Fisheries and Aquaculture
1575 Lake Road
Shelburne, Nova Scotia
B0T 1W0
www.novascotia.ca

APPLICATIONS POSTED NOTICE

The documents associated with the applications from Kelly Cove Salmon Ltd. for a boundary amendment of an existing site are available below. The information in these documents is provided as part of the routine disclosure of information by the Department of Fisheries and Aquaculture. Included is the original submission by the applicant, as well as supplementary information requested by the Department. Some information may be redacted as business confidential information or personal information.

This application is currently under review by the Department and other relevant provincial and federal departments and agencies. Please note, the review process may require the applicant to submit additional information to the Department which will be posted to the Department's website.

These documents were provided to the Department by the applicant. 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.

Boundary Amendment	
Applicant: Kelly Cove Salmon Ltd.	**Species:** Atlantic salmon, Atlantic halibut, Atlantic cod, Rainbow trout, Haddock
Location: AQ#1039, Annapolis Basin, Digby County	**Method of Cultivation:** Marine cage cultivation

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/

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 #SW2016-059

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 #1039 / Rattling Beach**

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 #1039 / Rattling Beach:

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]
Sr. Project Manager

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.: 1039

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) 755-1492 Email Address jnickerson@cookaqua.com

Mailing Address: P.O. Box 1546
Shelburne, NS

Postal Code B0T 1W0

Civic Address: 803 Ohio Road
Shelburne, NS

Postal Code B0T 1W0

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

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

Provide explanation: A boundary amendment application is being filed to the encompass existing occupation including all cages, mooring lines and anchors.

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

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

Signature of Applicant

October 24, 2016
Date

Signature of
Nova Scotia Department of Fisheries and Aquaculture Designate

Date

Total	**1,000.00**

SECURITY FEATURES INCLUDED – SEE REVERSE
CONTIENT DES CARACTÉRISTIQUES DE SÉCURITÉ – VOIR AU VERSO

S1067

Boundary Amendment Application

Boundary Amendment for Site #1039
Rattling Beach
County of Digby
Province of Nova Scotia

October 20, 2016

Prepared for:
Kelly Cove Salmon Ltd.
P.O. Box 1546
Shelburne, NS
B0T 1W0

Prepared by:
Sweeney International Marine Corp.
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SIMCorp File #SW2016-059

New Brunswick Newfoundland Nova Scotia

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October 20, 2016

SIMCorp File # SW2016-059

Jeff Nickerson
Kelly Cove Salmon Ltd.
P.O. Box 1546
Shelburne, NS
B0T 1W0

Dear Mr. Nickerson:

Reference: **Application for a boundary amendment for aquaculture site #1039, Rattling Beach, Nova Scotia**

Please find enclosed the supporting materials for the above mentioned boundary amendment at marine aquaculture site #1039, in Annapolis Basin, NS.

If you have any questions or comments on the above noted report, please do not hesitate to contact me at 506-467-9014.

Sincerely,

[redacted]

Sr. Marine Environmental Biologist
Atlantic Region
Sweeney International Marine Corp.
[redacted]t@simcorp.ca

cc: [redacted] (SIMCorp)
Brennan Goreham (NSDFA)
[redacted] (KCS)

EXECUTIVE SUMMARY

Project: Application for a boundary amendment of aquaculture site #1039 in Annapolis Basin, Nova Scotia

The following report and associated documents have been prepared by Sweeney International Marine Corp. (SIMCorp) for Kelly Cove Salmon Ltd. (KCS) in order to satisfy the criteria of the Nova Scotia Department of Fisheries and Aquaculture (NSDFA) Regulation 347/2015 Schedule A: *Regulations Respecting Aquaculture Licences and Leases*, section 3: Factors to be considered in decisions related to marine aquaculture sites. The purpose of this report is to formally apply for a boundary amendment of marine aquaculture site #1039 in Annapolis Basin, in Digby County, Nova Scotia. The farm would consist of twenty, 49-m, grid cells in a 2 x 10 configuration. The proposed lease dimensions are 190 x 180 x 720 x 370 x 630 x 280 m, resulting in a farm with an area of 29.08 ha. The site is approved for 1,100,000 Atlantic salmon in twenty cages.

SIMCorp is assisting KCS in this application for a boundary amendment of site #1039 through the preparation of this report and other supporting roles. All correspondence should be copied to SIMCorp.

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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	Vice President of Salt Water Operations
Jeff Nickerson	KCS	Corporate Support	NS Production Manager
[redacted]	SIMCorp	Sr. Project Manager	Company Owner
[redacted]	SIMCorp	Sr. Marine Environmental Biologist, Atlantic Region	M.Sc.
[redacted]	SIMCorp	Nova Scotia Division Manager	M.Sc.
Stephen Acker	Acker & Doucette Surveying Inc.	Survey Plan Preparation	N.S.L.S.

CONTACT INFORMATION

Proponent:

Company Name: Kelly Cove Salmon Ltd.
Principal Contact: Jeff Nickerson
Mailing Address: P.O. Box 1546
Shelburne, NS, B0T 1W0
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]@simcorp.ca

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FACTORS TO BE CONSIDERED IN DECISIONS RELATED TO MARINE AQUACULTURE SITES

a. Optimum Use of Marine Resources

Location Identification and Geographic Description of Site

Aquaculture site Rattling Beach (#1039) is owned and operated by Kelly Cove Salmon Ltd. (KCS). The marine farm consists of twenty, 49-m grid cells in a 2 x 10 configuration. The proposed lease incorporates all aquaculture-related gear, above and below the water line, with lease dimensions of 190 x 180 x 720 x 370 x 630 x 280 m, resulting in a farm area of 29.08 ha.

The general area around site #1039 appears on Canadian Hydrographic Service (CHS) Nautical chart #4396 (Annapolis Basin) and National Topographic System Map, Sector 021A (Annapolis Royale, Nova Scotia). The coordinates, obtained using DGPS, of the corners of the proposed lease area are located in Table 1.

Site #1039 is located on the western side of the Annapolis Basin, near the mouth of the Digby Gut channel in Digby County, Nova Scotia (Fig. 1). The site is approximately 2.5 km north of Digby. Rattling Beach is located in the Annapolis Basin, along with seven marine shellfish and two other marine finfish aquaculture sites. The basin also provides a number of different resources for humans and animals (Fig. 2). Fishing, specifically lobster, scallops, and harvesting of rockweed, are also important activities contributing to the economic wellbeing of cities and towns surrounding the basin. In addition, this area is considered to be a significant habitat for migratory birds supported by the presence of unique microenvironments such as salt marshes, bogs, and fens. The basin is a tourist destination, were people enjoy whale watching, kayaking, camping, recreational fishing, and boating to name a few activities, in and surrounding Annapolis Basin. KCS has implemented policies and procedures to manage their farms and protect wildlife. Aquaculture in the Annapolis Basin has been able to successfully co-exist with other resources in the area.

Table 1. Coordinates for the Boundary Amendment in Annapolis Basin

APPROXIMATE SITE CO-ORDINATES (NAD 83)		
Corner	**Latitude**	**Longitude**
1	44° 39’ 27.6”	65° 45’ 24.3”
2	44° 39’ 28.2”	65° 45’ 15.7”
3	44° 39’ 22.8”	65° 45’ 12.5”
4	44° 38’ 59.6”	64° 45’ 09.6”
5	44° 38’ 58.5”	64° 45’ 26.3”
6	44° 39’ 18.8”	64° 45’ 27.0”
Approximate Site Center	44° 39’ 13.6”	65° 45’ 19.8”

Figure 1. Proposed Boundary Location for Rattling Beach #1039 in Annapolis Basin

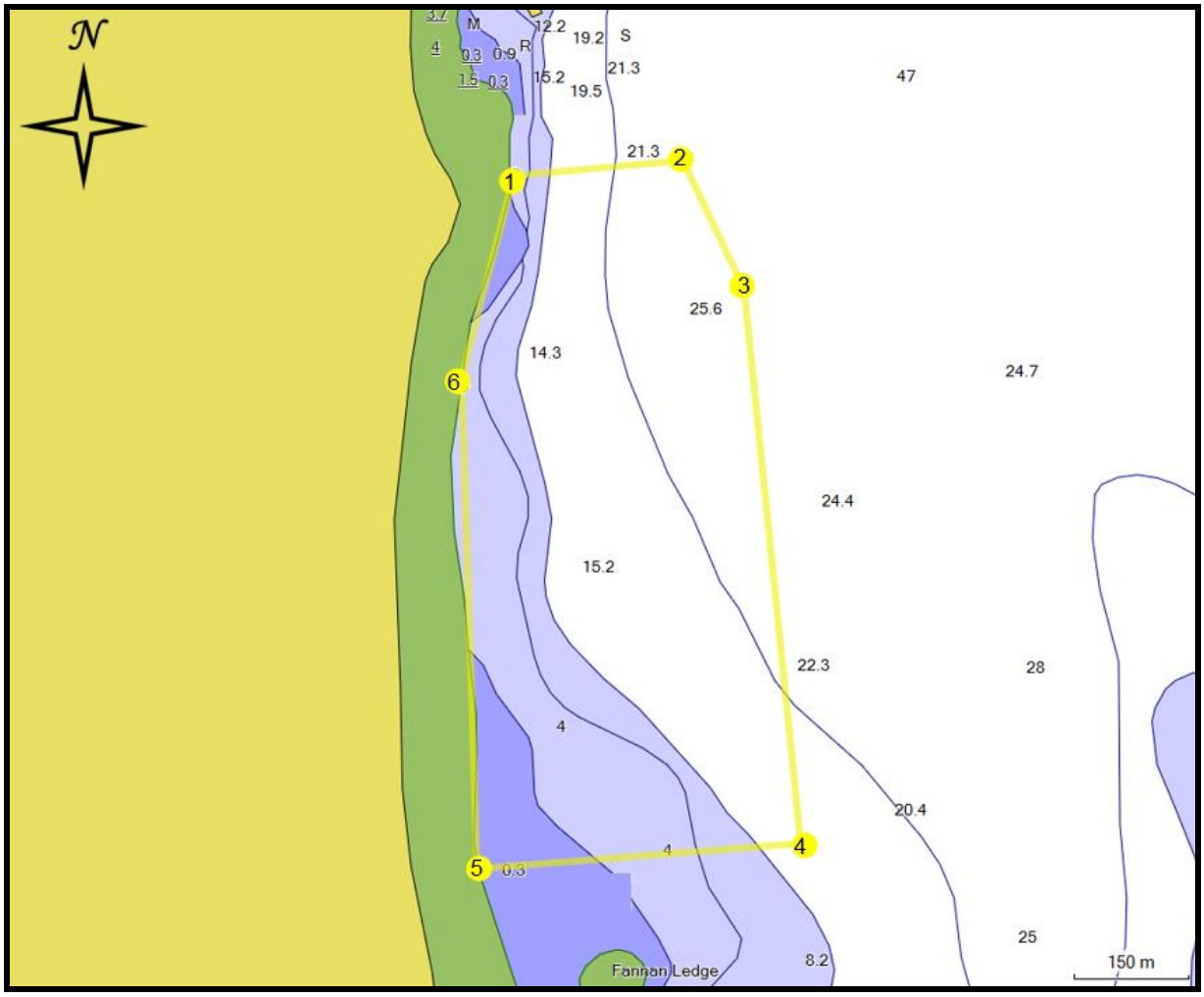

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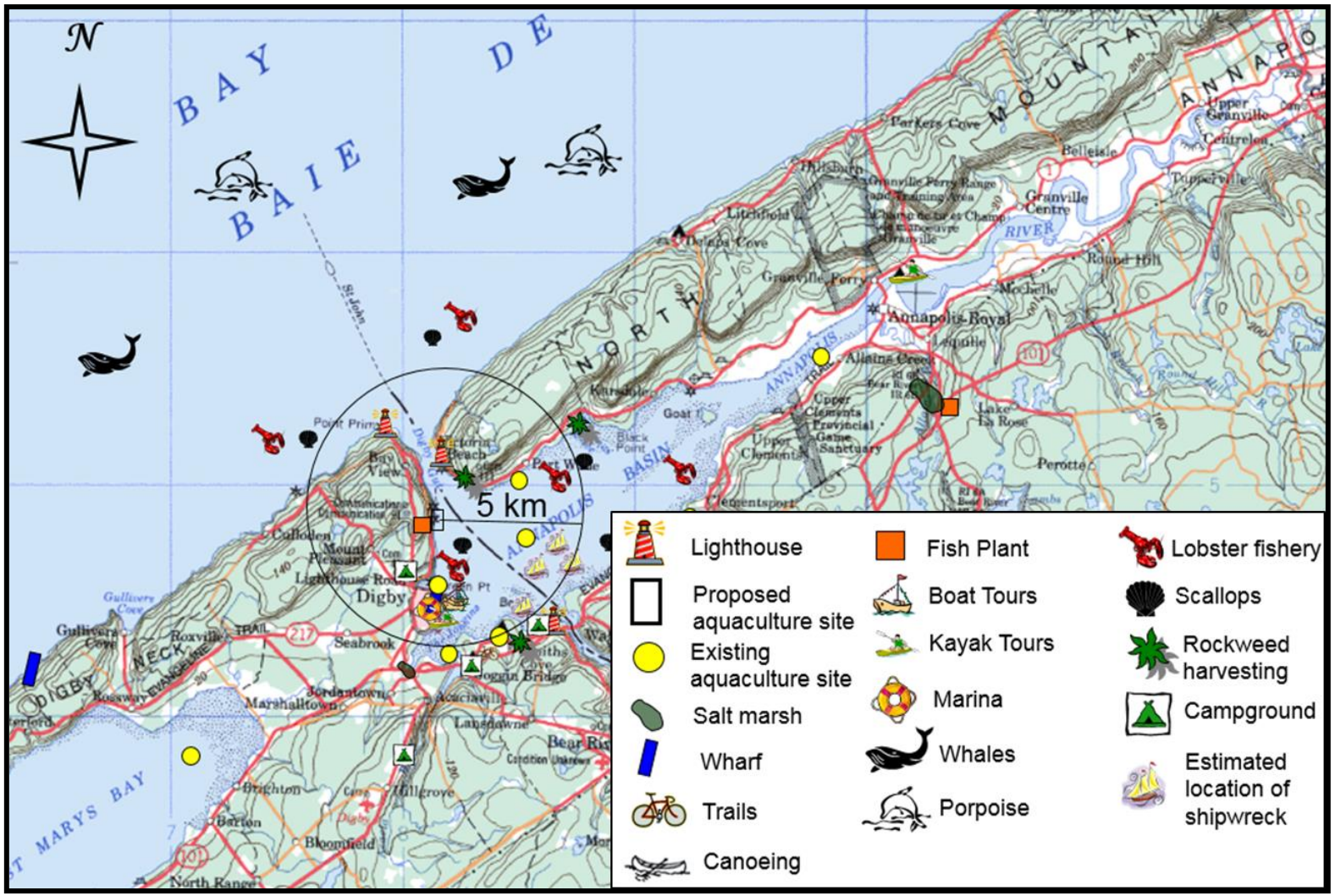
Figure 2. Resource Map of Annapolis Basin (Map: National Topographic System Map Sector 021A and Sector 020P)



b. Community and Provincial Economic Development

The following tables (Tables 2 - 4), obtained from the Statistics Canada website (Statistics Canada 2012, 2013), outline employment rates, industries, and occupations relative to Digby County and the province of Nova Scotia as a whole. The data is based on the 2011 census.

Table 2. Labour Force Indicators of Digby County and Nova Scotia

Labour Force Indicators	Digby County			Nova Scotia		
	Total	Male	Female	Total	Male	Female
Total population 15 years and over	15,290	7,385	7,905	768,060	368,640	399,425
In the labour force	8,685	4,600	4,080	484,585	247,725	236,860
Employed	7,415	3,995	3,420	435,895	220,810	215,085
Unemployed	1,265	605	665	48,690	26,910	21,775
Not in the labour force	6,600	2,780	3,820	283,475	120,910	162,560
Participation rate	56.8	62.3	51.6	63.1	67.2	59.3
Employment rate	48.5	54.1	43.3	56.8	59.9	53.8
Unemployment rate	14.6	13.2	16.3	10.0	10.9	9.2

Table 3. Industries of Digby County and Nova Scotia

Industry	Digby County			Nova Scotia		
	Total	Male	Female	Total	Male	Female
Total experienced labour force 15 years and over	8,685	4,605	4,080	484,590	247,725	236,860
Agriculture and other resource-based industries	1,430	1,135	295	18,340	14,740	3,595
Construction	560	530	25	32,245	28,835	3,405
Manufacturing	995	705	290	33,875	25,055	8,830
Wholesale trade	205	155	55	15,380	11,235	4,145
Retail trade	1,115	520	595	60,900	26,185	34,720
Finance and insurance	135	40	100	15,735	5,375	10,355
Health care and social services	875	80	795	59,670	10,090	49,575
Educational services	870	245	620	38,895	12,430	26,470
Other services	350	150	200	20,230	9,650	10,575

Table 4. Occupations of Persons in Digby County and Nova Scotia

Occupation	Digby County			Nova Scotia		
	Total	**Male**	**Female**	**Total**	**Male**	**Female**
Total experienced labour force 15 years and over	8,685	4,600	4,085	484,585	247,730	236,860
A Management occupations	690	415	270	48,000	28,825	19,175
B Business, finance and administration occupations	970	130	835	10,355	18,490	51,870
C Natural and applied sciences and related occupations	270	250	20	28.280	23,065	5,210
D Health occupations	545	80	465	33,580	6,080	27,500
E Occupations in social science, education, government service and religion	935	285	650	61,450	21,520	39,930
F Occupations in art, culture, recreation and sport	205	45	165	11,305	5,085	6,225
G Sales and service occupations	1,665	570	1,095	116,265	45,190	71,075
H Trades, transport and equipment operators and related occupations	1,310	1.235	75	69,025	65,975	3,050
I Occupations unique to primary industry	1,160	1,020	135	18,265	15,385	2,875
J Occupations unique to processing, manufacturing and utilities	785	495	290	18,130	13,130	4,980

The Nova Scotia government published aquaculture employment statistics from 2013 and 2014 (Table 5; NSDFA 2014). The number of job positions (full time and part time) in finfish aquaculture increased in 2014 from those in 2013. Overall, there was a decrease in job positions in aquaculture, but the decrease was due to a loss of positions in the shellfish industry. On a broader scale, the Atlantic Canada Fish Farmers Association reports that salmon farming employs over 3000 people and directly contributes over $350 million per year to the economy.

Table 5. Nova Scotia Aquaculture Employment Statistics

	Full time		Part time		Total	
	2013	**2014**	**2013**	**2014**	**2013**	**2014**
Finfish	159	163	64	72	223	235
Shellfish	112	64	233	237	345	301
Other	20	20	48	50	68	70
Total	**291**	**247**	**345**	**359**	**636**	**606**

According to Statistics Canada, in Nova Scotia, approximately 43% of the population lives in rural areas, which is twice the proportion for Canada as a whole (i.e. 20%) (Statistics Canada, 2015). In general, Nova Scotia has an increased reliance on natural-based industries, such as the finfish aquaculture industry. In addition to the jobs created directly by the aquaculture sites, there are also jobs created by associated activities such as manufacturing (e.g. cage building and repair, feed manufacturing), transport (e.g. shipping of product to processing plants and to market), processing (e.g. value added products), sales, administration, and sciences (e.g. veterinary services, environmental services). Marine aquaculture has the potential to be an economically sustainable, reliable, and environmentally sustainable industry in Atlantic Canada and to provide needed jobs to Atlantic Canadians. The United Nations Food and Agricultural Organization (FAO) reports that over 75% of the world's marine fish stocks are fully exploited, over exploited, or depleted (FAO 2003). Wild fisheries are therefore unlikely to satisfy the global appetites for seafood. Aquaculture, however, is poised to meet the demand for healthy sources of fish protein.

c. Fisheries Activities

Commercial Fisheries

There are over 500 species of fish found in Atlantic Canada and most of them are present off the 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 bottom. Various shellfish and seaweeds also support commercial fisheries. In 2014, the top five groundfish and pelagic species landed included herring, haddock, hake, redfish spp. and pollock (Table 6; Fisheries and Oceans 2014a).

Table 6. Atlantic Coast Commercial Landings for 2014
Note: sourced from Fisheries and Oceans (2014a)

2014 ATLANTIC COAST COMMERCIAL LANDINGS, BY REGION (metric tonnes, live weight)				
	Nova Scotia			Atlantic
	Maritimes	Gulf	Total	Total
Groundfish				
Atlantic Cod	2,348	23	2,371	13,001
Haddock	15,732	0	15,732	16,037
Redfish spp.	6,805	0	6,805	8,948
Halibut (Atlantic)	2,166	34	2,200	3,617
Flatfishes	1,964	151	2,115	10,751
Greenland turbot	44	0	44	14,312
Pollock	2,875	0	2,875	3,204
Hake	8,034	7	8,040	8,451
Cusk	210	0	210	212
Catfish	0	0	0	0
Skate	105	0	105	314
Dogfish	54	0	54	54

Other	2,186	41	2,226	2,363
Total	**42,523**	**256**	**42,779**	**81,263**
Pelagic & other finfish				
Herring	40,013	4,878	44,891	114,610
Mackerel	703	67	770	6,540
Swordfish	1,609	0	1,609	1,609
Tuna	493	78	571	763
Alewife	524	173	697	1,562
Eel	8	23	31	311
Salmon (Atlantic)	0	0	0	0
Smelt	0	0	0	124
Silversides	0	154	154	449
Shark	64	0	64	64
Capelin	0	0	0	28,867
Other	34	0	34	63
Total	**43,448**	**5,374**	**48,822**	**154,964**
GRAND TOTAL (5)	**238,708**	**17,834**	**256,542**	**686,629**

Groundfish

There are a number of commercially harvested species of groundfish off the south shore 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 (Fisheries and Oceans Canada 2014b). Haddock in 4X is in a rebuilding phase with a positive outlook; recruitment trends look very positive with spawning stocks continuing to increase in biomass since the last decade (Fisheries and Oceans Canada 2015g). However, fish size is decreasing at age (Showell et al. 2013). Cod in 4X demonstrate poor juvenile recruitment and low biomass levels, although there is considerable uncertainty regarding stock status; this stock is accessed by a very large number of fishing vessels and sectors (Clark et al. 2015). O'Boyle (2012) listed Western Scotian Shelf cod as critical. The pollock fishery in the Western Scotian Shelf (WSS), which reached historic lows in 2000, has since increased due to improved recruitment; though, it is still considered to be in the cautious (i.e. considered neither healthy nor critical) state (O'Boyle 2012).

Flatfish are also important commercial groundfish but they are caught mostly on the fishing banks and deeper areas (Fisheries and Oceans Canada 2014b). In NAFO Divisions 4X5Y, these species are halibut, yellowtail flounder, American plaice, winter flounder, and witch flounder (Fisheries and Oceans Canada 2014b). Overall, most flatfish species in this area are in decline or at low levels. Winter flounder is better in overall status with some positive indicators present (O'Boyle 2012), but American plaice stock status was still in decline as of 2009 and COSEWIC considers the Maritime population to be threatened (COSEWIC 2009a). O'Boyle (2012) had considered silver-hake stock status to be critical; however, recent biomass estimates have shown a large increase in number in 2014 (DFO 2015a). Halibut

stocks, however, appear to be improving and the biological information for this species continues to develop (DFO 2015b).

The Rattling Beach site is present in the Maritimes Statistical Districts 38 & 39. For 2015, 177,099 kg of groundfish was landed in this district with a value of $420,741. Key species landed include: Atlantic cod, witch flounder, haddock, halibut, monkfish, Pollock, redfish, sculpin, skate, white hake, and winter flounder. Both sculpin and winter flounder were noted as species caught for bait (C. O'Neil, pers. com.).

Figures 3 – 6 show the approximate groundfish landings off the coast of Nova Scotia between 1999 and 2003 (Fisheries and Oceans Canada 2014b).

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*)
- Monkfish (*Lophius americanus*)
- Skate (unknown species)
- Cusk (*Brosme brosme*), restricted to by-catch only
- Sculpin (unknown species)
- Redfish (*Sebastes* sp.)
- Silver hake (*Merluccius bilinearis*)
- White hake (*Urophycis tenuis*), restricted to by-catch only

Figure 3. Commercial Groundfish Landings (1999 – 2003)

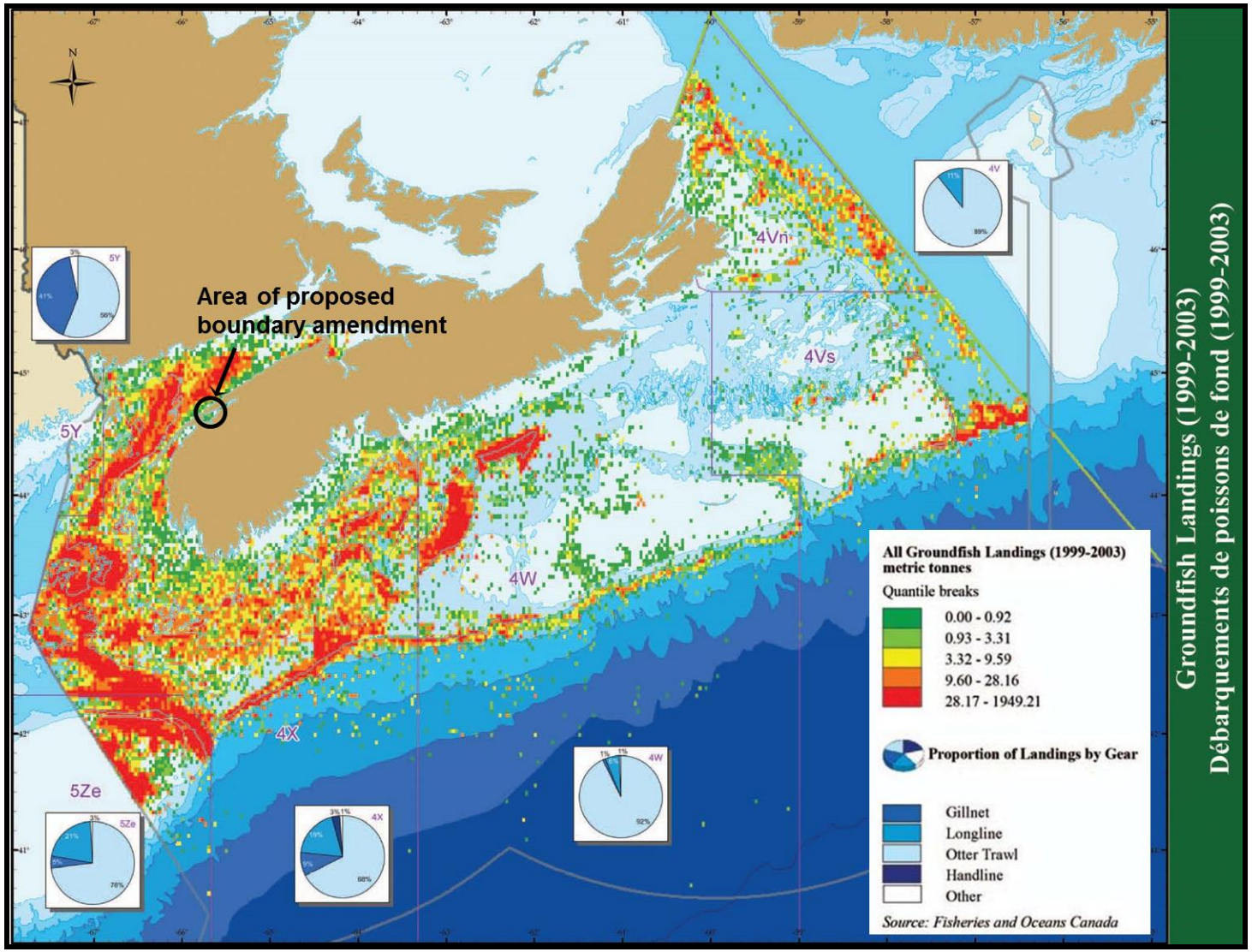


Figure 4. Commercial Cod, Haddock, and Pollock Landings (1999 – 2003)

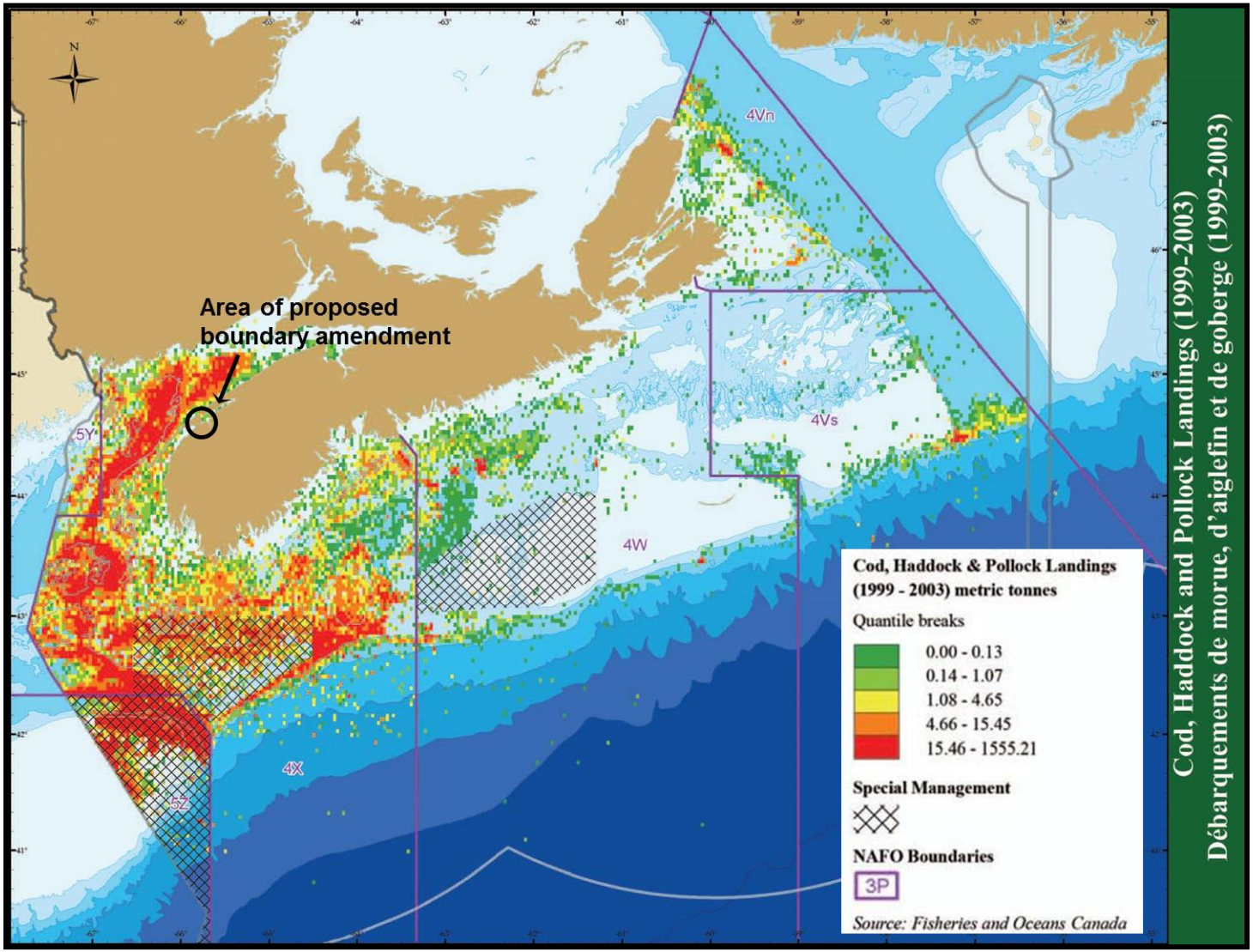


Figure 5. Commercial Flatfish Landings (1999 – 2003)

