuge islands. The mainland divisions provide habitat for songbirds, shorebirds, and waterfowl, as well as opportunities for bird watching and hiking.

Bald eagle

cover and facing photo: Bill Silliker, Jr.©

photo: Maine Dept. of Inland Fisheries & Wildlife

Seabird Struggles



James C. Leupold

Black guillemots

Seabirds have always relied on Maine's offshore islands as havens for raising their young. Small, unforested, rocky islands provide a setting free of mammalian predators such as foxes, coyotes, and raccoons. Flying distance from the mainland discourages avian predators such as great horned owls. The cold waters surrounding the islands hold an abundant supply of fish for adults and young alike.

Native Americans have used the coast's natural resources for more than 4,000 years. The Red Paint people camped on offshore islands in the summer and fished the deep ocean waters. Although they hunted seabirds and their eggs, they used sustainable methods, limiting harvest to certain islands and hunting any one colony once every three years.

Europeans began settling the islands in the 1600s, farming and raising sheep and hogs. The livestock disturbed nesting seabirds and trampled their habitat. The people hunted the birds and collected their eggs. In the late 1800s, the fashion industry posed an additional threat to the birds' existence. Women's hats were decorated with feathers. Egrets, herons, and terns were especially popular and, therefore, most harmed by the trend. At the start of the 20th Century, most seabirds in the Gulf of Maine were on the brink of extinction.

Concern for the future of all birds led to passage of the Migratory Bird Treaty Act in 1918. The Act protects migratory birds, their nests, and their eggs. At about the same time, trains and automobiles replaced boats as preferred forms of transportation. People relocated to the mainland, easing pressure on seabird habitat. Common and Arctic tern populations rebounded, reaching a high of almost 16,000 pairs along the Maine coast in 1940.

The recovery was short-lived, however. During the mid-1900s, the spread of open landfills along the coast and an increase in fishery waste provided easy pickings for herring and great black-backed gulls. These birds nest earlier than terns, claiming prime habitat and relegating terns to inferior nest sites. Some gulls also prey on tern eggs and chicks. The artificial food sources led to an explosion in gull populations. By 1977, the tern population in the Gulf of Maine had declined to roughly 5,000 nesting pairs.

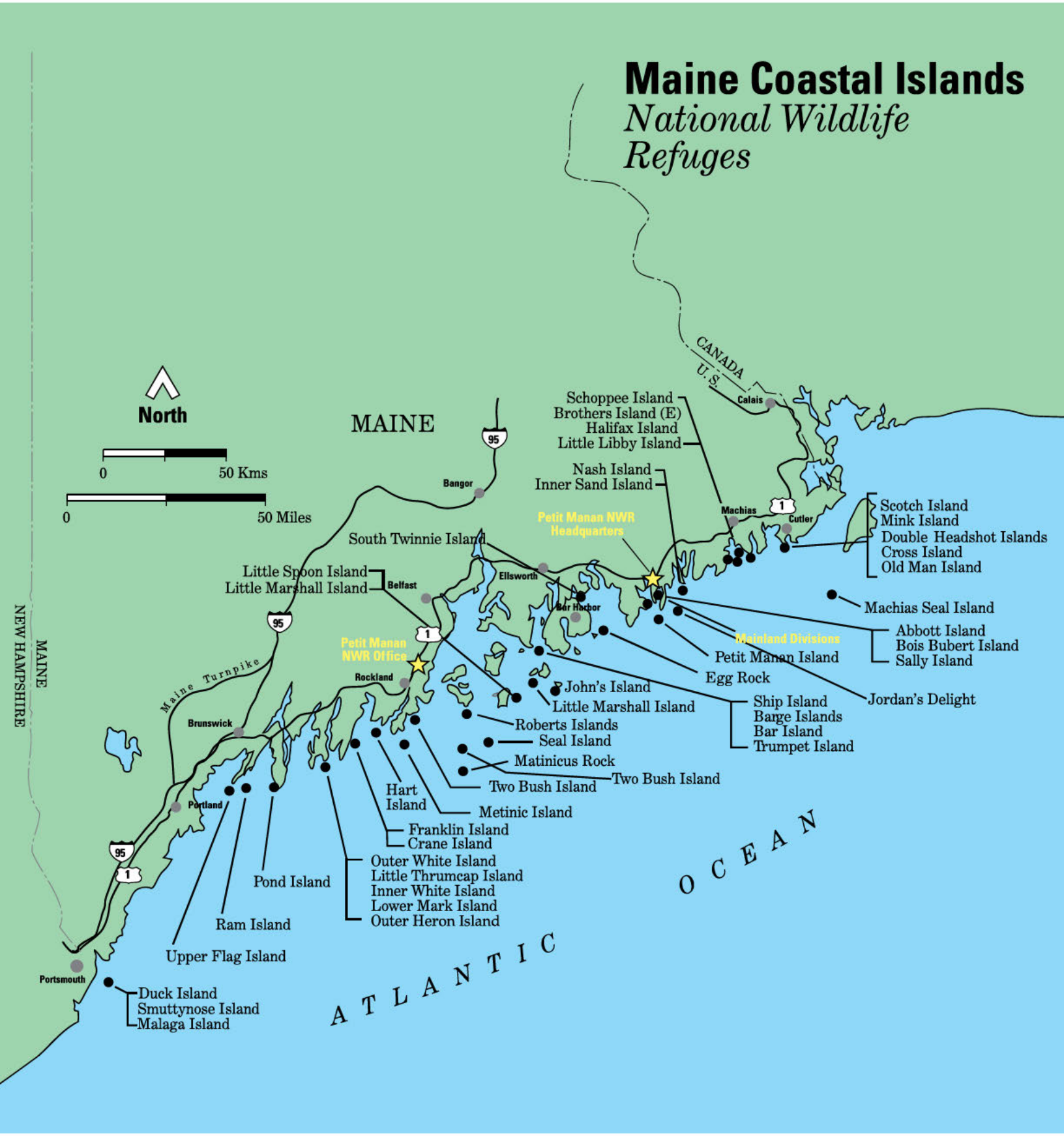
Burton Glendenning

Common terns

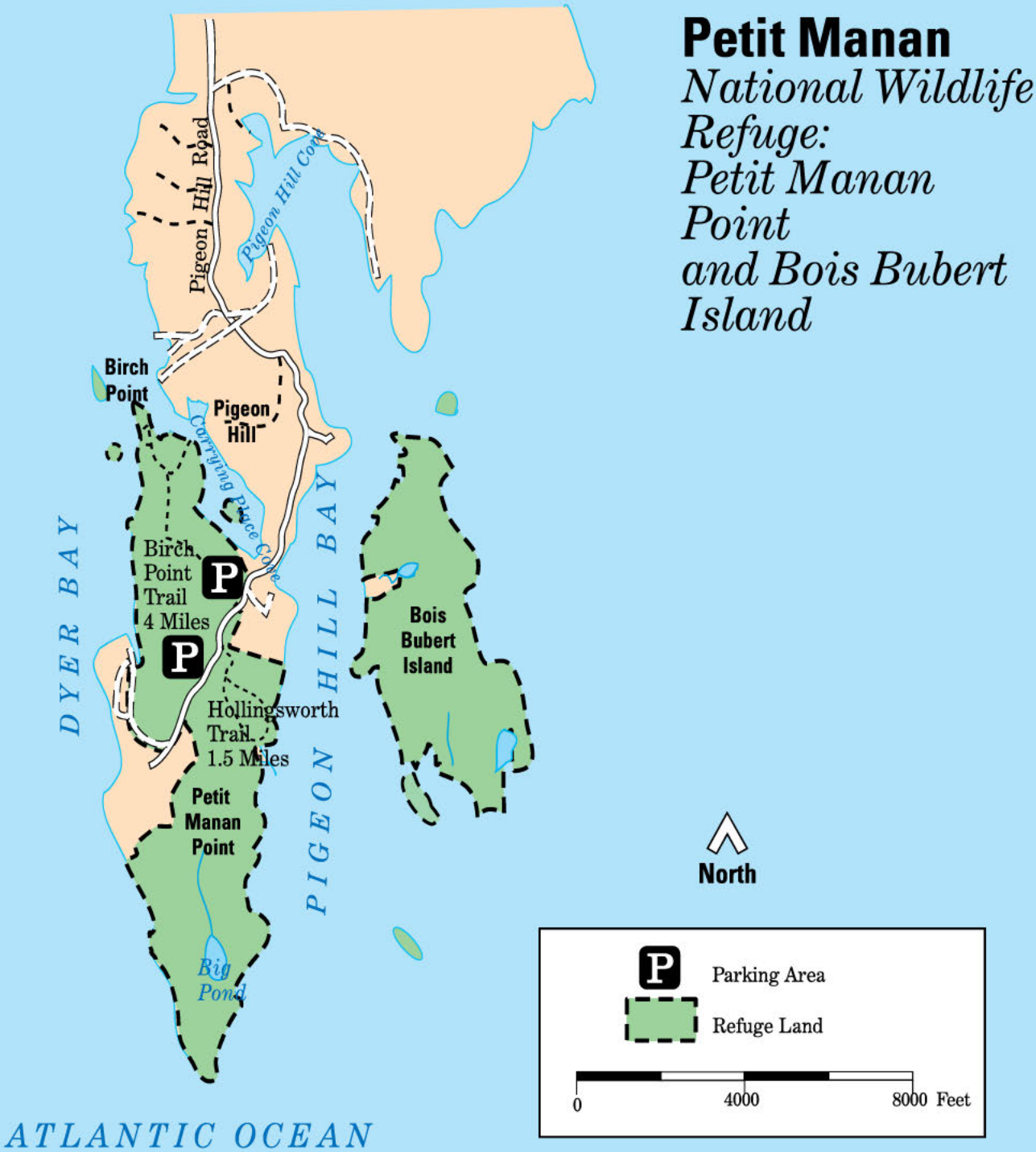
Seabird Restoration

Between 1972 and 1980, the refuges in the Maine Coastal Islands National Wildlife Refuge were established for the protection of migratory birds, principally colonial nesting seabirds. The Service has focused on restoring terns because their populations were particularly low. The roseate tern, a federally endangered species, prefers large colonies of common or Arctic terns in which to nest. Therefore, saving this species requires assisting the other two.

To restore terns to an island, it must first be made suitable for the birds again. This requires discouragement of herring and great black-backed gulls. In some cases, human presence on the island during the start of the gull nesting season is enough. Small populations of gulls can be controlled


Maine Coastal Islands
National Wildlife Refuges
North
0
50 Kms
0
50 Miles
MAINE
NEW HAMPSHIRE
CANADA
U. S.
Calais
Machias
Cutler
Bangor
Ellsworth
Bar Harbor
Belfast
Rockland
Brunswick
Portland
Portsmouth
Maine Turnpike
95
1
Petit Manan NWR Headquarters
Petit Manan NWR Office
Mainland Divisions
Schoppee Island
Brothers Island (E)
Halifax Island
Little Libby Island
Nash Island
Inner Sand Island
Scotch Island
Mink Island
Double Headshot Islands
Cross Island
Old Man Island
Machias Seal Island
Abbott Island
Bois Bubert Island
Sally Island
Petit Manan Island
Egg Rock
Jordan's Delight
Ship Island
Barge Islands
Bar Island
Trumpet Island
South Twinnie Island
Little Spoon Island
Little Marshall Island
John's Island
Little Marshall Island
Roberts Islands
Seal Island
Matinicus Rock
Two Bush Island
Two Bush Island
Metinic Island
Hart Island
Franklin Island
Crane Island
Outer White Island
Little Thrumcap Island
Inner White Island
Lower Mark Island
Outer Heron Island
Pond Island
Ram Island
Upper Flag Island
Duck Island
Smuttynose Island
Malaga Island
ATLANTIC OCEAN


Petit Manan
National Wildlife Refuge:
Mainland Divisions
Milbridge
Steuben
East Steuben
Gouldsboro
Prospect Harbor
Wyman
Sawyer's Marsh Division
Gouldsboro Bay Division
Williams Point
Corea Heath Division
Cranberry Point
Petit Manan Point Division
Petit Manan Point
Bois Bubert Island
Little Bois Bubert Island
Petit Manan Island
Green Island
Dyer Neck
Eagle Hill
Parker Head
Dyer Point
Stanley Point
Pigeon Hill
Lookout Mtn
Foster Island
Ripley Neck
Dyer Island
Trafton Island
Flint Island
Pond Island
Douglas Island Harbor
Forbes Pond
Big Pond
Chicken Mill Pond Rd.
Smithville Road
Rogers Point Road
Dyer Bay Road
Pigeon Hill Road
Morgador Road
Rocky Gulch Rd.
Shores Rd.
Dyer Neck Road
Petit Manan Point Road
Wyman Road
Fickett Pt. Road
NARRAGUAGUS RIVER
NARRAGUAGUS BAY
JOY BAY
WEST BAY
GOULDSBORO BAY
DYER BAY
PIGEON HILL BAY
PROSPECT HARBOR
Pinkham Bay
Dyer Harbor
Pigeon Hill Cove
Yeaton Cove
Over Cove
Stanley Cove
Corea Heath Cove
North
MAINE
Mainland Divisions
Other Refuge Lands
Lighthouse


Petit Manan
National Wildlife Refuge:
Petit Manan Point
and Bois Bubert Island
Pigeon Hill Road
Pigeon Hill Cove
Birch Point
Pigeon Hill
Corrupting Place Cove
DYER BAY
PIGEON HILL BAY
Birch Point Trail 4 Miles
Hollingsworth Trail 1.5 Miles
Petit Manan Point
Bois Bubert Island
Big Pond
ATLANTIC OCEAN
North
Parking Area
Refuge Land
0
4000
8000 Feet

through egg and nest destruction and noise-makers. If a gull colony has grown too large, these techniques may be ineffective. Lethal means, including limited shooting and the use of an avicide, may be necessary.

If terns have recently abandoned an island, they may return rapidly once the gulls are gone. However, in many cases, it has been decades since terns nested on an island. To entice them back, the Service uses sound systems playing recordings of a tern colony and tern decoys scattered in suitable nesting habitat. This method has been highly effective on several islands within the Gulf of Maine.

Bill Silliker, Jr.©

Roseate tern

Tern restoration began in 1984 on Seal and Petit Manan islands, which now support large colonies of common and Arctic terns. Roseates have returned to Petit Manan. More recent restorations have occurred on Pond, Metinic, and Eastern Brothers islands. The goal is to establish tern colonies on numerous refuge islands. This will ensure that a singular catastrophic event such as disease, an oil spill, or a hurricane, will not wipe out a species.

Other colonial nesting seabirds have benefited from tern restoration efforts. Atlantic puffins, black guillemots, laughing gulls, Leach's storm-petrels, and common eiders have recolonized some islands. Petit Manan Island now hosts all of these species during the nesting season. Razorbills, a relative of the extinct great auk, are at the southern end of their range along the Maine coast and nest on three refuge islands: Seal, Matinicus Rock, and Old Man. Herring and great black-backed gulls and double-crested cormorants breed on some refuge islands.

A "Bed and Breakfast" for the Birds

In addition to seabirds, refuge islands provide habitat for raptors, wading birds, shorebirds, and songbirds. Some of the forested islands, including Outer Heron, Sally, Bois Bubert, and Mink, have active bald eagle nests. Outer White Island supports a black-crowned night heron rookery. Migrating peregrine falcons stop on Seal Island to hunt and rest. Warblers such as the bay-breasted and blackpoll, and shorebirds, including ruddy turnstones and semipalmated plovers, rely on the islands as stepping stones on their long trips north and south.

Tern decoys

USFWS

Points of Light

Eight refuge islands possess historic light houses. For more than a century, light keepers operated beacons on Petit Manan, Franklin, Pond, Nash, Two Bush, and Libby islands and Matinicus and Egg rocks to ensure safe travel for passing vessels. With the advent of underwater electric cables and solar power, automation of the lights became possible. The islands were transferred to the Service from the Coast Guard. The Coast Guard maintains all of the lights except Nash Island Light, which no longer functions. All are on the National Register of Historic Places, with the exception of Two Bush Island Light.