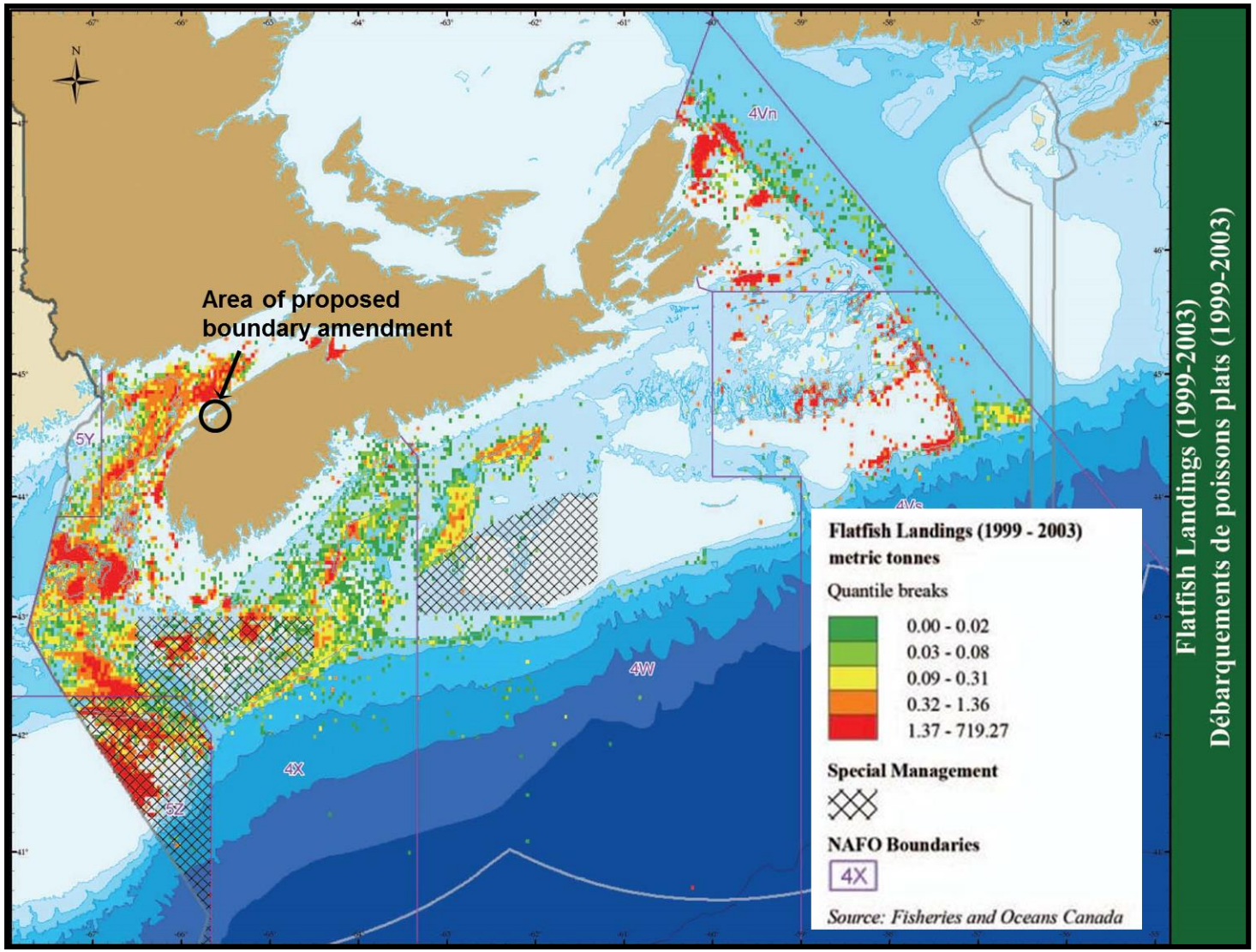
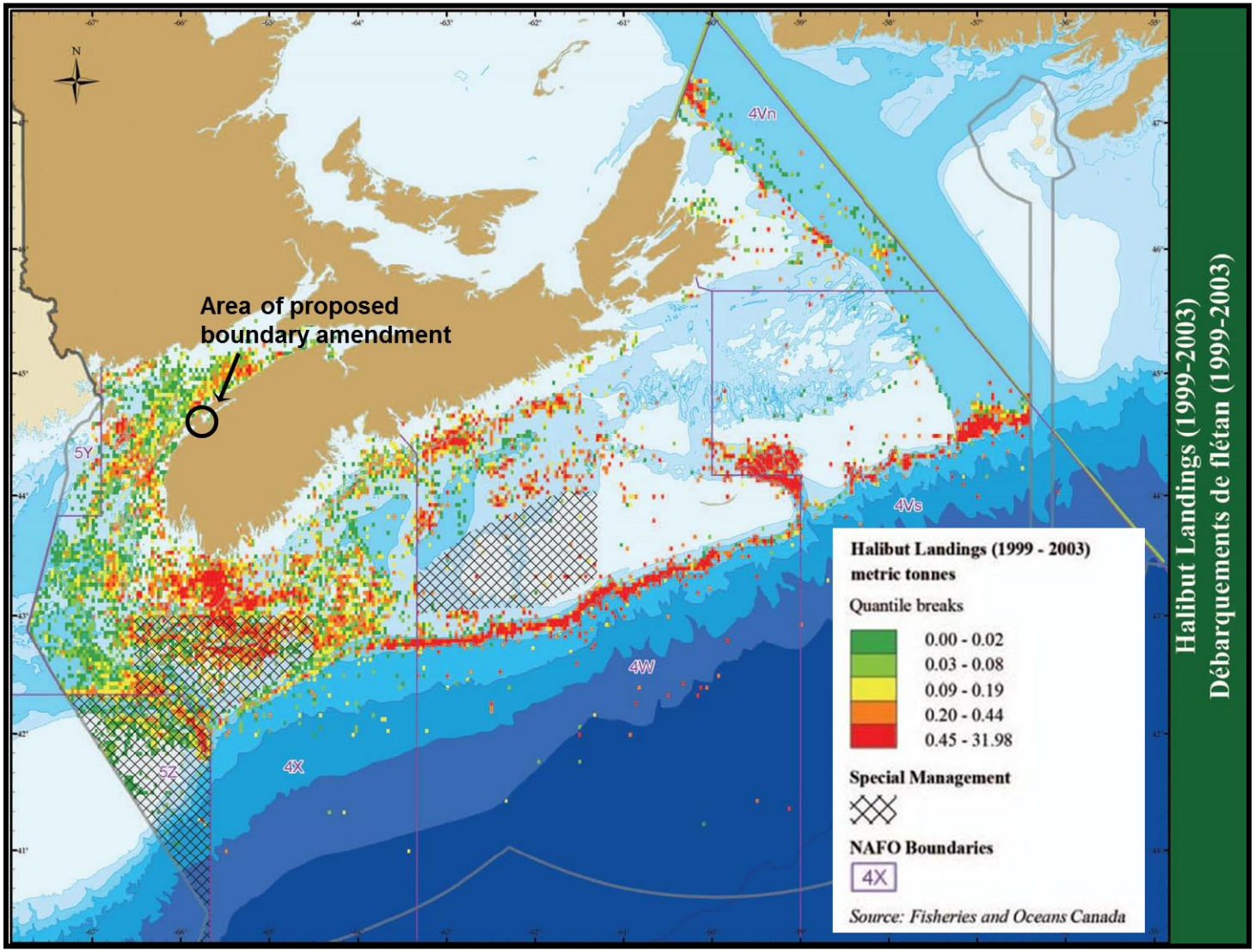


Figure 6. Commercial Halibut Landings (1999 – 2003)



Pelagics

The most common commercial species of pelagic fish off the shore of Nova Scotia include: herring (Fig. 7), mackerel (Fig. 8), tuna, swordfish, and alewife, with herring being the most valuable pelagic in 2014 (Table 6; Fisheries and Oceans 2014a). Herring (*Clupea harengus*) stocks in the Southwest Nova Scotia / Bay of Fundy herring spawning component have been of concern for a decade or more, and stock status reports have indicated the need for rebuilding (Clark et al. 2012). Clark et al. (2012) presented evidence of the decline in spawning grounds, targeting of juveniles in the fishery, and declines in catches. Recent biomass estimates have shown uncertainty; however, long-term trends show a general decrease in German Bank from 1999 and an increase in Scots Bay from 2005 (DFO 2015c). Approximated moving biomass averages for the Southwest Nova Scotia / Bay of Fundy area have indicated slight increases each year since 2012 (DFO 2015c). The herring fishery largely takes place on dense summer feeding, overwintering, and spawning locations and is dominated by purse seine, gillnet, and weir (DFO 2015c).

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 critical condition due to low abundances in egg and spawning biomass and appropriate reconstruction methods are being implemented (DFO 2014). The mackerel fishery is conducted with traps, gillnets, and handlines and is primarily an inshore fishery of the spring and summer months and extends into more offshore waters for the fall and winter (Fisheries and Oceans Canada 2014). Because of high fishing mortality, mackerel landings of recent years (2011 - 2013) have decreased within the Northwest Atlantic region when compared to numbers from years previous (DFO 2014). Figure 8 illustrates the general distribution of mackerel fishing activities in Atlantic waters.

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

The North Atlantic swordfish stock has been rebuilt after a 10-year recovery plan commencing in 1999. This fishery is now sustainable and well controlled with Canadian annual landings of 1,505 t in 2013 being exported to the United States at a value of $12.3 million (Fisheries and Oceans Canada 2015a). Swordfish (Fig. 9) are caught using longline and harpoon primarily along the edge of Georges Bank, the Scotian Shelf, and the Grand Banks in vessels often less than 65 feet; DFO lists principal ports in Nova Scotia as Shelburne, Cape Sable Island, Sambro, Wood's Harbour, and Clark's Harbour (Fisheries and Oceans Canada 2008). The bluefin tuna (Fig. 10) is the most common tuna found off the coast of Nova Scotia and is fished with tended line, rod and reel, harpoon, longline, and trap nets (Fisheries and Oceans Canada 2014b). The International Commission for the Conservation of Atlantic Tunas (ICCAT 2014) consider Atlantic bluefin and albacore tuna stocks overfished from 2010 and 2012 stock assessments, which indicated low recruitment. The bluefin and albacore tuna stocks are considered to be of a critical status whereas the bigeye and yellowfin tuna stocks are considered healthy (O'Boyle 2012).

In Maritimes Statistical Districts 38 & 39, pelagic landings and associated value was not separated in the provided “other species” category. For 2015, 11,262,144 kg was landed comprising of species other than groundfish and lobster with a value of $29,096,031. Key species landed include: elvers and herring (C. O’Neil, pers. com.).

Species list

- North Atlantic bluefin tuna (*Thunnus thynnus*)
- Swordfish (*Xiphias gladius*)
- Elver (*Anguilla rostrata*)
- Atlantic herring (*Clupea harengus*)
- Atlantic mackerel (*Scomber scombrus*)
- Alewife (*Alosa pseudoharengus*)

Figure 7. Commercial Herring Landings (1999 – 2003)

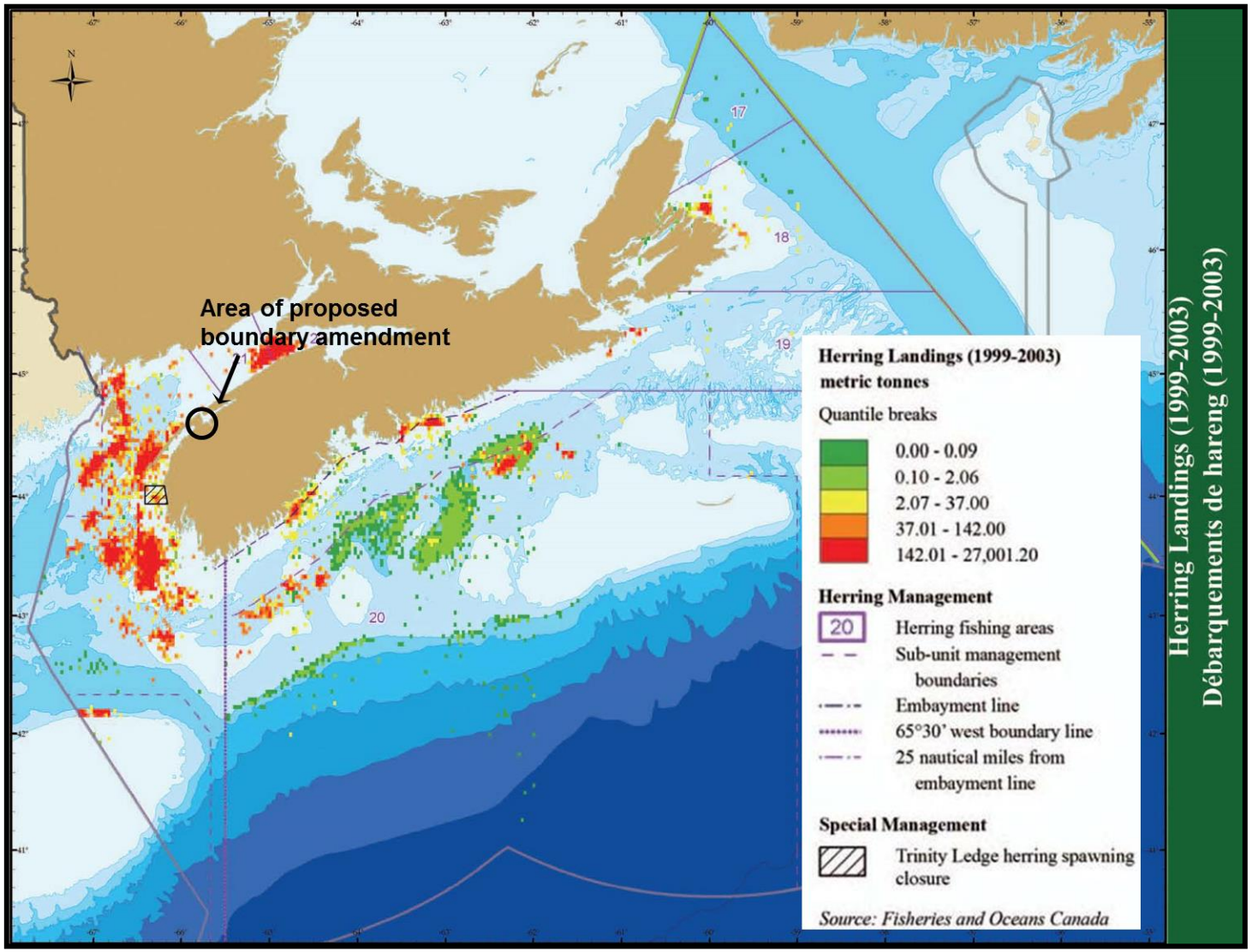


Figure 8. Commercial Mackerel Landings (1999 – 2003)

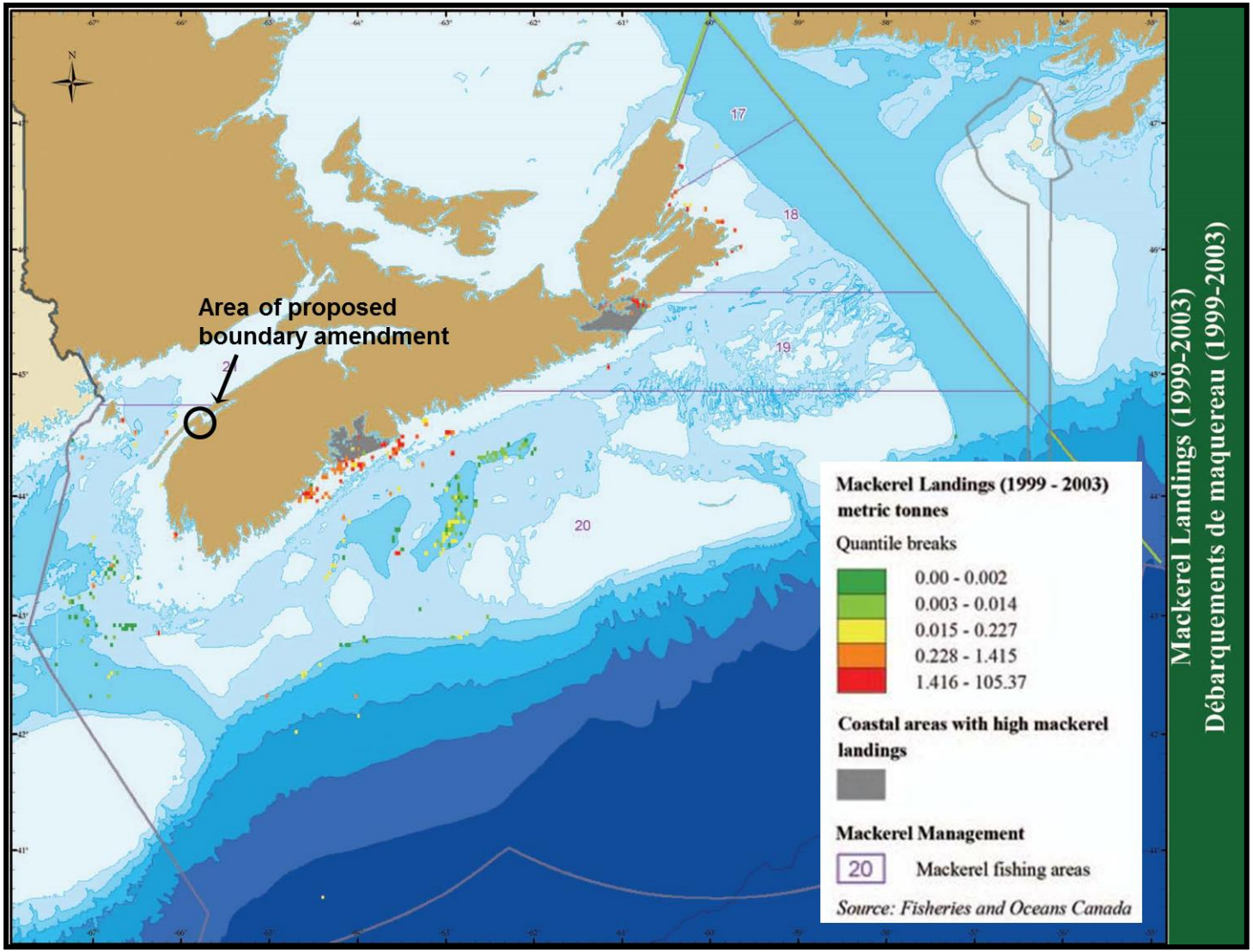


Figure 9. Commercial Large Pelagic Fish Landings, Excluding Bluefin Tuna (1999 – 2003)

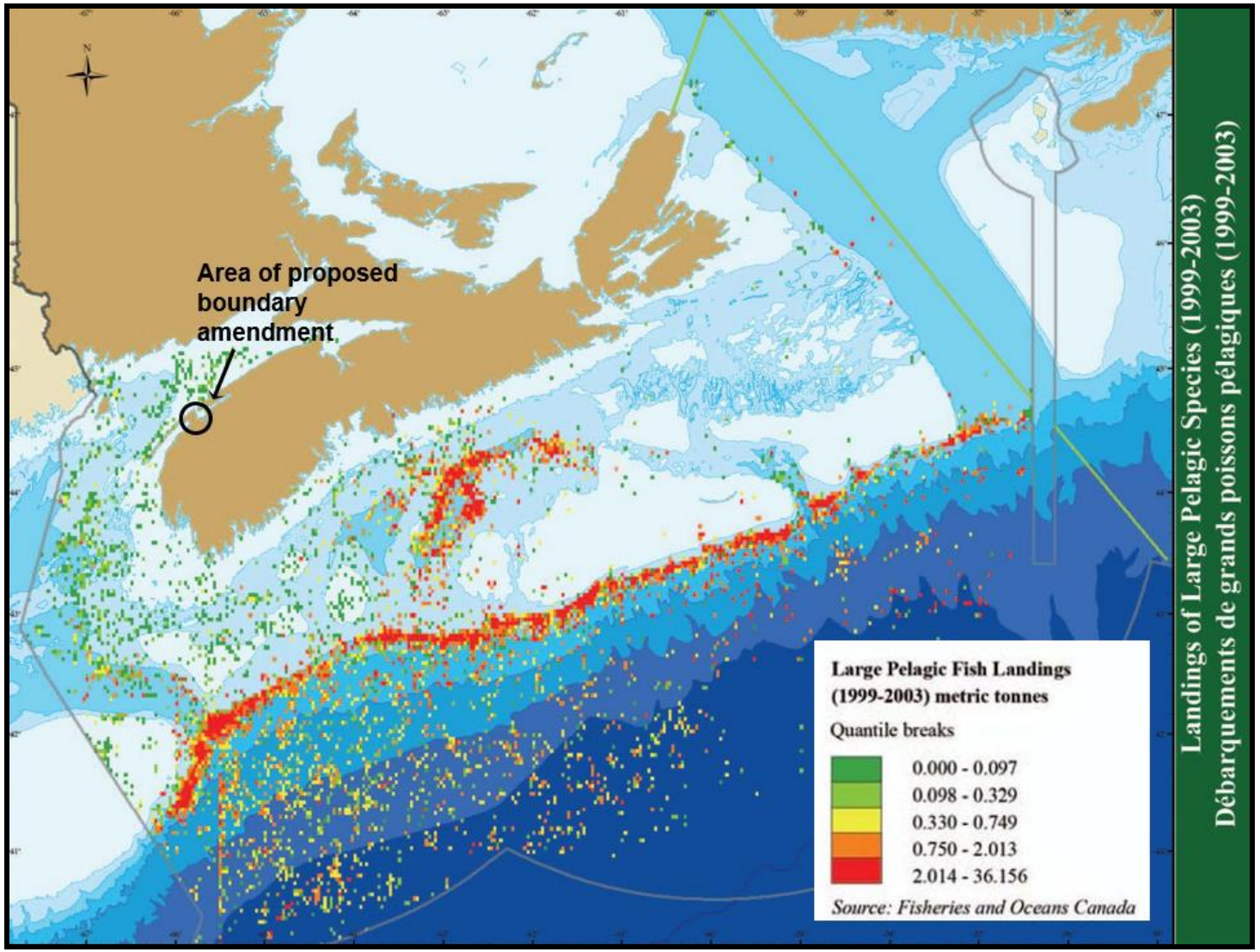
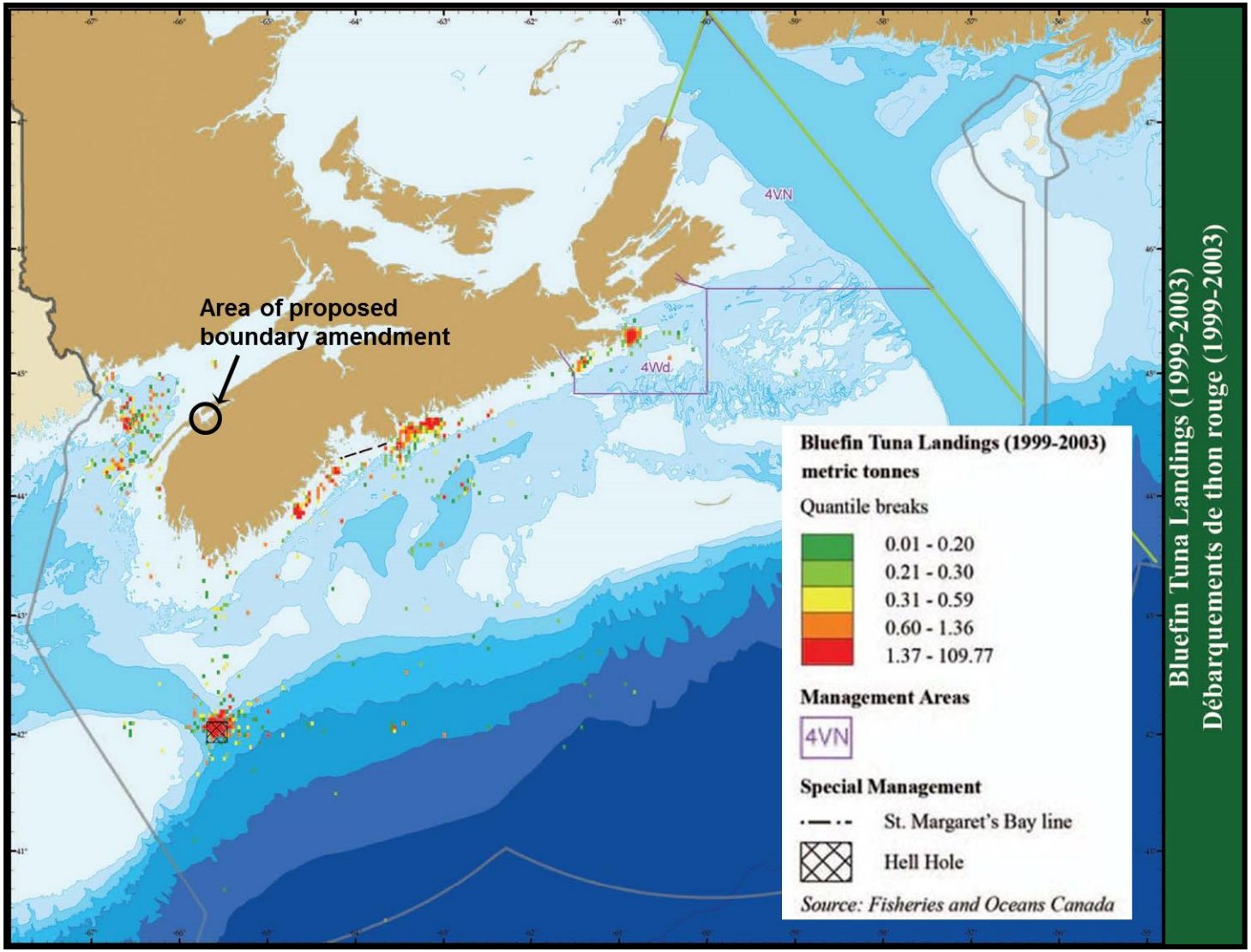


Figure 10. Commercial Bluefin Tuna Landings (1999 – 2003)



Shellfish and Other Invertebrates

There are a number of shellfish species that are harvested off Nova Scotia and included are such commercially important species as scallops, lobsters, shrimp, and crabs (Table 7; Fisheries and Oceans 2014a). Also harvested are sea cucumber, sea urchins, and soft-shell clams.

Table 7. Atlantic Coast Commercial Landings for 2014
Note: source from Fisheries and Oceans (2014a)

2014 ATLANTIC COAST COMMERCIAL LANDINGS, BY REGION
(metric tonnes, live weight)

Species	Nova Scotia			Atlantic
	Maritimes	Gulf	Total	Total
Shellfish				
Clams / quahaug	2,068	3	2,071	26,869
Oyster (1)	2	69	72	1,258
Scallop (2)	63,694	78	63,772	69,745
Squid	22	0	22	22
Mussel (3)	0	2	2	2
Lobster	47,235	4,300	51,534	92,779
Shrimp	24,748	124	24,872	129,658
Crab, Queen	12,142	7,045	19,187	96,103
Crab, Other	426	579	1,005	5,277
Whelks	111	0	111	3,491
Cockles	6	0	6	257
Sea cucumber	1,719	0	1,719	5,379
Sea urchin	270	0	270	2,377
Other	0	0	0	0
Total	**152,443**	**12,200**	**164,643**	**433,218**
Subtotal	**238,414**	**17,830**	**256,245**	**669,445**
Others				
Marine plants	214	4	218	14,360
Lumpfish roe	0	0	0	40
Miscellaneous (4)	80	0	80	2,784
Total	294	4	298	17,184
GRAND TOTAL (5)	**238,708**	**17,834**	**256,542**	**686,629**

(1) Oyster: BC data now reported under Aquaculture. 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) Miscellaneous value includes seal value.
(5) Totals may not add up due to rounding.
Source: Fisheries and Oceans Canada (DFO), Economic Analysis and Statistics

Invertebrate fisheries constitute the largest piece of the Nova Scotia fishery (Fisheries and Oceans Canada 2014a), of which the lobster fishery is the primary component. In 2014, Nova Scotia landed over 51,000 t of lobster valued at $570 million (Fisheries and Oceans Canada 2014a, Fisheries and Oceans Canada 2014c). The inshore lobster fishery accounts for ~ 90% of the lobster landings (Coffen-Smout et al. 2013) (Fig. 11), in which the landings have more than doubled in the past 20 years (NSDFA 2014). The proposed farm falls within lobster fishing area (LFA) 33. Typical lobster grounds are characterised by a hard seafloor such as ledge, boulder, or cobble (Lawton 1993) whereas the proposed aquaculture farm is located over mostly gravel and sandy conditions (see section **d. Oceanographic and Biophysical Characteristics**). 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.).

The Jonah-crab fishery occurs in both offshore and coastal areas of southwestern Nova Scotia; the rock crab is primarily found in shallow, nearshore areas (Fisheries and Oceans Canada 2014b) (Fig. 12). An exploratory snow-crab fishery in NAFO Division 4X (the western portion of CFA 24) was initiated in 1994; catches are relatively low from 4X (generally less than 350 t per year), the season extends from November to May and only one area is considered commercially important (Fisheries and Oceans Canada 2014b, DFO 2015d) (Fig. 13). Commercial snow (queen) crab landings for 2013 and 2014 are illustrated in Figure 14, which indicates that the proposed boundary amendment of Rattling Beach does not fall within a snow crab fishing area. Snow crab is the second most valuable Canadian fishery export product, and the Scotia-Fundy fishable biomass has increased in most areas (Fisheries and Oceans Canada 2015b).

Shrimp represents Canada's fourth most valuable seafood export, with the northern shrimp being the most abundant in Atlantic Canadian waters. The fishery uses demersal otter trawl fishing vessels both in the inshore and offshore fishery. In shrimp fishing area 16, a number of licenses are largely inactive due to low shrimp abundance in this area (Seafish 2015; Fig 15); however, Fisheries and Oceans maintain the stock biomass as being in the healthy zone (Fisheries and Oceans Canada 2015c).

The commercial fishery for scallops is typically offshore, although a smaller inshore fishery does occur along parts of the Atlantic coast (Fig. 16). Historically, the area off Digby, in the Bay of Fundy, has been the most important area for the inshore fishery (Fisheries and Oceans Canada 2014b). Scallop production areas (SPAs) 4 and 5 are located off of Digby and in Annapolis Basin, respectively. Scallops caught in SPA 4 were 124 t and in SPA 5 were 8.3 t for the 2014/2015 fishing season (Fisheries and Oceans Canada, 2016a; Fig. 17). The catch rate remained steady in SPA 4 but decreased in SPA 5 in 2015 relative to 2014; SPA 4 and 5 were joined under one Total Allowable Catch (TAC) limit for the 2013/2014 fishing season (Fisheries and Oceans Canada, 2016a). The commercial biomass in SPA 4 is considered to be in the healthy zone (Fisheries and Oceans Canada, 2016a). In 2014 and 2015, the number and weight per tow of commercial scallop in SPA 5 were above the medians of the 1996 to 2008 survey series, while recruit number and weight per tow were near the medians in 2014 and increased in 2015.

In Maritimes Statistical Districts 38 & 39, invertebrate landings and associated value was not separated in the provided “other species” category with the exception of lobster. For 2015, 11,262,144 kg was landed comprising of species other than groundfish and lobster with a value of $29,096,031. Key invertebrate species landed include: clams (Bar, quahaugs, soft shell and unspecified), rock crabs, sea scallops and sea urchins. Bait fisheries for rock crab were noted for these districts. In 2015, reported lobster landings weighed 2,898,078 kg with a value of $40,951,586 (C. O’Neil, pers. com.).

The area of the proposed fish farm falls within shellfish harvesting area NS-18-010-001 (Fig. 18). The majority of Annapolis Basin is classed as conditionally approved waters for harvesting shellfish; however, the Rattling Beach site is between waters to the north and the south which are prohibited for harvesting. Figure 18 was produced by Environment Canada (D. MacArthur, pers. comm.).

Species list

- Lobster (*Homarus americanus*)
- Shrimp (*Pandalus borealis*)
- Rock crab and Jonah crab (*Cancer irroratus* and *C. borealis*)
- Green crab (*Carcinus maenas)*
- Scallop (*Placopecten magellanicus*)
- Sea urchin (*Strongylocentrotus droebachiensis*)
- Soft-shell clam (*Mya arenaria*)
- Bar clam (*Spisula solidissima*)
- Quahaug (*Mercenaria mercenaria*)

Figure 11. Total Lobster Catch
Note: sourced from Coffen-Smout et al. (2013)

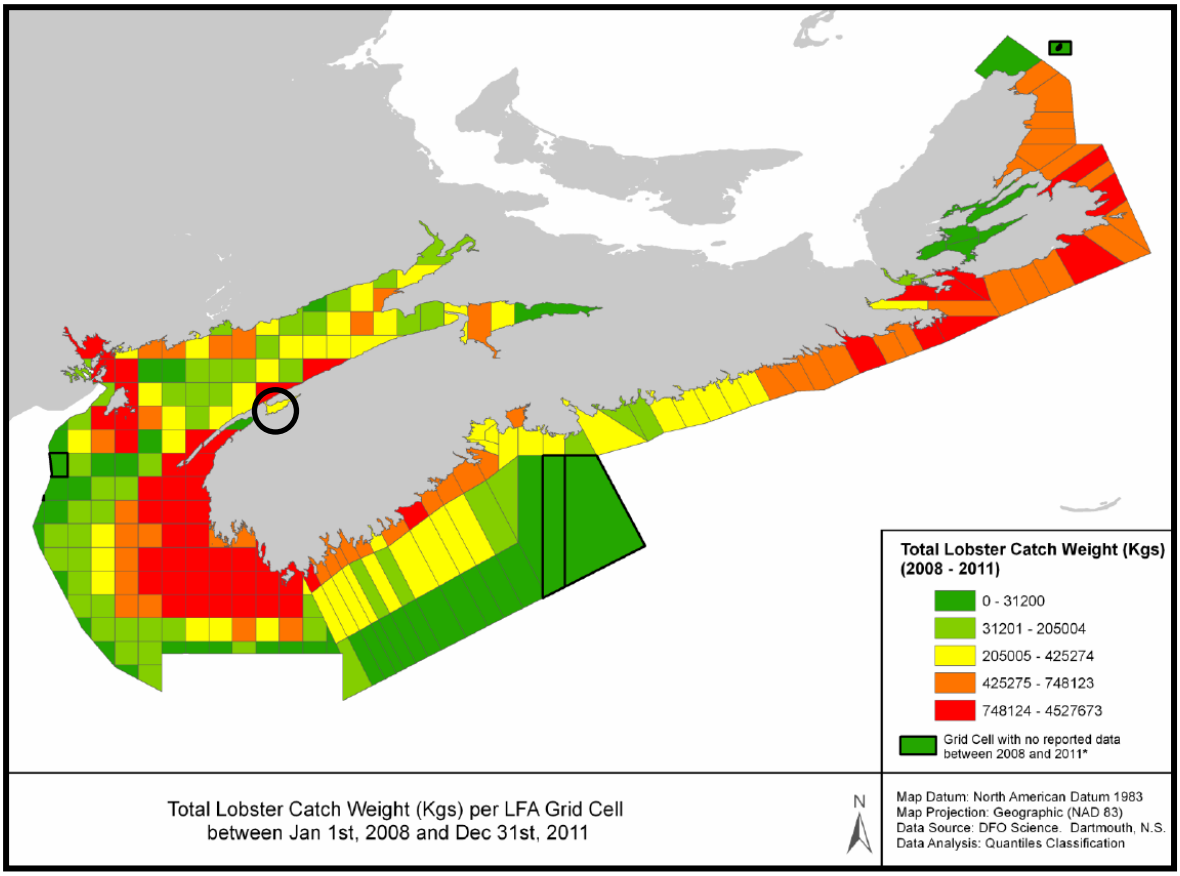


Figure 12. Commercial Crab Landings (1999 – 2003)

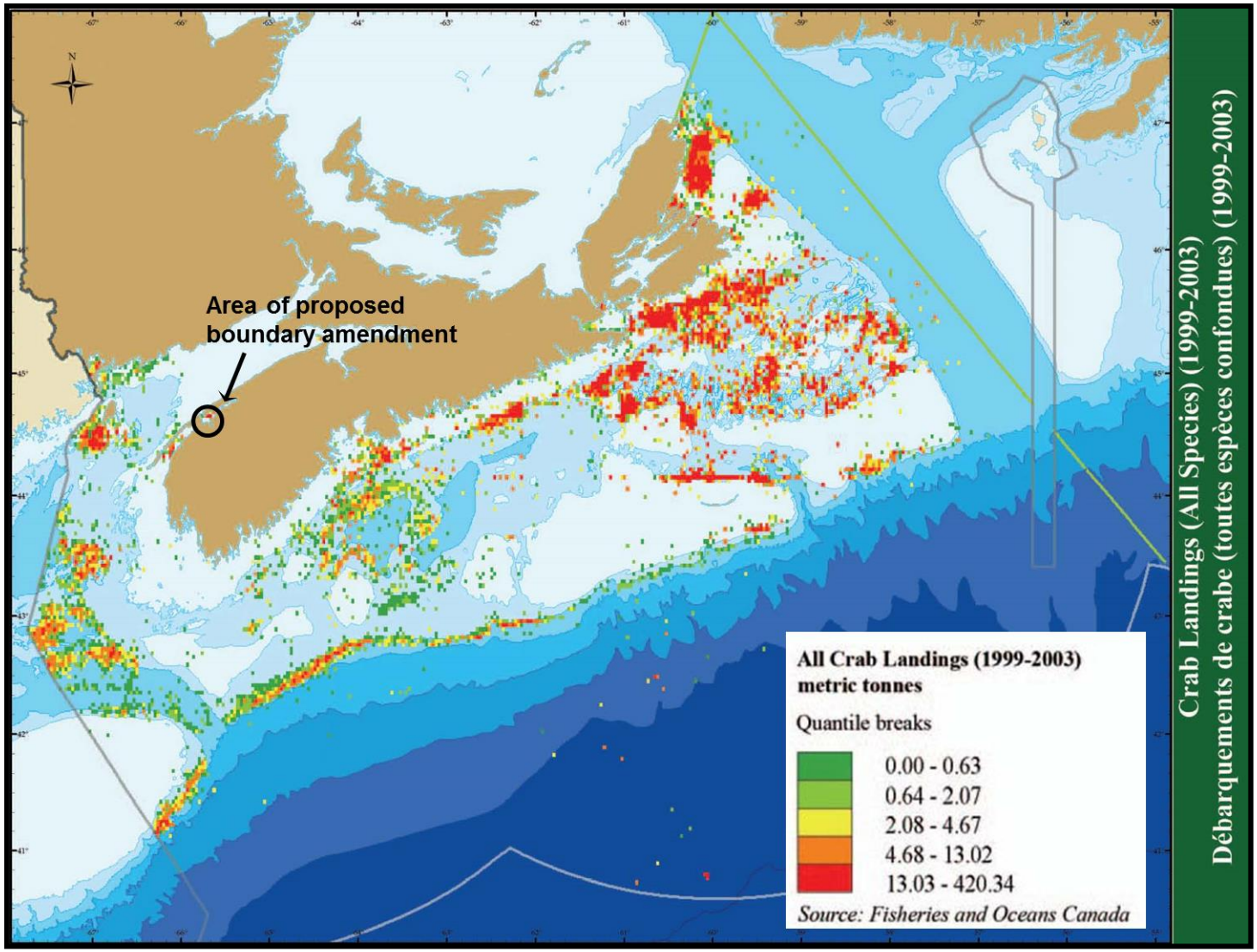


Figure 13. Commercial Snow Crab Landings (1999 – 2003)

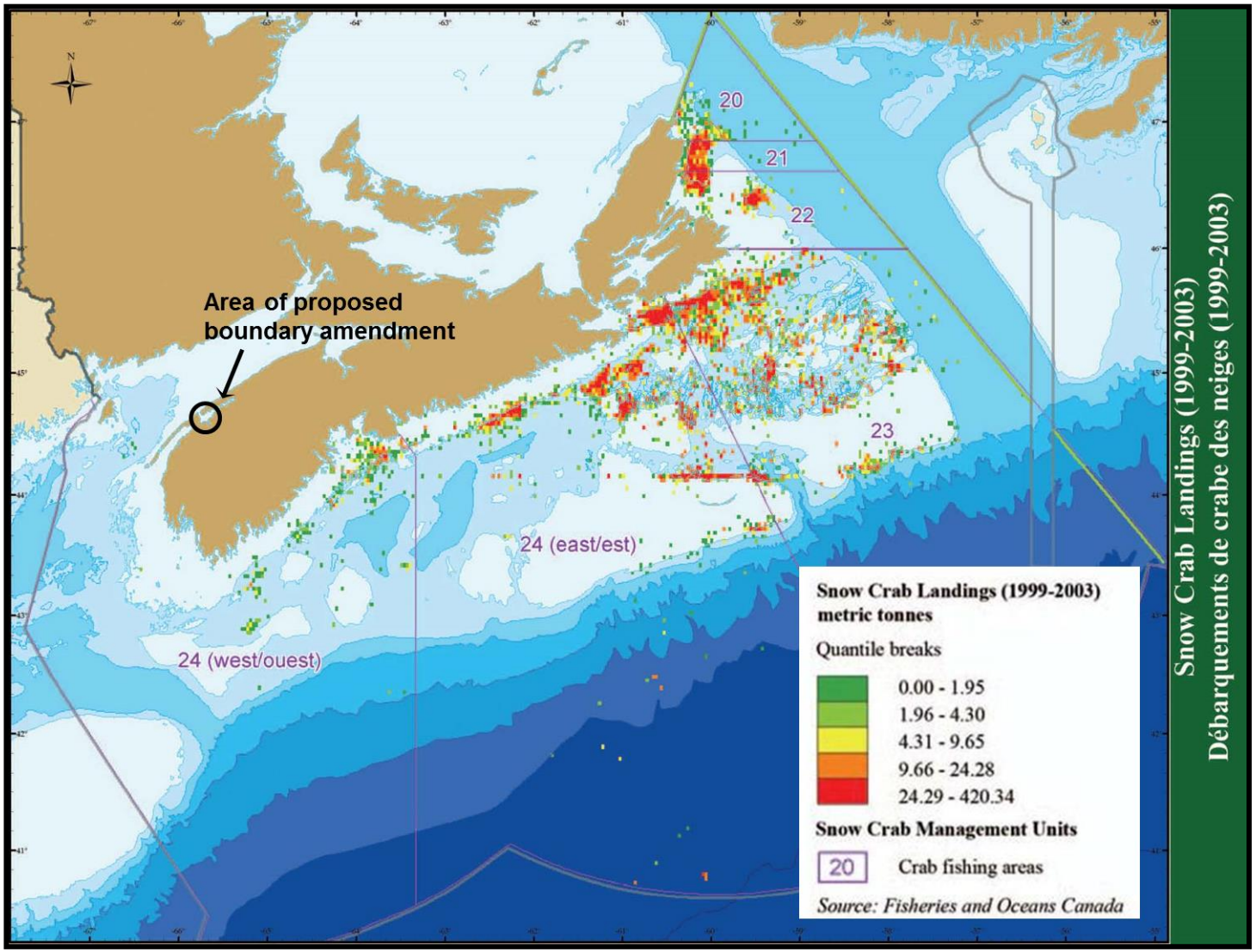


Figure 14. Commercial Snow Crab Landings (DFO 2015d)

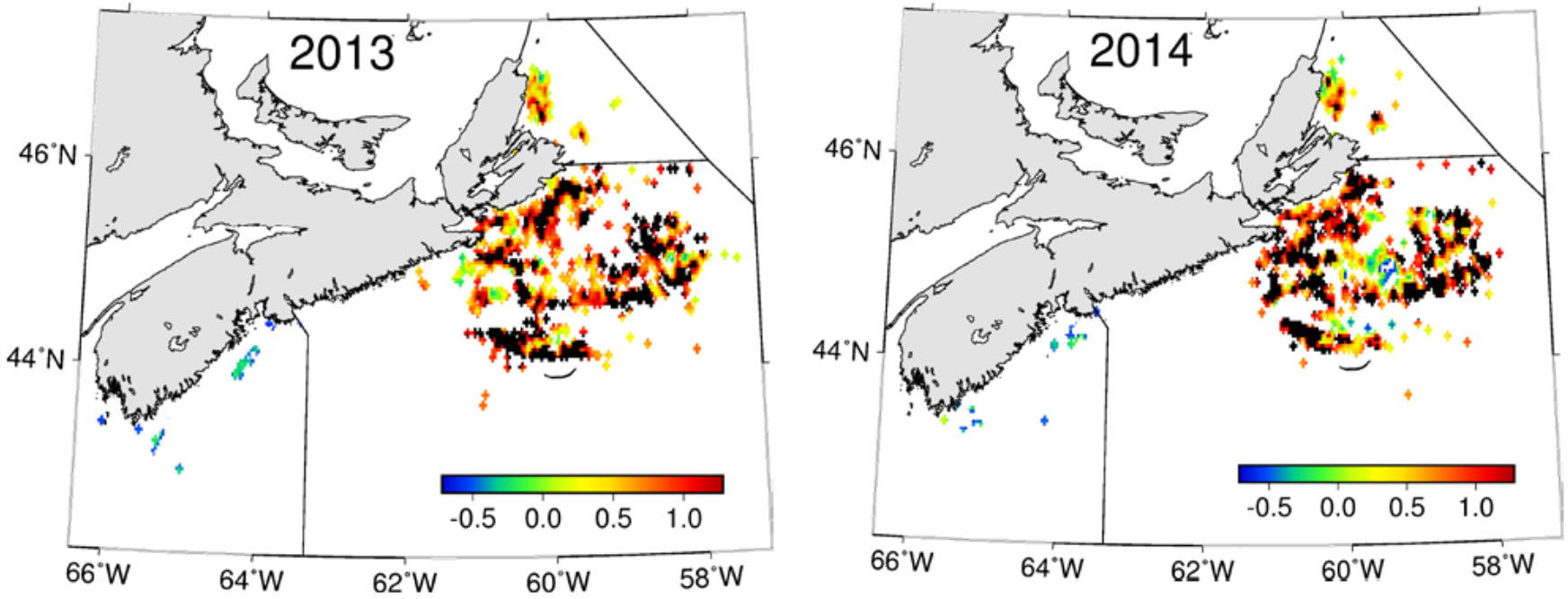


Figure 15. Shrimp Fishing Areas in Atlantic Canada
Note: Sourced from Fisheries and Oceans Canada (2015c)

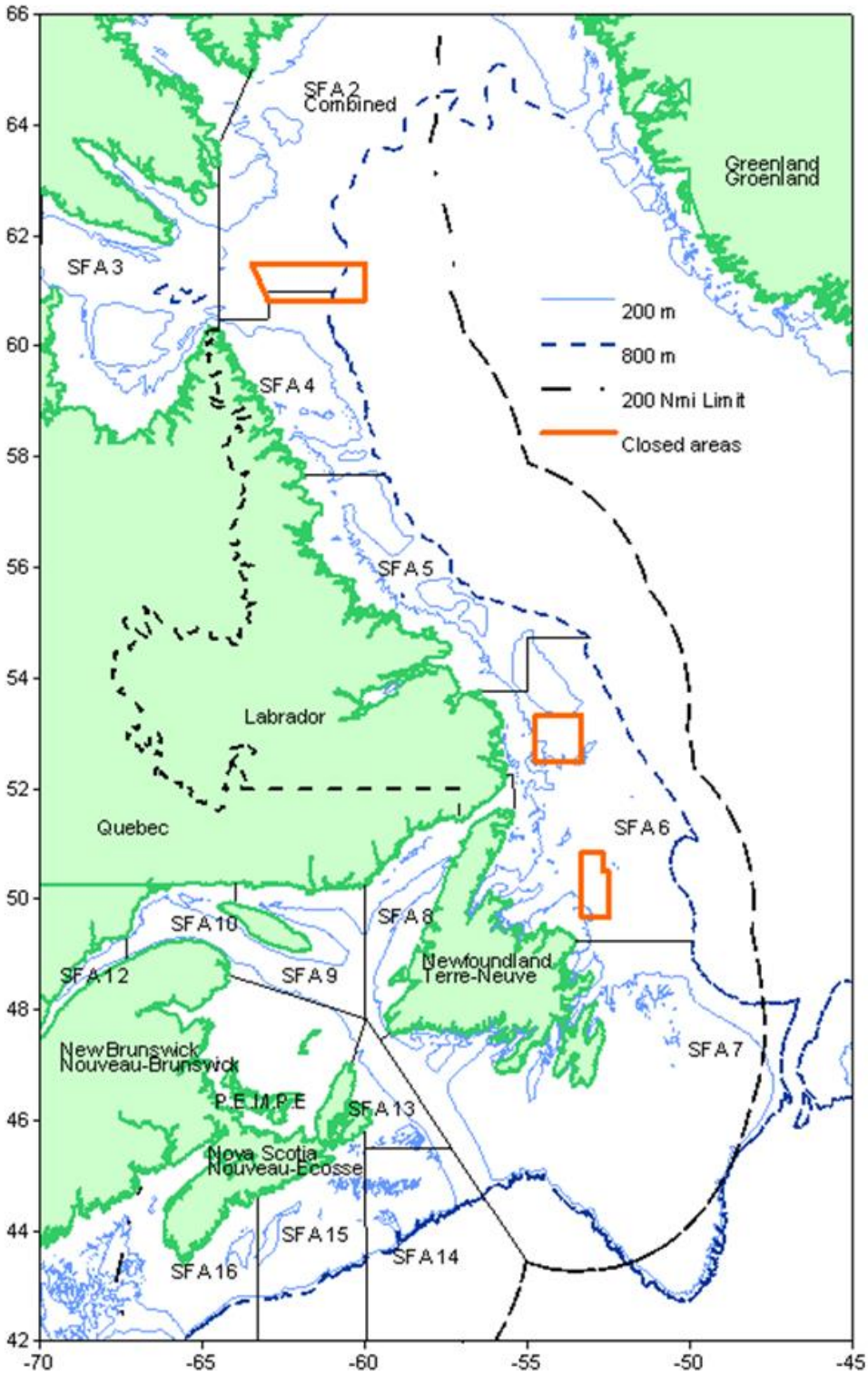


Figure 16. Commercial Scallop Landings (1999 – 2003)

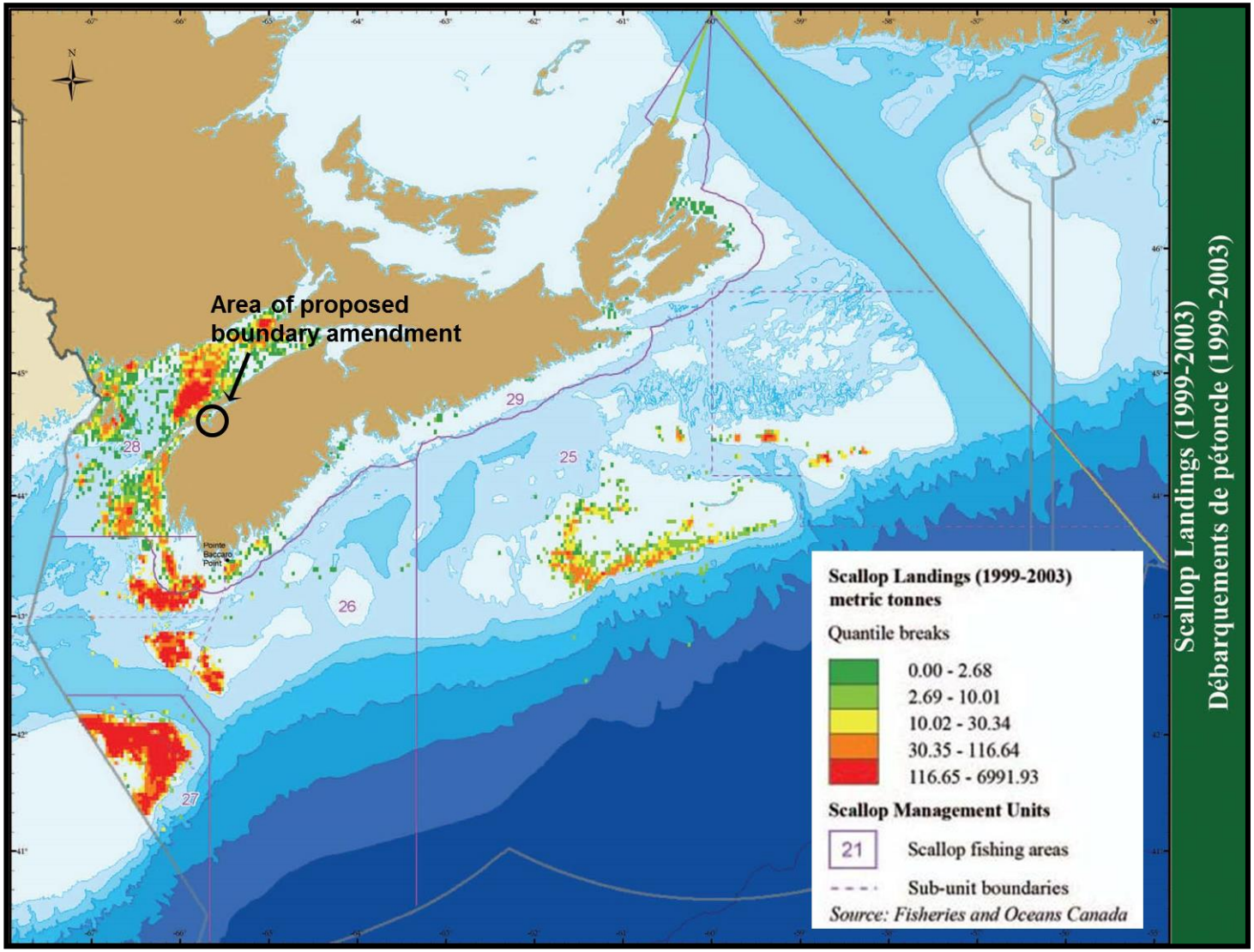


Figure 17. Scallop Production Areas
Note: sourced from Fisheries and Oceans (2016a)

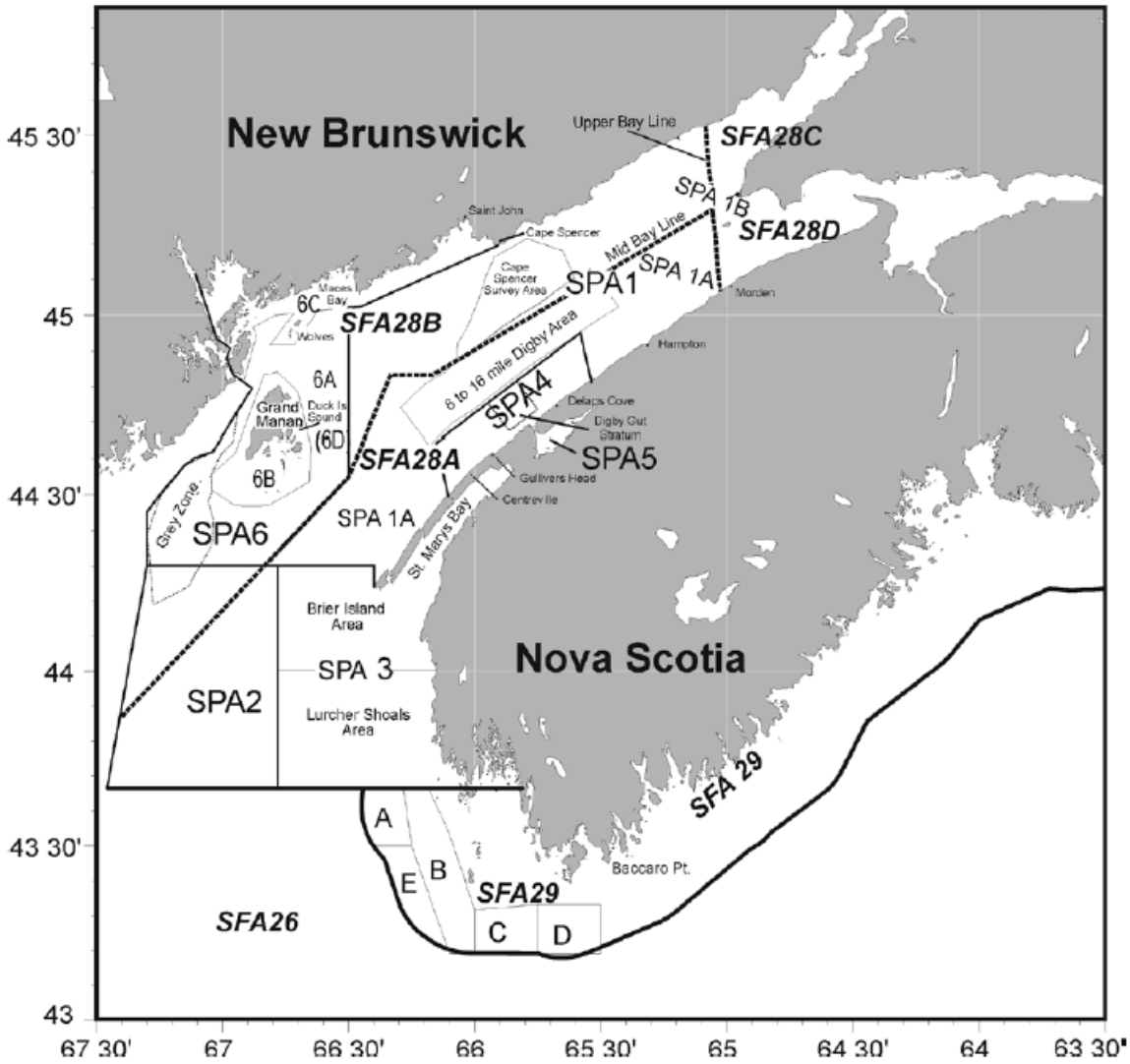
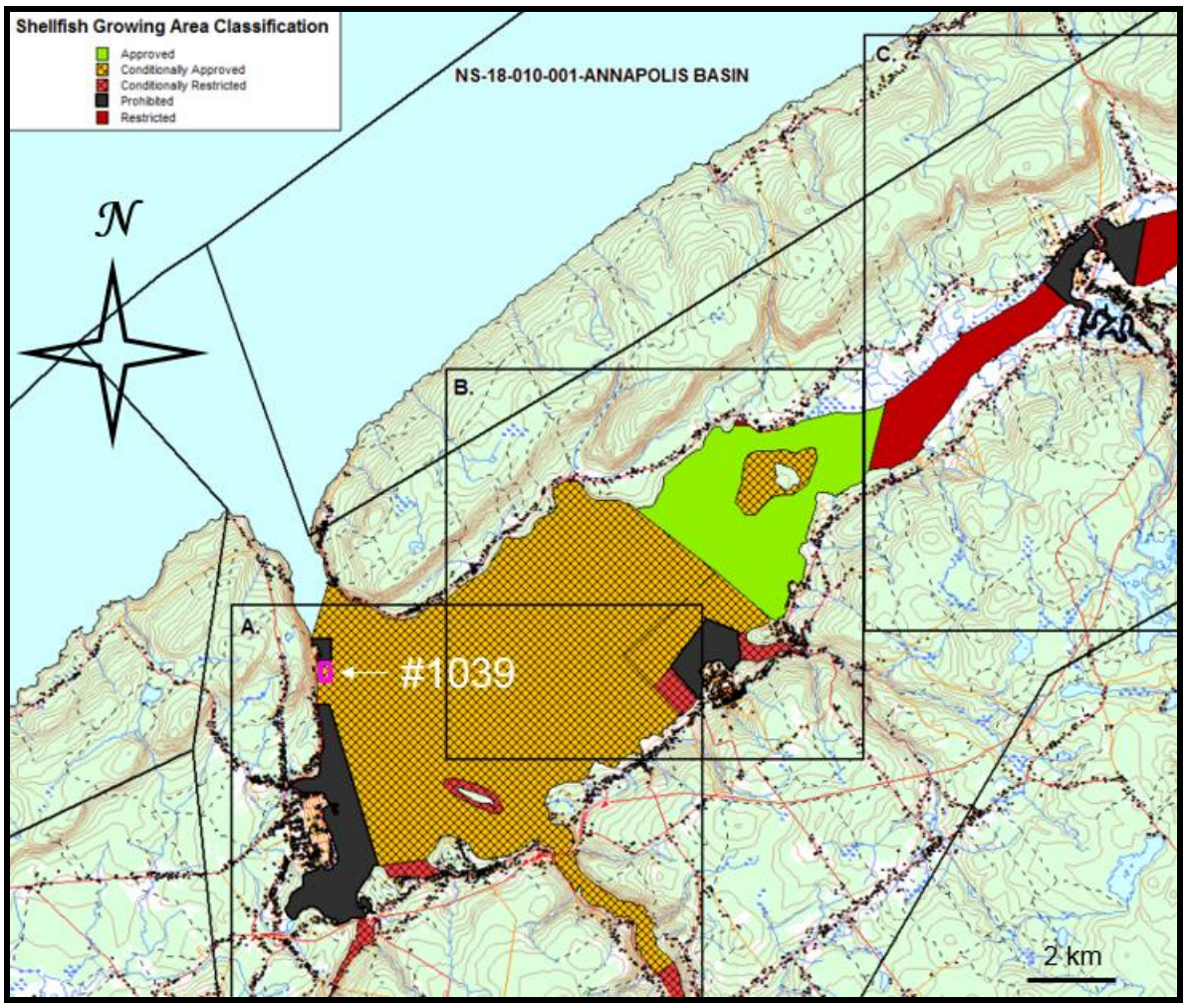


Figure 18. Shellfish Harvesting Classifications of the Annapolis Basin Area

Note: DFO is the central CSSP agency with respect to the real-time status of shellfish growing area classifications. DFO should be contacted directly for information on shellfish area closures.



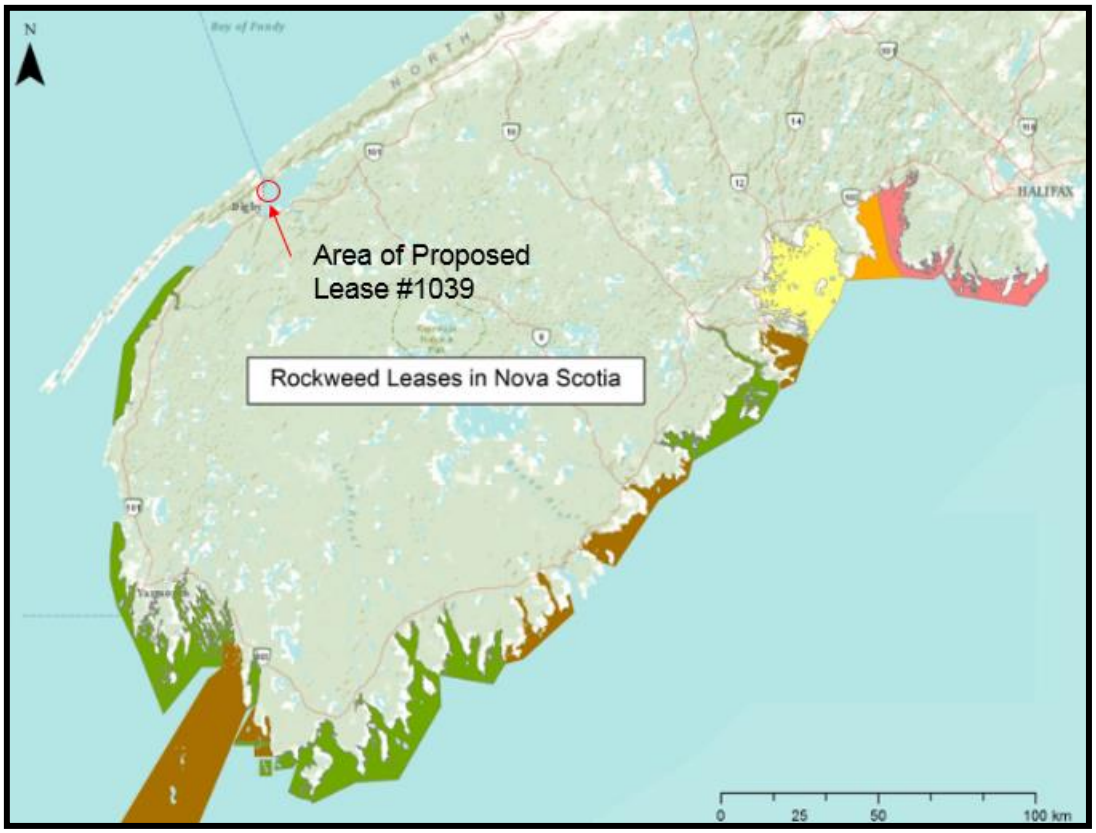
Seaweeds

Marine plants harvested commercially in Nova Scotia include rockweed (*Ascophyllum nodosum*), Irish moss (*Chrondus Chrispus*), dulse (*Palmaria palmata),* and kelp (*Saccharina latissima, S. groenlandica* and *Laminaria digitata*). In 2013, approximately 332 t of marine plants were landed in Nova Scotia at a value of nearly $107,560 (NSDFA 2013).

In Nova Scotia, *Ascophyllum* is harvested for animal fodder, fertiliser, and other specialty products. Irish moss is commonly harvested for carrageenan, which is used in the food industry for its thickening and stabilising properties. Though the species is not under any immediate threat, Nova Scotian Irish moss populations are beginning to experience signs of increase in site-specific harvesting pressure, and protection methods are beginning to be recognised (Fisheries and Oceans Canada 2013a). Harvest rates of rockweed in Annapolis Basin have remained high over the past 30 years; however, these rates indicate that the habitat value of these beds is significantly altered and takes years to recover. Reassessment of long-term impacts on habitat and the ecosystem are important in determining future harvest rates.

The province of Nova Scotia has jurisdiction over the issuing of rockweed licenses. 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.). This is due to the fact that rockweed harvesting takes place in shallow, intertidal water but aquaculture farms require deeper water. Irish moss also occurs low in the intertidal and into the shallow subtidal and is harvested with a hand rake (Fisheries and Oceans Canada 2013a). Harvesting *Ascophyllum* is considered a high risk activity as these plants and other biota can be damaged due to harvest. Annapolis Basin has a history of overharvest impacts; one full closure of the basin resulted when harvest rates were greater than 50%. Therefore, mitigation actions such as seasonal closures during peak growth or reproductive effort may be necessary to ensure population status (Fisheries and Oceans Canada 2013a). There are currently no rockweed leases in place for Annapolis Basin; however, two (2) applications have been received for this area and are currently being processed by the Province of Nova Scotia (W. Vissers, pers. com.; Fig.19).

Figure 19. Rockweed Licences in Nova Scotia
Note: sourced from Nova Scotia Department of Fisheries and Aquaculture



Recreational Fisheries

Department of Fisheries and Oceans Canada was contacted for recreational fishing landings, however this data is not available through their database (C. O'Neil, pers. com.).

Aboriginal Fisheries

Aboriginal landings were reported in Maritimes Statistical Districts 38 & 39 however the landing data, species fished, value and fishing effort was not provided by the Department of Fisheries and Oceans Canada (C. O'Neil, pers. com.).

d. Oceanographic and Biophysical Characteristics

Baseline Survey

A baseline survey of the proposed lease area was conducted on July 20, 2016. The baseline survey report, a document separate from this information package, is entitled Baseline Assessment Site #1039 Rattling Beach and dated October 20, 2016 (Appendix A).

Physical Oceanography

Wind

The proposed boundary amendment of NS aquaculture site #1039 is located near the channel at the entrance to Annapolis Basin, on the Fundy shore of Nova Scotia. The site is sheltered from the south around to the northwest due to its proximity to the mainland of Nova Scotia. The most significant wind directions for this site are from the east-northeast around to the south-southeast, to which the site is exposed to the greatest fetches.

The following wind speed data, including Figures 20 and 21, were collected from the *Wind and Wave Climate Atlas – Volume I: The East Coast of Canada*, for the Nova Scotian Shore, prepared by MacLaren Plansearch Ltd. (1991). Winds speed of less than 25 knots occur 90.9% of the time on the south shore of Nova Scotia. Storm force winds (i.e. > 45 knots) occur only 0.2% of the time. The most common wind directions are southwest (~20% occurrence) and west (~17.5% occurrence) while the least common wind directions are from the northeast (~7.5% occurrence), east (~6% occurrence), and southeast (~5.5% occurrence). Historically, the months with the highest mean wind speeds in the area have been January and December. During these months, the most frequent wind directions are from the northwest, north, and west, respectively. Annual wind statistics for the Fundy shore of Nova Scotia are presented in Figure 20 and summary graphs of average monthly wind speeds are presented in Figure 21.

Wind speed and direction data were also collected from the Brier Island weather station (Environment Canada 2016) at Digby Neck, located at N44° 17’ 09.000” W66° 20’ 48.000”. Data collected between April 1, 2011 and May 24, 2016 were used to produce the wind-rose plot of Figure 22. Based on this data, the most common and strongest winds in the Annapolis Basin area occur between 150 and 175º (coming from approximately the south-southeast through the southwest). Most commonly, wind speeds are between 4 and 10 km/h (Fig. 23).