USFWS

Petit Manan Island Light

Meanwhile, On the Mainland

The refuge's four mainland properties are located in Hancock and Washington counties. Upland areas are characterized by spruce-fir forests with some mixed hardwoods. The 2,195-acre Petit Manan Point Division, in Steuben, also includes jack pine stands, coastal raised heath peatlands, blueberry barrens, old hayfields, freshwater and saltwater marshes, cedar swamps, granite shores, and cobble beaches. The Gouldsboro Bay Division, in Gouldsboro, protects 623 acres, including a large tidal saltmarsh and mudflat. The 1028-acre Sawyer's Marsh Division lies at the head of a broad saltmarsh in Milbridge, just north of Petit Manan Point.

The Corea Heath Division is a 431-acre raised coastal peatland situated on the Corea peninsula in Gouldsboro.

A Seasonal Home

Neotropical migratory songbirds thrive in the forests of the mainland divisions. These birds breed in North America and winter in the Caribbean, Mexico, and Central and South America. Recently, populations of species such as the American redstart, Swainson's thrush, and song sparrow, have declined due to habitat loss throughout their migratory routes.

Sid Bahrt

Yellow warbler

The Service monitors songbird populations by conducting surveys at the height of the breeding season each year. Experts walk designated routes, stopping at set intervals to identify and count birds by sight and song. Other studies use banding to identify individuals and track their survival and productivity.

The saltmarshes and mudflats of the mainland divisions attract waterfowl, wading birds, and shorebirds. Black ducks, great blue herons, and American bitterns ply the waters of the saltmarshes. Semipalmated sandpipers, short-billed dowitchers, greater and lesser yellowlegs, and dunlins probe the mudflats for invertebrates.

During fall migration, the 80-acre Cranberry Flowage on Petit Manan Point is filled with over 4,000 ducks. Black ducks, green-winged teal, and mallards rest and feed on wild rice

in preparation for the long flight south. Long-tailed duck, surf, black, and white-winged scoters, common goldeneyes, and common eiders winter in coastal waters.

The former pastures and blueberry fields on Petit Manan Point provide nesting habitat for grassland birds such as bobolinks and savannah sparrows. In the spring, American woodcock use the clearings for their unique courtship displays. Whimbrels stop off here during their fall migration from the Arctic tundra to the southern United States. The Service maintains open areas through periodic mowing and controlled burning.

Some species call the refuge's mainland "home" year-round. Resident wildlife include ruffed and spruce grouse, white-tailed deer, bobcats, snowshoe hares, porcupines, coyotes, and raccoons.

A Group Effort

Partnerships between the Service and other public and private organizations are key to the success of seabird restoration efforts at the refuge. Since 1984, refuge staff have worked closely with representatives from the Maine Department of Inland Fisheries and Wildlife, College of the Atlantic, National Audubon Society, Maine Audubon Society, and Canadian Wildlife Service in the Gulf of Maine Seabird Working Group. The Group guides restoration efforts on Maine's offshore islands, including those in the refuge.

Razorbill

Linda Welch/USFWS

Linda Welch/USFWS

Atlantic Puffin

Since the early 1980s, the National Audubon Society has worked with the Service to restore seabirds to Seal Island, located 21 miles southeast of Rockland, Maine. Through its Project Puffin, the Society successfully re-introduced Atlantic puffins to the island by transporting chicks from Newfoundland, Canada, and hand-raising them. Puffins now nest on the island, after a 150-year absence. Seal Island also supports the largest tern colony in the Gulf of Maine, with 2,000 pairs. National Audubon is working with the Service to manage and restore seabirds on Matinicus Rock and Pond Island.

Tom Goettel/USFWS

Old Man Island

The Service works with private organizations at the local, state, and national levels to add land to the refuge. These groups serve a vital function by purchasing property from willing sellers and protecting it until it can be acquired by the Service. Through conservation easements, refuge staff help landowners manage their properties for wildlife.

Where You Come In

Wildlife comes first on national wildlife refuges. All human activities must be compatible with the needs of wildlife. Six priority public uses are encouraged when they do not interfere with the individual refuge's mission. These are: hunting, fishing, wildlife observation and photography, environmental education, and interpretation.

The refuge offers excellent opportunities for bird watching and hiking. Foot trails wind through a variety of habitats, from spruce-fir woodlands to grasslands to freshwater and saltwater marshes to mudflats. On Petit Manan Point, the Hollingsworth Trail is a 1.5-mile loop with views of heaths and cobble beaches. Interpretive signs offer insight into refuge wildlife, habitats, and management. The Birch Point Trail (four miles round trip) begins in a blueberry field and leads to the saltmarshes of Dyer Bay, passing through a mixed-wood forest. A hiking trail on the Gouldsboro Bay Division is under development.

USFWS

Hollingsworth Trail - Petit Manan Point

Cross, Scotch, Halifax, and Bois Bubert islands are open to visitors all year. Seal Island and Duck Island are closed at all times. The remaining refuge islands are open from September 1 through March 31 and closed during the seabird nesting season, April 1 - August 31. Commercial tour boats provide views of nesting seabirds on Petit Manan and Machias Seal islands.

USFWS

Parts of the refuge are open to hunting. Contact the refuge office for a list of open areas and current regulations.

To reach the Petit Manan Point Division, take Pigeon Hill Road off U.S. Route 1 in Steuben. The parking area for the Birch Point Trail is 5.8 miles from Route 1, and the parking area for the Hollingsworth Trail is 6.2 miles. The Gouldsboro Bay, Corea Heath and Sawyer's Marsh divisions have no public use facilities at present.

Your Cooperation is Appreciated....

To protect the refuge's wildlife and habitats, please comply with the following:

The refuge is open during daylight hours only.

Dogs are allowed on mainland divisions only and must be on hand-held leashes no longer than 10 feet.

All-terrain vehicles and open fires are not allowed.

Blueberries may be hand-picked; raking is not allowed.

New Brunswick's Protected Wildlife

The following species are protected under SARA (Species at Risk Act) and/or COSEWIC (Committee on the status of Endangered Wildlife in Canada). Of the protected species found in New Brunswick and the Atlantic Ocean, these either have (recently) been observed in the area of southwestern NB's aquaculture sites or they are likely to be found in the area of the aquaculture sites due to their environmental preferences. If any of these animals are found in distress around the aquaculture sites, Canadian Coast Guard should be contacted at **1-800-565-1633**. If any of these animals are observed, care should be exercised to avoid causing them any harm.

Atlantic Cod *(Gadus morhua)*, Southern population

Habitat: Shoreline to continental shelf in Northeast Atlantic
Description: Brown to green or grey with spots on dorsal surface, pale underside. Distinctive chin barbell.
3 dorsal fins and 2 anal fins.
Max. size: 2 m, 96 kg

Atlantic Salmon (*Salmo salar*), iBoF population

Habitat: Fresh water streams in winter then migrates out to Bay
Description: Sides and belly are silvery,
back varies from shades of brown to green and blue.
Adult size: 60 cm, 3 kg
Season of Concern: Spring, summer and fall

Atlantic Bluefin Tina (*Thunnus thynnus*)

Habitat: Mostly pelagic species but can dive to depths of 500 to 100 m. Tolerates a wide thermal range (3 to 30˚C).
Description: Fusiform body, conical head, pointed snout; blue-black dorsal surface, lighter blue sides, and silvery-grey underside; 2 dorsal fins.
Adult size: 400 kg, 270 cm FL
Season of Concern: Summer to late fall

Fin Whale *(Balaenoptera physalus)*

Habitat: Temperate, cool waters. Found in shallow and uneven depths of the Bay of Fundy.
Description: Baleen whale with a long and slender, streamline body; dark grey, white underneath. Narrow, V-shaped head, pointed snout, paired blowholes.
Adult Size: 20-27 m, 70,000 kg
Season of concern: Summer

Harbour Porpoise *(Phocoena phocoena)*

Habitat: Temperate and subarctic waters (<16 °C). Inhabit marine and fresh waters, depths of < 650 m.
Description: Black back, grayish-white sides fading to white underneath
Max. size: 1.7 m, 65 kg

Thorny Skate *(Amblyraja radiata)*

Habitat: Ocean bottoms at depths of 18-1400 m, at temperatures of 0-10˚C.
Description: Dark colored upper body, white under side. A row of 11-19 large thorns runs down the middle of its back and along the tail.
Adult Size: 110 cm, 12.5 kg

Porbeagle *(Lamna nasus)*

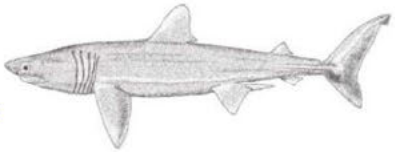
Habitat: Found at depths of 1 m to 700 m though more often on continental shelves. Prefers temperatures 5 – 10˚C.
Description: Large shark with a powerful streamlined body. Grey-bluish black body with a white patch on the back of dorsal fin, white underside. Head is stout, snout is pointed.
Max. size: 3.5 m, 135 kg

Leatherback Sea Turtle (*Dermochelys coriacea*)

Habitat: Offshore and coastal waters, at depth of 2 to 5033 m.
Description: Largest living sea turtle. Lacks a bony shell, instead its carapace is covered by bluish black skin.
Max.size: 2.4 m in length, 3.6 m wide, up to 725 kg
Season of Concern: April to December

Atlantic Wolffish *(Anarhichas lupus)*

Habitat: Bottom dweller, found in cold, deep waters. Prefers rock or hard-clay sediment.
Description: Rounded profile, heavy head, blunt snout, lacking pelvic fins. Body color ranges from slate blue to dull green to purplish brown with vertical, dark brown bars along the sides. Extensive teeth structure
Max. size: 150 cm, 20 kg



Basking Shark *(Cetorhinus maximum)*

Habitat: Prefers shallow coastal waters
Description: Blackish to grey-brown coloring, pointed snout, crescent-shaped caudal fin, elongated gill slits, large mouth with small teeth
Max. size: 15.2 m
Season of Concern: Summer

North Atlantic Right Whale *(Eubalaena glacialis)*

Habitat: Temperate northern waters (in summer)
Description: Large black baleen whale distinguished by the callosities (thick, hard, white bumps) on its head. Broad back, lacks a dorsal fin.
Adult Size: 16-17 m, 63,500 kg
Season of Concern: Summer and fall

American Eel *(Anguilla rostrata)*

Habitat: Found in all freshwater, estuarine, and marine waters that are connected to the Atlantic Ocean.
Description: Elongate and serpentine body with scales. Adults are grey with a white belly, juveniles have a dark back and a yellow, green, or olive-brown belly. A single fin extends from its back around the tail to its belly.
Adult size: 1 m (females), 0.4 m (males)

Harlequin Duck *(Histrionicus histrionicus)*
Habitat: Offshore islands, rocky coastline where surf breaks against rock and ice build-up is minimal.
Description: Small sea duck. Males have slate-blue plumage, chestnut sides, and streaks of white, chestnut and black on head. Females are plain, brownish-grey with patches of white
Adult size: 45cm
Season of Concern: Winter

Red Knot rufa *(Calidrius canutus rufa),*
Tierra del Fuego/Patagonia wintering population
Habitat: (migration) coastal areas with sandflats
Description: Medium size shorebird with sandpiper profile. Non-breeding plumage is plain with white underparts and pale grey back.
Adult size: 23- 25 cm, 135 g
Season of Concern: May/June and July/August

Red-necked Phalarope (*Phalaropus lobatus*)
Habitat: near water surface where there are prey aggregations
Description: (non-breeding plumage) white along the head, throat, breast and underparts with dark upper parts, eye stripe, and crown
Adult size: 18 cm
Season of Concern: April – May and August - October

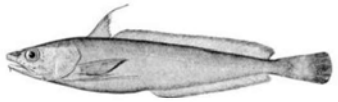
Peregrine Falcon anatum/tundrius (*Falco peregrinus*)
Habitat: cliffs or buildings for nesting, open landscapes for foraging, with nearby waterbodies
Description: (adults) bluish-grey/darker upper parts and pale under parts with dark spotting and barring; (immatures) pale to slate or chocolate brown upper parts, under parts are buffy with blackish streaks
Adult size: (males) 36-49 cm long, 650 g; (females) 45-58 cm long, 950 g

Lesser Yellowlegs (*Tringa flavipes*)
Habitat: uses freshwater and marine shorelines during migration
Description: small, slender shorebird with greyish plumage, a long neck, straight black bill, and long yellow legs
Adult size: 23 – 25 cm, 67-94 g
Season of Concern: Fall and spring

Spiny Dogfish (*Squalus acanthis*)
Habitat: Occurs world-wide from the intertidal to the continental shelf slope, most common at 10-100 m depth. Usually found at temperatures of 5-15˚C.
Description: Small shark, grey-brown on the upper body and whitish on the under side.
Max. size: 112 cm TL (female), 94 cm TL (male)

Leach's Storm-Petrel *(Oceanodroma leucorhoa)*
Habitat: Forages in open ocean waters, breeds on vegetated islands, nests on island with other seabirds.
Description: A small, tube-nosed seabird, dark blackish-brown plumage, long wings, forked tail.
Adult size: 45 g

Killer Whale *(Oricinus orca)*
Habitat: Occur in all oceans; tolerate a wide range of salinity, temperature, and turbidity
Description: Distinctive black and white coloration, tall triangular dorsal fin.
Adult size: 9 m, 6600 kg (males); 7.7 m, 4700 kg (females)



White Hake *(Urophycis tenuis)*
Habitat: Groundfish, prefers depths of 144-358 m and temperatures between 4 and 8˚C.
Description: Elongated body, small barbel at the tip of the lower jaw, 2 dorsal fins. Color ranges from muddy or purple brown on the dorsal side, bronze or golden sides, white or yellow-white belly with small dots.
Max. size: 133-135 cm, 21.5 – 22.3 kg

White Shark (*Carcharodon carcharias*),
Atlantic population
Habitat: Inshore and offshore waters; just below surface to 1100 m depth; off sandy beaches, rocky shores; enters bays, harbours.
Description: Heavy, torpedo-shaped body, grey/black back and white underside, pointed dorsal fin, cone-shaped snout
Adult size: 2 – 6 m length

Lumpfish (*Cyclopterus lumpus*)
Habitat: found in benthic and pelagic environments; seem to prefer temperatures of 5˚C
Description: thick, ball-shaped fish with a sucker on the underside, rounded snout
Max. size: 55 cm

Shortfin Mako (*Isurus oxyrinchus*)
Habitat: Prefers temperatures of 17-22˚C thus likely doesn't reside extensively in Canadian waters.
Description: Dark colored dorsal surface, white underside. Pointed snout, small eyes, U-shaped mouth. First dorsal fin height greater than base length.
Max. size: 4.5 m TL

Newfoundland and Labrador Protected Wildlife

The following species are protected under SARA (*Species at Risk Act*) and / or COSEWIC (Committee on the status of Endangered Wildlife in Canada) and/or the *Newfoundland and Labrador Endangered Species Act* and have been or could be found near aquaculture sites on the south coast of Newfoundland. If any animals shown below are found in distress around aquaculture sites, Canadian Coast Guard should be contacted at 1.800.565.1633. They will provide assistance in how to proceed. Care should always be exercised around wildlife to avoid causing any harm to human or wildlife. Where species specific contact information is provided below, sightings should be reported.

Acadian Redfish (*Sebastes fasciatus*)
Habitat: Smaller fishes live in shallow waters and adults are found in deeper waters.
Description: Spiny-rayed with distinctive flame-red colouring and fan of bony spines.
Adult size: 60 cm in length.

American Eel (*Anguilla rostrata*)
Habitat: Uses all salinities during life stage, found in all freshwaters that are accessible to the Atlantic Ocean.
Description: Elongated, grey with cream colour belly.
Adult size: Male: 0.4 m; Female: 1.0 m.
Contact: Provincial Biologist – 1.709.637.2043

American Plaice (*Hippoglossoides platessoides*)
Habitat: Juveniles prefer finer sediment to partially or fully bury themselves while adults are less stringent.
Description: Laterally flattened. The eyed side is typically red to grayish brown and the blind side is white. Small head with a relatively large mouth.
Adult size: 61 cm in length.

Atlantic Bluefin Tuna (*Thunnus thynnus*)
Habitat: Seasonal migrants and occurs in the area during its summer feeding migration.
Description: Large, stout but fusiform body. Dorsal surface is dark blue to black, shading to lighter blue on the sides and silvery grey below.
Adult size: 270 cm fork length and 400 kg or more.

Atlantic Cod – Laurentian North (*Gadus morhua*)
Habitat: Migrates inshore to their feeding grounds.
Description: Brown to green or grey with spots on dorsal surface, pale underside. Distinctive chin barbell, 3 dorsal and 2 anal fins.
Adult Size: 2 m and 96 kg

Atlantic Salmon – South NL (*Salmo salar*)
Habitat: Requires rivers or streams that are generally clear, cool, and well-oxygenated, but undertakes lengthy feeding migrations in the North Atlantic Ocean as older juveniles and adults
Description: Fusiform body shape.
Adult size: 100 + cm in length.

Atlantic Wolffish (*Anarhichas lupus*)
Habitat: Bottom dwellers, prefer rock or hard clay.
Description: Rounded profile, heavy head, blunt snout. Colour ranges from slate blue to dull green to purplish brown with vertical, dark brown bars along the sides. Extensive teeth structure.
Adult size: 150 cm in length and 20 kg.

Blue Whale (*Balaenoptera musculus*)
Habitat: Off the south coast of Newfoundland.
Description: Largest animal on earth, coloured dark and light grey, smallish dorsal fin and pointed pectoral flippers.
Adult size: 30 m in length and 181 MT.
Contact: Whale Release and Strandings group 1.888.895.3003

Fin Whale (*Balaenoptera physalus*)
Habitat: Temperate, deep, cool waters.
Description: Long, slender body, V-shaped head, paired blowholes, asymmetrical colouring.
Adult size: 20 to 27 m in length and 70 MT.
Contact: Whale Release and Strandings group 1.888.895.3003

Leatherback Sea Turtle (*Dermochelys coriacea*)
Habitat: Can be found close to shore and at times in relatively shallow waters to feed on jellyfish aggregations in late summer.
Description: Largest living sea turtle. Lacks a bony shell, its carapace is covered in bluish black skin.
Adult size: 2.4 m in length, 3.6 m wide, 725 kg.
Contact: Whale Release and Strandings group 1.888.895.3003

North Atlantic Right Whale (*Eubalaena glacialis*)
Habitat: Temperate northern waters in summer.
Description: Large black baleen whale distinguished by the callosities (thick, hard, white bumps) on its head.
Adult size: 16 to 17 m in length, 64 MT.
Contact: Whale Release and Strandings group 1.888.895.3003

Northern Wolffish (*Anarhichas denticulatus*)
Habitat: Inhabits cold waters usually between 2- 5°C and mainly at depths of 400-1000 metres. Prefers rocky or muddy sea floor.
Description: Thick and heavy set, with a large head, small sharp teeth with grey to dark chocolate colour appearance.
Adult size: 1.4 m in length and 20 kg.

Porbeagle (*Lamna nasus*)
Habitat: Pelagic, epipelagic, or littoral, found far from land in ocean basins and close inshore.
Description: Streamlined body, dark grey - bluish black back and white underneath. Stout head and large eyes.
Adult size: 3 m in length.
Contact: NL shark sightings DFO -1.844.400.7870

Thorny Skate (*Amblyraja radiata*)
Habitat: Found on sand, gravel, mud and broken shells.
Description: Disk spade to heart-shaped, corners rounded, rounded snout, tail 1.0-1.1 times its body length, and a single dominant mid-dorsal row of 11-19 large thorns.
Adult size: 110 cm in length.

White Shark (*Carcharodon carcharias*)
Habitat: Breakers off sandy beaches, rocky shores, and readily enters enclosed bays and estuaries.
Description: Heavy spindle-shaped body with sharp coloured contrast between its backside and underside
Adult size: 3.8 to 6 m in length.
Contact: NL shark sightings DFO -1.844.400.7870

Spotted Wolffish (*Anarhicas minor*)
Habitat: Arctic and Atlantic Ocean, 200-750 m on the continental shelf or deep trenches.
Description: Large head and rounded snout, yellow, grey, or brown with dark spots.
Adult size: Max. size 150 cm weighing up to 22 kg.

Lumpfish *(Cyclopterus lumpus)*
Habitat: Prefer hard rocky bottom with lots of vegetation in cold water.
Description: Short, stubby, with a small mouth and slightly rounded tail.
Adult size: Max. size: 60 cm, weighing up to 10kg.

Harbour Porpoise (*Phocoena phocoena*)
Habitat: Found primarily over continental shelves, and occasionally in deeper waters
Description: Robust body, dark grey fins and flipper, light grey sides, and whiter underside.
Adults size: 1.9 m in length and 76 kg.
Contact: Local DFO Office – 1-709-885-2520

Loggerhead Sea Turtle (*Caretta caretta*)
Habitat: Atlantic, Pacific, and Indian Oceans
Description: head and carapace are reddish-brown, flippers are chestnut brown, the bridge, plastron, underside of throat, flippers and tail are yellow
Adult size: 200 to 350 pounds
Contact: Whale Release and Strandings group – 1.888.895.3003

Harlequin Duck (*Histrionicus histrionicus*)
Habitat: Turbulent mountain streams in summer, rocky coastal waters in winter.
Description: Males have slate-blue plumage, chestnut sides, streaks of white, chestnut, and black on head. Females are plain, brownish grey with patches of white.
Adult size: 45 cm in length.
Contact: Provincial Biologist – 1.709.637.2026

Piping Plover (*Charadrius melodus melodus*)
Habitat: Nests and forages for on ocean beaches, sand spits, or barrier beaches.
Description: Small, thrush-sized shorebird primarily the colour of dry sand with distinctive black markings, a white rump, and bright orange legs.
Adult size: 18 cm in length.
Contact: Provincial Biologist – 1.709.637.2026

Red Knot (*Calidris canutus rufa*)
Habitat: Use coastal mudflats, salt marshes, sandy estuaries, and sand flats during their fall migration
Description: Medium-sized shorebird. Long bill, long legs, long tapered wings with elongated body.
Adult size: 25 cm in length.
Contact: Provincial Biologist – 1.709.637.2026

Nova Scotia Protected Wildlife

The following species are protected under SARA (Species at Risk Act) and/or COSEWIC (Committee on the status of Endangered Wildlife in Canada). Of the protected species found in Nova Scotia and the Atlantic Ocean, these either have (recently) been observed in the area of NS's aquaculture sites or they are likely to be found in the area of the aquaculture sites due to their environmental preferences. If any of these animals are found in distress around the aquaculture sites, Canadian Coast Guard should be contacted at **1-800-565-1633**. If any of these animals are observed, care should be exercised to avoid causing them any harm.

American Eel (*Anguilla rostrata*)
Habitat: Uses all salinities during life stage, found in all freshwaters that are accessible to the Atlantic Ocean.
Description: Elongated, grey with cream colour belly.
Max Size: Male: 0.4 m; Female: 1.0 m

Atlantic Cod (*Gadus morhua*)
Habitat: Shoreline to continental shelf in Northeast Atlantic
Description: Brown to green or grey with spots on dorsal surface, pale underside. Distinctive chin barb. 3 dorsal fins and 2 anal fins
Max Size: 2 m; 96 kg

Atlantic Wolffish (*Anarhichas lupus*)
Habitat: All around Nova Scotia. Deep, rocky continental shelf. Periodically found on sandy or muddy bottom.
Description: Rounded profile, heavy head, blunt snout, lacking pelvic fins. Colour ranges from slate blue to dull green to purplish brown with vertical, dark brown bars along the sides. Extensive teeth structure
Max Size: 150 cm, 20 kg

Blue Whale (*Balaenoptera musculus*)
Habitat: North shore of the Gulf of St Lawrence and off Eastern Nova Scotia during spring, summer, and fall.
Description: Tapered, elongated body, pleated grooves in the skin of the neck, small dorsal fin, mottled dark blue and grey.
Max Size: 30 m, 181 MT

Atlantic Bluefin Tuna (*Thunnus thynnus*)
Habitat: Seasonal migrant and occurs in the area during its summer feeding migration.
Description: Large, stout but fusiform body. Dorsal surface is dark blue to black, shading to lighter blue on the sides and silvery grey below.
Max Size: 270 cm fork length and 400 kg or more

Atlantic Salmon – NS (*Salmo salar*)
Habitat: Throughout the inner Bay of Fundy following anadromous migration
Description: Sides and belly are silvery, back varies from shades of brown to green and blue
Max Size: 60 cm, 3 kg

Basking Shark (*Cetorhinus maximus*)
Habitat: Prefers temperatures of 8 to 14.5 °C and is often seen close to land and near surface as it slowly feed on plankton.
Description: Cavernous jaw and obvious gill slits. Colours range from dark brown to black or blue dorsally and fade to a dull white on the underside.
Max Size: 15+ m

Fin Whale (*Balaenoptera physalus*)
Habitat: Temperate, deep, cool waters.
Description: Long, slender body, V-shaped head, paired blowholes, asymmetrical colouring.
Max Size: 20 to 27 m in length and 70 MT.

Harbour Porpoise (*Phocoena phocoena*)
Habitat: Found primarily over continental shelves, and occasionally in deeper waters
Description: Robust body, dark grey fins and flipper, grey sides, and whiter underside.
Max Size: 1.9 m in length and 76 kg.

Lumpfish *(Cyclopterus lumpus)*
Habitat: Prefer hard rocky bottom with lots of vegetation in cold water.
Description: Short, stubby, with a small mouth and slightly rounded tail.
Max Size: 60 cm, weighing up to 10kg.

Porbeagle (*Lamna nasus*)
Habitat: Pelagic, epipelagic, or littoral, found far from land in ocean basins and close inshore.
Description: Streamlined body, dark grey - bluish black back and white underneath. Stout head and large eyes.
Max Size: 3 m in length

Striped Bass (*Morone saxatilis*)
Habitat: Anadramous species spawns in freshwater, moves to coastal brackish or salt water to feed and mature. Found along the Atlantic Coast.
Description: Dark olive green back with pale silver striped sides and white belly
Max Size: 1.8 m

Barrow's Goldeneye (*Buscephala islandica*)
Habitat: Coastal waters throughout Atlantic Ocean
Description: Medium sized sea duck. High, rounded head is black with white patch under eye. Males are black and white; females are greyish brown and white.
Max Size: 53 cm, 1 kg

Leatherback Sea Turtle (*Dermochelys coriacea*)
Habitat: Can be found close to shore and at times in relatively shallow waters to feed on jellyfish aggregations in late summer.
Description: Largest living sea turtle. Lacks a bony shell, its carapace is covered in bluish black skin.
Max Size: 2.4 m in length, 3.6 m wide, 725 kg.

North Atlantic Right Whale (*Eubalaena glacialis*)
Habitat: Temperate northern waters in summer.
Description: Large black baleen whale distinguished by the callosities (thick, hard, white bumps) on its head.
Max size: 16 to 17 m in length, 64 MT.

Shortfin Mako *(Isurus oxyrinchus)*
Habitat: Prefers water temperatures between 17-22°C so it is unlikely to be found outside of summer in Canadian waters.
Description: Cylindrical shape with a vertically elongated tail. Metallic blue coloration dorsally and white on its underside.
Max Size: 4 m in length

White Shark (*Carcharodon carcharias*)
Habitat: Breakers off sandy beaches, rocky shores, and readily enters enclosed bays and estuaries.
Description: Heavy spindle-shaped body with sharp colour contrast between its backside and underside.
Max Size: 3.8 to 6 m in length

Harlequin Duck (*Histrionicus histrionicus*)
Habitat: Turbulent mountain streams in summer, rocky coastal waters in winter.
Description: Males have slate-blue plumage, chestnut sides, streaks of white, chestnut, and black on head. Females are plain, brownish grey with patches of white.
Max size: 45 cm in length.

Red Knot (*Calidris canutus rufa*)
Habitat: Migrate from Canadian Arctic to South America in July and August. Migration stops can include tidal sandflats and mudflats along the gulf of St Lawrence and Bay of Fundy.
Description: Shorebird with long straight bill, small head, and long legs. Brownish red face, neck, chest, and underparts. White stripe on upper part of wings.
Max Size: 26 cm in length.

Roseate Tern (*Sterna dougallii*)
Habitat: Occurs in large colonies on coasts and islands.
Description: Medium sized seabird with long forked tail. White with black head cap and bill.
Max Size: 40 cm, 130 g

Leach's Storm-petrel (*Oceanodroma leucorhoa*)
Habitat: Forages over the continental shelf during the breeding season, moving into open oceanic waters to feed on small fish and crustacea.
Description: Tube nosed with blackish-brown plumage, long wings angled at the carpal joint, and forked tail. Distinctive white rump
Max Size: 21 cm in length, 48 cm wingspan

Lesser Yellowlegs (*Tringa flavipes*)
Habitat: Utilizes intertidal habitat during migration south.
Description: Medium sized shorebird with yellow legs. Bill is short, slim, straight, and dark. Breast is streaked and flanks are finely marked with short bars.
Max size: 27 cm in length, 64 cm wingspan

Piping Plover (*Charadrius melodus melodus*)
Habitat: Nest and feed primarily on coastal sand or gravel beaches and sand flats. Found all along the southern shore of Nova Scotia
Description: Grey/brown sides and back, white under. Black spots around neck, on forehead, and at beak tip.
Max Size: 19 cm, 48 g

Red-necked Phalarope (*Phalaropus labatus*)
Habitat: Spends much of its nonbreeding season at sea.
Description: Small shorebird with red and orange on sides and base of its neck during breeding season. Non breeding plumage is white along the head, throat, breast and underparts, with dark upper parts, eye stripe, and crown.
Max Size: 20 cm in length

Short-eared Owl (*Asio flammeus*)
Habitat: Tundra, coastal barrens, sand dunes, field, and bog areas.
Description: Medium-sized, puffy white and brown owl with short ear tufts and yellow eyes.
Adult size: 43 cm, 475 g.

Thorny Skate *(Amblyraja radiata)*
Habitat: Ocean bottoms at depths of 18-1200 m, at temperatures of 0-10˚C.
Description: Dark colored upper body, white under side. A row of 11-19 large thorns runs down the middle of its back and along the tail.
Adult Size: 110 cm, 12.5 kg

Peregrine Falcon anatum/tundrius (*Falco peregrinus*)
Habitat: cliffs or buildings for nesting, open landscapes for foraging, with nearby waterbodies
Description: (adults) bluish-grey/darker upper parts and pale under parts with dark spotting and barring; (immatures) pale to slate or chocolate brown upper parts, under parts are buffy with blackish streaks
Adult size: (males) 36-49 cm long, 650 g; (females) 45-58 cm long, 950 g

Spiny Dogfish (*Squalus acanthis*)
Habitat: Occurs world-wide from the intertidal to the continenta shelf slope, most common at 10-100 m depth. Usually found a temperatures of 5-15˚C.
Description: Small shark, grey-brown on the upper body and whitish on the under side.
Max. size: 112 cm TL (female), 94 cm TL (male)

APPENDIX D
Notice of Works

Transport Canada / Transports Canada

NAVIGATION PROTECTION ACT (NPA)
NOTICE OF WORKS FORM

WARNING: Any false or misleading statement with respect to this form and supporting documentation, including the misrepresentation of a material fact, may result in the refusal to authorize or issue Approval or result in the suspension or cancellation of an Approval obtained through fraudulent means.

PRIOR TO COMPLETING THIS FORM:
1. Determine if your project is on a navigable water listed on the Schedule to the NPA. A *Notice to the Minister* is required for works on scheduled navigable waters. Works on non-scheduled navigable waters may be eligible to opt in; if requesting Opt-in, the Opt-in annex must be included with your *Notice to the Minister*.
2. Self assess your project against the *Minor Works Order* to determine if a *Notice to the Minister* is required. Links to the NPA Schedule, Order and Regulations can be accessed through the Navigation Protection Program (NPP) website at http://www.tc.gc.ca/eng/programs-621.html.

PURPOSE

This *Notice of Works* Form and its supporting documentation (as well as other relevant information) which may be required for a review by Transport Canada (TC), once completed and submitted, comprise the *Notice to the Minister* as required under the NPA. For assistance in completing your submission, refer to the guidance provided on the NPP website under "Apply to the NPP" including the *Guide to the Navigation Protection Program's Notification, Application and Review Requirements*.