Figure 20. Annual Wind Statistics for the Bay of Fundy Shore
Note: sourced from MacLaren Plansearch Ltd. (1991)

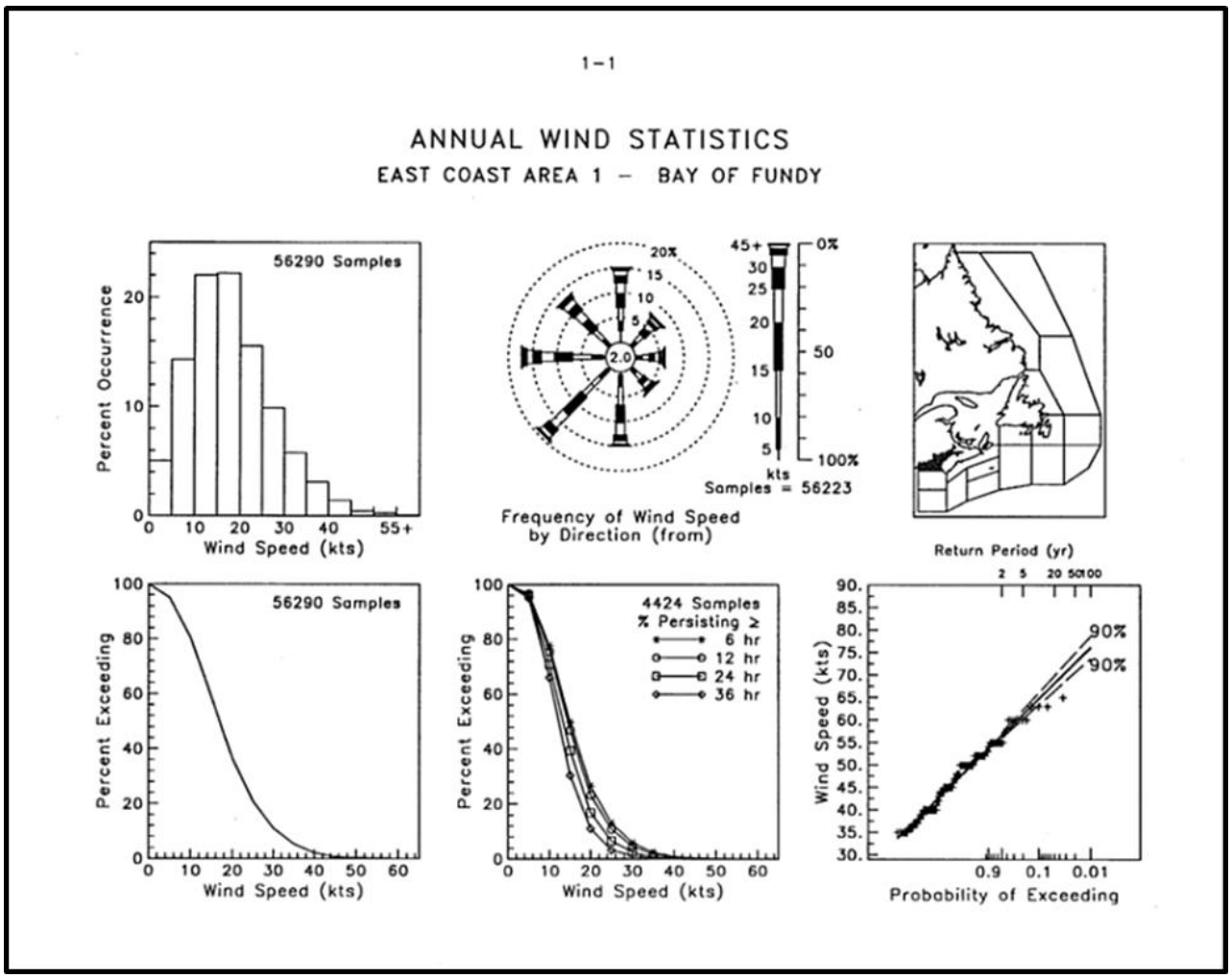


Figure 21. Average Monthly Wind Statistics for the Bay of Fundy Shore
Note: sourced from MacLaren Plansearch Ltd. (1991)

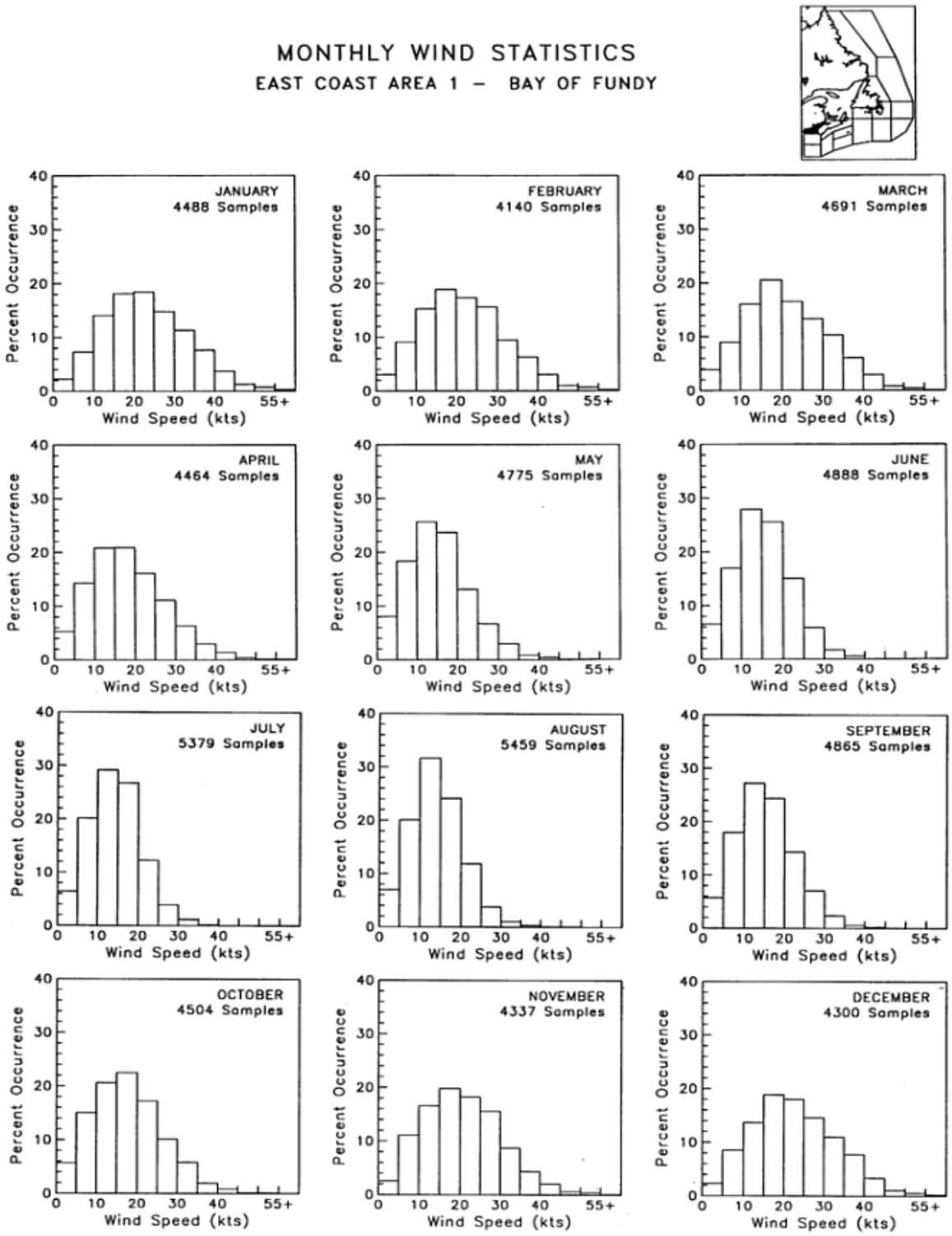
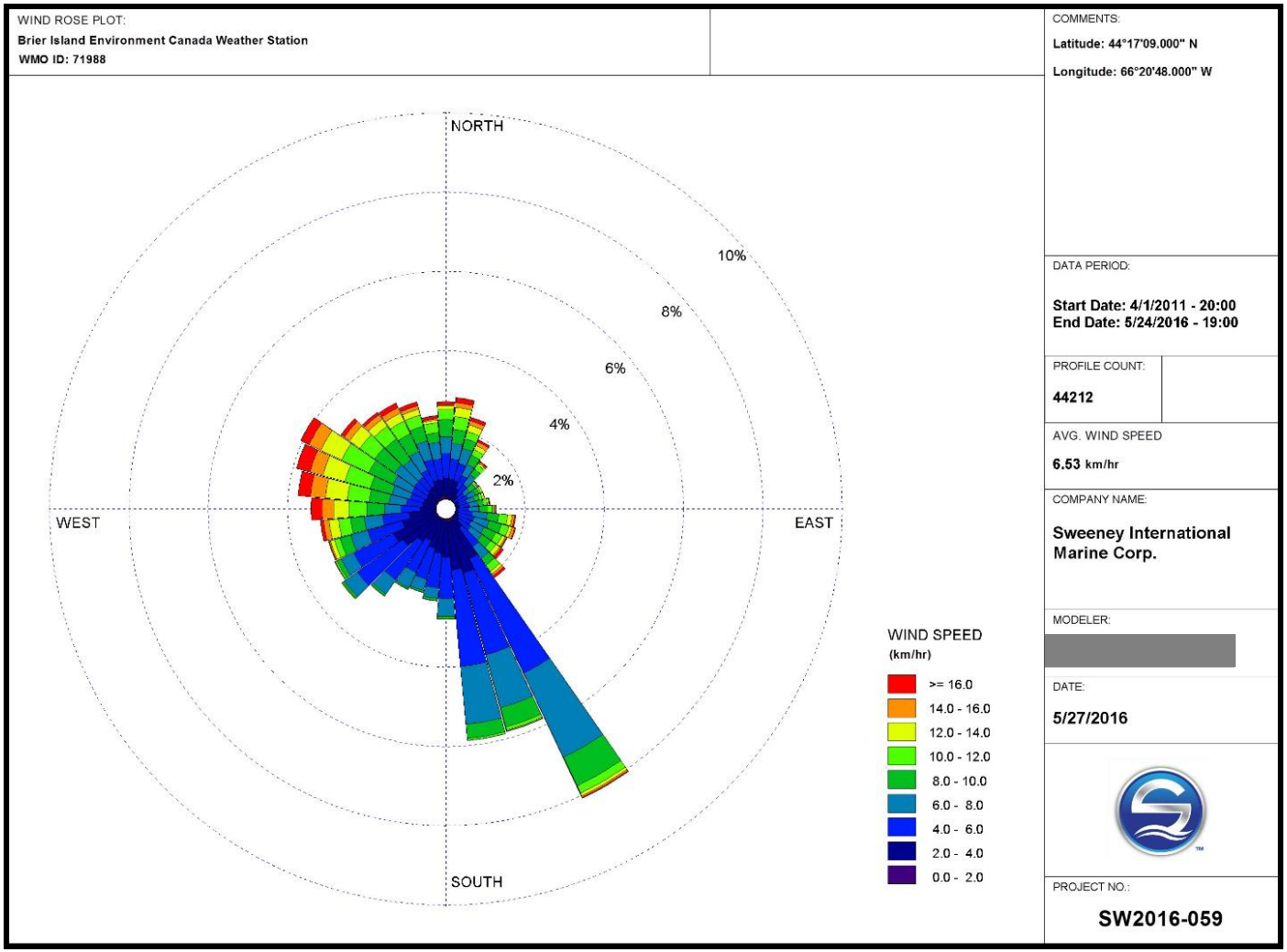
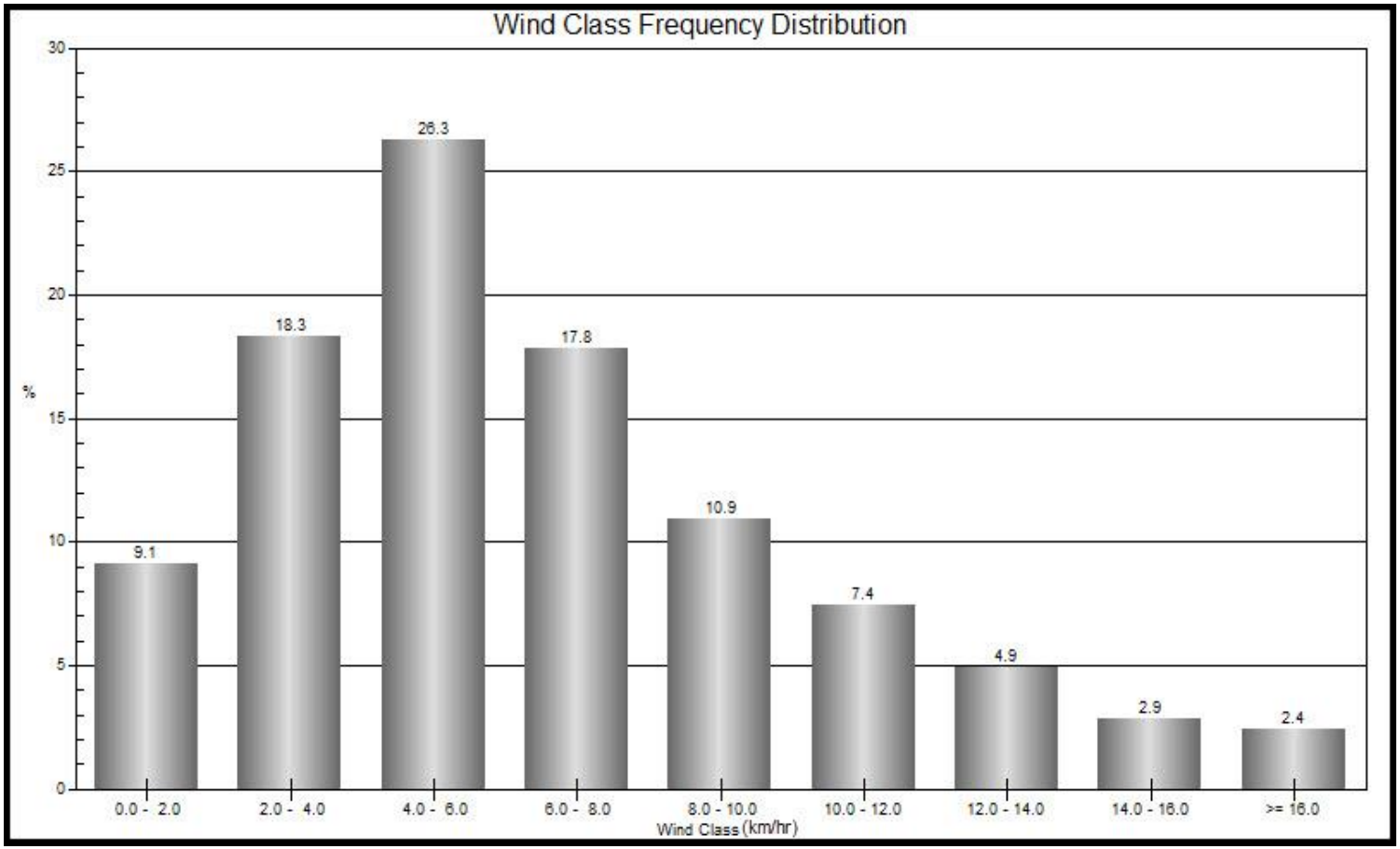


Figure 22. Wind-rose Plot of Brier Island Weather Station Data Collected Between April 1, 2011 and May 24, 2016
Note: the bars on the plot indicate the direction the wind was coming from
Data sourced from Environment Canada (2016)



20(1)

Figure 23. Frequency of Wind Speed Observed at the Brier Island Weather Station between April 1, 2011 and May 24, 2016
Data sourced from Environment Canada (2016)



Waves

The following wave height data, including Figures 24 and 25, were collected from the *Wind and Wave Climate Atlas – Volume I: The East Coast of Canada*, prepared by MacLaren Plansearch Ltd. (1991).

Wave heights of 6 m and greater are generally associated with winds speeds of 30 knots or more. Waves of less than 3 m in height were recorded 89.9% of the time while waves greater than 5 m were recorded only 1.0% of the time. Waves reaching the Fundy shore of Nova Scotia most commonly come from the southwest (24.7%) and west (18.9%). The aquaculture site at Rattling Beach is sheltered by land for these directions. The largest wave heights (i.e. > 5 m) generally come from the east. Waves coming from west, southwest, northwest, northeast, and southeast very rarely exceed 3.5 m in height. The greatest monthly average wave height for the Nova Scotian shore is 1.1 m, which occurs in the months of January, and December. Annual wave height statistics for the Nova Scotia shore are presented in Figure 24 and summary graphs of the average monthly wave heights are presented in Figure 25.

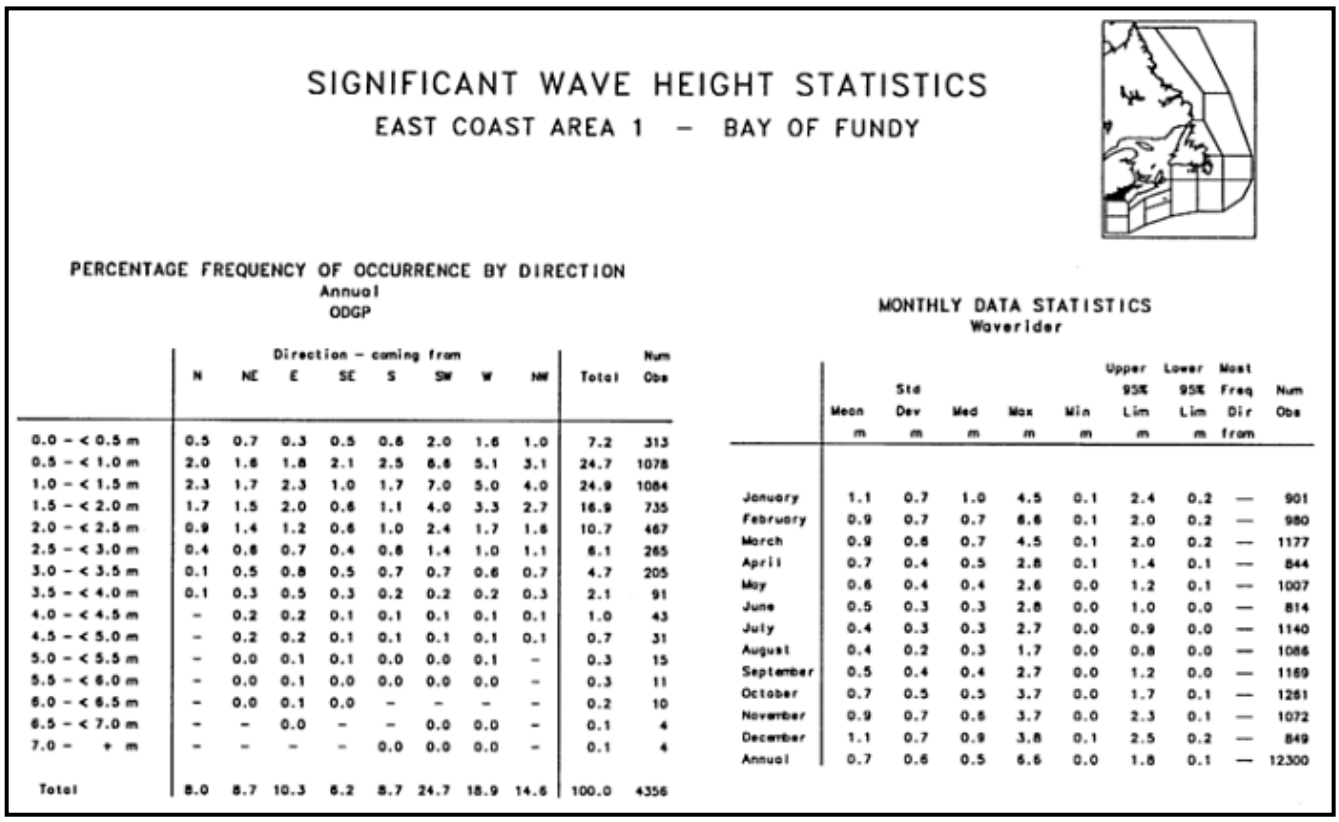
Wave height data was also obtained from the National Data Buoy Center (NOAA 2016a) to determine maximum waves. Data presented in Table 8 were collected by the Jonesport, Maine station 44027 buoy, which is located 20 nautical miles southeast of Jonesport (N44° 17' 13" W67° 18' 27").

Table 8. Wave Height Data from Buoy 44027 near Jonesport Maine

Date of Maximum Wave of the Year	Wave Height (m)	Wave Period (s)	Sustained Wind Speed (knots)	Gusts (knots)	Wind Direction
April 8, 2016	5.78	10.0	27.2	31.9	S
January 27, 2015	8.43	9.09	38.9	48.2	N
February 15, 2014	6.12	12.12	33.2	42.6	WNW
November 27, 2013	6.55	10.0	15.6	45.1	SSE
January 14, 2012	7.18	11.43	35.0	42.0	WSW
November 23, 2011	4.8	8.33	15.0	43.3	NNE
January 26, 2010	6.07	9.09	33.6	41.8	SSE
December 10, 2009	6.29	10.0	N/A	N/A	N/A
January 8, 2009	5.66	11.43	30.5	38.9	WSW
October 29, 2008	8.08	11.43	33.0	39.7	SSW

February 15, 2007	6.88	10.81	34.8	42.6	SE
October 29, 2006	7.81	11.43	36.0	43.9	SW
November 23, 2005	6.82	12.12	23.9	30.3	SSW

Figure 24. Significant Wave Height Statistics for the Fundy Shore
Note: sourced from MacLaren Plansearch Ltd. (1991)



SIGNIFICANT WAVE HEIGHT STATISTICS

EAST COAST AREA 1 – BAY OF FUNDY

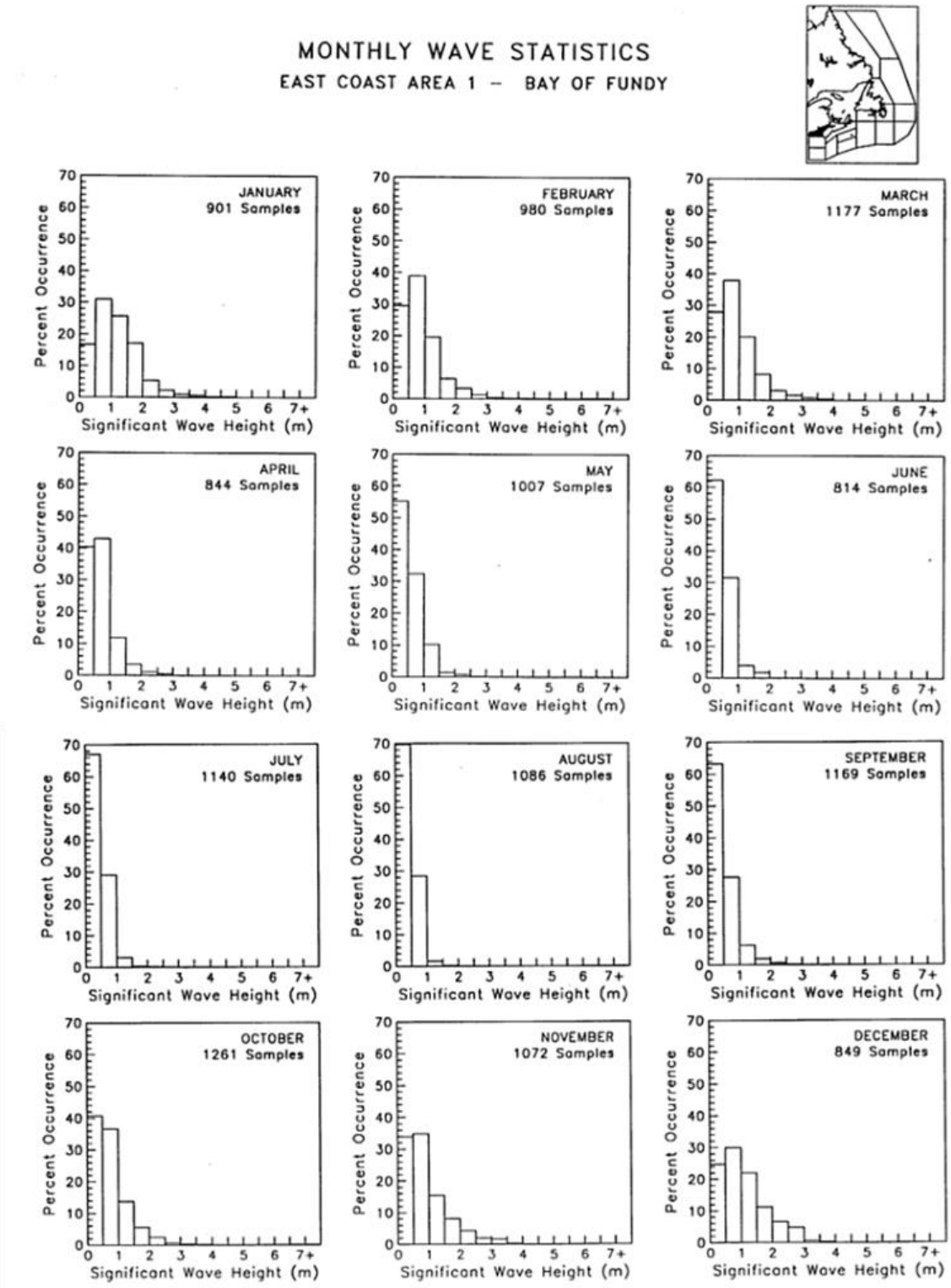
PERCENTAGE FREQUENCY OF OCCURRENCE BY DIRECTION
Annual
ODGP

	Direction – coming from									
	N	NE	E	SE	S	SW	W	NW	Total	Num Obs
0.0 – < 0.5 m	0.5	0.7	0.3	0.5	0.6	2.0	1.6	1.0	7.2	313
0.5 – < 1.0 m	2.0	1.6	1.8	2.1	2.5	6.6	5.1	3.1	24.7	1078
1.0 – < 1.5 m	2.3	1.7	2.3	1.0	1.7	7.0	5.0	4.0	24.9	1084
1.5 – < 2.0 m	1.7	1.5	2.0	0.6	1.1	4.0	3.3	2.7	16.9	735
2.0 – < 2.5 m	0.9	1.4	1.2	0.6	1.0	2.4	1.7	1.6	10.7	467
2.5 – < 3.0 m	0.4	0.6	0.7	0.4	0.6	1.4	1.0	1.1	6.1	265
3.0 – < 3.5 m	0.1	0.5	0.8	0.5	0.7	0.7	0.6	0.7	4.7	205
3.5 – < 4.0 m	0.1	0.3	0.5	0.3	0.2	0.2	0.2	0.3	2.1	91
4.0 – < 4.5 m	–	0.2	0.2	0.1	0.1	0.1	0.1	0.1	1.0	43
4.5 – < 5.0 m	–	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.7	31
5.0 – < 5.5 m	–	0.0	0.1	0.1	0.0	0.0	0.1	–	0.3	15
5.5 – < 6.0 m	–	0.0	0.1	0.0	0.0	0.0	0.0	–	0.3	11
6.0 – < 6.5 m	–	0.0	0.1	0.0	–	–	–	–	0.2	10
6.5 – < 7.0 m	–	–	0.0	–	–	0.0	0.0	–	0.1	4
7.0 – + m	–	–	–	–	0.0	0.0	0.0	–	0.1	4
Total	8.0	8.7	10.3	6.2	8.7	24.7	18.9	14.6	100.0	4356

MONTHLY DATA STATISTICS
Waverider

	Mean m	Std Dev m	Med m	Max m	Min m	Upper 95% Lim m	Lower 95% Lim m	Most Freq Dir from	Num Obs
January	1.1	0.7	1.0	4.5	0.1	2.4	0.2	—	901
February	0.9	0.7	0.7	6.6	0.1	2.0	0.2	—	980
March	0.9	0.6	0.7	4.5	0.1	2.0	0.2	—	1177
April	0.7	0.4	0.5	2.8	0.1	1.4	0.1	—	844
May	0.6	0.4	0.4	2.6	0.0	1.2	0.1	—	1007
June	0.5	0.3	0.3	2.8	0.0	1.0	0.0	—	814
July	0.4	0.3	0.3	2.7	0.0	0.9	0.0	—	1140
August	0.4	0.2	0.3	1.7	0.0	0.8	0.0	—	1086
September	0.5	0.4	0.4	2.7	0.0	1.2	0.0	—	1169
October	0.7	0.5	0.5	3.7	0.0	1.7	0.1	—	1251
November	0.9	0.7	0.8	3.7	0.0	2.3	0.1	—	1072
December	1.1	0.7	0.9	3.8	0.1	2.5	0.2	—	849
Annual	0.7	0.6	0.5	6.6	0.0	1.8	0.1	—	12300

Figure 25. Average Monthly Wave Height Statistics for the Bay of Fundy Shore
Note: sourced from MacLaren Plansearch Ltd. (1991)



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 that could cause unwanted changes to the project. However, 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 to the project caused by weather and climate extremes. KCS has a number of high energy sites in New Brunswick, Nova Scotia, and Newfoundland, which are exposed to strong winds and large waves. The grid and anchoring systems used at Rattling Beach have been proven successful at these high energy sites. The plastic, circular cages and grid components employed by KCS have been tested and shown to withstand wave heights of 8 m. 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. In the event damage is sustained, repairs will be carried out as necessary. Any significant damage will be reported to NSDFA.

Temperature

Temperatures at the Rattling Beach aquaculture site were recorded and collected by KCS staff during site operations. The minimum water temperature was recorded in February 2015 and was approximately 0^{o}C. The maximum water temperature was recorded in September 2015 and was approximately 14.7^{o}C. Figure 26 displays the historical water temperature trends from the Rattling Beach site.

Long-term temperature data for the Fundy shore area (Prince 5) were sourced from the DFO OSD Atlantic Zone Monitoring Program and are presented in Fig. 27 (Fisheries and Oceans Canada 2016). Monthly, average, temperature data provided in Fig. 28 were derived from climatology data of the DFO Maritime Oceans and Ecosystem Science (OES) project, Hydrographic Database, Subarea 55 (Fisheries and Oceans Canada 2007). Figures 27 and 28 display average and monthly water temperature data for the Fundy shore of Nova Scotia. Mean water temperatures from this data range between 1.8 and 12.7^{0} C. The lowest temperatures of the year are normally experienced in February to March and the highest temperatures in August. The existing, successful, aquaculture site at Rattling Beach would indicate that the temperatures in the area are tolerable for Atlantic salmon.

Figure 26. Daily Water Temperature Data from the Rattling Beach Aquaculture Site #1039

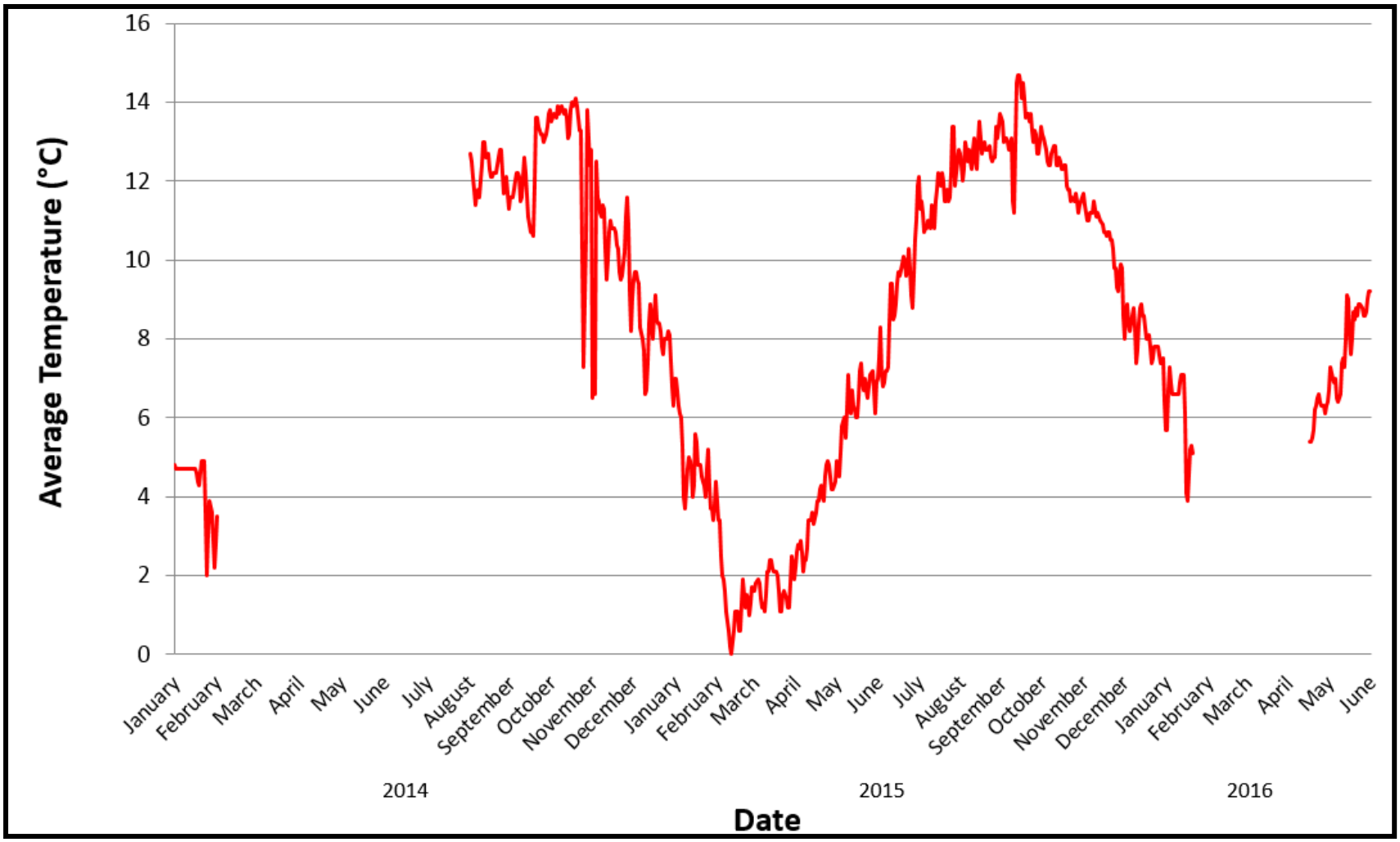


Figure 27. Average Monthly Temperature Data of OES Subarea 55 (Bay of Fundy) at 0 to 30 m Deep
Note: Data was obtained from the Oceans and Ecosystem Science website (Fisheries and Oceans 2007).

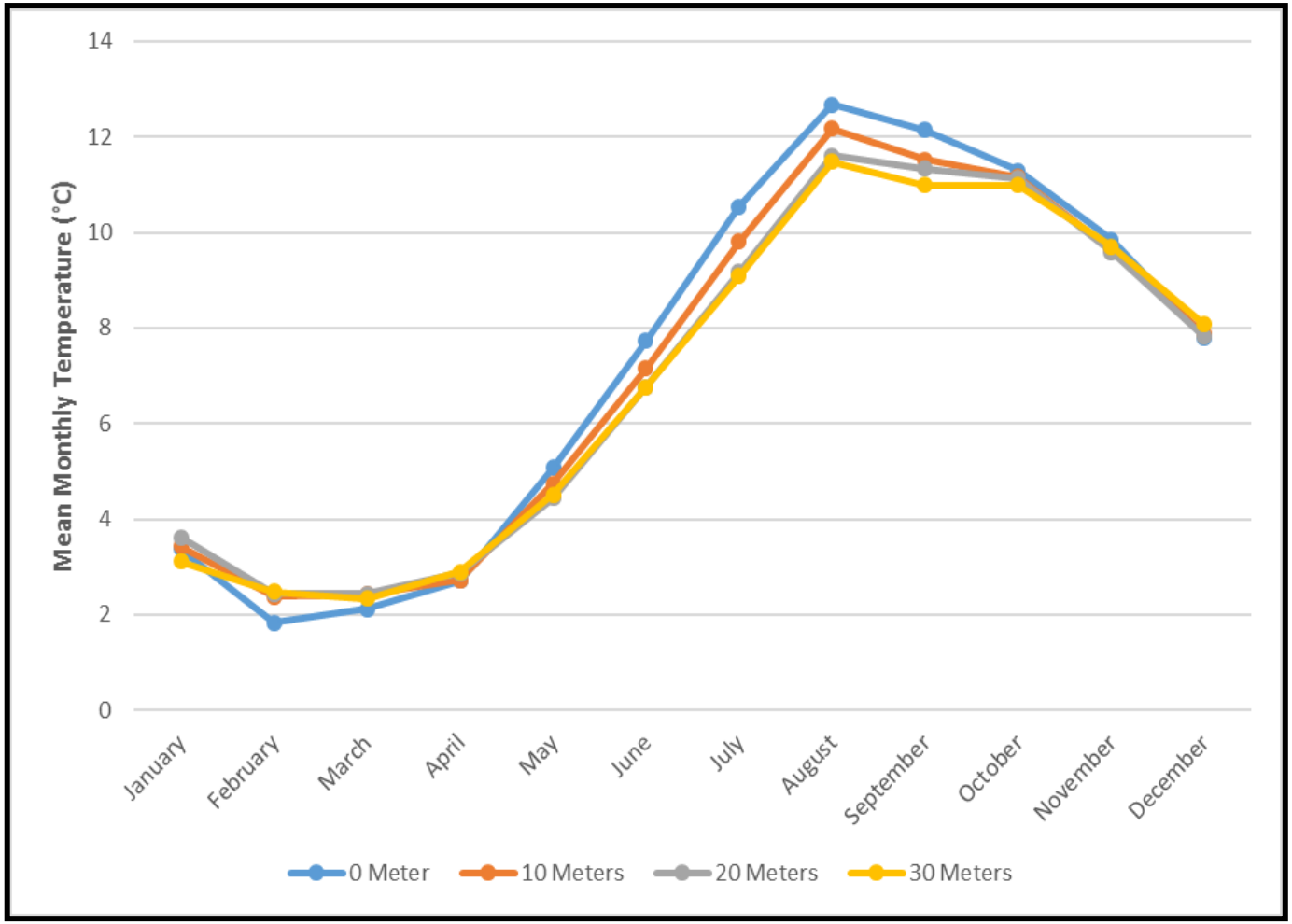
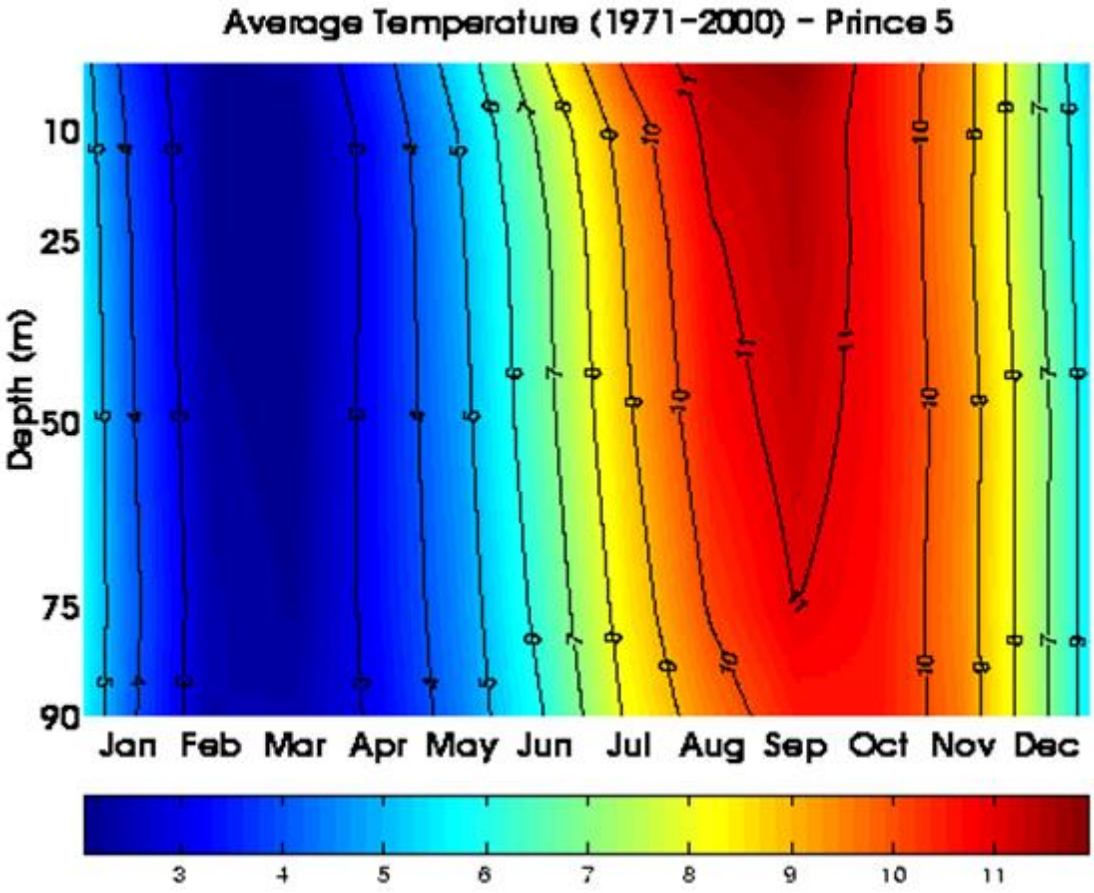


Figure 28. Contour Plot of Average Monthly Temperatures from Prince 5 Station of DFO's Atlantic Zone Monitoring Program
Note: Graph was obtained from Fisheries and Oceans Canada (2016b).



Superchill

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^{o}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.

Sea Ice

Sea ice is typically not a problem in Annapolis Basin. The thirty-year frequency of presence of sea ice (Fig. 29) and predominant ice type (Fig. 30) for the Bay of Fundy and Annapolis Basin are unknown. Both Figure 29 and 30 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 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.

Figure 29. Frequency of presence of sea ice in Atlantic Canada
Note: Figure sourced from Environment Canada, Canadian Ice Service (2010)

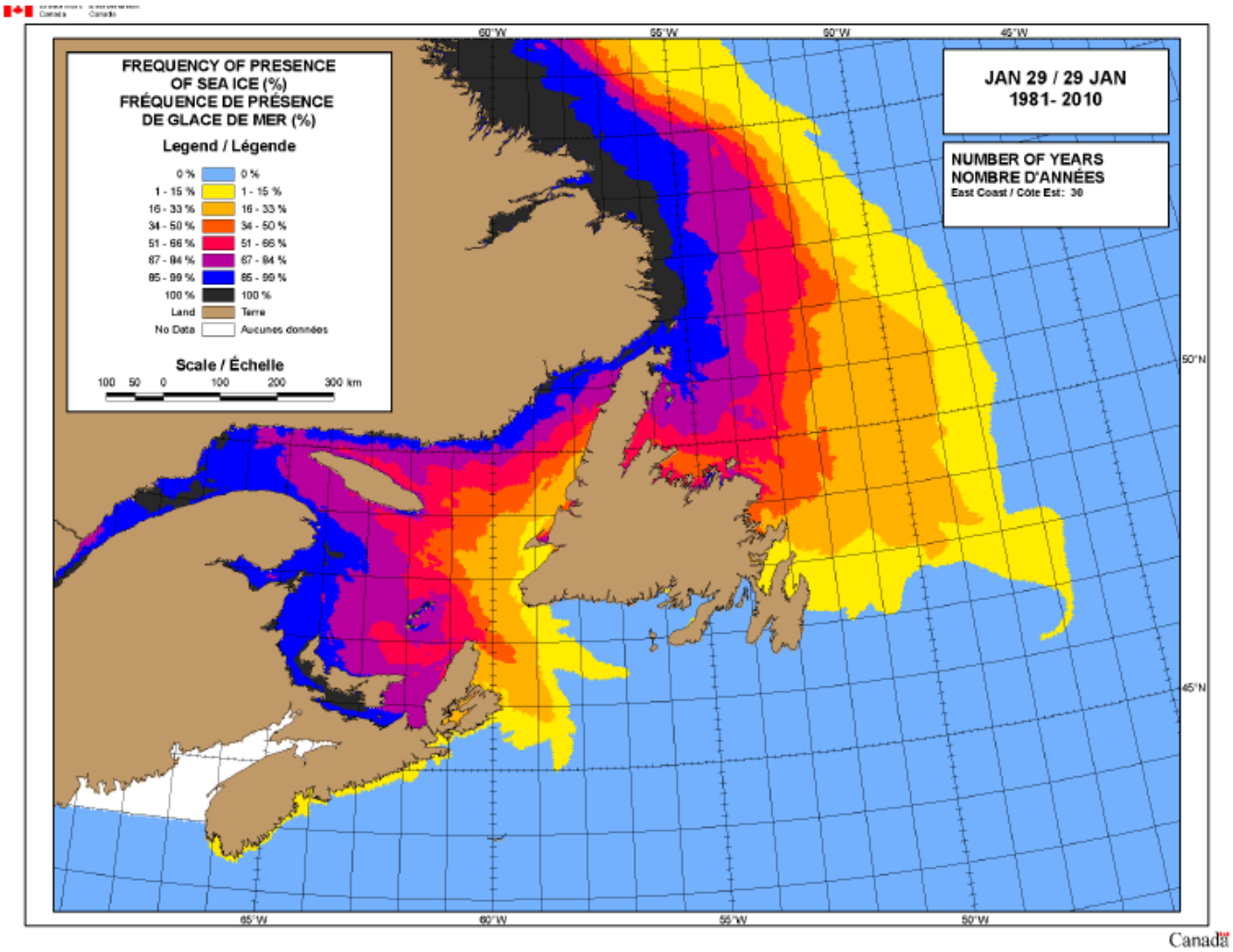
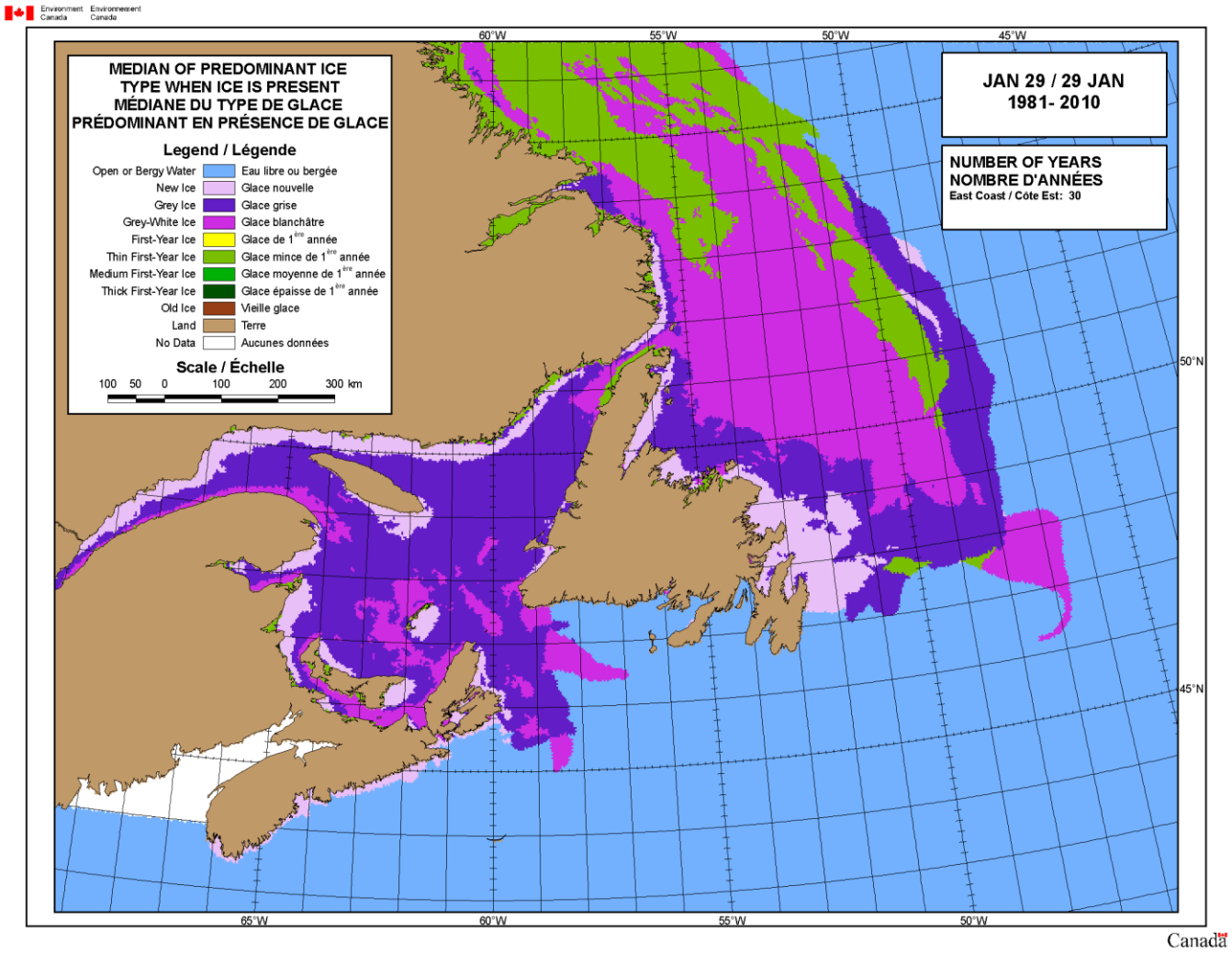


Figure 30. Median of Predominant Ice Type in Atlantic Canada
Note: Figure sourced from Environment Canada, Canadian Ice Service (2010)



Salinity

KCS reported salinities for Rattling Beach site between 30 and 32‰. According to the monthly, average, salinity data gathered from the DFO OSD Atlantic Zone Monitoring Program, (Fisheries and Oceans Canada 2016b; Fig 31) for Prince 5, Bay of Fundy, salinity ranges between 30.9 and 32.9‰. In general, salinity is lowest in April to June and highest between the months of August to December. The existing, successful, aquaculture site at Rattling Beach would indicate that the salinities in the area are tolerable for Atlantic salmon. Monthly, average, salinity data from Subarea 55 are presented in Figure 32 (Fisheries and Oceans Canada 2007).

Figure 31. Contour Plot of Average Monthly Salinity of Prince 5 Station of DFO's Atlantic Zone Monitoring Program

Note: Graph was obtained from the Fisheries and Oceans Canada (2016b), Marine Environmental Data Services website

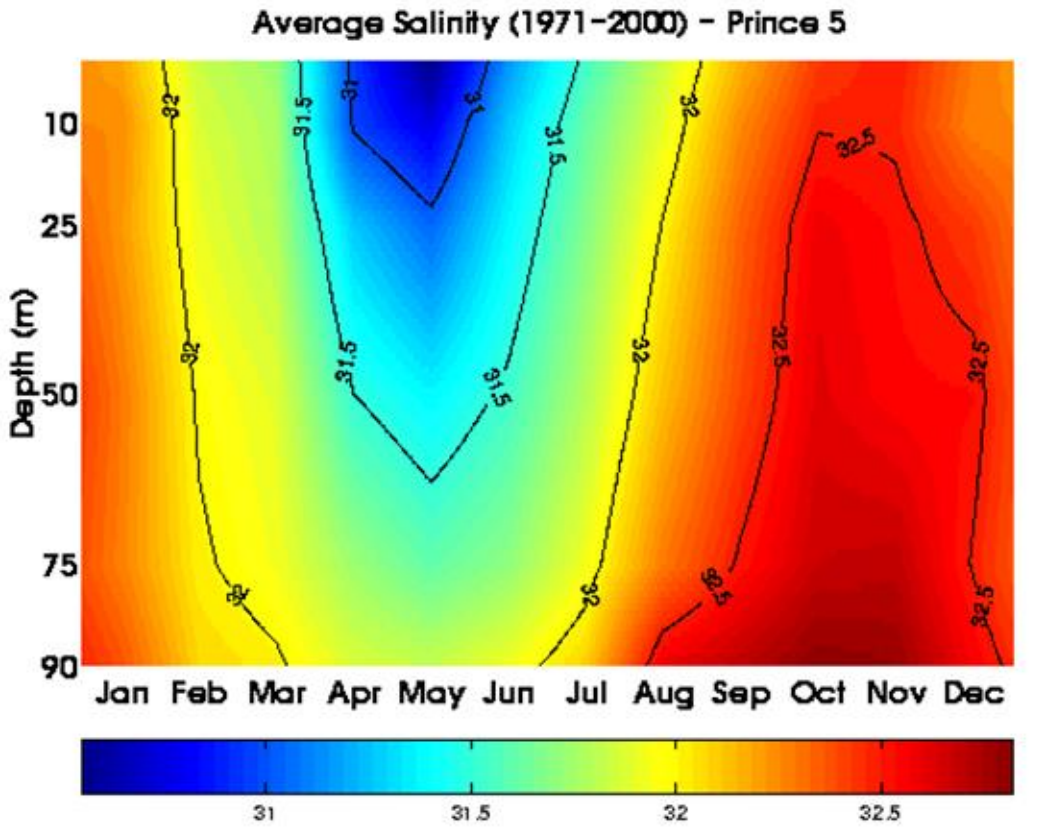
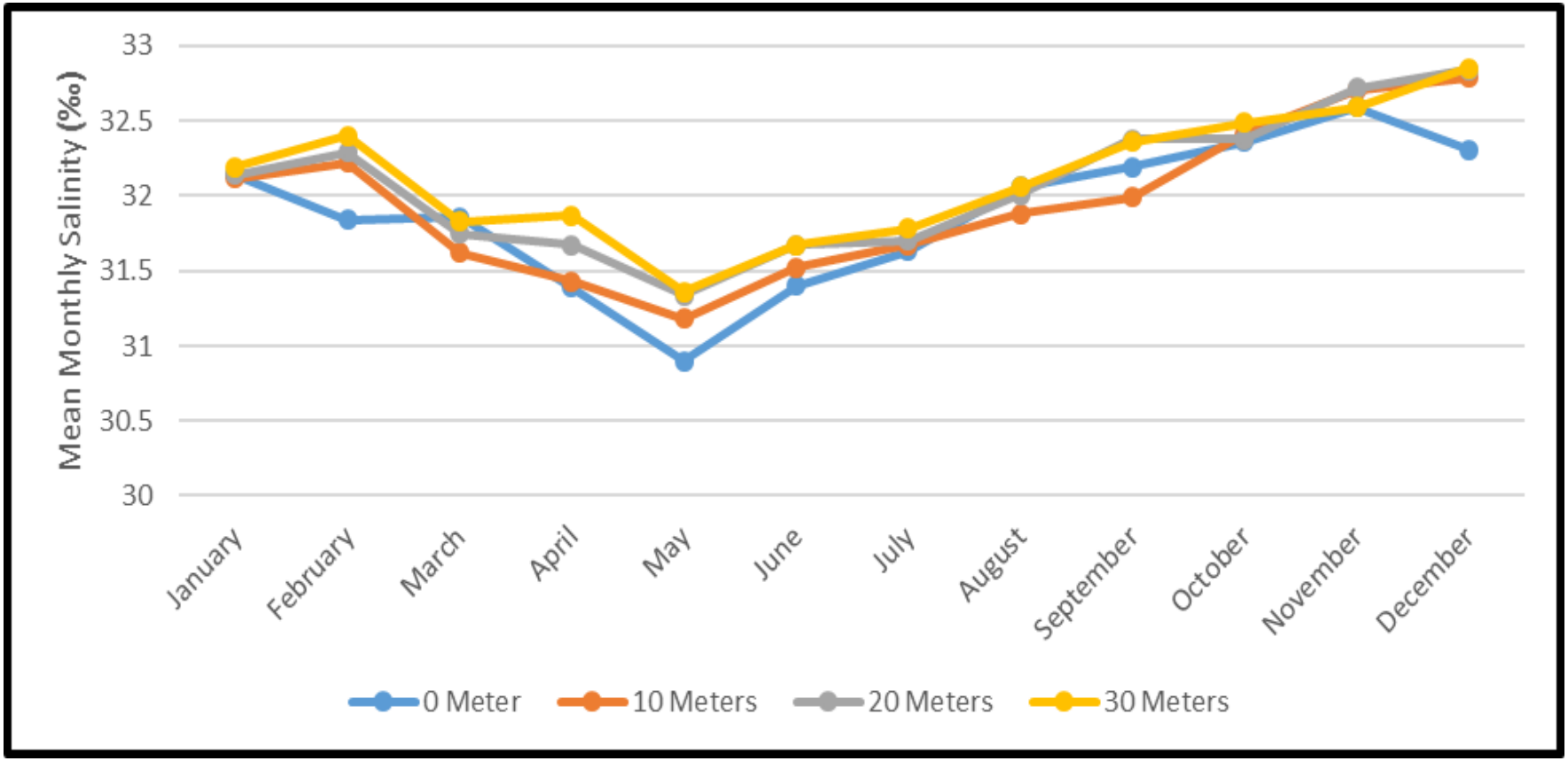


Figure 32. Average Monthly Salinity of OES Subarea 55 (Bay of Fundy) at Various Depths
Note: Data was obtained from the Oceans and Ecosystem Science website (Department of Fisheries 2007).



Tides

Based on Canadian Hydrographic Service Tide Tables (Fisheries and Oceans Canada 2016c) for Digby (Station #325), the predicted highest high tide for 2016 is 9.4 m and the lowest low tide is -0.4 m, giving a maximum tidal range of 9.8 m. Typically, the tidal range is between 6 and 9 m. In 2015, the highest high tide was 9.4 m and the lowest low tide was -0.3 m, giving a tidal range of 9.6 m. However, storm surges, should they co-occur with the highest high water, could result in higher water levels.

Currents

Collection of local current speed and direction data throughout the water column was carried out between June 29 and August 4, 2016 using a 600-kHz Acoustic Doppler Current Profiler (ADCP) deployed by NSDFA. The current meter could not be deployed at the center of the proposed lease due to the presence of gear and fish. The current meter was located ~ 100 m to the southeast of the original lease boundaries (N44^{o} 39' 03.3" W65^{o} 45' 14.8").

At depths 3 – 10 m above the seafloor, the majority of water flowed towards the NNE, with approximately 39% of all recorded currents travelling between 5 and 25 degrees. The depth-averaged current speed of all recorded profiles at this site was 22.65 cm/s. In depth profiles 3 – 10 m above the seafloor, the maximum recorded speed was 81.0 cm/s occurring 10 m from the bottom. The most frequently observed speeds were between 18 and 24 cm/s near the seafloor (25.3% at 3 m) and 24 and 36 cm/s within the mid water column (18.3% at 10 m). Data obtained from the upper water column did not yield reliable data with less than 75% of the data present; therefore, it was omitted from the analysis. Average current speeds significantly varied with depth, with the cell nearest to the surface having the highest occurrence of currents greater than 80 cm/s.

The maximum current speed observed was 81.0 cm/s while the minimum was 0.2 cm/s (Table 9). The overall mean current speed was 23.9 cm/s but currents in the uppermost cell presented (i.e. 10 m above the seafloor) were considerably faster at 32.8 cm/s. This may have been due to the influence of the wind. Overall, current speeds < 5 cm/s occurred 1.94% of the time. Graphs illustrating the current directions and current speed frequency distributions are located in Appendix A.

Table 9. Current Data Summary Statistics for Rattling Beach

Rattling Beach	Current Speed Statistics						
Depth from Seafloor	**Mean**	**Min**	**Max**	**Mode**	**< 2 cm/s**	**< 5 cm/s**	**Directional Modes**
(m)	(mm/s)	(mm/s)	(mm/s)	(mm/s)	(%)	(%)	(Cardinal or Intercardinal)
3	198.1	24	516	183	0	0.83	NNE
4	213	4	559	191	0	1.04	NNE
5	225	4	601	203	0	1.71	NNE
6	232	4	644	117	0	2.14	NNE
7	240	2	675	171	0	2.3	NNE
8	263.3	3	715	295	0	2.01	NNE
9	292.4	9	751	407	0	3.56	NNE
10	327.9	7	810	331	0	1.94	NNE
Overall	**238.7**	**7**	**659**	**237**	**0**	**1.94**	**NNE**

Chemical Oceanography

Oxygen

Long-term, monthly, average, dissolved-oxygen data presented in Figure 33 are from the Fundy Prince 5 Station located at 44.93ºN 66.85ºW (Fisheries and Oceans 2016b). This was the closest monitoring station to the proposed location and was therefore chosen over alternate monitoring stations as a source of oceanographic data. From this averaged data, the lowest dissolved oxygen appeared in September - November, while the highest concentrations of dissolved oxygen were present in March - May.

Dissolved oxygen concentrations at the Rattling Beach aquaculture site were collected and reported by KCS staff during the site operations. The minimum DO value recorded was approximately 0 mg/L; however, an equipment malfunction is suspected for this date making the lowest, reliable concentration 7.41 mg/L. The maximum concentration recorded was approximately 13.4 mg/L. For adult salmon, the lower limit of DO for optimal growth is generally accepted as 6 mg/L. The Rattling site typically displays DO values well above this threshold. Figure 34 illustrates the historical, DO trends from the Rattling Beach site.

Figure 33. Dissolved Oxygen Concentrations as Measured at the Prince 5 Station
Note: Graph was obtained from the Fisheries and Oceans Canada (2016b), Marine Environmental Data Services Website

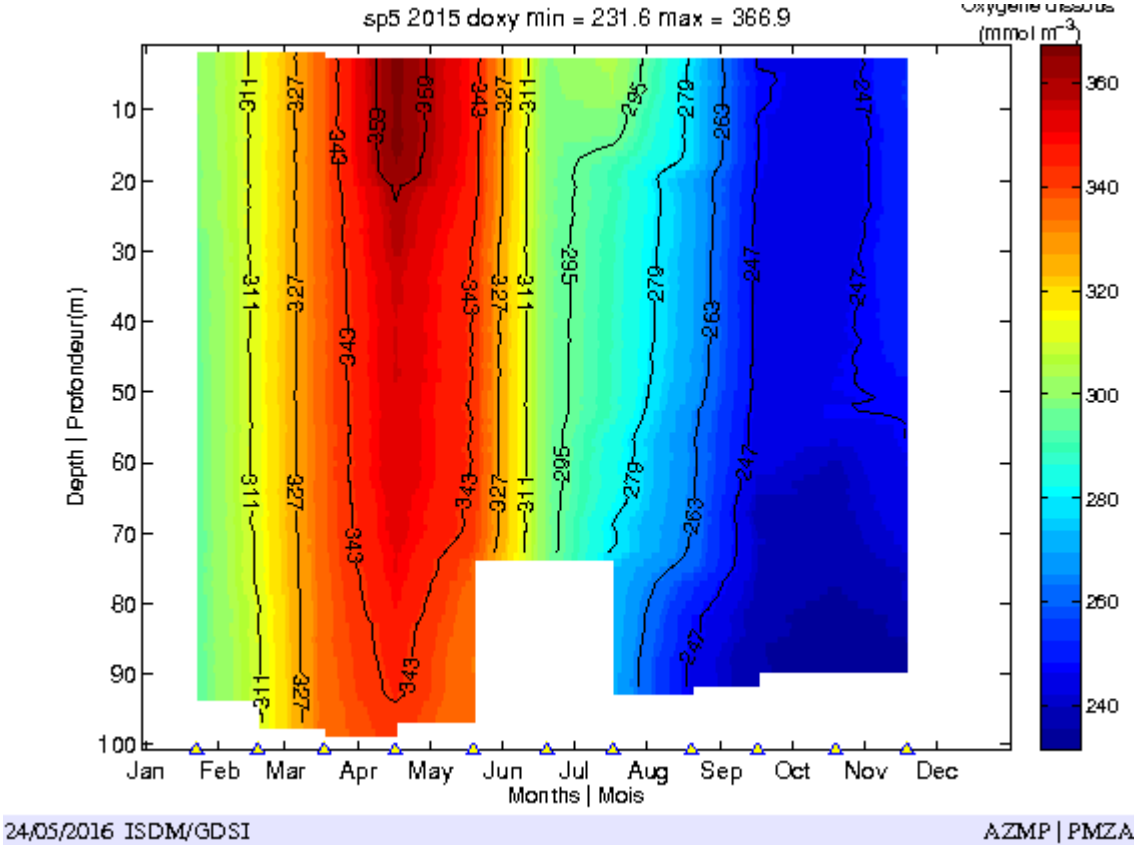
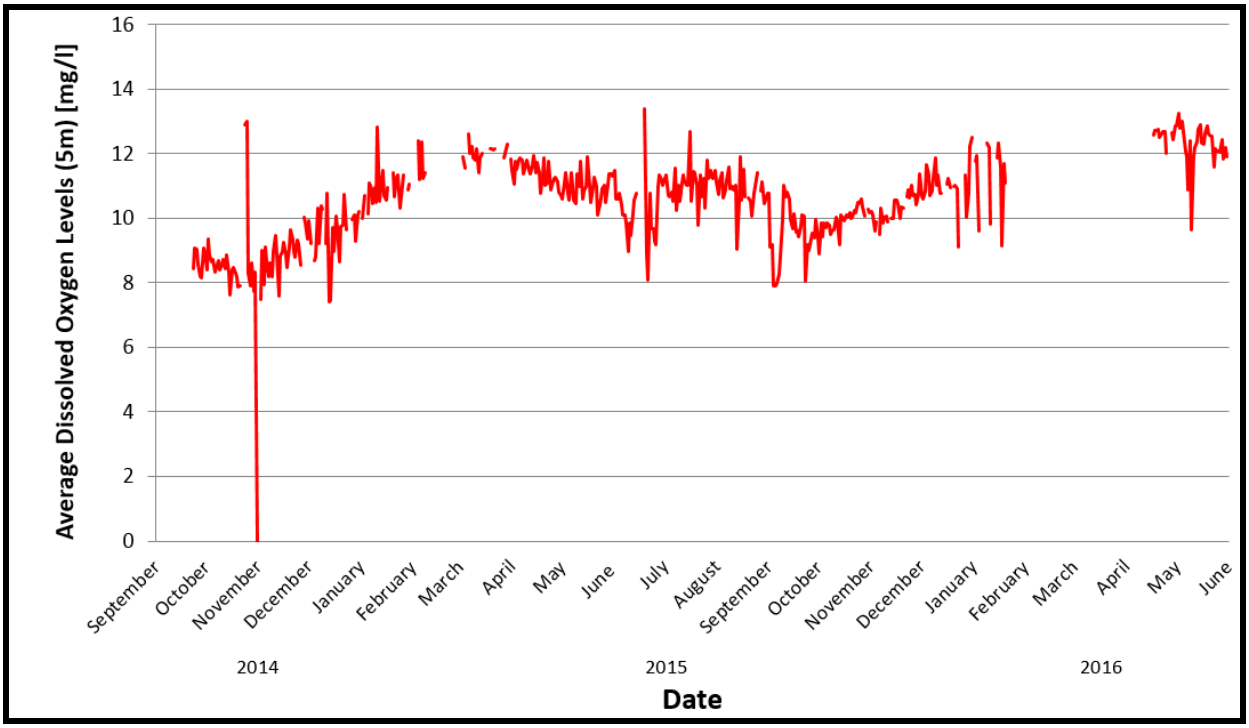


Figure 34. Dissolved Oxygen Levels as Measured at the Rattling Beach Aquaculture Site #1039



Biological Oceanography

Harmful Algal Blooms

The occurrence of a harmful algal bloom (HAB) is sometimes unpredictable, but the effects on fish farms may be successfully avoided or managed by a variety of means. The Harmful Algae Monitoring Program (HAMP) was established in 1999 in order to cope with the effects of harmful algae throughout the aquaculture industry (Fisheries and Oceans Canada 2013b). Microscopic surveillance of water samples from finfish farms has produced a series of data, aiding in the prediction of algal blooms in the vicinity of the aquaculture cages (Fisheries and Oceans Canada 2013b). Research continues to be conducted on algal blooms in order to better understand and predict HABs (Fisheries and Oceans Canada 2013b). This research serves to identify the species of algae, cultivate it within a lab environment, and document the trends of the blooms (Fisheries and Oceans Canada 2013b).