SUPPORTING DOCUMENTATION REQUIREMENTS

Mandatory Information Checklist (incomplete information will be returned with no action)	Recommended Information (may expedite your review)
☑ Completed and signed "Notice of Works Form" with all mandatory fields completed	☑ Body of water details
☑ Map showing location of project[1]	☑ Land use/Ownership information
☑ Top/Plan drawing with dimensions[1]	☑ Body of water use information
☑ Side/Profile drawing with dimensions[1]	☑ Impacts, obstructions and mitigation plans
	☐ Any environmental review information
[1] 6 copies if hard copy submission	☑ Operation, maintenance and marking plans
	☐ Photographs of work site and body of water
	☐ Aboriginal consultation results
	☑ Other government agencies involved
	☐ Water lot lease information
	☐ Opt-in request annex (non-scheduled navigable waters only)

When submitting a Notice to the Minister, owners should note:

- All plans and drawings must be legible when printed on 11" x 17" paper
- For e-mail submissions, provide a scan of all relevant supporting documentation
- Your completed Notice to the Minister should be sent to the appropriate regional office as outlined below

TRANSPORT CANADA NAVIGATION PROTECTION PROGRAM REGIONAL OFFICE LOCATIONS

Pacific Region 820-800 Burrard Street Vancouver BC V6Z 2J8 Telephone: 604-775-8867 Email: NPPPAC-PPNPAC@tc.gc.ca	**Prairie and Northern Region** Canada Place 1100-9700 Jasper Ave Edmonton AB T5J 4E6 Telephone: 780-495-8215 Email: NPPPNR-PPNRPN@tc.gc.ca	**Ontario Region** 100 South Front Street, 1st Floor Sarnia ON N7T 2M4 Telephone: 519-383-1863 Email: NPPONT-PPNONT@tc.gc.ca
Headquarters (For info on the NPP and NPA ONLY) Notices not processed at this office Tower C, 330 Sparks Street, 18th Floor Ottawa ON K1A 0N5 Telephone: 613-991-3476 Email: NPPHQ-PPNAC@tc.gc.ca	**Quebec Region** 401-1550 d'Estimauville Avenue, 5th Floor Quebec QC G1J 0C8 Telephone: 877-646-6420 Email: PPNQUE-NPPQUE@tc.gc.ca	**Atlantic Region** 95 Foundry Street, 6th Floor P.O. Box 42 Moncton NB E1C 8K6 Telephone: 506-851-3113 Email: NPPATL-PPNATL@tc.gc.ca

NAVIGATION PROTECTION ACT
NOTICE OF WORKS FORM

TC file number (if known): 8200-93-3057

Are you the riparian property owner? ◯Yes ◉No

GENERAL INFORMATION

Official and/or local name(s) of the body of water (Required)	Is the body of water listed on the schedule to the NPA?
Brier Island, Westport Harbour	◉Yes ◯No ◯Unknown
Are you also requesting an Approval, if required? ◉Yes ◯No	Is this an Opt-in request? ◯Yes ◉No
Are you representing an Aboriginal group? ◯Yes ◉No	Is the work near/on First Nations reserve or land claim? ◯Yes ◉No ◯Unknown
Does this project involve throwing or depositing materials in water? ◯Yes ◉No	Does this project involve dewatering a body of water? ◯Yes ◉No

OWNER CONTACT INFORMATION[2]

Individual or company name (Required)	Contact name (Required)
Kelly Cove Salmon Ltd.	Jeff Nickerson

Mailing address (Required)

134 North St.

City/Town (Required)	Province/Territory (Required)	Postal code (Required)
Bridgewater	Nova Scotia	B4V 2V6

Primary telephone number (Required)	Other telephone number	E-mail
902-527-5536		jnickerson@cookeaqua.com

Owner's agent/mandatary (contractor/consultant/representative/co-proponent, if any)

Company name	Contact name
SIMCorp Marine Environmental Inc.	[redacted]

Mailing address

46 Milltown Blvd.

City/Town	Province/Territory	Postal code
St. Stephen	NB	E3L 1G3

Primary telephone number	Other telephone number	E-mail
506-467-9014	[redacted]	[redacted]

WORK SITE INFORMATION

Nearest municipality/county/district (Required)	Province/Territory (Required)
Westport, Digby County	Nova Scotia

Site location such as lot, concession, section, township, range, meridian, 911 address, property identification, etc. (Required)

Brier Island aquaculture site #0742 is located in Westport Harbour approximately 350 meters east of the town of Westport. Site #0742 is situated on the western side of Grand Passage and 800 meters northwest of Peter's Island.

Site position Latitude North (Required)	Site position Longitude West (Required)
Degrees 44 Minutes 15 Seconds 42.1	Degrees 66 Minutes 20 Seconds 48.6
Hydro chart number: 4118	Topo map number:

Body of water details, such as characteristics, bank/bottom features, biological components, flow/tides, etc.

Site #0742 is located on the western side of Grand Passage in Westport Harbour, occupies a 11.04-ha parcel, and is located over waters ranging from 6-20m in depth. The sediment composition of the seafloor is composed primarily of hard packed sand, with rare gravel and shell debris observed. The southwest corner has prevalent eel grass while the southeast corner is composed primarily of kelp and other macroalgae.

Potential obstructions, such as natural/man-made, other works, navigation aids, etc.

This site consists of plastic circular cages and compensator buoys. The outside corners of the lease are marked with a 0.6m buoy equipped with a light and radar reflectors. Grand Passage also has a marked navigation channel.

Land use/Ownership, such as past/current, private/government, rural/suburban, coastal, environmental, etc.

Aquaculture site #0742 is owned by Kelly Cove Salmon Ltd.

BODY OF WATER USE INFORMATION

Navigation types (check all that apply)
☑ Commercial ☐ Recreational

Maximum vessel size
Length _____ Width _____ Draft _____

Traffic direction
○ One-way ◉ Two-way

Manoeuvrability (check all that apply)
☐ Poor ☑ Good ☐ Excellent

Day/Night
○ Day ○ Night ◉ Both

Volume
○ Low ◉ Med ○ High

Navigation season(s) (check all that apply)
☑ Winter ☑ Spring ☑ Summer ☑ Fall

Other uses such as cottagers, special events, fishing, etc

The area surrounding aquaculture site #0742 is used primarily by fishing vessels traveling in and out of the port of Westport. A ferry makes trips between Long Island and Brier Island and docks 400 meters north of site #0742. Recreational vessels also frequent this area. The primary vessel traffic around Brier Island aquaculture site would be from aquaculture vessels.

PROJECT INFORMATION

Name of work such as bridge, dam, marina, etc. (Required)

Aquaculture site

Type of work (check all that apply) (Required)
☐ Construct ☐ Place ☐ Alter
☐ Repair ☐ Decommission ☐ Rebuild
☐ Permanent ☑ Temporary ☐ Remove

Brief project description (or attach) such as status, structures, operation, etc. (Required)

The aquaculture site consists of two strings of 4 circular 100m circumference cages. Cages are present on site all year round.

Method of construction such as temporary works, activities, etc. (Required)

Aquaculture site consists of a 3x4 floating grid layout with the center grid being empty (see attached plans). Crews visit the site daily to feed and maintain the cage system.

Anticipated impacts such as source, severity, mitigation, marking, waste/debris management, use, cumulative, etc.

Expected start date (dd-mm-yyyy) (Required)
Immediately

Expected completion date (dd-mm-yyyy) (Required)
Ongoing

ENVIRONMENTAL REVIEW INFORMATION

Is the work located on Federal lands?

◯ Yes ◉ No ◯ Unknown

Is the project a designated project under the *Regulations Designating Physical Activities* under the *Canadian Environmental Assessment Act, 2012*?

◯ Yes ◉ No ◯ Unknown

Is the project subject to Northern Environmental Assessment (EA) Regime(s)?

◯ Yes ◉ No ◯ Unknown

If yes, identify the northern EA regime(s) that apply

- ☐ Inuvialuit Final Agreement (IFA)
- ☐ *Mackenzie Valley Resource Management Act* (MVRMA)
- ☐ Nunavut Land Claims Agreement (NLCA)
- ☐ *Yukon Environmental and Socio-economic Assessment Act* (YESAA)

Other Federal Organizations involved

- ☐ Canadian Environmental Assessment Agency (CEAA)
- ☐ Environment Canada (EC)
- ☑ Fisheries and Oceans Canada (DFO)
- ☐ Natural Resources Canada (NRCan)
- ☐ Major Projects Management Office (MPMO)
- ☐ Northern Projects Management Office (NPMO)
- ☐ Aboriginal Affairs and Northern Development Canada (AANDC)
- ☐ Other: _____

OWNER AUTHORIZATION[2]

I hereby certify that the information contained herein and in any of the supporting documents is complete, true and accurate to the best of my knowledge and belief, and that I am authorized, as the owner, to submit this Notice to the Minister.

[redacted]

Signature (Required)

10.12.2021

Date (dd-mm-yyyy) (Required)

Jeffery Nickerson

Print Name (Required)

FOR OFFICE USE ONLY

	Date stamped (dd-mm-yyyy)

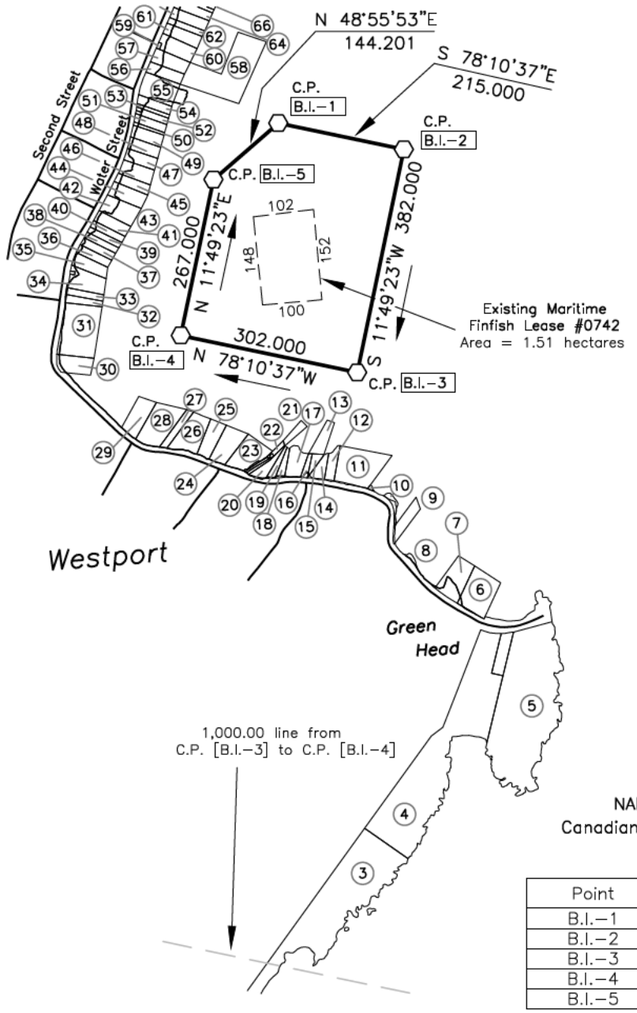
[2] "Owner", in relation to a work, means the actual or reputed owner of the work or that owner's agent or mandatary. It includes a person who is in possession or claiming ownership of the work and a person who is authorizing or otherwise responsible for the construction, placement, alteration, repair, rebuilding, removal, decommissioning, maintenance, operation, safety or use of the work. It also includes a person who proposes to construct or place a work.

The personal information provided on this Notice to the Minister is collected under the authority of the ***Navigation Protection Act***, sections 4, 5, 6, 9, 21, 22, 23 and 24. This information is required for the purpose of processing applications made under the above-noted sections for proposed, commenced or existing works that are or will be constructed, placed, altered, repaired, rebuilt, removed or decommissioned in, on, over, under, through or across any navigable water in Canada. The personal information collected is described in a personal information bank entitled ***Navigation Protection Program*** (bank number TC PPU 086). Under the provisions of the ***Privacy Act***, individuals have the right of access to, correction of and protection of their personal information. Instructions for obtaining personal information are provided in Info Source, a copy of which is available in major public and academic libraries or online at http:// ww.infosource.gc.ca

Sweeney International Marine Corp.
46 Milltown Blvd.
St. Stephen, NB
E3L 1G3

SIMCorp Environmental Sciences Lab
120 Milltown Blvd.
St. Stephen, NB
E3L 1G6

NORTH
UTM ZONE 19N
GRID
NAD83 (CSRS)



#	P.I.D. #	OWNER / ADDRESS
1	30188395	Nova Scotia Nature Trust 2085 PO BOX 2202 Maitland S Halifax N.S. Canada B3J3C4
2	30188387	H.M. in right of Canada (DFO) PO BOX 2247 STN Central Halifax N.S. Canada B3J3C9
3	30324339	[redacted]
4	30188429	
5	30188403	
6	30348841	
7	30188460	
8	30255350	Owner Unkown

#	P.I.D. #	OWNER / ADDRESS
9	30188510	[redacted]
10	30255343	
11	30188544	
12	30188569	
13	30343123	H.M. in right of Canada PO BOX 1035 Dartmouth N.S. CA B2Y4T3
14	30188585	[redacted]
15	30343115	H.M. in right of Canada PO BOX 1035 Dartmouth N.S. CA B2Y4T3
16	30343107	Fisheries & Oceans Canada PO BOX 1035 Dartmouth N.S. CA B2Y4T3

Westport Harbour

(Atlantic Ocean)

Proposed Marine Aquaculture Site

Brier Island Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 11.04 hectares

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 19N

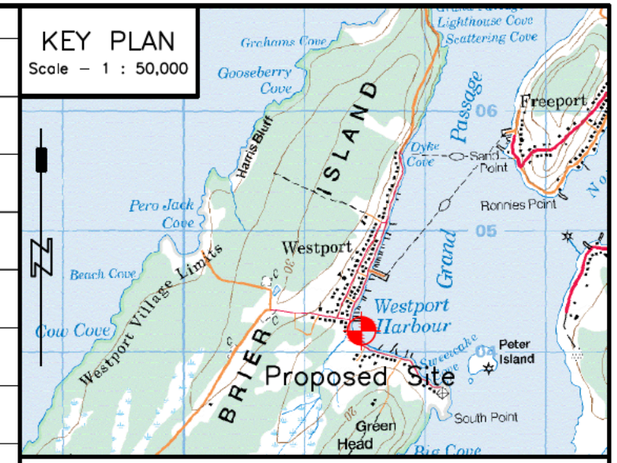
Point	Northing	Easting
B.I.–1	4,904,564.710	711,756.689
B.I.–2	4,904,520.659	711,967.128
B.I.–3	4,904,146.763	711,888.860
B.I.–4	4,904,208.640	711,593.267
B.I.–5	4,904,469.975	711,647.972

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co–ordinates

Point	Latitude (N)	Longitude (W)
B.I.–1	44°15'48.6603"	66°20'49.3625"
B.I.–2	44°15'47.0136"	66°20'39.9457"
B.I.–3	44°15'34.9903"	66°20'44.0170"
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3986"

KEY PLAN

Scale – 1 : 50,000



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CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	
OTHER BOUNDARY	
TIE LINES	
NOT TO SCALE	
MAJOR CONTOURS	
MINOR CONTOURS	
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED BOUNDARY AMENDMENT TO LEASE #0742

KELLY COVE SALMON LTD. / BRIER ISLAND

LOCATED AT:

WESTPORT, WESTPORT HARBOUR (ATLANTIC OCEAN),
BRIER ISLAND, DIGBY COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 21st day of May, 2021.

[redacted]

Jeff Nickerson

A&D JOB #149–16–0742

SHEET 1 OF 11 | DATE: May 21, 2021

NOTES:

(1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
(2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
(3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
(4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
(5.) SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
(6.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
(7.) ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
(8.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS), USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 19 NORTH (UTM Z19N).

KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen D.F. Acker
N.S.L.S. 639
MEMBER

PURPOSE OF PLAN (SHEET 1 OF 11)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 2–11.