There are five general strategies that function to intervene with HABs; mechanical, biological, chemical, genetic, and environmental control (NCBI 2009). Mechanical control involves the removal of HAB species by dispersing clay over the water surface (NCBI 2009). The clay and algae aggregate and settle to the seafloor (NCBI 2009). Biological control consists of using various pathogens or species of fauna to destroy or filter the harmful algae out of the surrounding water (NCBI 2009). Although biological control is considered, there are many logistical issues with the release of another species into a foreign area, and it is rarely used (NCBI 2009). Chemical control involves the use of chemicals or minerals toxic to the HAB

(NCBI 2009). Although copper sulphate has been used in the past, chemical interventions are generally dismissed as they would require extensive research to identify a chemical or mineral that would actively keep algae out of the finfish cages while not causing a widespread effect on the environment and all other organisms in the area (NCBI 2009). Genetic control involves the genetic engineering of exotic or newly introduced species in order to adjust the environmental tolerances, reproduction rates, or other aspects of a pest within the area of the aquaculture sites (NCBI 2009). Issues with this form of control are similar to those of the biological control in that the negative impacts of the integrated species may worsen the condition of the aquaculture site (NCBI 2009). For these reasons, the use of genetic control is not likely to gain approval (NCBI 2009). The environmental manipulation of the area in which a HAB occurs involves the modification of either the physical or chemical aspects of the environment (NCBI 2009). This may include the alteration of nutrient levels in the water with the use of pollution control or the alteration of the physical properties in the area such as water circulation (NCBI 2009).

It may be possible to detect the beginning of a HAB event by monitoring fish behaviour. In some cases, fish will reduce or stop feeding, be less energetic, orient themselves peculiarly in the water column (such as swimming near the cage bottom), or exhibit odd swimming behaviour and lack of equilibrium (Rensel and Whyte 2003). Cage site staff will report any odd behaviour of the salmon to KCS management.

Due to the relatively shallow water, mechanical and physical measures of bloom intervention are not feasible at the marine site. KCS will instead monitor water samples on a regular basis during the months harmful algae may be present (typically mid-April until November). Should concentrations of harmful algal cells become a cause for concern, feeding activities would cease in order to allow the fish to rest and retreat to the depths of the cages away from surface-oriented blooms.

e. Other Users of the Public Waters

Geology

In the area of Annapolis Basin, the bedrock geology consists of alluvial and lacustrine clastic sedimentary rocks and local basalt, granite, syenite, gabbro, and minor felsic volcanic rocks of the Newark Supergroup (Hibbard et al. 2006). Closest to the Rattling Beach marine site are the North Mountain (basalt) and Blomidon (lacustrine playa, sandflat, and deltaic clastic rocks, minor aeolian sandstone and conglomaerate) formations (Keppie 2000).

Archaeology

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 examined by Nova Scotia Communities, Culture, and Heritage (CCH) (S. Weseloh-McKeane, pers. com.). In general, most cage-based aquaculture sites, like Rattling Beach, cause minimal damage to submerged archaeological resources as the anchors are the only portion of the site in contact with the seafloor.

Shipwrecks

Several shipwrecks may be in the area of the proposed site (Maritime Museum of the Atlantic 2016); however, detailed locations or coordinates are not available. Estimates of some of the wreck locations are shown on Figure 2. A number of shipwrecks reported in the Annapolis and Digby areas took place within Annapolis Basin. These include, but are not limited to, the *Clarence A Shafner*, the *James Muir*, the *Lizzie Wharton*, the *Lorne B. Snow*, the *Marie Delphin*, the *Martha D. Mclain*, the *Meldon G*., the *Ora*, the *Ronald Eugene*, the *Robert Leonard*, the *Singer*, and the *Wanda Elaine*.

The *Clarence A. Shafner* was stranded in Annapolis basin due to broken moorings in 1902 while on a voyage to Cuba. The schooner was considered a partial loss. In 1874, a barque, known as the *James Muir*, was stranded in Pond Cove of Bear Island in Annapolis Basin due to stress of weather; the ship was declared a partial loss, with approximately $4500 of cargo lost. The schooner, *Lizzie Warton*, was in Annapolis Basin when it caught fire in 1901. The disaster resulted in the total loss of the ship along with $800 worth of cargo. While out on a fishing voyage in 1914, the *Lorne B. Snow* was stranded in Annapolis Basin by unknown causes. The event led to the partial loss of the schooner. Similarly, the *Marie Delphin* was stranded at Hardy's Point in Annapolis Basin in 1894 for unknown reasons. The event led to the total loss of the schooner. The wreck of the *Martha D Mclain* at Sulis Point of Annapolis Basin was induced by stress of weather in 1899; the schooner was on a fishing voyage when it suffered a total loss. In 1968, the *Meldon G.* foundered in Annapolis Basin resulting in the total loss of the ship. The brigantine, *Ora*, was wrecked in 1902 in Annapolis Basin due to stress of weather; the result was a partial loss. The *Ronald Eugene* was stranded at Man O' War Rock in Annapolis Basin in 1948 due to unknown causes resulting in the total loss of the ship. Also due to unknown causes, the *Robert Leonard* was stranded in Annapolis Basin in 1879; the event was deemed a partial loss. The fishing vessel, *Singer*, was lost due to heavy seas and stress of weather when it smashed ashore in Annapolis Basin in 1972. Also in 1972, the engine room of the *Wanda Elaine* caught fire while the ship was in Annapolis Basin, resulting in the wreckage and total loss of the fishing vessel.

Recreation and Tourism

The Annapolis Basin area offers an extensive list of recreational and tourism activities. Perhaps the most well-known tourist attraction in the area of Annapolis Basin is whale watching tours. Opportunities are offered by Brier Island Whale Watching and Seabird Cruises, Ocean Explorations, Mariner Cruises Whale Watching and Seabird Tour, Gael Tours, Dockside Whale Watching & Charters, and Fundy Adventures. The area of Annapolis Basin is also known to have tourism activities such as yachting out of the Royal Western Nova Scotia Yacht Club & Marina, located in Digby (~2.7 km from proposed site). Many different provincial and historic parks are around Annapolis Basin. Provincial Parks in the area include the Central Grove Provincial Park located on Digby neck and the Annapolis Basin Look Off in Digby (~1.2 km from proposed site). Historic sites include the Port Royal Habitation and National Historic Site, the Forte Anne Historic Site, and the Annapolis Royal Historic Gardens. Kayaking and canoeing rentals and routes for the Annapolis River, Bear River, and other rivers in the area are offered by Canoe Annapolis County. Private kayak tours are also offered throughout Annapolis Basin by Kayak Annapolis Royal and Dockside Kayak Rentals. There are a number

of lighthouses in the areas of Annapolis and Digby county, including the Prim Point Lighthouse in Victoria Park (~ 4.5 km from proposed site), the Bear River Lighthouse in Smiths Cove (~ 6.2 km from proposed site), and the lighthouse located in Gilberts Cove. Camping areas within Annapolis and Digby Counties are provided by Digby Campground and Fun Park, Fundy Trail Campground and Cottages in Delaps Cove, and Jaggers Point Ocean Front Campground in Smiths Cove (~ 6.2 km from proposed site). Public beaches in the general vicinity of the Annapolis Basin include Sandy Cove Beach, a well-known tourist destination, and Smiths Cove, where clam digging is offered by the team of Fundy Adventures (~ 6.5 km from proposed site). Walking trails can be found in the Historical Association of Annapolis Royal's Historic Walking Trails. Hiking opportunities are also available on a large trail extending from the tail of Bear River in Smiths Cove to Harbourview (~ 6.6 km from proposed site). Many tourists come to enjoy freshly caught local seafood, which is offered at a number of restaurants around Annapolis Basin. Some of the more famous restaurants include Restaurant Composé, in Annapolis Royal, and Shore Road Seafood, in Hillsburn.

Annapolis Royal offers many different places to stay the night, including the Croft House Bed and Breakfast, The Garrison House, the Hillside House Inn, the Annapolis Royal Inn, At the Turret Bed & Breakfast, The Bailey House, and The Queen Anne Inn. Other Bed and Breakfasts in the area of Annapolis Basin include the Seafaring Maiden near Granville Ferry, the Harbour View Inn in Smiths Cove, Headley House by the Sea in Smiths Cove, and Ocean Hillside Bed and Breakfast in Digby. Figure 35 illustrates a number of tourist and recreational attractions in the area of the Rattling Beach aquaculture site.

Figure 35. Tourism and Recreation

Marine Protected Areas

As defined by DFO, marine protected areas (MPAs) are geographic areas dedicated to and managed for the long-term conservation of nature. Fisheries and Oceans Canada establishes and manages MPAs under the *Oceans Act* in order to conserve numerous aspects of the areas. The aspects 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 Minister's mandate of scientific research (Fisheries and Oceans Canada 2016d).

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

The Sable Gully is a submarine canyon formed by glacial ice erosion over thousands of years. Surrounding the Sable Gully is an important and highly functional area, in which a number of commercial fisheries are supported, and it is of great importance to the oil and gas industry. The MPA is a crucial habitat to a number of 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 it 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 DFO 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 DFO, with the help of the management 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.

Significance of Proposed Area to SARA

There are a number of 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 10 - 13 list those species, their status, and their occurrence in the study area.

Table 10. 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 (Nova Scotia Canada 2016)

COMMON NAME	SCIENTIFIC NAME	COMMENTS
Endangered Species		
Atlantic whitefish	*Coregonus huntsmani*	-Last COSEWIC designation (Nov 2010): endangered -Historically found only in the Tusket and Petite Rivière watersheds, and their adjacent estuaries and bays, but was extirpated from the Tusket River system sometime after 1982 (Fisheries and Oceans Canada 2006) -Poor damming practices and insufficient fish ladders have led to declines (Fisheries and Oceans Canada 2010) -Protected under the *Species at Risk Act* (Schedule 1)
Blue whale	*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*
Eskimo curlew	*Numenius borealis*	-Last COSEWIC status (Nov 2009): endangered -May be extinct -Occasionally staged in the Maritimes; diet included coastal shrimp-like invertebrates -Protected under the *Species at Risk Act* (Schedule 1) and the *Migratory Birds Convention Act*
Leatherback sea turtle (Atlantic population)	*Dermochelys coriacea*	-Last COSEWIC designation (May 2012): endangered -Is the most common sea turtle recorded in Nova Scotian coastal waters (NS Museum 2016) -Atlantic Canada supports one of the largest seasonal foraging populations of leatherbacks in the Atlantic (NOAA 2016b) -The most common sea turtle recorded in Nova Scotian coastal waters (NS Museum)

Little brown myotis	*Myotis lucifugus*	-Last COSEWIC designation (Nov 2013): endangered -Protected under the federal *Species at Risk Act* (Schedule 1) -Largest threat to the bat is white-nose syndrome, a fungal infection
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 under the *Fisheries Act* -Not known to frequent the study area
Northern myotis	*Myotis septentrionalis*	-Last COSEWIC designation: (Nov 2013): endangered -Protected under the federal *Species at Risk Act* (Schedule 1) -Largest threat to the bat is white-nose syndrome, a fungal infection
Pink Coreopsis	*Coreopsis rosea*	-Last COSEWIC designation (Nov 2012): Endangered -Occurs along the eastern seaboard of United States and southwestern Nova Scotia sites; Salmon Lake, Willson Lake, and Bennetts Lake and Tusket River Valley -Protected under the federal *Species at Risk Act* (Schedule 1) -Protected provincially as an endangered species by the *NS Endangered Species Act*
Piping plover	*Charadrius melodus*	-Last COSEWIC designation (Nov 2013): endangered -Nests above high water mark on exposed gravel or sandy beaches -On the Atlantic coast they often nest in association with small cobble and other small beach debris on ocean beaches, sand spits or barrier beaches; they also forage for food on these beaches -Protected under the federal *Species at Risk Act* (Schedule 1), the federal *Migratory Birds Convention Act* and the *Nova Scotia Endangered Species Act* -No known beaches in the vicinity of the site (BSC 2014)

Plymouth Gentian	*Sabatia kennedyana*	-Last COSEWIC designation (Nov 2012); Endangered -Occurs in Massachusetts, North Carolina, South Caroline, Rhode Island, and the shorelines of eight lakes with Nova Scotia`s Tusket River Valley and the Annis River system -Largest population survives within the Tusket River Nature Preserve -Protected under the federal *Species at Risk Act* (Schedule 1) -Protected provincially as an endangered species by the *NS Endangered Species Act*
Red knot rufa	*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 -Protected under the federal *Species at Risk Act* (Schedule 1) and the *Nova Scotia Endangered Species Act* -Proximity to the study area is unknown
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* -Not known to occur near the study area (BSC 2014)
Tri-coloured bat	*Perimyotis subflavus*	-Last COSEWIC designation (Nov 2013): endangered -One of the smallest bats in North America -Declines of more than 75% in Eastern Canada; expected to continue to decline due to fungal infections (COSEWIC 2013a) -Largest threat to the bat is white-nose syndrome, a fungal infection -Protected under the federal *Species a Risk Act*

Vole ears lichen	*Erioderma mollissimum*	-Last COSEWIC designation (Nov 2009): endangered -It inhabits cool, humid, and coastal conifer forests dominated by balsam fir (COSEWIC 2009b) -Protected under the federal *Species at Risk Act* (Schedule 1) -Not known to be in the project area
White shark	*Carcharodon carcharias*	-Last COSEWIC designation (Apr 2006): 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 11. 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 (Nova Scotia Canada 2016)

COMMON NAME	SCIENTIFIC NAME	COMMENTS
Threatened Species		
Canada warbler	*Wilsonia canadensis*	-Last COSEWIC designation (Apr 2008): threatened -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) and the *Migratory Birds Convention Act, 1994* -Protected under *Canada National Parks* Act -Confirmed sightings throughout the Annapolis Basin area (BSC 2014)

Chimney swift	*Chaetura pelagica*	-Last COSEWIC status (Apr 2007): 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* -Confirmed sightings throughout the Annapolis Basin area (BSC 2014)
Common nighthawk	*Chordeiles minor*	-Last COSEWIC designation (Apr 2007): threatened -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 river banks; 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* -Confirmed sightings ~ 4 km south of the site (BSC 2014)
Eastern whip-poor-will	*Caprimulgus vociferus*	-Last COSEWIC designation (Apr 2009): Threatened -Prefers to nest in semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances -Protected under the federal *Species at Risk Act* (Schedule 1) and the *Migratory Birds Convention Act, 1994* -No known sightings in the vicinity of the proposed project (BSC 2014)
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 also brackish and saline swamps -Protected by the *Canada National Parks* Act -Protected under the federal *Species at Risk Act* and the *Migratory Birds Convention Act, 1994* -No known sightings in the vicinity of the proposed project (BSC 2014)

Olive-sided flycatcher	*Contopus cooperi*	-Last COSEWIC designation (Nov 2007): Threatened -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* -Confirmed sightings ~ 4 km south of the site (BSC 2014)
Sweet Pepperbush	*Clethra alnifolia*	-Last COSEWIC designation (May 2014): Threatened -Ranges from Texas and Florida to northern Maine, along with southwestern Nova Scotia in Belliveau Lake of Digby County, Louis Lake and the Canoe Lakes of Yarmouth County, and Mill Lake, Mudflat Lake, and Mary Lake of Annapolis County -Occurs on exposed, gravel ridges created by ice movement on lake margins -Protected by federal *Species at Risk Act* (Schedule 1) -Protected as a vulnerable species by the *Nova Scotia Endangered Species Act*
Wood turtle	*Glyptemys insculpta*	-Last COSWIC designation (Nov 2007): Threatened -Associated with rivers and streams with sandy or gravely-sandy bottoms and prefers clear, meandering watercourses with a moderate current -Habitats used less frequently include bogs, marshy pastures, beaver ponds, shrubby cover, meadows, coniferous forests, mixed forests, hay and agricultural fields, and pastures -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 II) -Proximity to the proposed project is unknown

Table 12. 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 (Nova Scotia Canada 2016)

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 (BSC 2014)
Eastern lilaeopsis	*Lilaeopsis chinensis*	-Last COSEWIC designation (May 2004): special concern -Grows in long, narrow estuaries at the mouths of large rivers that are separated from the open ocean; is a plant of the intertidal zone and grows on gently sloping mudflats, often between large shoreline boulders -Protected under the *Species at Risk Act* (Schedule 1) and the *Nova Scotia Endangered Species Act* -Not known to be present in the study area
Fin whale	*Balaenoptera physalus*	-Last COSEWIC designation (May 2005): 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, Dunravan Bog, and Digby Neck; population on Brier Island has been extirpated -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) -Protected as a vulnerable species by the *Nova Scotia Endangered Species Act*
Harbour porpoise	*Phocoena phocoena*	-Last COSEWIC designation (Apr 2006): Special concern -Sometimes frequents bays and harbours, particularly during summer -Protected from certain activities under the Marine Mammal Regulations of the *Fisheries Act* -Protected by *Species at Risk Act* Schedule 2
Harlequin duck	*Histrionicus histrionicus*	-Last COSEWIC designation (May 2013): special concern -Inhabits rocky coastal marine areas the majority of the year, 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* -No known sightings in the vicinity of the site
Humpback whale	*Megaptera novaeangliae*	-Last COSEWIC designation (May 2003): not at risk -Humpback whales form distinct populations and live close to coastlines -SARA schedule 3
Long's Bulrush	*Scirpus longii*	-Last COSEWIC designation (Apr 1994): Special concern -Prefers peat wetlands where competition from shrubs is minimal. Favoured wetlands include peaty shores of high watershed lakes, small bogs associated with lakes or rivers, still-water meadows, and inland fens -Protected under the *Nova Scotia Endangered Species Act* (Schedule 3)

Monarch butterfly	*Danaus plexippus*	-Last COSEWIC status (Apr 2010): special concern -Exist primarily wherever milkweed (*Asclepias*) and wildflowers (such as goldenrod, asters, and purple loosestrife) exist -Protected under the federal *Species at Risk Act* (Schedule 1) -Protected by the *Canada National Parks* Act
Redroot	*Lachnanthes caroliniana*	-Last COSEWIC designation (Nov 2009): Special concern -Occurs along the Atlantic coast from Nova Scotia to Mississippi -Fewer than 5000 individuals in Canada -Inhabits cobble beaches with peat or gravel; distribution depends on water level variations -Two populations in Nova Scotia: Ponhook and Molega Lake -Protected by the federal *Species at Risk Act* (Schedule 1) -Species not present within the vicinity of the aquaculture site
Rusty blackbird	*Euphagus carolinus*	-Last COSEWIC status (Apr 2006): 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) -Confirmed sightings near the aquaculture site (BSC 2014)
Short-eared owl	*Asio flammeus*	-Last COSEWIC designation (Apr 2008): Special concern -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 -Confirmed sightings ~ 4 km south of the proposed site
Snapping turtle	*Chelydra serpentine*	-Last COSEWIC designation (Nov 2008): Special concern -The species is widespread from Nova Scotia to southeastern Saskatchewan -Observed in shallow water in almost every kind of freshwater habitat; preferred habitat of the species is characterised by slow-moving water with a soft

		mud bottom and dense aquatic vegetation -Protected under the *Species at Risk Act* (Schedule 1) -Protected under the *Canada National Parks* Act -Unlikely to be affected by the proposed project
Sowerby's beaked whale	*Mesoplodon bidens*	-Last COSEWIC designation (Nov 2006): 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*
Tubercled Spikerush	*Eleocharis tuberculosa*	-Last COSEWIC designation (Apr 2010): Special concern -Inhabits coastal plains along the Atlantic, ranging from Nova Scotia down to Florida and westward along the coast of the Gulf of Mexico -Populations within Nova Scotia occur in an estimated 3000 to 4000 clumps, with 60-70% of them occurring around a single lake -Typically occur in hot dry areas within sandy or stone terrain or on gravel or peat layers floating or pushed up onto the shore by ice -Protected federally by the *Species at Risk Act* (Schedule 1)
Water pennywort	*Hydrocotyle umbellate*	-Last COSEWIC designation (May 2014): Special concern -Only occur on small areas of two lakes located in southwestern Nova Scotia (Kejimkujijk National Park) -Protected by the federal *Species at Risk Act* (Schedule 1)

Table 13. 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 (Nova Scotia Canada 2016)

COMMON NAME	SCIENTIFIC NAME	COMMENTS
Species with no SARA status		
American eel	*Anguilla rostrate*	-Last COSEWIC designation (May 2012): threatened -Canadian range includes all fresh, estuarine, and coastal marine waters that are accessible to the Atlantic Ocean -Blockage of migratory streams is a major threat to the species
American plaice	*Hippoglossoides platessoides*	-Last COSEWIC designation (Apr 2009b): threatened
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 (COSEWIC 2011a)
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 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 (ASF 2016a) -The Annapolis, Round Hill, Moose, Bear, and Acacia Brook Rivers are listed as present salmon rivers and the Lequille as extirpated (ASF 2016b)
Atlantic sturgeon (Maritime Populations)	*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 (COSEWIC 2011b)

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 Coast of New Brunswick and Nova Scotia -Bird Studies Canada records indicate bank swallows have been observed around Annapolis Basin (BSC 2014)
Barn swallow	*Hirundo rustica*	-Last COSEWIC designation (May 2011): threatened -Protected under the *Migratory Birds Convention Act, 1994* -Bird Studies Canada records indicate confirmed occurrences of barn swallows on the shore nearest the aquaculture site (BSC 2014)
Basking Shark (Atlantic population)	*Cetorhinus maximus*	-Last COSEWIC designation (Nov 2009): special concern -Uses coastal, temperate waters (COSEWIC 2009c) -Mortality caused by fishing by-catch and boat strikes are cited as the major threats to the species (COSEWIC 2009d)
Blue felt lichen	*Degelia plumbea*	-Last COSEWIC designation (Nov 2010): special concern -Occurs in coastal sub-oceanic areas (COSEWIC 2010a) -Threatened by activities changing relative humidity of forest, airborne pollutants, and poor forestry practices in which precautions have not been made (Nova Scotia Canada 2016)
Blue shark	*Prionace glauca*	-Last COSEWIC designation (Apr 2006): special concern -In Atlantic Canada, they are regularly found in almost all waters but are most often encountered offshore; fishing by-catch is the largest threat (COSEWIC 2006)
Eastern wood peewee	*Contopus virens*	-Last COSEWIC designation (Nov 2012): special concern - Bird Studies Canada (2014) considers occurrences of the bird in the area to be possible
Killer whale (Northwest Atlantic population)	*Orcinus orca*	-Last COSEWIC designation (Nov 2008): special concern -Northwest Atlantic distribution includes Nova Scotian waters (COSEWIC 2008)

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 (COSEWIC 2010b)
Macropis cuckoo bee	*Epeoloides pilosulus*	-Last COSEWIC designation (May 2011): endangered -Found in habitats supporting both macropis bees (Melittidae) and their food plant, yellow loosestrife (*Lysimachia*), which grows in swampy or moist habitats; two males found in Nova Scotia in 2002 (COSEWIC 2011c) -Greatest threats include habitat loss, and use of insecticides (Nova Scotia Canada 2016) -Thought to be extinct until a small population was found in Annapolis Valley, lack of relocation suggests near extinction (Nova Scotia Canada 2016)
Moose (NS mainland population)	*Alces alces americana*	-Last COSEWIC designation: none -This species is protected under the *Nova Scotia Endangered Species Act* (Nova Scotia Canada 2016)
Peregrine Falcon *anatum* subspecies	*Falco peregrinus anatum*	-Last COSEWIC designation (Apr 2007): non-active -Prefer open habitats, such as sea coasts, for hunting -Protected under the *Nova Scotia Endangered Species Act* -Protected by the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (Appendix I)
Porbeagle shark	*Lamna nasus*	-Last COSEWIC designation (May 2014): endangered -Can be found from the coast to the open sea migrating annually to further inshore; seasonally ranging from the Scotian shelf and Bay of Fundy to Newfoundland on the continental shelf occasionally close to shore -Is 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 still continues -Currently no fisheries management measures for this species

Shortfin mako (Atlantic population)	*Isurus oxyrinchus*	-Last COSEWIC designation (Apr 2006): threatened -Found in both inshore and offshore waters -COSEWIC identified fishing, pelagic long-lining in particular, as being the most significant threat to the species; 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 (Natanson et al. 2007) -By-catch mortality contributes to population decline (Natanson et al. 2007) -No direct fisheries for this species, however captured as by-catch in fisheries directed towards groundfish (Fisheries and Oceans Canada 2015d) -Population of the Laurentian-Scotian has accounted for 90% of the smooth skates in Canada, while covering 70% of the Canadian smooth skate range (Fisheries and Oceans Canada 2015d) -Area of abundance along the Scotian Shelf has drastically declined since 1970 (Fisheries and Oceans Canada 2015d)
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 (BIO 2015a) -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 (COSEWIC 2010c) -Target of direct fisheries in Atlantic Canada (Fisheries and Oceans Canada 2015)
Thorny skate	*Amblyraja radiata*	-Last COSEWIC designation (May 2012): special concern -One of the most common skates in the Northwest Atlantic (BIO 2015b) -Both a target of directed fisheries and caught as by-catch, although directed fisheries along the Scotian Shelf stopped in 2005 (BIO 2015b) -Regarded as over fished and landing of this species is prohibited throughout the Gulf of Maine (BIO 2015b)

White hake	*Urophycis tenuis*	-Last COSEWIC designation (Nov 2013): threatened -Adjust their depth distribution to find temperatures in the range of 4 - 8°C (COSEWIC 2013b)
Winter skate (Georges Bank-Western Scotian Shelf-Bay of Fundy populations	*Leucoraja ocellata*	-Last COSEWIC designation (May 2015): special concern -Estimated to have declined by 90% since 1970, now at a historic low (IUCN 2009) -Caught as by-catch in groundfish targeting fisheries (IUCN 2009) -Bottom-dwelling species usually found on sand and gravel and at depths less than 111 m (COSEWIC 2005) -Landings under quota control on the Scotian Shelf (IUCN 2009)
Wood thrush	*Hylocichla mustelina*	-Last COSEWIC designation (Nov 2012): threatened -Not known to occur within 5 km of the project area (BSC 2014)
Wrinkled shingle lichen	*Pannaria lurida*	-Last COSEWIC designation (Apr 2016): threatened -Proximity to proposed project unknown
Yellow-banded bumble bee	*Bombus terricola*	-Last COSEWIC designation (May 2015): special concern -Has been collected over most of NS (COSEWIC 2015)

Critical Habitat and Mitigation Plans

Atlantic Whitefish

Critical habitat was not identified in the *Recovery Strategy for the Atlantic Whitefish (Coregonus huntsmani) in Canada* (Fisheries and Oceans Canada 2016e). Atlantic whitefish were known to historically occur in the Tusket and Petite Rivers, but they no longer appear to exist outside the Petite Rivière watershed (Fisheries and Oceans Canada 2016e). The Hebb, Milipsigate, and Minamkeak lakes are the only known areas where full, life-cycle closure is achieved. Species survival, and also recovery, is therefore completely dependent on the continued viability of this population whose only area of occupancy is a semi-natural lake habitat.

Critical habitat is described in the 2016 Department of Fisheries and Oceans Amended Recovery Strategy for the Atlantic Whitefish *(Coregonus huntsmani)* in Canada, in which the critical habitat is defined as the substrate within the three Petite Lakes along with any connections between them and the ocean. The total combined area consists of approximately 16 km^2, including the three dams and their structures of Hebb, Milipsigate, and Minamkeak Lakes (Fisheries and Oceans Canada 2016e). The Schedule of Studies provided within the *Species at Risk Act* Action Plan for the Atlantic Whitefish *(*Coregonus *huntsmani)* in Canada (Fisheries and Oceans Canada 2016e) states that research activities are required to better

identify the critical habitats, including a better understanding of currents throughout the three lakes. Should more information be gained, the section regarding the alteration of critical habitat will be replaced within the Recovery Strategy (Fisheries and Oceans Canada 2016e). Under SARA, critical habitat must be legally protected within 180 days after it is identified in a recovery strategy or action plan.

Mitigation Plan for KCS: Atlantic whitefish are protected under the federal *Species at Risk Act* (Schedule 1). The Nova Scotia Fishery Regulations under the *Fisheries Act* prohibit the taking of Atlantic whitefish from all provincial waters by any method at any time of the year. This species is also protected under the Nova Scotia *Endangered Species Act*. Under this Act, it is prohibited to kill, harm, or collect this species. Neither KCS nor any of its employees will attempt to harm or capture Atlantic whitefish.

Leatherback Sea Turtle

While the state of knowledge on habitat requirements of leatherback turtles in Canadian waters is increasing, it is currently not possible to identify critical habitat for this species (Atlantic Leatherback Turtle Recovery Team 2006).

Mitigation Plan for KCS: 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 given details of the sighting.

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. 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 without loose, free-floating ends in order to prevent entanglements of marine animals.

North Atlantic Right Whales

North Atlantic right whales have occurred throughout history along the coastal waters of the Atlantic, ranging from lower latitudes throughout the fall and winter for breeding, and higher latitudes for feeding during the spring and summer months (NOAA 2016b). Throughout these migrations, areas of high use include Coastal Florida and Georgia, the Great South Channel, Massachusetts Bay, Cape Cod Bay, the Bay of Fundy, and the Scotian Shelf (NOAA 2016b). Much of these areas were listed as critical habitats for the North Atlantic right whale in 1994 before the critical habitats were updated and expanded in January 2016 (NOAA 2016b).

Grand Manan Basin, in the Bay of Fundy, has been identified as critical habitat for right whales (Fisheries and Oceans Canada 2014d). Right whales eat copepods and this area supports the highest concentrations of copepods in the Bay of Fundy (Michaud and Taggart 2011). Roseway Basin, on the southwestern Scotian Shelf, is another important area of right-whale aggregation wherein right whales have been observed feeding and socialising. This area has also been designated as a conservation area for right whales (Fig. 36). Neither of these areas identified as either critical habitat or conservation area for right whales is within 5 km of the proposed aquaculture site. The closest area, Roseway Basin, is greater than 100 km from the proposed aquaculture site.

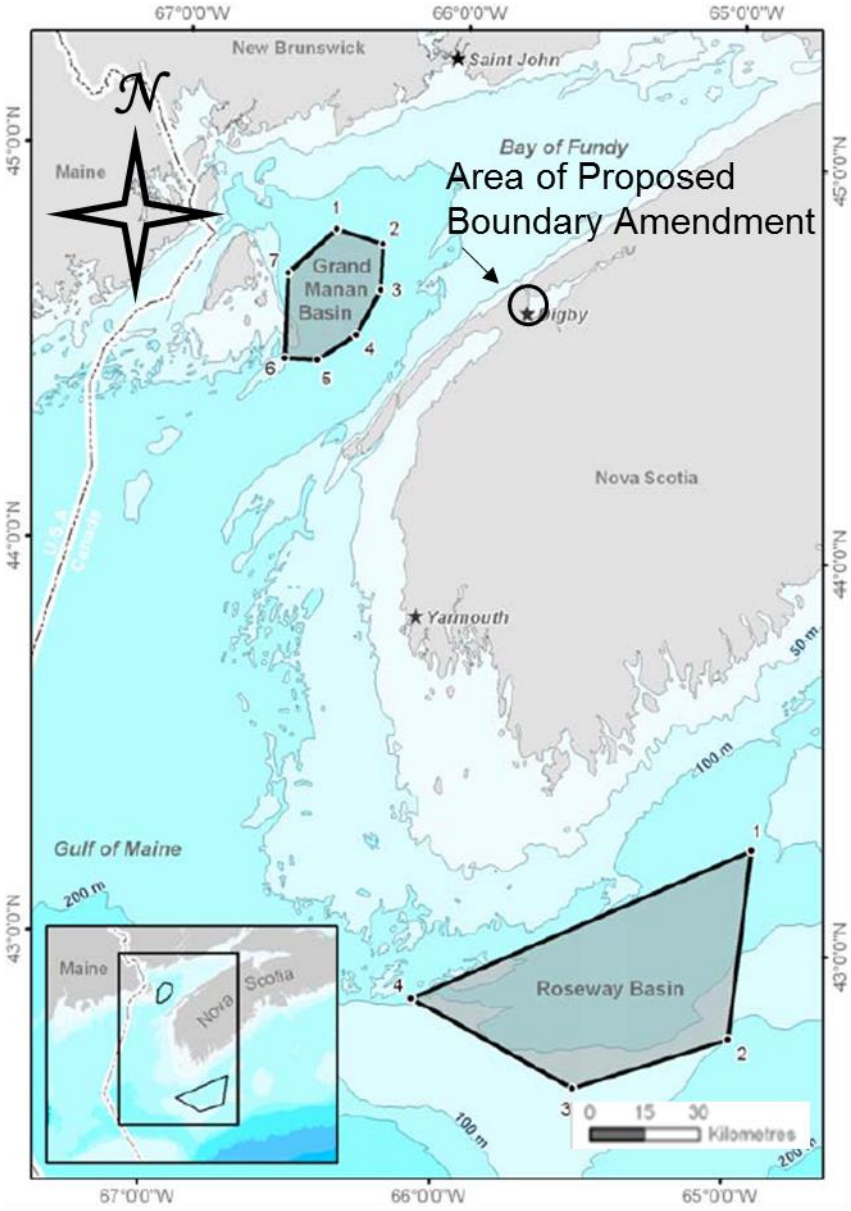
Despite best efforts, vessel strikes are currently the leading cause of right whale deaths (Fisheries and Oceans Canada 2014e). In an effort to protect the North Atlantic right whales, Fisheries and Oceans Canada have dedicated two habitats as conservational areas for right whales (Fisheries and Oceans 2014f). The Roseway Basin and the lower Bay of Fundy area (Grand Manan Basin) are understood to be seasonally high-use habitats for right whales in Canada (Fisheries and Oceans Canada 2014e). Since 2002, the diversion of vessel traffic in the lower Fundy Bay area has been enforced (Fisheries and Oceans Canada 2014e). The other conservation habitat, Roseway Basin, has no known traffic measures through the area (Fisheries and Oceans Canada 2014e). In 2007, the IMO safety committee proposal was accepted by Transport Canada, and Roseway Basin has been declared an “Area to be Avoided”; all traffic is strongly encouraged to find an alternate route (Fisheries and Oceans Canada 2014e).