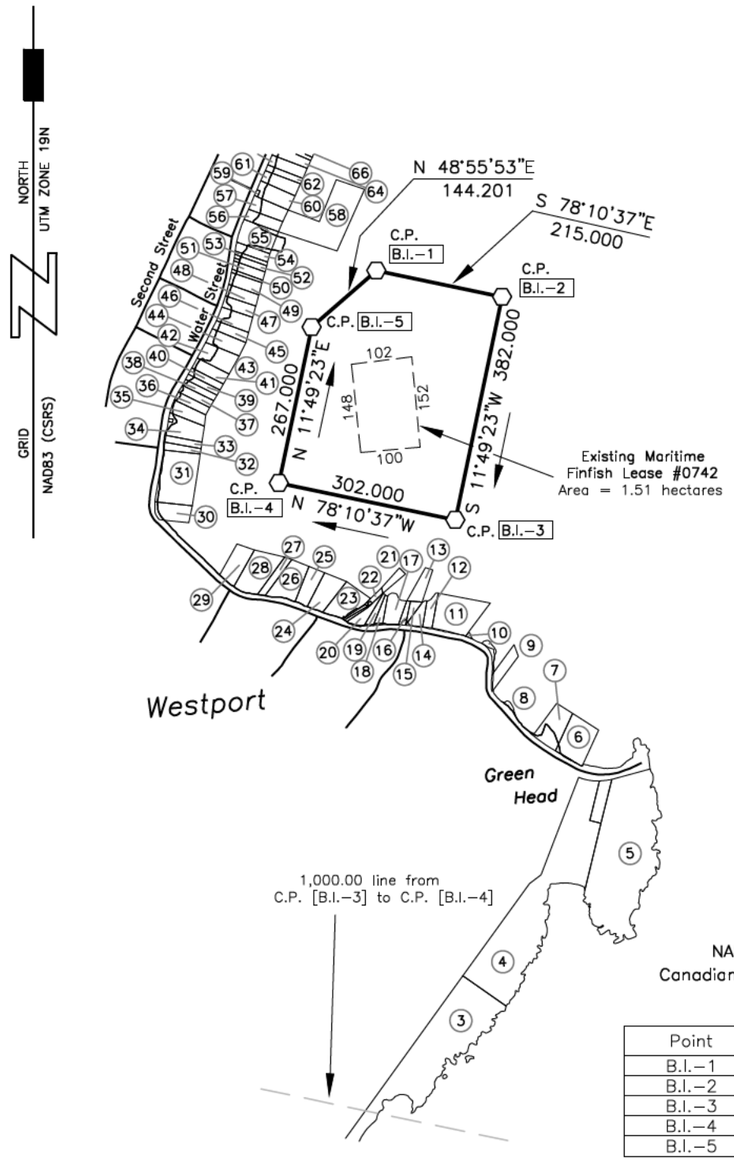
200 0 200 400 600

SCALE – 1 : 10,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors &
Professional Engineers

4083 Highway #308, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0
Phone: (902) 648–2186
www.adsurveying.ca

80B Ohio Road, P.O. Box 367
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0
Phone: (902) 875–2110
info@adsurveying.ca



#	P.I.D. #	OWNER / ADDRESS
17	30188692 30188700	[redacted]
18	30188718	
19	30188742	
20	30360754	
21	30343099	H.M. in right of Canada (DFO) PO box 1035 Dartmouth N.S. Canada B2Y4T3
22	30349161	H.M. in right of Canada 1713 Bedford row floor 7th floor PO box 2247 Halifax N.S. Canada B3J3C9
23	30188791	[redacted]
24	30188841	

#	P.I.D. #	OWNER / ADDRESS
25	30188866	[redacted]
26	30255335	
27	30363220	
28	30255327	
29	30188890	
30	30323158	
31	30189054	R.E. Robicheau Limited 225 Water Street Westport N.S. Canada B0V1H0
32	30189062	[redacted]

Westport Harbour

(Atlantic Ocean)

Proposed Marine Aquaculture Site

Brier Island Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 11.04 hectares

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 19N

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Canadian Spatial Reference System (CSRS)
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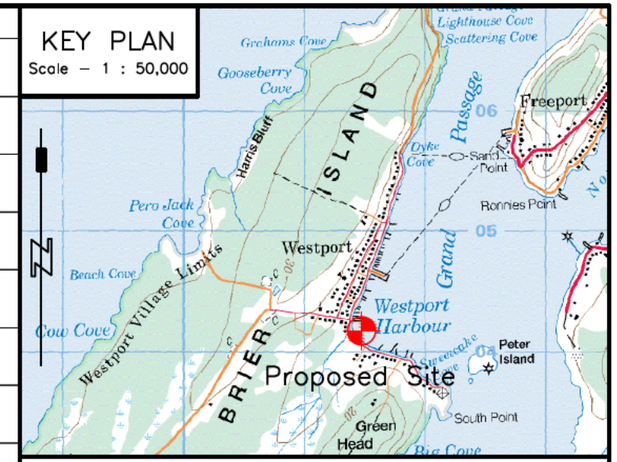
B.I.–3	44°15'34.9903"	66°20'44.0170"
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3986"

KEY PLAN
Scale – 1 : 50,000



Legend:

CALCULATED POINT	C.P. ○
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	
OTHER BOUNDARY	
TIE LINES	
NOT TO SCALE	
MAJOR CONTOURS	
MINOR CONTOURS	
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED BOUNDARY AMENDMENT TO LEASE #0742

KELLY COVE SALMON LTD. / BRIER ISLAND

LOCATED AT:

WESTPORT, WESTPORT HARBOUR (ATLANTIC OCEAN),
BRIER ISLAND, DIGBY COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 21st day of May, 2021.

_____[redacted]_____

Jeff Nicke

A&D JOB #149–16–0742

SHEET 2 OF 11 | DATE: May 21, 2021

NOTES:

(1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
(2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
(3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
(4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
(5.) SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
(6.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
(7.) ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
(8.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS), USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 19 NORTH (UTM Z19N).

KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen D.F. Acker
N.S.L.S. 639
MEMBER

PURPOSE OF PLAN (SHEET 2 OF 11)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1, 3–9.

200 0 200 400 600

SCALE – 1 : 10,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
Tusket, Yarmouth County
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B0W 3M0
Phone: (902) 648–2186
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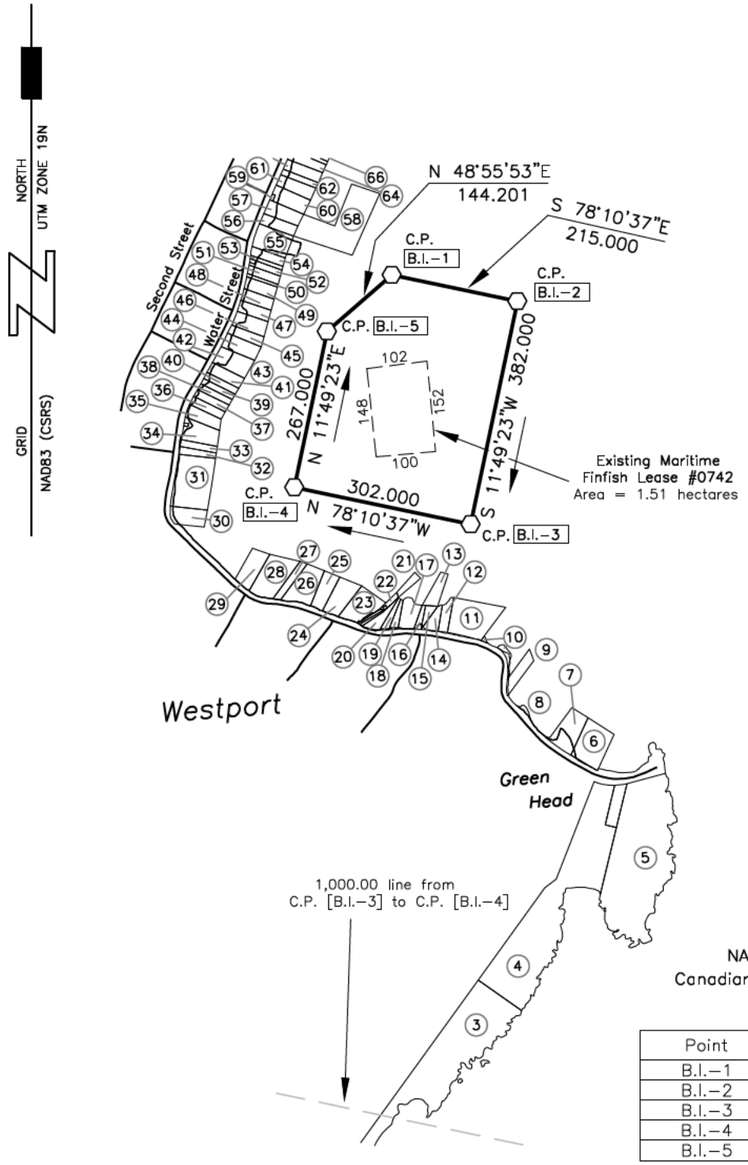


Westport Harbour

(Atlantic Ocean)

Proposed Marine Aquaculture Site

Brier Island Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 11.04 hectares

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 19N

Point	Northing	Easting
B.I.–1	4,904,564.710	711,756.689
B.I.–2	4,904,520.659	711,967.128
B.I.–3	4,904,146.763	711,888.860
B.I.–4	4,904,208.640	711,593.267
B.I.–5	4,904,469.975	711,647.972

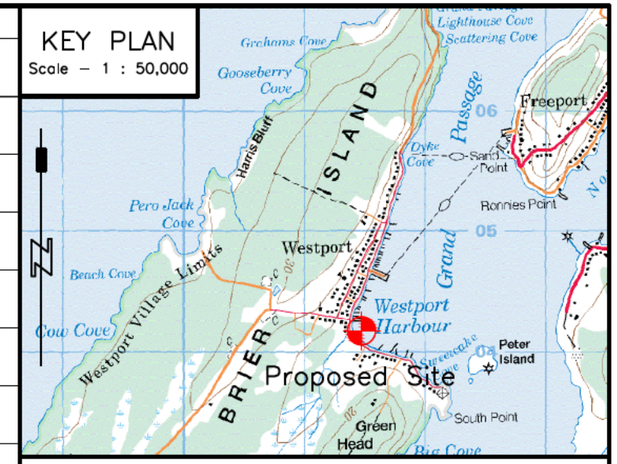
NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co–ordinates

Point	Latitude (N)	Longitude (W)
B.I.–1	44°15'48.6603"	66°20'49.3625"
B.I.–2	44°15'47.0136"	66°20'39.9457"
B.I.–3	44°15'34.9903"	66°20'44.0170"
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3986"

#	P.I.D. #	OWNER / ADDRESS
33	30190581	[redacted]
34	30190599	D.B. Kenney Fisheries Limited PO box 1210 Westport N.S. Canada B0V1H0
35	30190615	Graham Fisheries Holdings Limited 385 Water Sreet Westport N.S. Canada B0V1H0
36	30190623	[redacted]
37	30190631	
38	30190649	D.B. Kenney Fisheries Limited PO box 1210 Westport N.S. Canada B0V1H0
39	30190656	D.B. Kenney Fisheries Limited PO box 1210 Westport N.S. Canada B0V1H0
40	30190664	[redacted]

#	P.I.D. #	OWNER / ADDRESS
41	30190672	[redacted]
42	30190680 30190698	3280081 Nova Scotia Limited 130 Falls Point Road Lower Woods Harbour N.S. Canada B0W2E0
43	30376008 30375992	H.M. in right of the Province of N.S. PO box 186 Halifax N.S. Canada B3J2N2
44	30190714	3280081 Nova Scotia Limited 130 Falls Point Road Lower Woods Harbour N.S. Canada B0W2E0
45	30190722	D.B. Kenney Fisheries Limited 197 Dufferin Street Bridgewater N.S. Canada B4V2G9
46	30190730	3280081 Nova Scotia Limited 130 Falls Point Road Lower Woods Harbour N.S. Canada B0W2E0
47	30190763	[redacted]
48	30190771	D.B. Kenney Fisheries Limited PO box 1210 Westport N.S. Canada B0V1H0

KEY PLAN
Scale – 1 : 50,000



Legend:

CALCULATED POINT	C.P. ○
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	
OTHER BOUNDARY	
TIE LINES	
NOT TO SCALE	
MAJOR CONTOURS	+ 00.0
MINOR CONTOURS	
DEPTH SOUNDINGS	□
CONCRETE MOORING	
ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED BOUNDARY AMENDMENT TO LEASE #0742

KELLY COVE SALMON LTD. / BRIER ISLAND

LOCATED AT:

WESTPORT, WESTPORT HARBOUR (ATLANTIC OCEAN),
BRIER ISLAND, DIGBY COUNTY, NOVA SCOTIA

Client's Statement

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Dated this 21st day of May, 2021.

[redacted]

Jeff Nickerso

A&D JOB #149–16–0742

SHEET 3 OF 11 | DATE: May 21, 2021

NOTES:

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KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen D.F. Acker
N.S.L.S. 639
MEMBER

PURPOSE OF PLAN (SHEET 3 OF 11)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND. FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1–2, 4–11.

200 0 200 400 600

SCALE – 1 : 10,000 (METRIC)

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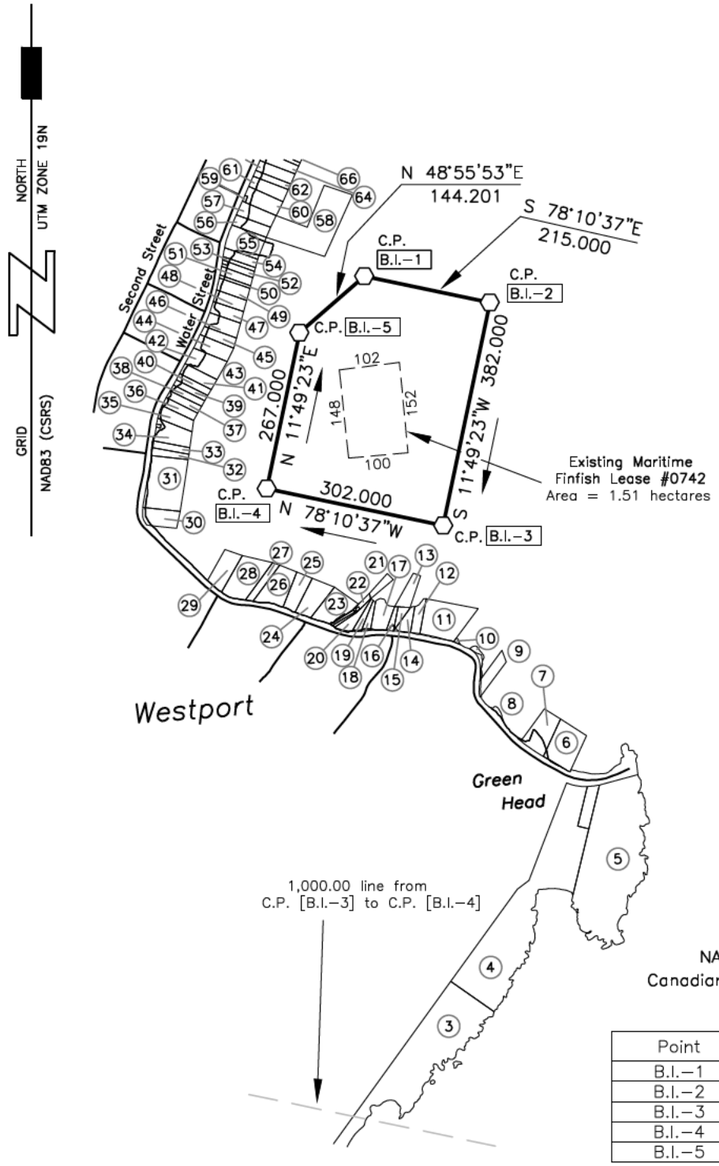

Westport Harbour

(Atlantic Ocean)

Proposed Marine Aquaculture Site

Brier Island Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 11.04 hectares

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 19N

Point	Northing	Easting
B.I.–1	4,904,564.710	711,756.689
B.I.–2	4,904,520.659	711,967.128
B.I.–3	4,904,146.763	711,888.860
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Canadian Spatial Reference System (CSRS)
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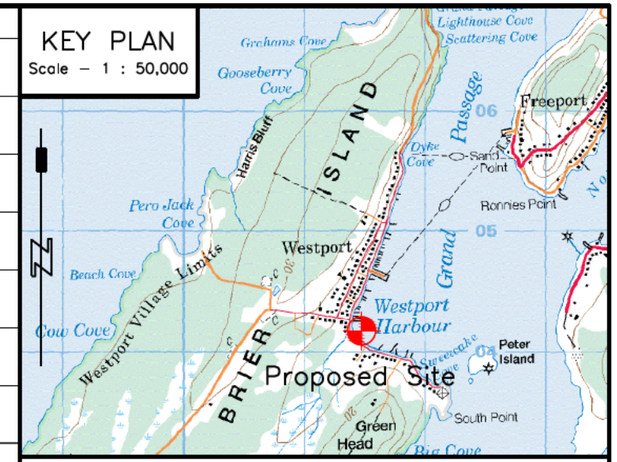
B.I.–3	44°15'34.9903"	66°20'44.0170"
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3986"

#	P.I.D. #	OWNER / ADDRESS
49	30190789 30380232	[redacted]
50	30190797	
51	30351720	D.B. Kenney Fisheries Limited Water Street Westport N.S. Canada B0V1H0
52	30351712	D.B. Kenney Fisheries Limited Water Street Westport N.S. Canada B0V1H0
53	30351696	[redacted]
54	30190805	
55	30375984	H.M. in right of the Province of N.S. PO box 186 Halifax N.S. Canada B3J2N2
56	30190821	H.M. in right of Canada PO box 2247 STN. Central Halifax N.S. Canada B3J3C9
57	30190839	H.M. in right of Canada PO box 2247 STN. Central Halifax N.S. Canada B3J3C9
58	30318638	H.M. in right of Canada PO box 2247 STN. Central Halifax N.S. Canada B3J3C9
59	30190847	Delaney Fisheries Limited PO box 415 Westport N.S. Canada B0V1H0
60	30190854	Delaney Fisheries Limited PO box 415 Westport N.S. Canada B0V1H0
61	30190862	DBK Seafoods Limited 1819 Granville Street Suite 102 Halifax N.S. Canada B3J3R1
62	30190870	DBK Seafoods Limited 1819 Granville Street Suite 102 Halifax N.S. Canada B3J3R1
63	30190888	[redacted]
64	30250492	

KEY PLAN

Scale – 1 : 50,000



Legend:

CALCULATED POINT	C.P. ○
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	
OTHER BOUNDARY	
TIE LINES	
NOT TO SCALE	
MAJOR CONTOURS	+ 00.0
MINOR CONTOURS	
DEPTH SOUNDINGS	□
CONCRETE MOORING	
ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED BOUNDARY AMENDMENT TO LEASE #0742

KELLY COVE SALMON LTD. / BRIER ISLAND

LOCATED AT:

WESTPORT, WESTPORT HARBOUR (ATLANTIC OCEAN),
BRIER ISLAND, DIGBY COUNTY, NOVA SCOTIA

Client's Statement

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Dated this 21st day of May, 2021.