Mitigation Plan for KCS: Many whales are protected under the Marine Mammals Regulations of the *Fisheries Act*. KCS will comply with these regulations and will not attempt to harvest, kill, or harass any whales that are seen during aquaculture activities. Should a 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 given details of the sighting.

Vessels servicing the site will travel at a maximum speed of 9 knots in order 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 known whale areas (i.e. 9.9 knots).

Figure 36. Boundaries of North Atlantic Right Whale SARA Conservation Area for the Grand Manan Basin

Note: Figure produced by Oceans and Coastal Management Division, DFO and copied from the Species at Risk Public Registry (Fisheries and Oceans Canada 2014d)



Piping Plover

Suitable piping-plover habitat can be approximated as a beach with the following attributes: a gently sloping foredune, wide stretches of beach that afford protection from flooding during high water, sand and/or gravel and/or cobble substrate, and a lack of vegetation (Environment Canada 2012). A number of sites in Nova Scotia have been identified as meeting these criteria. Distribution often fluctuates due to changes in habitat. These changes may include,

but are not limited to, beach width, composition of substrate, feeding areas, vegetation coverage, and human disturbance (COSEWIC 2013c). There is no known piping-plover beach near the proposed aquaculture site.

Mitigation Plan for KCS: The piping plover is protected under the *Species at Risk Act* and the federal *Migratory Birds Convention Act*. KCS employees of the proposed aquaculture site will not kill, harm, or collect adults, young, or eggs of the piping plover.

Red Knot *rufa*

Breeding critical habitat for *rufa* cannot be identified at this time; however, the known stopover habitat attributes required by *rufa* are muddy, sandy, or rocky coastal marine and estuarine habitats with large intertidal flats [e.g. mouths of bays and estuaries, lagoons, salt marshes, sand spits, islets, shoals, sandbars, rocky (limestone) tidal flats (either covered or not covered) with seaweed (e.g. *Fucus* species), and features often associated with natural inlets] and/or inland saline lake habitat (Environment and Climate Change Canada 2016a). Stopover critical habitat is located at Beaverhill Lake, AB; Quill, Last Mountain, Chaplain, Old Wives, and Reed Lakes, SK; the shore of Hudson Bay in and adjacent to Wapusk National Park, MB; sections of shore along Hudson Bay in ON; shorelines of James Bay in ON and QC; sections of the Parc marin du Saguenay–Saint-Laurent and adjacent shores, QC; the Mingan Archipelago National Park Reserve, QC; and the Magdalen Islands, QC (Environment and Climate Change Canada 2016a).

Mitigation Plan for KCS: None of the listed areas are within 5 km of the proposed project. However, KCS will limit beach clean-up activities to only take place during the fall and winter months.

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 populations 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. In 2014, the critical habitat of Roseate Tern became legally protected on federal land and waters of the Sable Island National Park Reserve of Canada.

Mitigation Plan for KCS: None of the identified areas are within 5 km of the proposed project. However, KCS will limit beach clean-up activities to only take place during the fall and winter months and will be scheduled so as not to interfere with the sensitive breeding, nesting, and fledging times (i.e. mid-April to mid-August).

Blue Whale

Fisheries and Oceans Canada have been conducting studies on marine animal health since 1990. Causes of whale death are investigated to assess any potential threats to whale populations in their habitat.

As of February 2016, the blue whale remains listed under the *Species at Risk Act* as an endangered species throughout the Atlantic Ocean (Fisheries and Oceans Canada 2016f). New recovery, management, and action plans have not yet been released by the Species at Risk Public Registry but are expected in the near future (Fisheries and Oceans Canada 2016f). DFO is currently aiding in the recovery of the blue whale by enforcing the legislation. In doing so, DFO also reviews the environmental assessments of offshore petroleum industries to ensure that endangered species are considered (Government of Canada 2016). The *Fisheries Act*, *Species at Risk* Act, *Canadian Environmental Assessment Act*, and *National Energy Board Act* all consider the needs of the blue whale (Government of Canada 2016)

The Marine Animal Response Society (MARS) is working to develop and implement a cetacean sighting network in Nova Scotia and hopes to work with other groups in New Brunswick and Prince Edward Island to implement a Maritime-wide assistance network. The Grand Manan Whale and Seabird Research Station (GMWSRS) is developing a voluntary Code of Conduct for fishermen using fixed fishing gear near large whales in the Bay of Fundy. This will foster stewardship, provide information to prevent entanglement of whales and loss of fishing gear, and will promote education on endangered whales in the coastal communities of New Brunswick and Nova Scotia.

As of 2016, the recovery goal was to have a minimum of 1000 mature individuals within the North Atlantic (Government of Canada 2016). To meet this goal, measures are being taken to monitor the population trends within the Atlantic, to reduce noise and activities within feeding areas, and to gain knowledge of threats to the blue whale's food resources. Also of concern are injuries and mortalities, activities that cause disturbance to the whales, contamination, and other impacts and their effects on populations (Government of Canada 2016).

Mitigation Plan for KCS: Blue whales are protected under the Marine Mammals Regulations of the *Fisheries Act*. KCS will comply with these regulations and will not attempt to harvest, kill, or harass any blue whales (or any other whales, such as right whales) that are seen during aquaculture activities. Should any whale in distress be noted by any of the crew members at the aquaculture site, the Marine Animal Response Society (MARS) will be contacted at 1.866.567.6277 and given details of the sighting.

The Campobello Whale Rescue Team, located on Campobello Island, New Brunswick, specialises in the disentanglement of whales and provides advice through telephone conversations when in need of immediate help (Government of Canada 2016). This team works in close proximity with DFO, offering advice when a distressed or deceased whale is found (Government of Canada 2016). The Whale Release and Stranding Group established in Newfoundland and Labrador report incidents in which whales are injured or deceased (Government of Canada 2016). All documentation and samples are sent to DFO Science in the

surrounding area (Government of Canada 2016). As well as reporting and documenting, a response team aids with entanglements and awareness activities (Government of Canada 2016).

Vessels servicing the site will travel at a maximum speed of 9 knots in order 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 known whale areas (i.e. 9.9 knots).

White Shark

The white shark occurs in both inshore and offshore waters, from the intertidal to the upper continental slope and mesopelagic zone. Known bathymetric range is from just below the surface to just above the bottom to a depth of at least 1,280 m (Bigelow and Schroeder 1948). 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 (Compagno 2001). Critical habitat for this species has not been identified in Canada.

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

Other Significant or Sensitive Habitats

There are a few significant habitats within 5 km of the Rattling Beach site. The whole of Annapolis Basin (9,273.2 ha) has been designated as significant habitat for migratory birds. This area is part of an important migratory route called the Atlantic Flyway which follows the Atlantic Coast of North America and the Appalachians Mountains with end points at the Eastern Artic Islands/the coast of Greenland and the Gulf of Mexico. A salt marsh is present approximately 2.2 km south-southeast of the Rattling Beach site and a number of marshes, bogs/fens, and swamps surround the basin (Fig. 37; NSDNR 2016). The only existing protected area within 5 km of the site is the Annapolis Basin Look-Off Provincial Park, which offers exceptional views of the whole basin on a clear day (Fig. 38).

Figure 37. Significant Habitats
Note: Base map was obtained from NSDNR (2016)

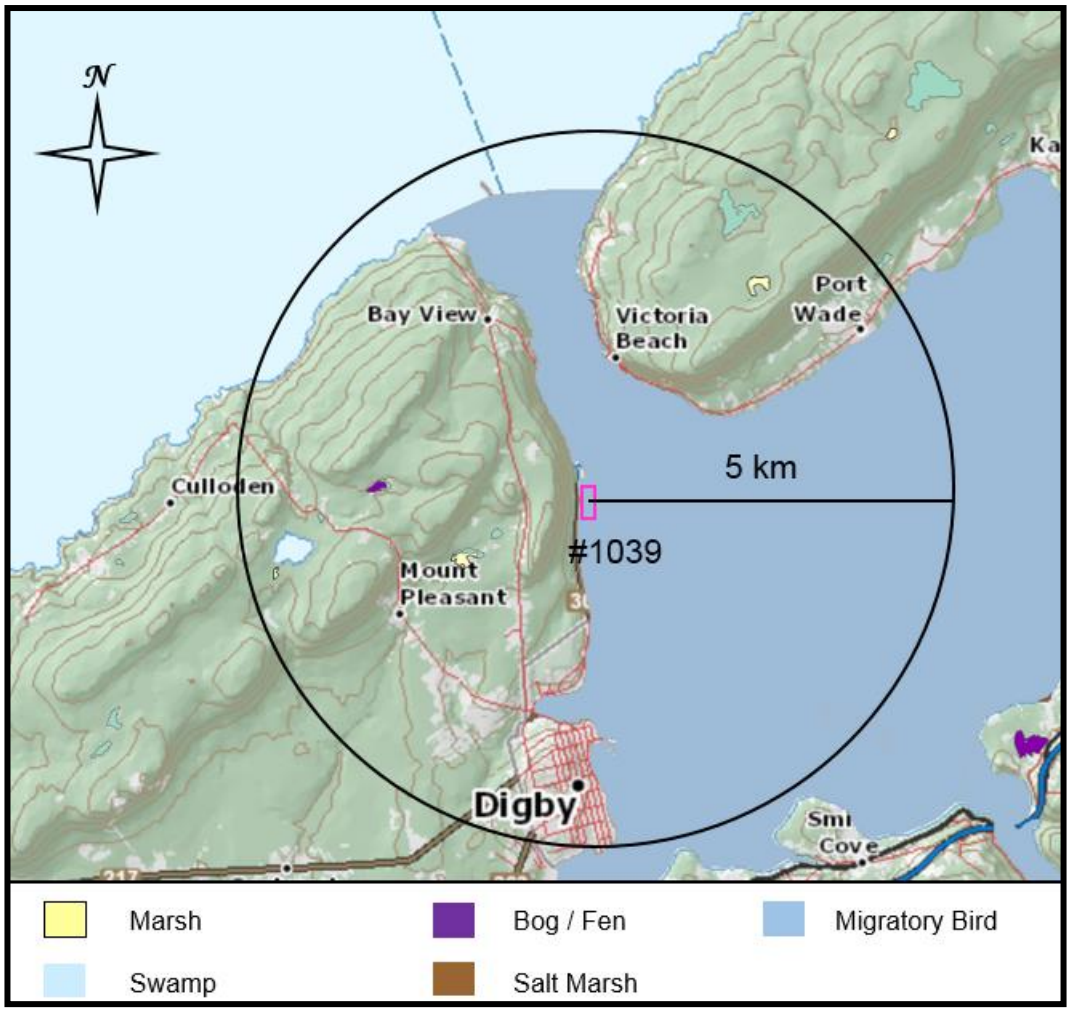
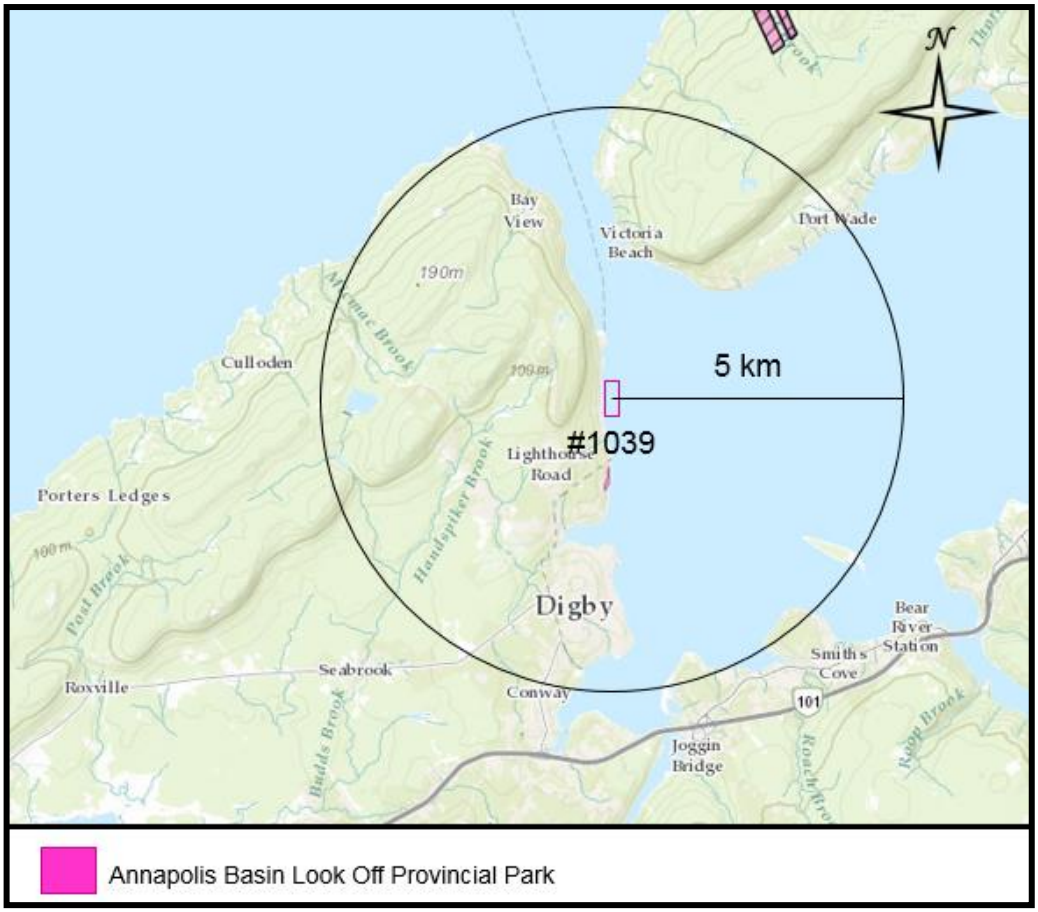


Figure 38. Existing and Pending Protected Areas
Note: Base map was obtained from NS Environment (2016)



Birds

Most of the species of birds in Canada are protected under the *Migratory Birds Convention Act* (Environment and Climate Change Canada 2016b). A number of 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 landbirds, such as eagles, falcons, and hawks.

The location of the proposed farm falls within block 113 of the Canadian Wildlife Service survey areas (Fig. 39). This bird block is not considered an Important Bird Area (IBA) by Bird Studies Canada (2014); however, the Province of Nova Scotia (2016b; Fig. 37) recognises Annapolis Basin as a significant habitat for migratory birds. Surveys, completed between February 2000 and March 2010 by the Canadian Wildlife Service (CWS) and Nova Scotia's Department of Natural Resources, identified several species of birds in blocks 113 (Table 14). Due to funding deficiencies, few surveys have been performed since March 2010 and no

additional data are available for this block (A. Hicks, pers. comm.). The long-tailed duck was the most common bird noted followed by the merganser and scaup.

Mitigation Plan for KCS: To limit any potential disturbance to nesting shorebirds, beach clean-ups for the proposed farm will only take place during the fall and winter months and will be scheduled so as not to interfere with the sensitive breeding, nesting, and fledging times of mid-April to mid-August.

Figure 39. Map of Canadian Wildlife Service Survey Area Block 113

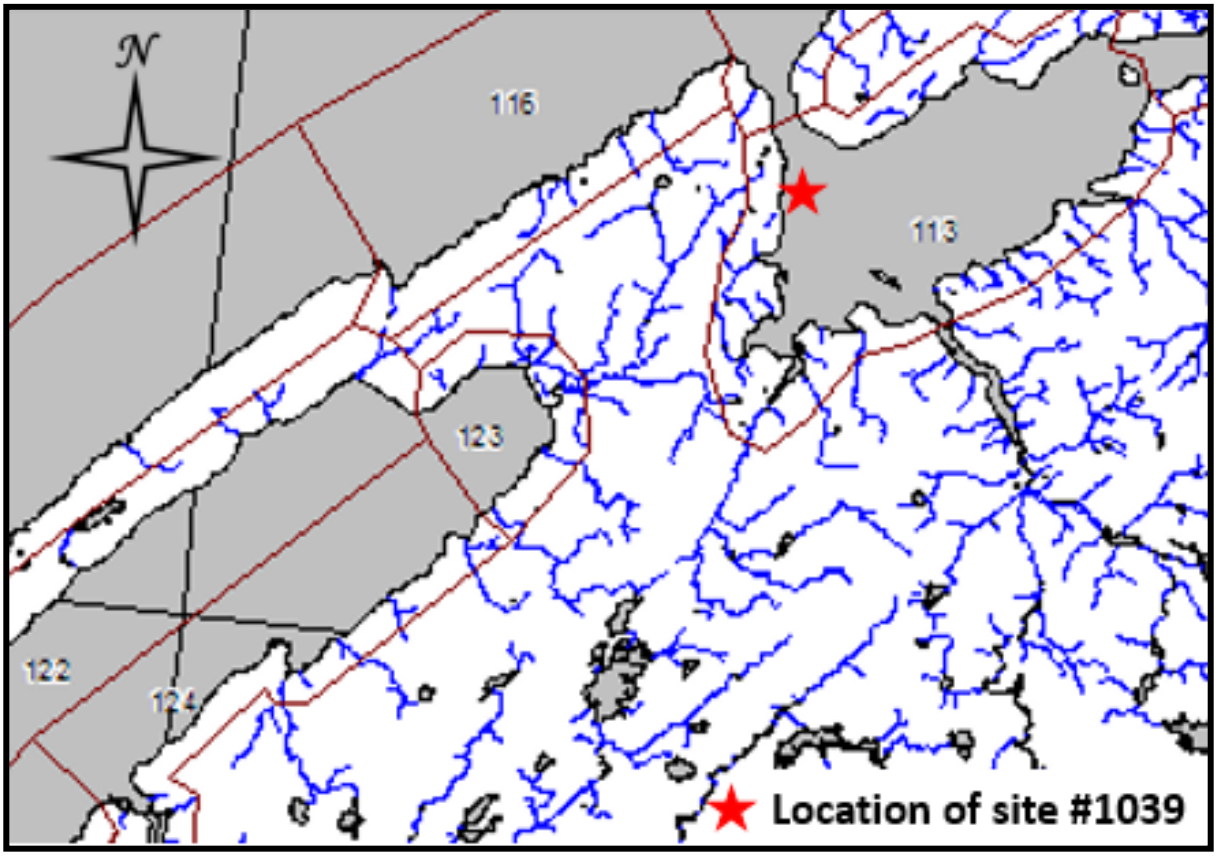


Table 14. Waterfowl Identified in Block 113

Canadian Wildlife Service – Block 113							
	Numbers of Sightings per Survey						
Bird Name	**02-Feb-00**	**16-May-00**	**04-Mar-04**	**26-Feb-07**	**18-Feb-09**	**22-Jan-10**	**Grand Total**
American Black Duck		0	81	98	424	312	**915**
American Green-winged Teal	0	0	0	0	0	0	**0**
American Wigeon	0	0	0	0	0	0	**0**
Atlantic Brant	0	0	0	0	0	0	**0**
Barrow's Goldeneye	0	0	0	0	0	0	**0**
Black Scoter	0	0	0	75	61	137	**273**
Blue-winged Teal	0	0	0	0	0	0	**0**
Bufflehead	130	0	44	0	37	0	**211**
Canada Goose	44	0	0	0	0	0	**44**
Common Eider	0	0	5	47	18	0	**70**
Common Goldeneye	0	0	48	9	111	22	**190**
Common Loon	0	0	9	9	21	2	**41**
Common Merganser	11	0	0	0	0	0	**11**
Female Common Eider	2	0	0	0	0	0	**2**
Gadwall	0	0	0	0	0	0	**0**
Greater Scaup	0	0	0	0	0	0	**0**
Harlequin Duck	0	0	0	0	0	0	**0**
Hooded Merganser	0	0	0	0	0	2	**2**
King Eider	0	0	0	0	0	0	**0**
Lesser Scaup	0	0	0	0	0	0	**0**
Long-tailed Duck	0	0	306	224	88	0	**618**
Male Common Eider	2	0	0	0	0	0	**2**
Mallard	0	0	0	0	0	0	**0**
Northern Pintail	0	0	0	0	0	0	**0**
Northern Shoveler	0	0	0	0	0	0	**0**
Red-breasted Merganser	0	0	0	0	11	0	**11**
Ring-necked Duck	0	0	0	0	0	0	**0**
Snow Goose	0	0	0	0	0	0	**0**
Surf Scoter	0	0	0	0	8	0	**8**
Unidentified Cormorant	0	0	0	1	2	0	**3**
Unidentified Diving Duck	0	0	0	0	0	0	**0**
Unidentified Duck	0	0	0	0	0	0	**0**
Unidentified Goldeneye	5	0	0	0	0	0	**5**
Unidentified Merganser	0	0	91	317	139	1	**548**
Unidentified Scaup	62	0	52	192	33	0	**339**
Unidentified Scoter	0	0	2	85	0	0	**87**
Unidentified Teal	0	0	0	0	0	0	**0**
White-winged Scoter	1	0	0	0	0	0	**1**
Wood Duck	0	0	0	0	0	0	**0**
Grand Total	**257**	**0**	**639**	**1057**	**953**	**476**	**3382**

f. Public Right of Navigation

The following figures provide information regarding navigation routes that are used by KCS while servicing the aquaculture site in Annapolis Basin (Fig. 40) and the layout of on-site equipment (Figs. 41 - 45)

Figure 40. Marine Chart showing KCS vessel route from Rattling Beach to the Digby Government Wharf

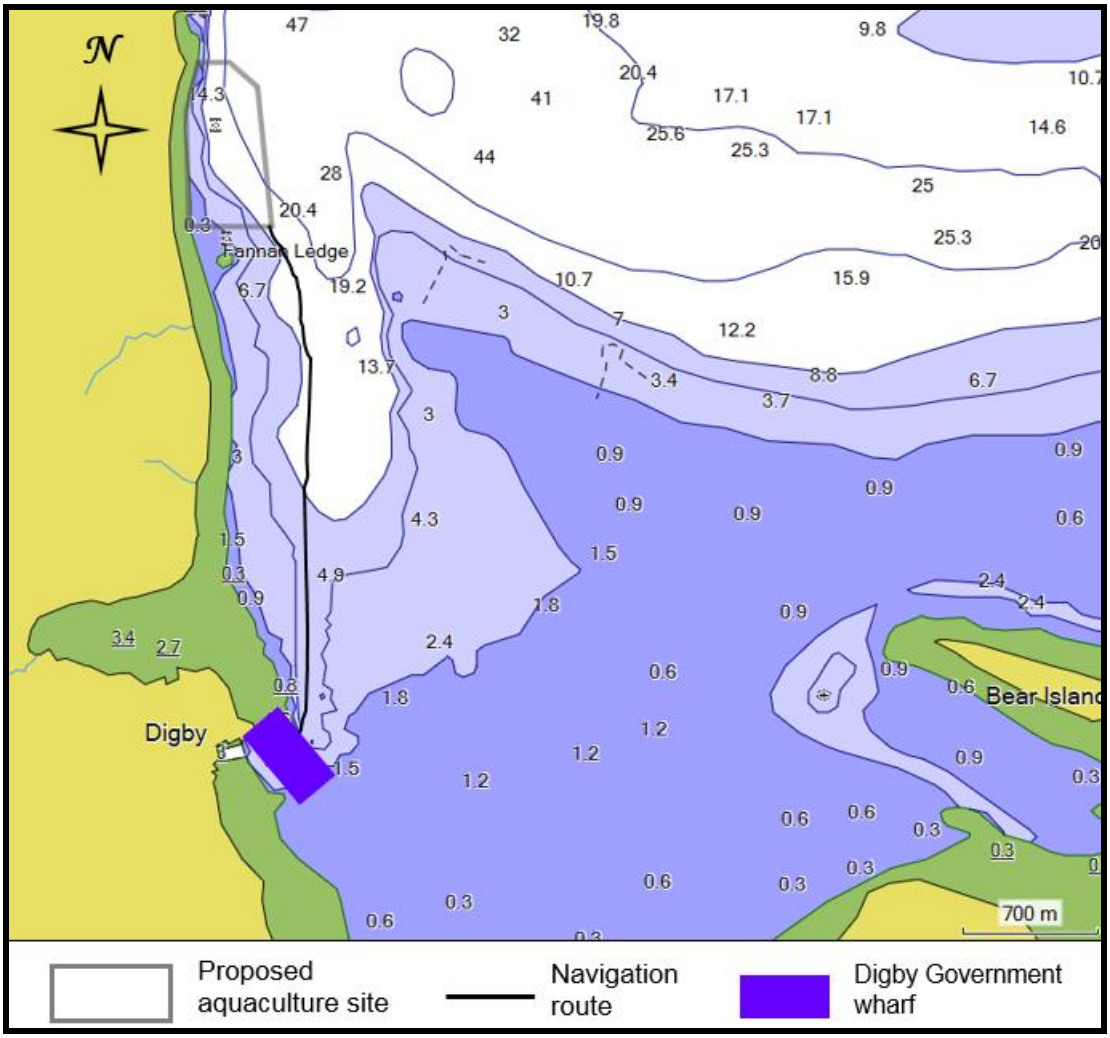
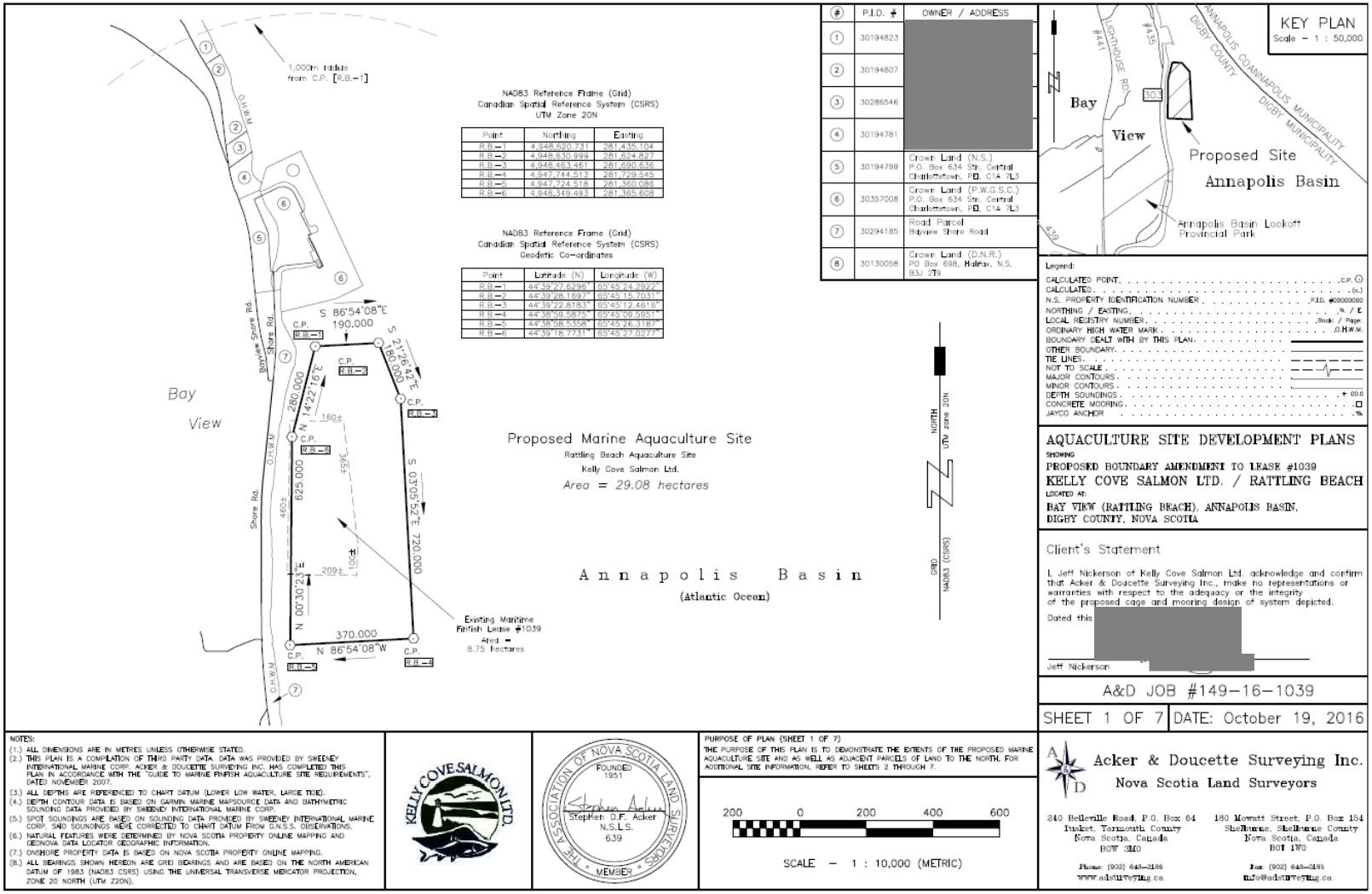
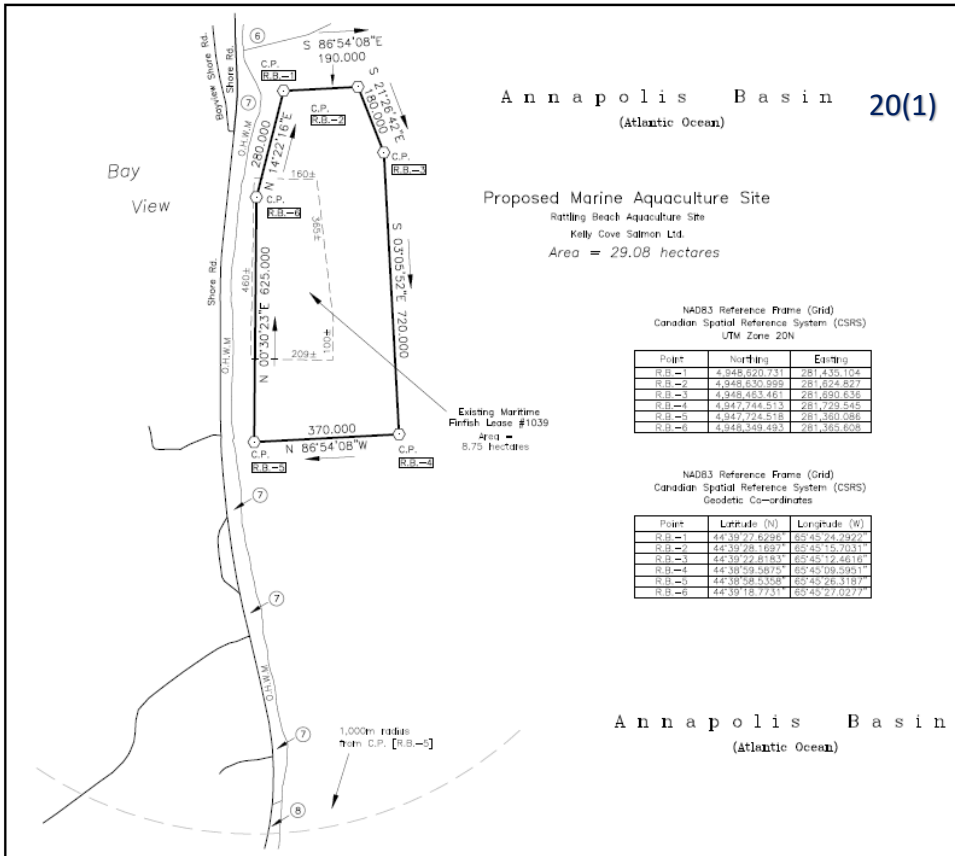


Figure 41. Plan View of the Proposed Boundary Amendment of the Rattling Beach Aquaculture Site Showing Nearby Property Owners





Annapolis Basin

20(1)

(Atlantic Ocean)

Proposed Marine Aquaculture Site

Rattling Beach Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 29.08 hectares

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

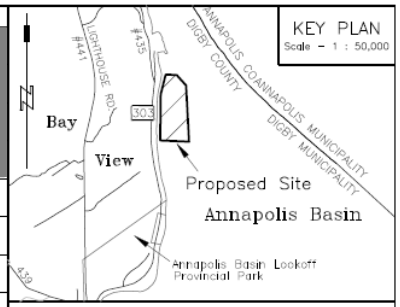
Point	Northing	Easting
R.B.–1	4,948,620.731	281,435.104
R.B.–2	4,948,630.999	281,624.827
R.B.–3	4,948,463.461	281,690.636
R.B.–4	4,947,744.513	281,729.545
R.B.–5	4,947,724.518	281,360.086
R.B.–6	4,948,349.493	281,365.608

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

Point	Latitude (N)	Longitude (W)
R.B.–1	44°39'27.6296"	65°45'24.2922"
R.B.–2	44°39'28.1697"	65°45'15.7031"
R.B.–3	44°39'22.8183"	65°45'12.4616"
R.B.–4	44°38'59.5875"	65°45'09.5951"
R.B.–5	44°38'58.5358"	65°45'26.3187"
R.B.–6	44°39'18.7731"	65°45'27.0277"

NORTH
UTM zone 20N
GRID
NAD83 (CSRS)

#	P.I.D. #	OWNER / ADDRESS
1	30194823	
2	30194807	
3	30286546	
4	30194781	
5	30194799	Crown Land (N.S.) P.O. Box 634 Stn. Central Charlottetown, PEI. C1A 7L3
6	30357008	Crown Land (P.W.G.S.C.) P.O. Box 634 Stn. Central Charlottetown, PEI. C1A 7L3
7	30294185	Road Parcel Bayview Shore Road
8	30130058	Crown Land (D.N.R.) PO Box 698, Halifax, N.S. B3J 2T9



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 . . . □
- JAYCO ANCHOR . . . ⊸

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED BOUNDARY AMENDMENT TO LEASE #1039

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN, 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 19th day of October, 2016

[redacted]

Jeff Nickerson

A&D JOB #149–16–1039

SHEET 2 OF 7 | DATE: October 19, 2016

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 20 NORTH (UTM Z20N).