[redacted]

Jeff Nickerson

A&D JOB #149–16–0742

SHEET 4 OF 11 | DATE: May 21, 2021

NOTES:

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KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen D.F. Acker
N.S.L.S. 639
MEMBER

PURPOSE OF PLAN (SHEET 4 OF 11)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1–3, 5–11.

200 0 200 400 600

SCALE – 1 : 10,000 (METRIC)

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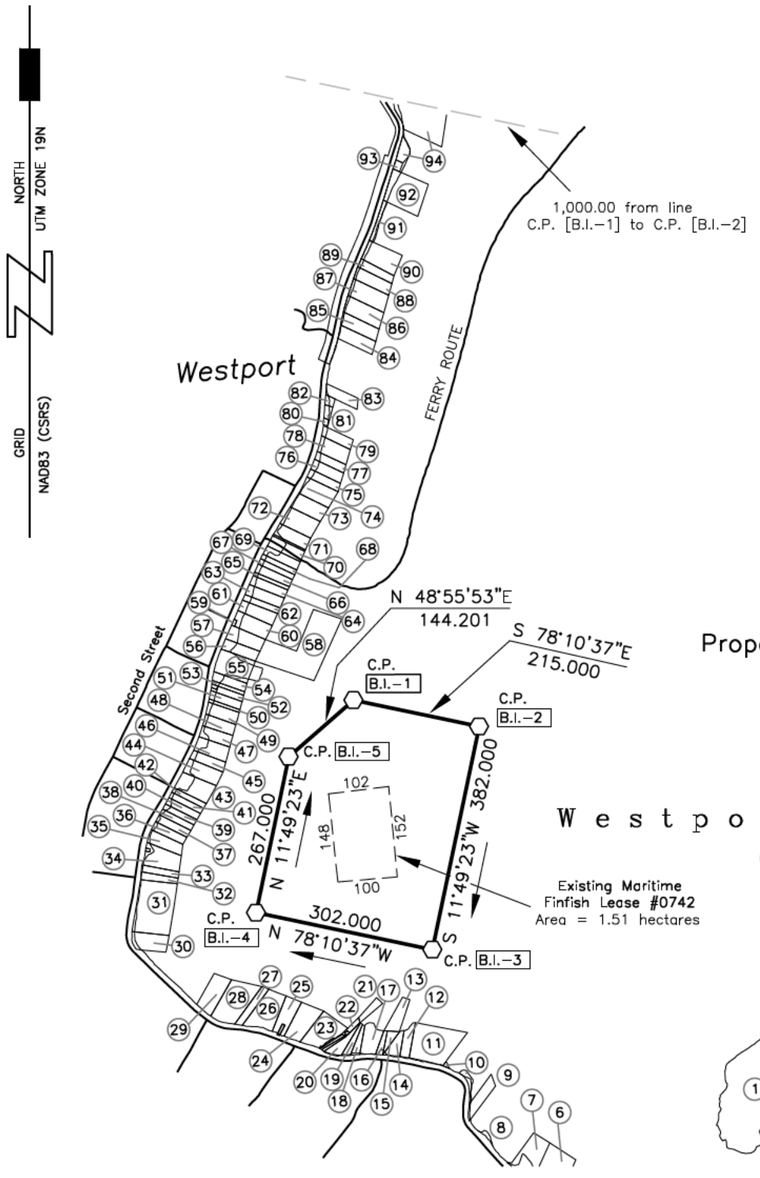

Proposed Marine Aquaculture Site

Brier Island Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 11.04 hectares

W e s t p o r t H a r b o u r

(Atlantic Ocean)

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 19N

Point	Northing	Easting
B.I.–1	4,904,564.710	711,756.689
B.I.–2	4,904,520.659	711,967.128
B.I.–3	4,904,146.763	711,888.860
B.I.–4	4,904,208.640	711,593.267
B.I.–5	4,904,469.975	711,647.972

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co–ordinates

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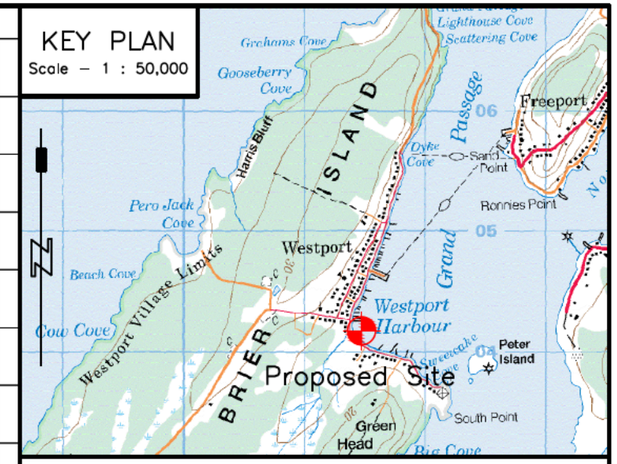
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3986"

(#)	P.I.D. #	OWNER / ADDRESS
(65)	30190896	[redacted]
(66)	30348981	
(67)	30190904	
(68)	30190912	
(69)	30190920	H.M. in right of the province of N.S. Westport N.S. Canada B0V1H0
(70)	30250476	H.M. in right of the province of N.S. Water Street Westport
(71)	30282552	[redacted]
(72)	30190946	

(#)	P.I.D. #	OWNER / ADDRESS
(73)	30190953	[redacted]
(74)	30190961	
(75)	30190979	
(76)	30324909	
(77)	30190987	
(78)	30279517	
(79)	30191001	
(80)	30190995	

KEY PLAN

Scale – 1 : 50,000



Legend:

CALCULATED POINT	C.P. ○
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	
OTHER BOUNDARY	
TIE LINES	
NOT TO SCALE	
MAJOR CONTOURS	
MINOR CONTOURS	
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED BOUNDARY AMENDMENT TO LEASE #0742

KELLY COVE SALMON LTD. / BRIER ISLAND

LOCATED AT:

WESTPORT, WESTPORT HARBOUR (ATLANTIC OCEAN),
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Client's Statement

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Dated this 21st day of May, 2021.

[redacted]

Jeff Nickerson

A&D JOB #149–16–0742

SHEET 5 OF 11 | DATE: May 21, 2021

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KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen D.F. Acker
N.S.L.S. 639
MEMBER

PURPOSE OF PLAN (SHEET 5 OF 11)

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200 0 200 400 600

SCALE – 1 : 10,000 (METRIC)

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Nova Scotia Land Surveyors & Professional Engineers

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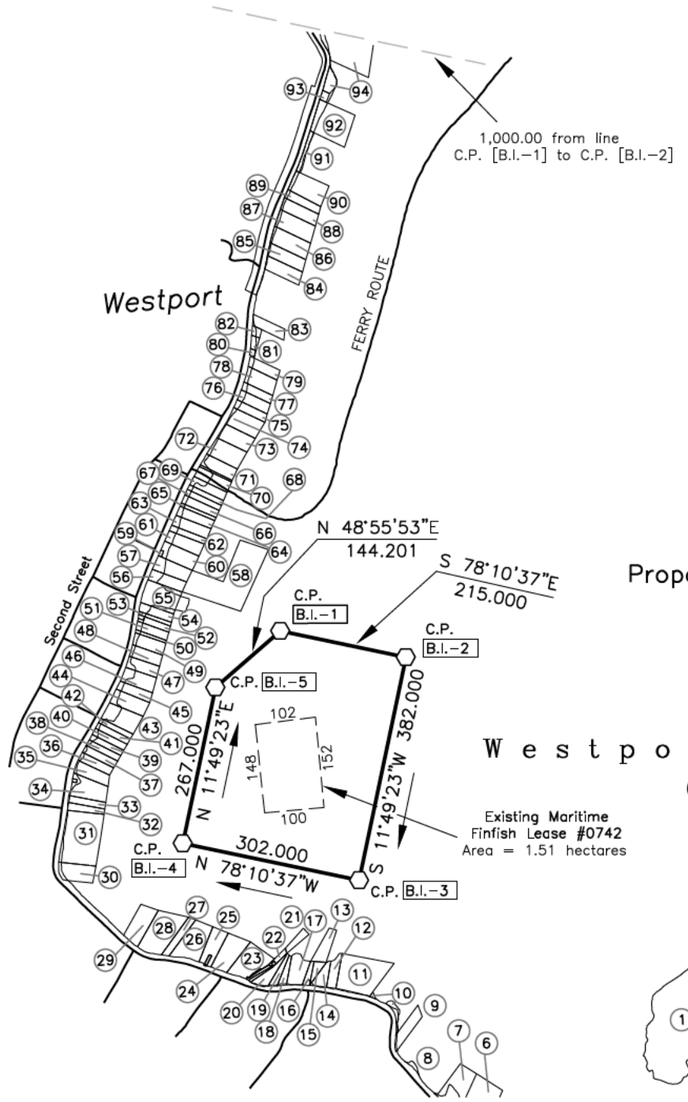
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0
Phone: (902) 875–2110
info@adsurveying.ca

GRID NAD83 (CSRS) UTM ZONE 19N NORTH



Proposed Marine Aquaculture Site

Brier Island Aquaculture Site
Kelly Cove Salmon Ltd.
Area = 11.04 hectares

W e s t p o r t H a r b o u r

(Atlantic Ocean)

#	P.I.D. #	OWNER / ADDRESS
81	30191027	[redacted]
82	30343404	
83	30191050	
84	30191126	
85	30370910	
86	30347892	
87	30191167	
88	30191175	

#	P.I.D. #	OWNER / ADDRESS
89	30191183	[redacted]
90	30191191	
91	30191233	
92	30257653	
93	30346944	
94	30276927	Zinc Sacrificial Anode INC. 6508 Highway 101 Gilbert's Cove N.S. Canada B0W2R0

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 19N

Point	Northing	Easting
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Point	Latitude (N)	Longitude (W)
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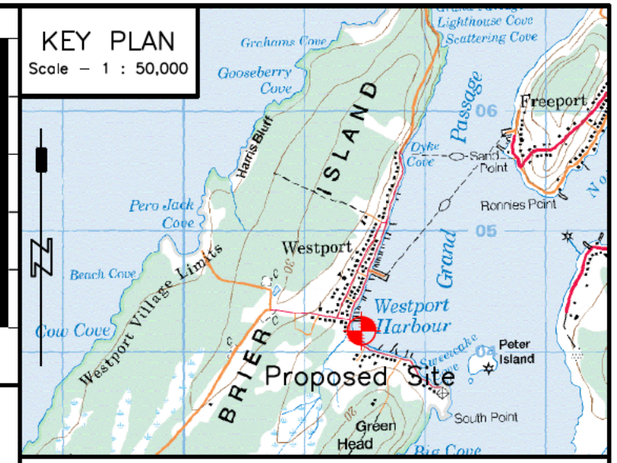
B.I.–2	44°15'47.0136"	66°20'39.9457"
B.I.–3	44°15'34.9903"	66°20'44.0170"
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3986"

KEY PLAN
Scale – 1 : 50,000



Legend:

CALCULATED POINT	C.P. ○
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	
OTHER BOUNDARY	
TIE LINES	
NOT TO SCALE	
MAJOR CONTOURS	
MINOR CONTOURS	
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
PROPOSED BOUNDARY AMENDMENT TO LEASE #0742
KELLY COVE SALMON LTD. / BRIER ISLAND
LOCATED AT:
WESTPORT, WESTPORT HARBOUR (ATLANTIC OCEAN),
BRIER ISLAND, DIGBY COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 21st day of May, 2021.

[redacted]

Jeff Nickers

A&D JOB #149–16–0742

SHEET 6 OF 11 | DATE: May 21, 2021

NOTES:
(1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
(2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
(3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
(4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
(5.) SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
(6.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
(7.) ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
(8.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS), USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 19 NORTH (UTM Z19N).

KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen D.F. Acker
N.S.L.S. 639
MEMBER

PURPOSE OF PLAN (SHEET 6 OF 11)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1–5, 7–11.

200 0 200 400 600

SCALE – 1 : 10,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

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Tusket, Yarmouth County
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Nova Scotia, Canada
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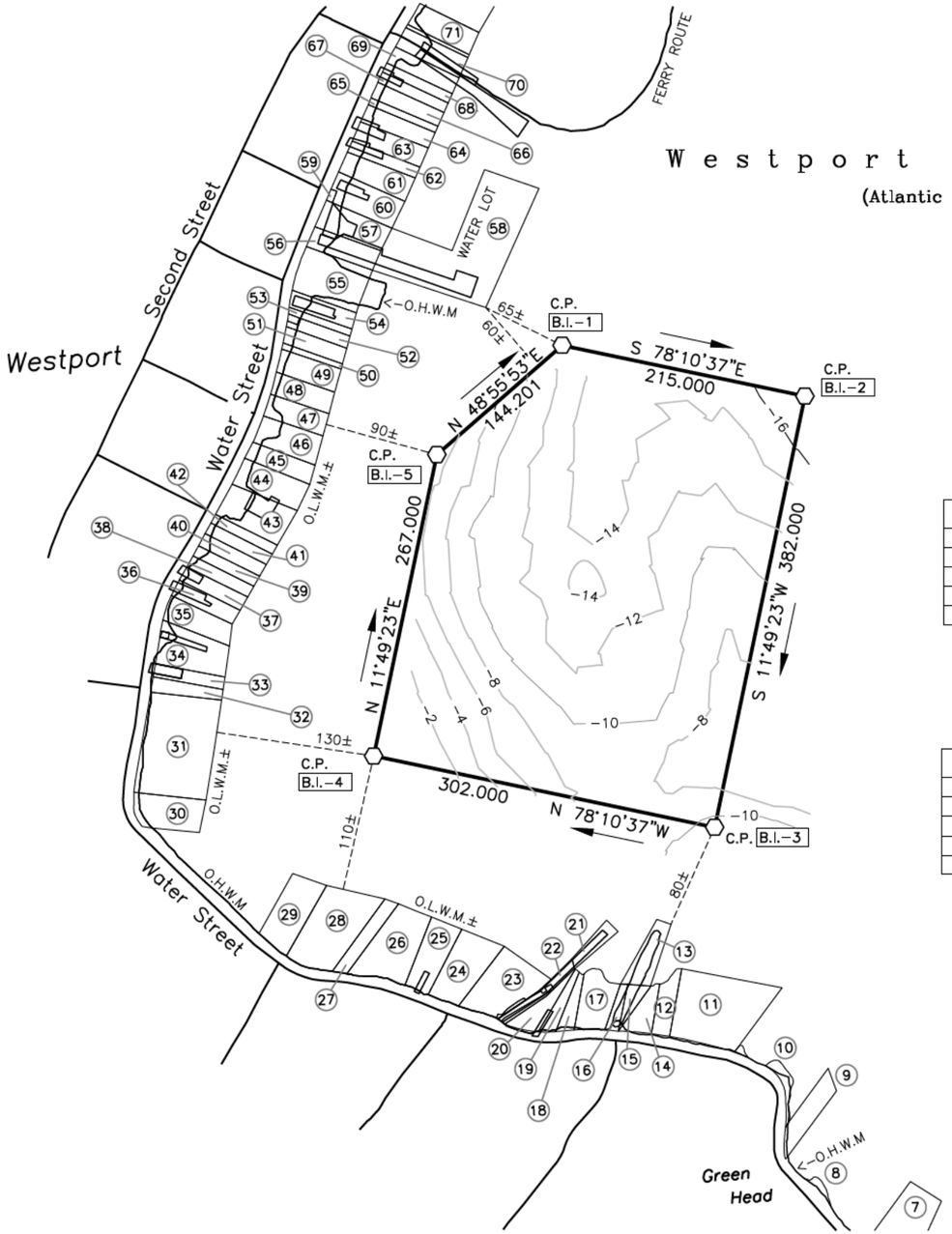


Proposed Marine Aquaculture Site

Brier Island Aquaculture Site
Kelly Cove Salmon Ltd.
Area = 11.04 hectares

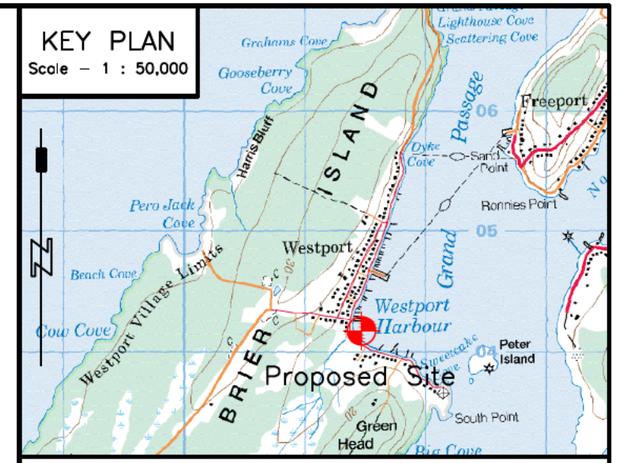
NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 19N

Point	Northing	Easting
B.I.–1	4,904,564.710	711,756.689
B.I.–2	4,904,520.659	711,967.128
B.I.–3	4,904,146.763	711,888.860
B.I.–4	4,904,208.640	711,593.267
B.I.–5	4,904,469.975	711,647.972

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co–ordinates

Point	Latitude (N)	Longitude (W)
B.I.–1	44°15'48.6603"	66°20'49.3625"
B.I.–2	44°15'47.0136"	66°20'39.9457"
B.I.–3	44°15'34.9903"	66°20'44.0170"
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3986"

GRID NAD83 (CSRS) UTM ZONE 19N NORTH



Legend:

CALCULATED POINT	C.P. ○
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	
OTHER BOUNDARY	
TIE LINES	
NOT TO SCALE	
MAJOR CONTOURS	
MINOR CONTOURS	
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
BASIC SEAFLOOR TOPOGRAPHY
KELLY COVE SALMON LTD. / BRIER ISLAND
LOCATED AT:
WESTPORT, WESTPORT HARBOUR (ATLANTIC OCEAN),
BRIER ISLAND, DIGBY COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 21st day of May, 2021.

[redacted]

Jeff Ni[redacted]

A&D JOB #149–16–0742

SHEET 7 OF 11 | DATE: May 21, 2021

NOTES:

(1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
(2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
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KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen D.F. Acker
N.S.L.S. 639
MEMBER

PURPOSE OF PLAN (SHEET 7 OF 11)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND BASIC SEAFLOOR TOPOGRAPHY, FOR ADDITIONAL ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1–6 & 8–11.

100 0 100 200 300

SCALE – 1 : 5,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
Tusket, Yarmouth County
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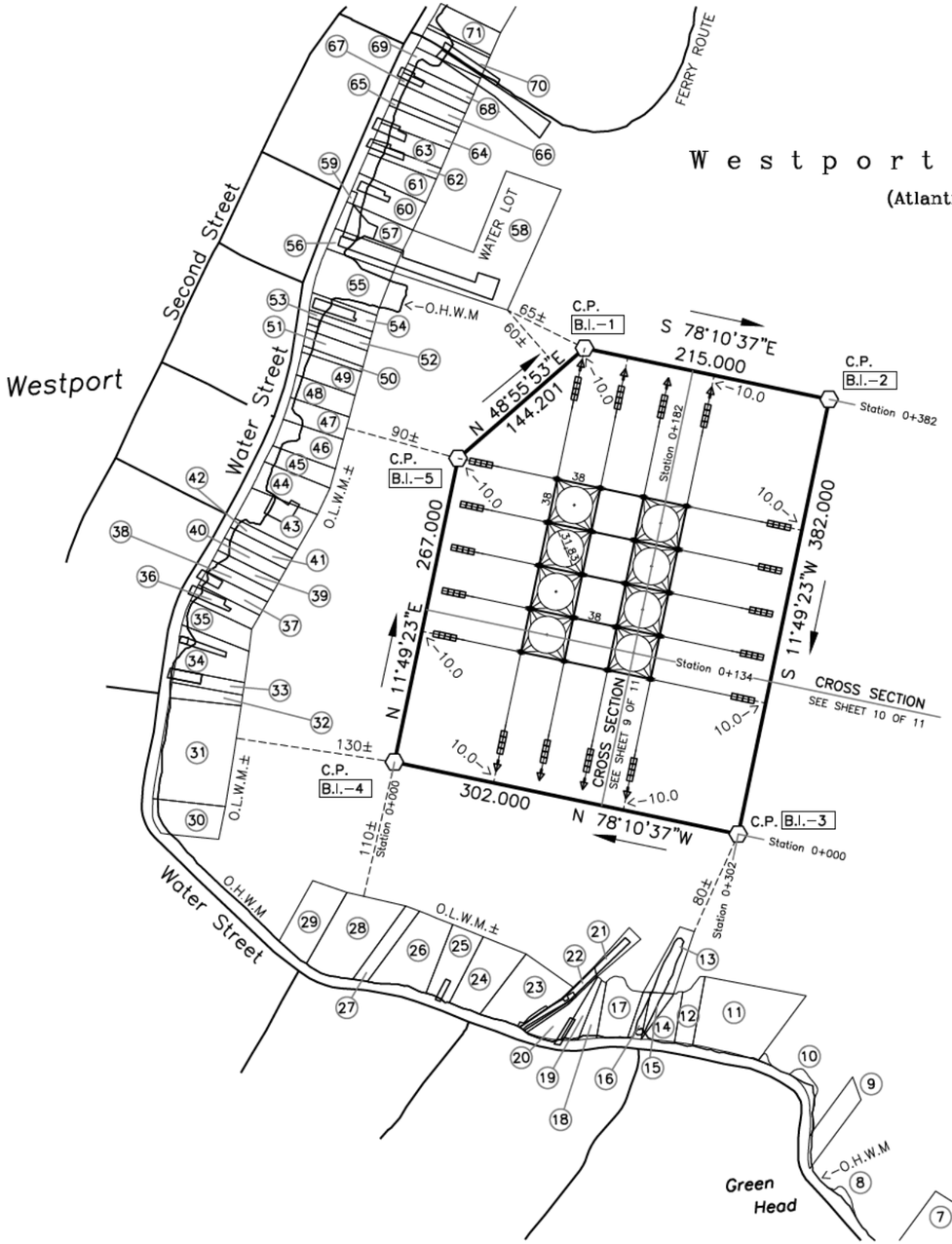
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0
Phone: (902) 875–2110
info@adsurveying.ca

SHEET 8 OF 11 NOTES:
(1.) 8 PROPOSED CAGES IN A 3x4 FLOATING GRID LAYOUT WITH THE CENTER COLUMN BEING EMPTY.
(2.) CAGE CIRCUMFERENCE IS 100.00m.
(3.) GRID SIZE IS 38.00m x 38.00m.
(4. THIS PLAN SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
(5.) ANCHOR BLOCKS, ANCHORS, AND MOORING LINES ARE NOT DRAWN TO SCALE.
(6.) OFFSETS TO THE LEASE BOUNDARIES ARE HORIZONTAL DISTANCES FROM THE BACK OF THE ANCHOR.

Westport Harbour

(Atlantic Ocean)



Proposed Marine Aquaculture Site

Brier Island Aquaculture Site
Kelly Cove Salmon Ltd.
Area = 11.04 hectares

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 19N

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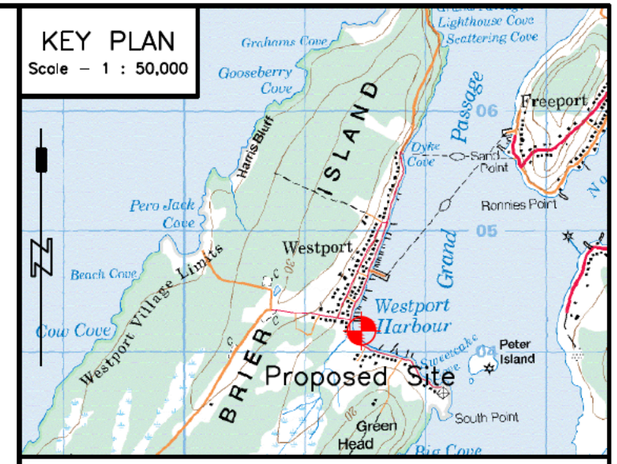
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3986"

GRID NORTH
UTM ZONE 19N
NAD83 (CSRS)

KEY PLAN
Scale – 1 : 50,000



Legend:

CALCULATED POINT	C.P. ○
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	
OTHER BOUNDARY	
TIE LINES	
NOT TO SCALE	
MAJOR CONTOURS	
MINOR CONTOURS	
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
AQUACULTURE CAGE CONFIGURATION
KELLY COVE SALMON LTD. / BRIER ISLAND
LOCATED AT:
WESTPORT, WESTPORT HARBOUR (ATLANTIC OCEAN),
BRIER ISLAND, DIGBY COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 21st day of May, 2021.

_____
Jeff Nickerson

A&D JOB #149–16–0742

SHEET 8 OF 11 | DATE: May 21, 2021

NOTES:
(1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
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(3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
(4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
(5.) SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
(6.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
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(8.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS), USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 19 NORTH (UTM Z19N).

KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen D.F. Acker
N.S.L.S. 639
MEMBER

PURPOSE OF PLAN (SHEET 8 OF 11)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATIONS OF ALL ANCHORS, CAGES, AND THE GRID/MOORING CONFIGURATION RELATIVE TO THE LEASE BOUNDARIES.

100 0 100 200 300
SCALE – 1 : 5,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
Tusket, Yarmouth County
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Nova Scotia, Canada
B0T 1W0
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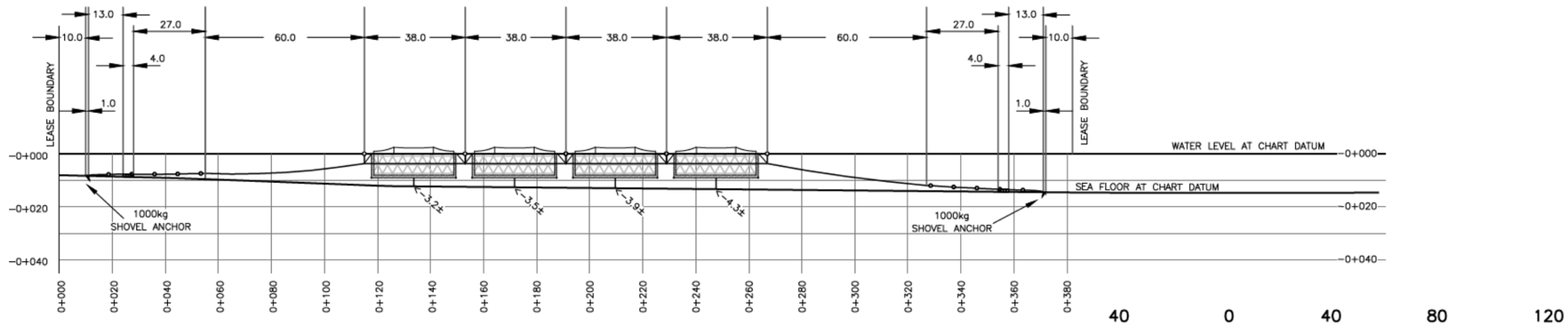
info@adsurveying.ca

CROSS SECTION

HORIZONTAL SCALE – 1 : 2,000 (METRIC)
VERTICAL SCALE – 1 : 2,000 (METRIC)

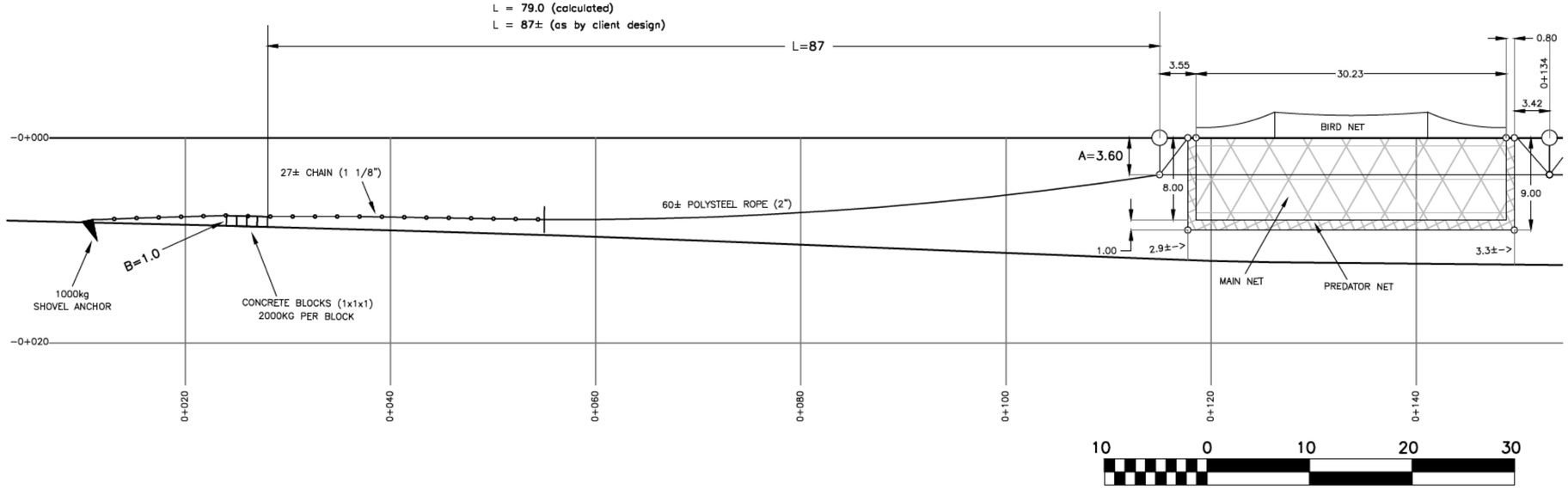


SCALE – 1 : 2,000 (METRIC)

DETAILED CROSS SECTION

HORIZONTAL SCALE – 1 : 500 (METRIC)
VERTICAL SCALE – 1 : 500 (METRIC)

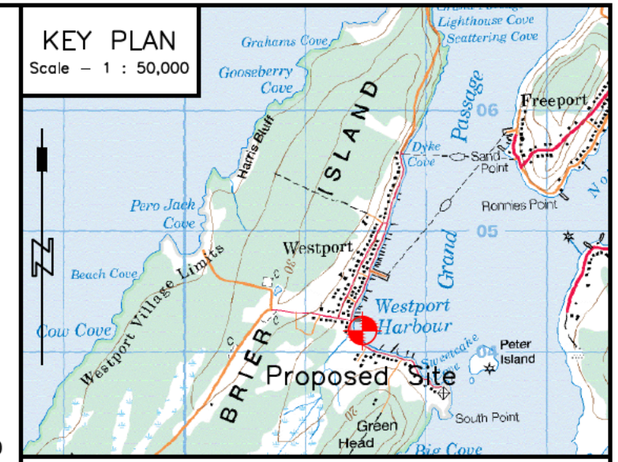
5:1 Mooring Scope Calculation
L = [(max depth + max tide range) – A – B] x 5
L = [(14± + 6.4±) – 3.6 – 1.0] x 5
L = 79.0 (calculated)
L = 87± (as by client design)



SCALE – 1 : 500 (METRIC)

KEY PLAN

Scale – 1 : 50,000



Legend:

CALCULATED POINT	C.P. ○
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	
OTHER BOUNDARY	
TIE LINES	
NOT TO SCALE	
MAJOR CONTOURS	
MINOR CONTOURS	
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
LATERAL CROSS–SECTION
KELLY COVE SALMON LTD. / BRIER ISLAND
LOCATED AT:
WESTPORT, WESTPORT HARBOUR (ATLANTIC OCEAN),
BRIER ISLAND, DIGBY COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 21st day of May, 2021.

[redacted]

Jeff Nicke[redacted]

A&D JOB #149–16–0742

SHEET 9 OF 11 | DATE: May 21, 2021

NOTES:

(1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
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KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen D.F. Acker
N.S.L.S. 639
MEMBER

PURPOSE OF PLAN (SHEET 9 OF 11)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LATERAL CROSS SECTION AS SHOWN ON SHEET 8 OF 11, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

(1.) THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
(2.) FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 8 OF 11.
(3.) DISTANCES FROM SEA FLOOR MAY VARY DEPENDING ON TIDE AND CURRENT.
(4.) DISTANCES FROM SEA FLOOR ARE APPROXIMATE ONLY.
(5.) DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).

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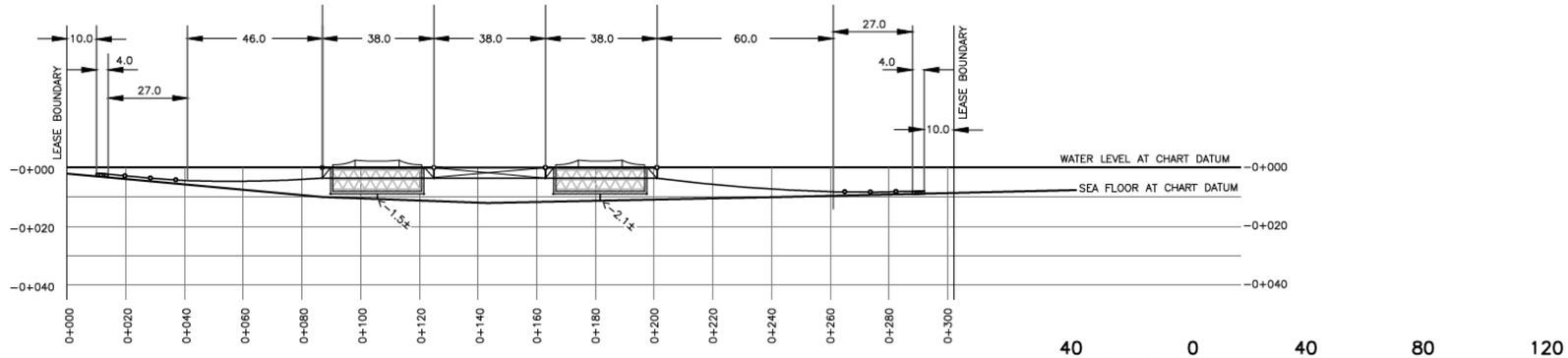
CROSS SECTION

HORIZONTAL SCALE – 1 : 2,000 (METRIC)
VERTICAL SCALE – 1 : 2,000 (METRIC)



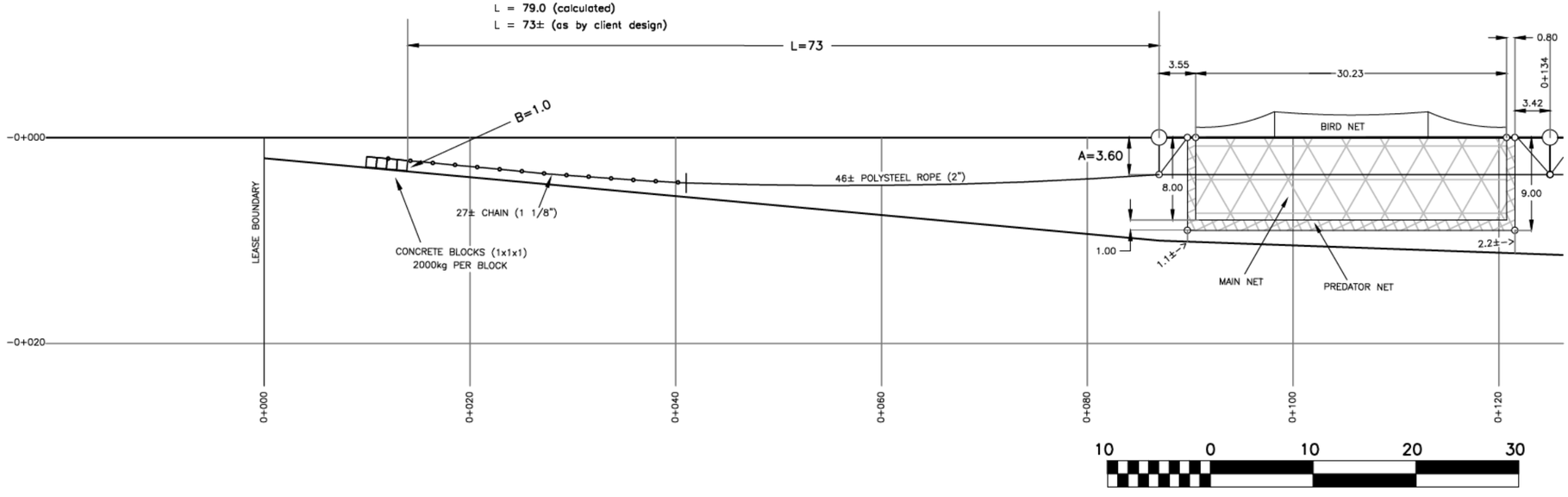
40 0 40 80 120

SCALE – 1 : 2,000 (METRIC)

DETAILED CROSS SECTION

HORIZONTAL SCALE – 1 : 500 (METRIC)
VERTICAL SCALE – 1 : 500 (METRIC)

5:1 Mooring Scope Calculation
L = [(max depth + max tide range) – A – B] x 5
L = [(14± + 6.4±) – 3.6 – 1.0] x 5
L = 79.0 (calculated)
L = 73± (as by client design)

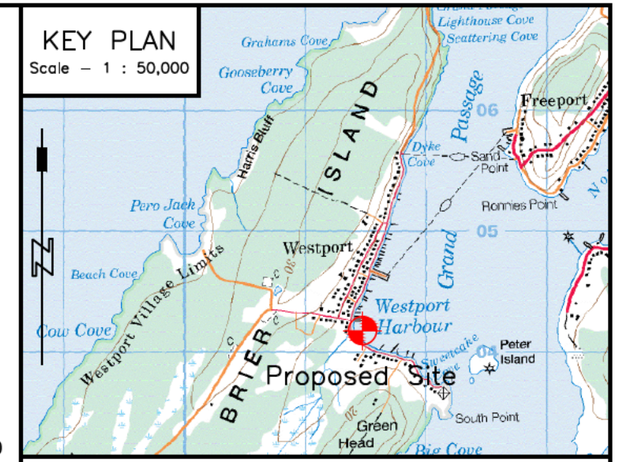


10 0 10 20 30

SCALE – 1 : 500 (METRIC)

KEY PLAN

Scale – 1 : 50,000



Legend:

CALCULATED POINT	C.P. ○
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	
OTHER BOUNDARY	
TIE LINES	
NOT TO SCALE	
MAJOR CONTOURS	
MINOR CONTOURS	
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
LONGITUDINAL CROSS–SECTION
KELLY COVE SALMON LTD. / BRIER ISLAND
LOCATED AT:
WESTPORT, WESTPORT HARBOUR (ATLANTIC OCEAN),
BRIER ISLAND, DIGBY COUNTY, NOVA SCOTIA

Client's Statement

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Dated this 21st day of May, 2021.

[redacted]

Jeff Nicke

A&D JOB #149–16–0742

SHEET 10 OF 11 | DATE: May 21, 2021

NOTES:

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(3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
(4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
(5.) SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
(6.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
(7.) ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
(8.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS), USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 19 NORTH (UTM Z19N).

KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen D.F. Acker
N.S.L.S. 639
MEMBER

PURPOSE OF PLAN (SHEET 10 OF 11)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LATERAL CROSS SECTION AS SHOWN ON SHEET 8 OF 11, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

(1.) THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
(2.) FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 8 OF 11.
(3.) DISTANCES FROM SEA FLOOR MAY VARY DEPENDING ON TIDE AND CURRENT.
(4.) DISTANCES FROM SEA FLOOR ARE APPROXIMATE ONLY.
(5.) DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

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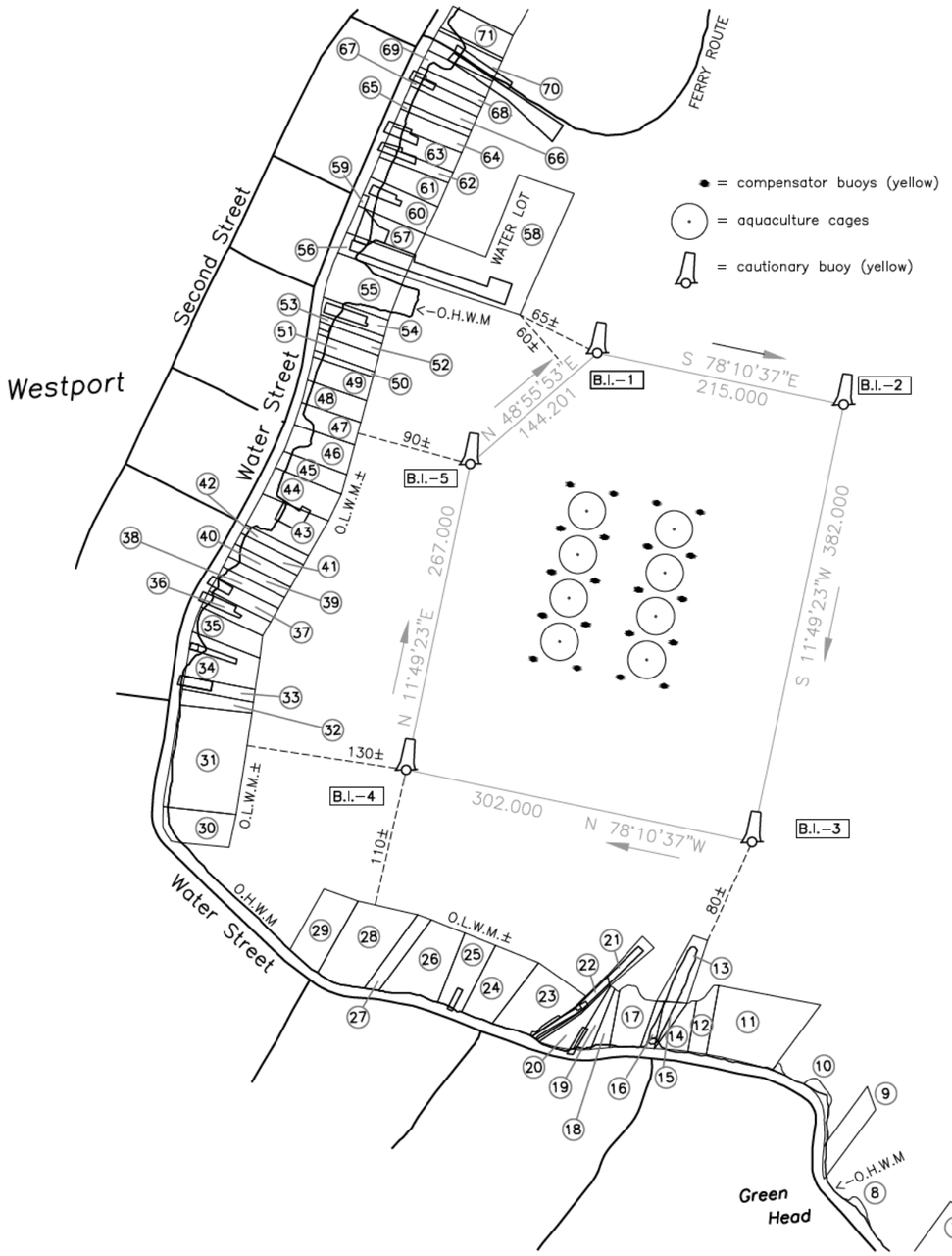


Proposed Navigational Aids Marking

Brier Island Aquaculture Site
Kelly Cove Salmon Ltd.
Area = 11.04 hectares

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 19N

Point	Northing	Easting
B.I.–1	4,904,564.710	711,756.689
B.I.–2	4,904,520.659	711,967.128
B.I.–3	4,904,146.763	711,888.860
B.I.–4	4,904,208.640	711,593.267
B.I.–5	4,904,469.975	711,647.972

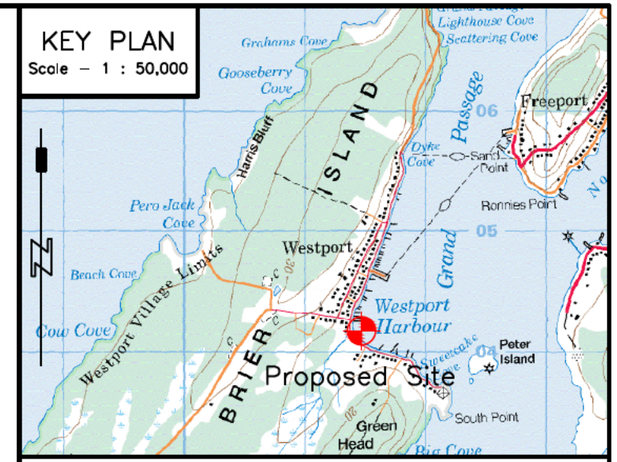
NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
B.I.–1	44°15'48.6603"	66°20'49.3625"
B.I.–2	44°15'47.0136"	66°20'39.9457"
B.I.–3	44°15'34.9903"	66°20'44.0170"
B.I.–4	44°15'37.3031"	66°20'57.2437"
B.I.–5	44°15'45.7069"	66°20'54.3986"

W e s t p o r t H a r b o u r
(Atlantic Ocean)

NORTH
UTM ZONE 19N
GRID
NAD83 (CSRS)

KEY PLAN
Scale – 1 : 50,000



Legend:

CALCULATED POINT	C.P. ○
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	
OTHER BOUNDARY	
TIE LINES	
NOT TO SCALE	
MAJOR CONTOURS	
MINOR CONTOURS	
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
PROPOSED NAVIGATIONAL AIDS MARKING PLAN
KELLY COVE SALMON LTD. / BRIER ISLAND
LOCATED AT:
WESTPORT, WESTPORT HARBOUR (ATLANTIC OCEAN),
BRIER ISLAND, DIGBY COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 21st day of May, 2021.

[redacted]

Jeff Nicke[redacted]

A&D JOB #149–16–0742

SHEET 11 OF 11 | DATE: May 21, 2021

NOTES:

(1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
(2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
(3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
(4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
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FOUNDED 1951
Stephen Acker
Stephen D.F. Acker
N.S.L.S.
639
MEMBER

PURPOSE OF PLAN (SHEET 11 OF 11)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATION AND TYPES OF ALL NAVIGATIONAL AIDS RELATIVE TO THE PROPOSED LEASE BOUNDARIES.

100 0 100 200 300
SCALE – 1 : 5,000 (METRIC)

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