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 7)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND TO THE SOUTH. FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1 AND 3 THROUGH 7.

200 0 200 400 600

SCALE – 1 : 10,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

240 Belleville Road, P.O. Box 64
Truro, Tarmouth County
Nova Scotia, Canada
B0W 3M0

Phone: (902) 643–2188
www.adsurveying.ca

180 Mowatt Street, P.O. Box 154
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Fax: (902) 643–2185
info@adsurveying.ca

Figure 42. Rattling Beach Site Development Plan Showing Basic Seafloor Topography

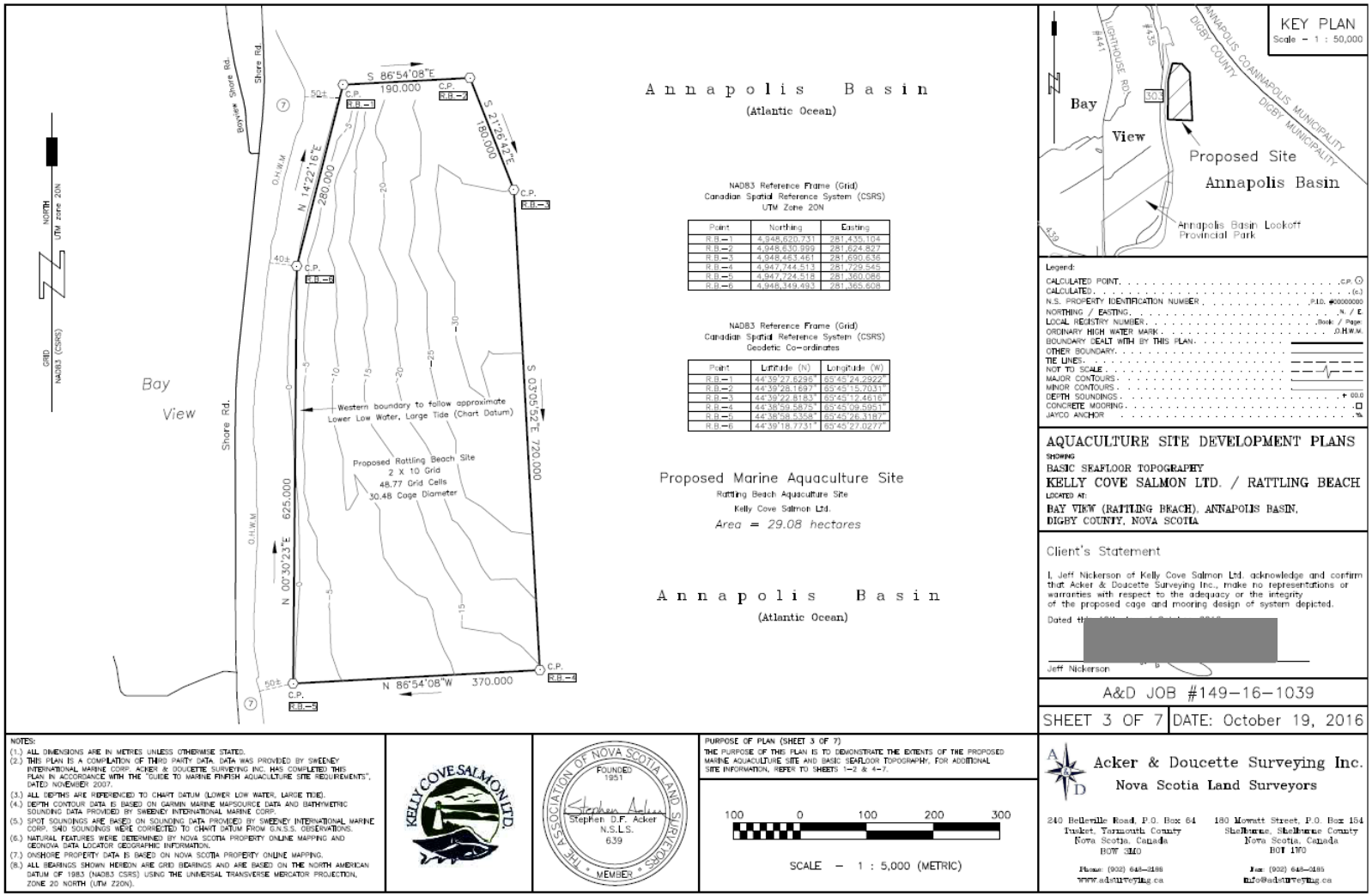


Figure 43. Rattling Beach Site Development Plan Showing Cage Configuration

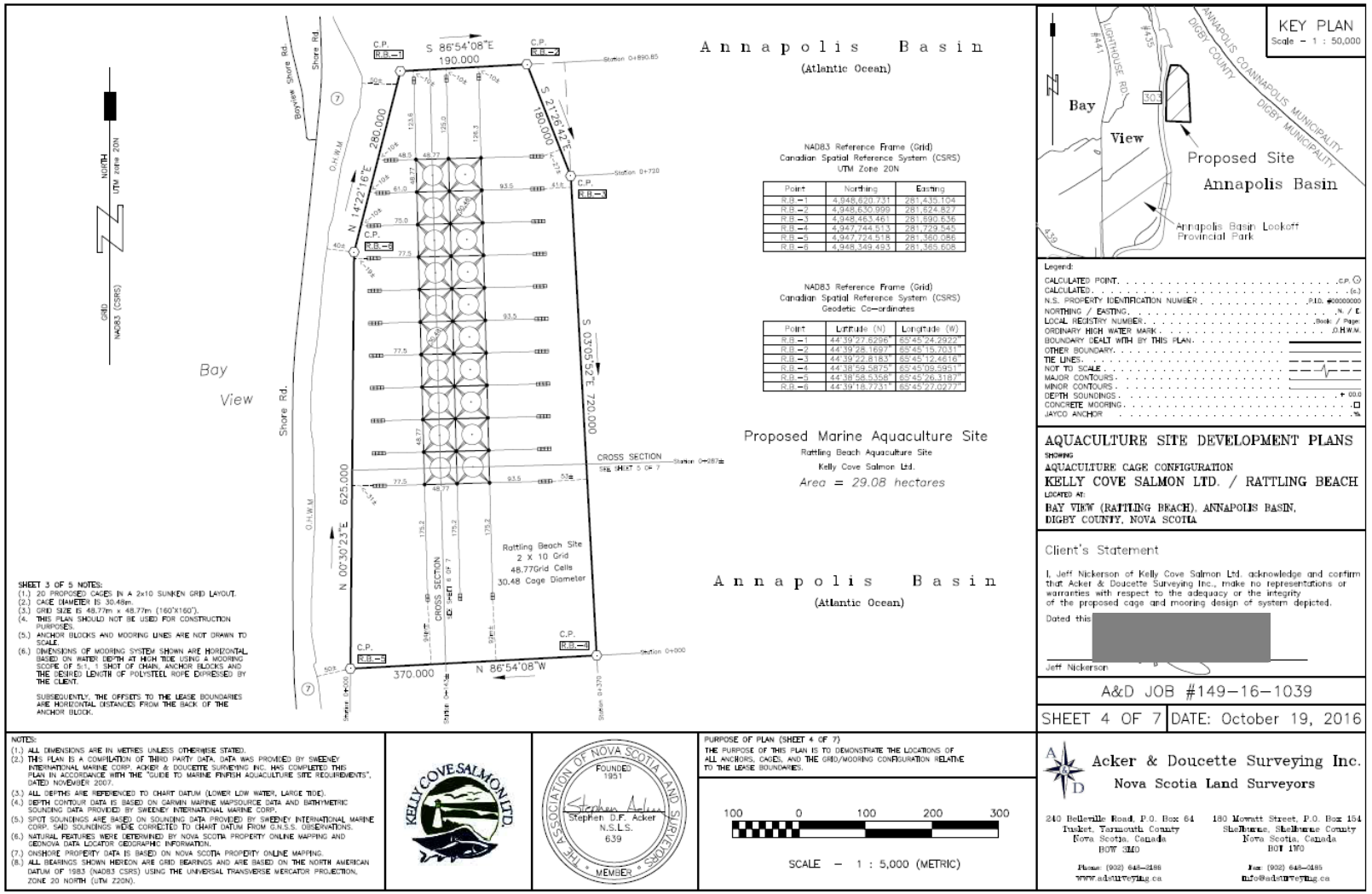


Figure 44. Rattling Beach Cross-sectional Plan A

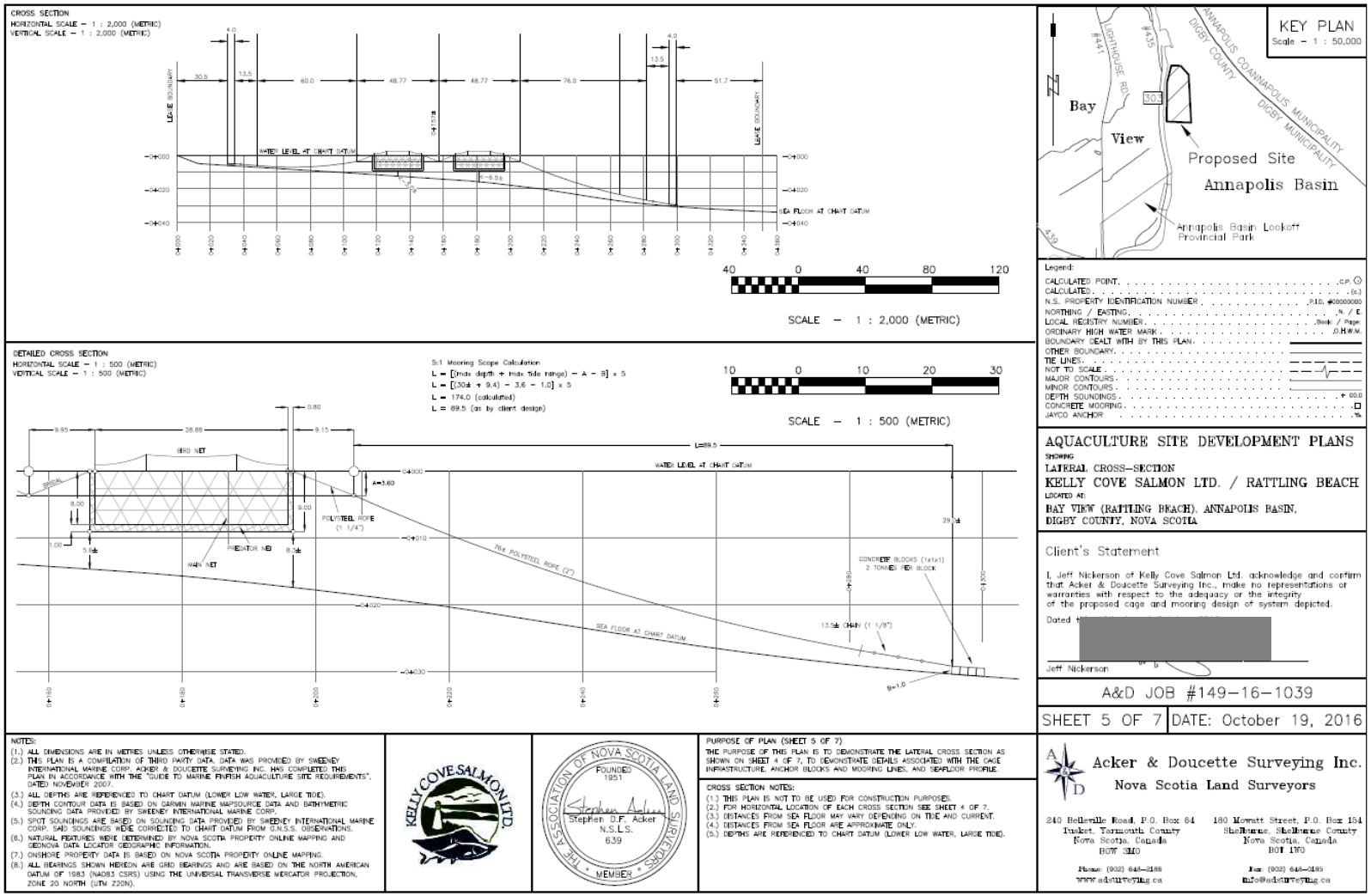
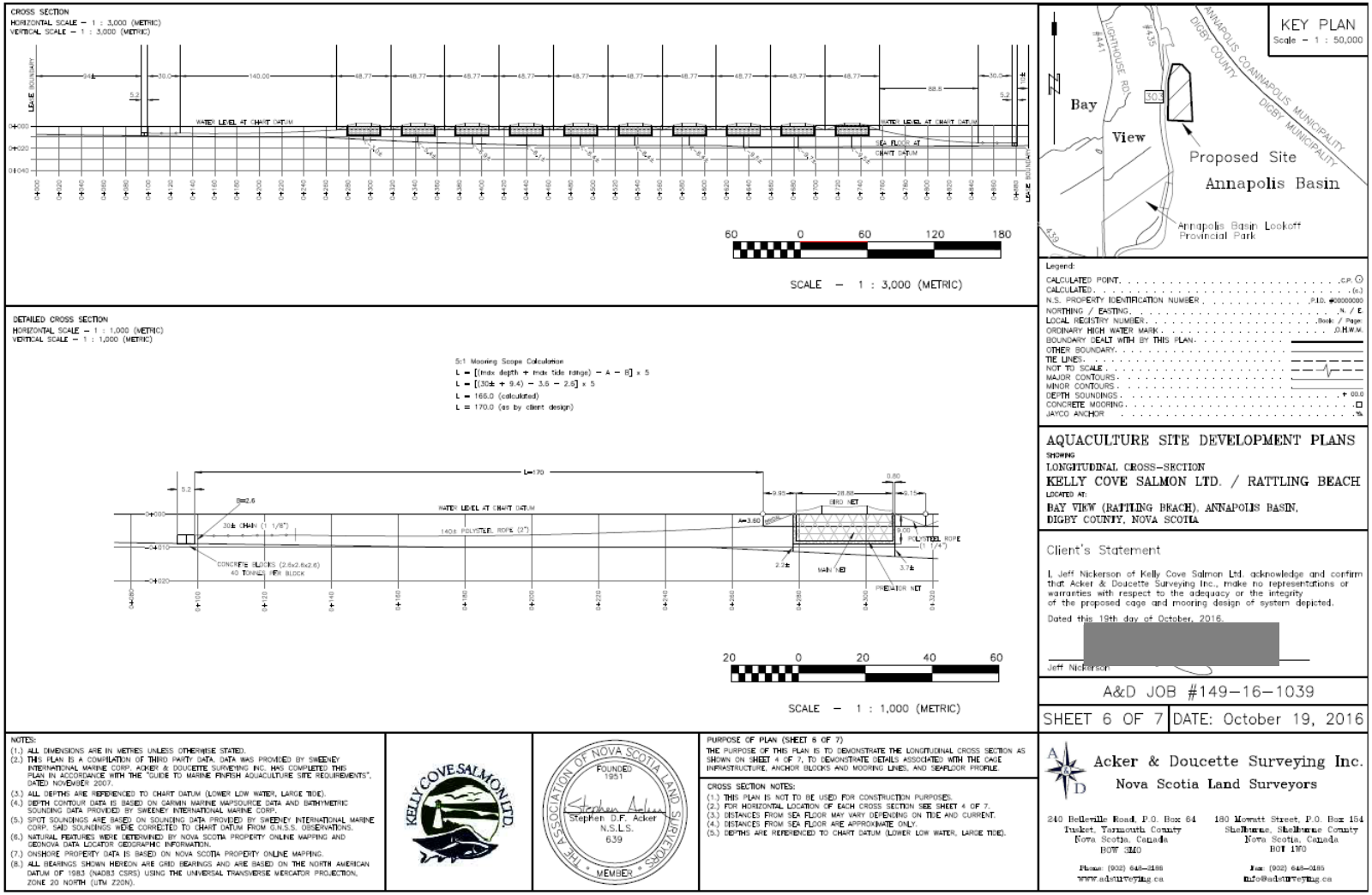


Figure 45. Rattling Beach Cross-sectional Plan B



Notice of Works

Transport Canada requires a notice of works form in order to notify the Navigation Protection Program (NPP) regarding a proposed or existing work in navigable water. The notice of works form will be completed and submitted separately from this document.

g. Sustainability of Wild Salmon

The Rattling Beach marine aquaculture site is located 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. 46). The marine aquaculture site in Annapolis Basin is located in SFA 21. A region-wide electrofishing survey conducted in 2000 found salmon in 28 of 52 rivers surveyed (54%) whereas a similar survey conducted in 2008 and 2009 found salmon in only 21 of 54 rivers surveyed (39%) (DFO 2011a). The pH of water samples collected in the 1980s and 1990s indicated that several rivers in Nova Scotia were partially to heavily acidified (Lacroix and Knox 2005, Gibson et al. 2009, DFO 2011b). River acidification is recognised as a major factor in the survival of Atlantic salmon in Nova Scotia.

All Atlantic salmon index populations within DFO's Maritimes Region were assessed to be well below conservation (egg) requirements in 2014. 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 deposits ranging between 2 and 4% of conservation requirements in 2014 (Fisheries and Oceans Canada 2015e). In November 2010, COSEWIC designated the Outer Bay of Fundy, Nova Scotia Southern Upland, and Eastern Cape Breton population assemblages as endangered (Fisheries and Oceans Canada 2011). However, the SARA status is "no status, no schedule". There are a number of rivers in the Upper Bay of Fundy and Minas Basin which COSEWIC has listed as endangered or possibly extirpated for Atlantic salmon. These rivers are all over 100 km away from the proposed aquaculture site (ASF 2016b).

The Salmon Atlas and the Atlantic Salmon Federation (Figs. 47 - 48) count five salmon rivers feeding into the Annapolis Basin: Annapolis River, Round Hill River, Moose River, Bear River, and Acacia Brook; the Lequille River is considered extirpated (ASF 2016b). Other nearby rivers that flow into Saint Mary's Bay include the Boudreau and Meteghan rivers, which both also have wild salmon (ASF 2016b). The aquaculture site under boundary amendment application is located approximately 4 and 6 km from the mouths of Acacia Brook and Bear Rivers, respectively, the nearest identified wild salmon rivers.

The abundance of Atlantic salmon in the Maritimes Region has been in decline for over 20 years leaving populations in many rivers to become extirpated and Inner Bay of Fundy Salmon to be listed as endangered under the Species at Risk Act (SARA).

Figure 46. Atlantic Salmon Fishing Areas of Atlantic Canada
Note: Figure was sourced from the Fisheries and Oceans (2015e). White, numbered circles identify designated Salmon Fishing Areas.

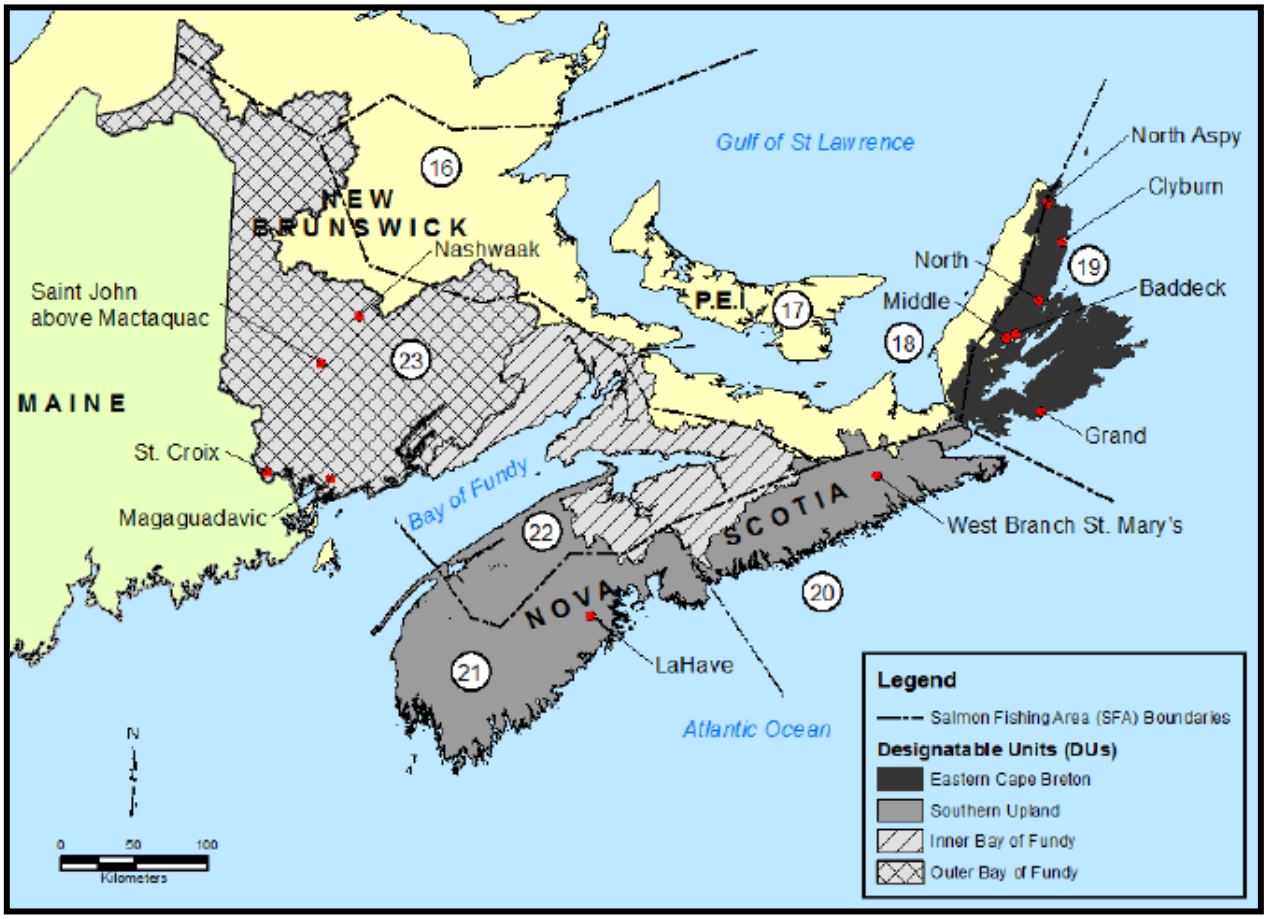


Figure 47. Atlantic Salmon Rivers of Nova Scotia According to The Salmon Atlas
Note: Figure was sourced from The Salmon Atlas (http://www.salmonatlas.com/atlanticsalmon/canada-east/nova-scotia/mapnovascotia.html)

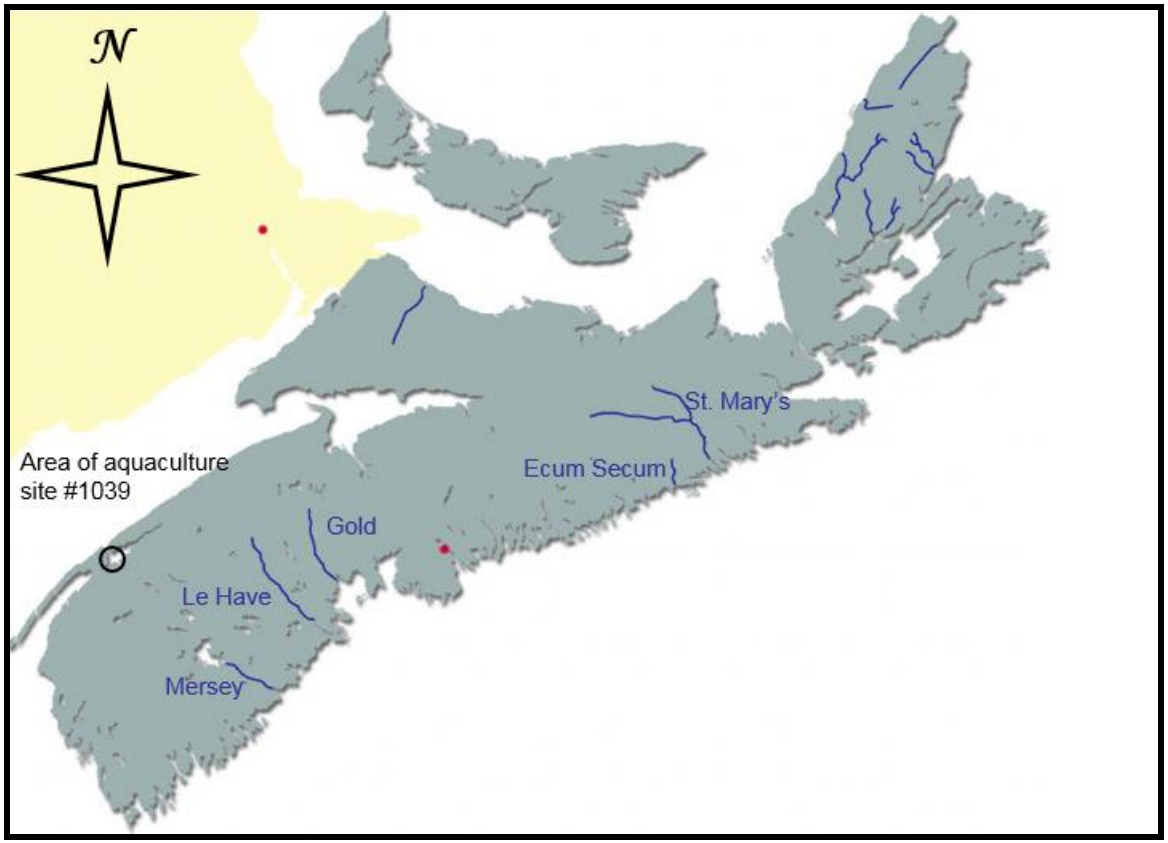
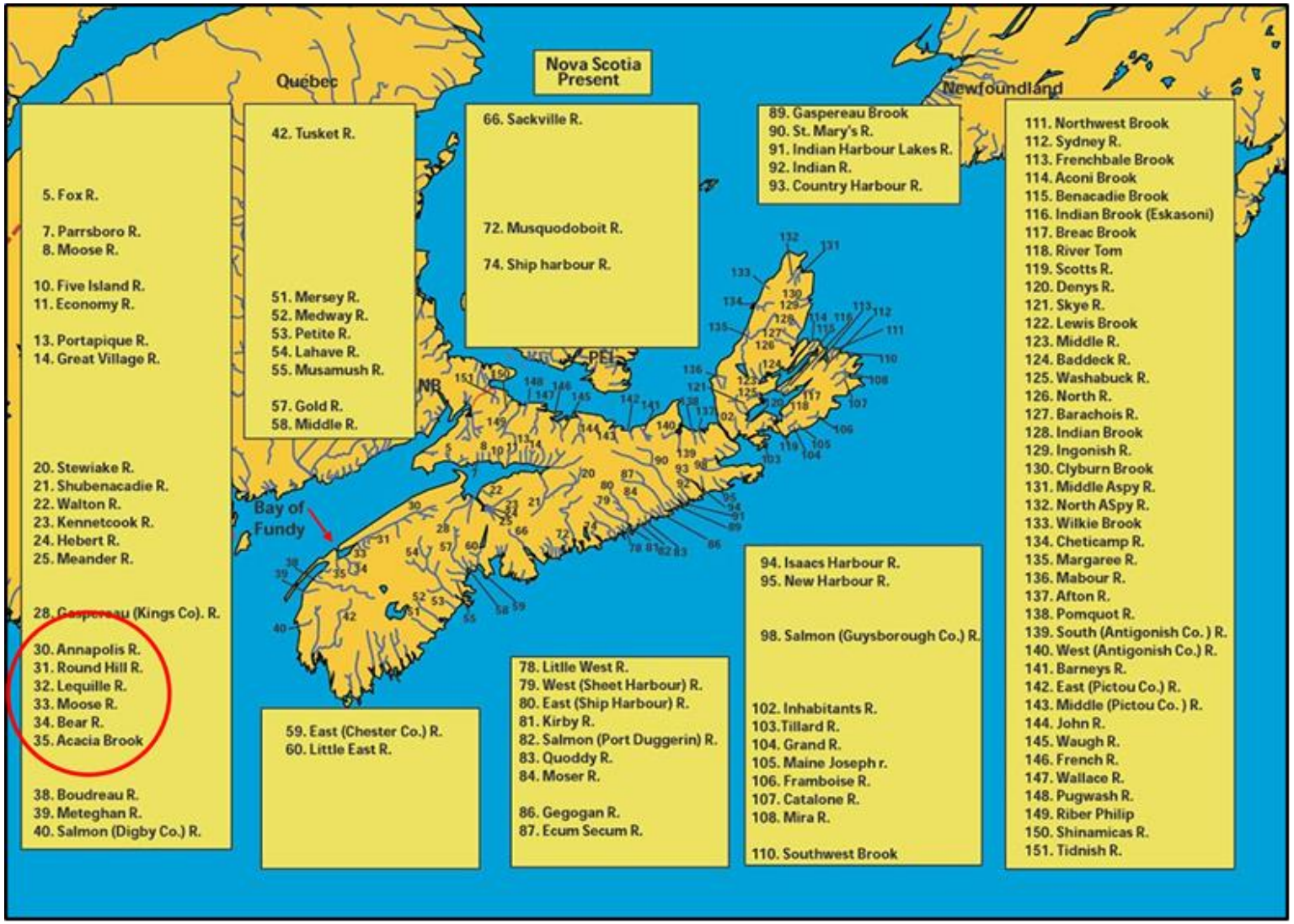


Figure 48. Present Atlantic Salmon Rivers of Nova Scotia
Note: Figure was sourced from the Atlantic Salmon Federation (2016)



A number of 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 DFO (1999). They are as follows:

1) Improved containment, including the development and implementation of Code of Practice, contingency plans, and a reporting system for escapees
2) Improved fish health management, including completion and implementation of provincial Codes of Practice, including contingency plans and a reporting system for specified diseases
3) Upgrading policy for introductions and transfers of fishes and improving related enforcement
4) Enhancing education and training of aquaculture workers, particularly relative to containment and farm/hatchery management
5) Ensuring the maintenance of wild stocks at or above their conservation requirements
6) Continuing the use of local stocks as donors, where possible, for currently practiced aquaculture, or using other strains if rendered sterile or properly contained, and
7) Continue incorporating risk analysis into the review process for the location of hatcheries and salmon farms

KCS has in place plans and codes of practice that address points 1, 2, 4, and 6 above. Points 3, 5, and 7 are beyond the control of KCS.

KCS' plans for containment include checking net integrity after every severe weather event and carrying out repairs as necessary. Net changes are conducted in such a manner as to prevent escapes and salmon losses. KCS will also follow the *Code of Containment for Culture of Atlantic Salmon in Marine Net Pens in New Brunswick* (2008), published by the New Brunswick Salmon Growers Association – now the Atlantic Canada Fish Farmers Association. In the unlikely event that there is an accidental release, the Site Manager will contact the Production Manager, who will then contact NSDFA to report the losses.

KCS follows their fish health management plan. A copy of this plan will become part of the Farm Management Plan, as required by NSDFA. As part of the fish health management, veterinarians regularly visit the marine sites to inspect fish and collect samples. Any diseases that are discovered are treated accordingly and any federally reportable aquatic animal diseases identified will be reported to CFIA.

All KCS farm-site workers involved in transferring or moving fish (e.g. introductions, harvests, net changes, etc.) receive training in proper techniques.

Currently, all of the KCS broodstock are of the Saint John River strain, a local, Maritime Canada strain of Atlantic salmon. Broodstock from other countries are not used.

h. The Number and Productivity of Other Aquaculture Sites in the Public Waters Surrounding the Proposed Aquacultural Operation

There are nine (9), aquaculture sites less than 15 km from the Rattling Beach site; two are marine finfish (Atlantic salmon), one is licensed for halibut (#1302), one for quahog (#1228), five for soft-shell clam (#1343, 1338, 1342, 1339, 1340) and one is for mixed species of sea/bay scallop, American Oyster, and European Oyster (#1042; Fig. 49, Table 15). The Atlantic salmon farms nearest to the site are both owned by KCS; however, only one (#1040) is operational. Victoria Beach #1040 was acquired in 2014 with an approved production level based on December 2015 I&T permit of 440,000 fish. The site is currently being operated to its fullest capacity.

Annual environmental monitoring of Rattling Beach has resulted in Oxic site classifications for the last two production cycles, indicating this site is stocked and managed sustainably. Production information for KCS Atlantic salmon sites in Annapolis Basin is privileged and confidential. KCS may be directly contacted with inquiries as it is not intended for public dissemination.

Figure 49. Marine Chart Showing Other Aquaculture Operations
Note: Figure was sourced from the Department of Fisheries and Aquaculture (2016)

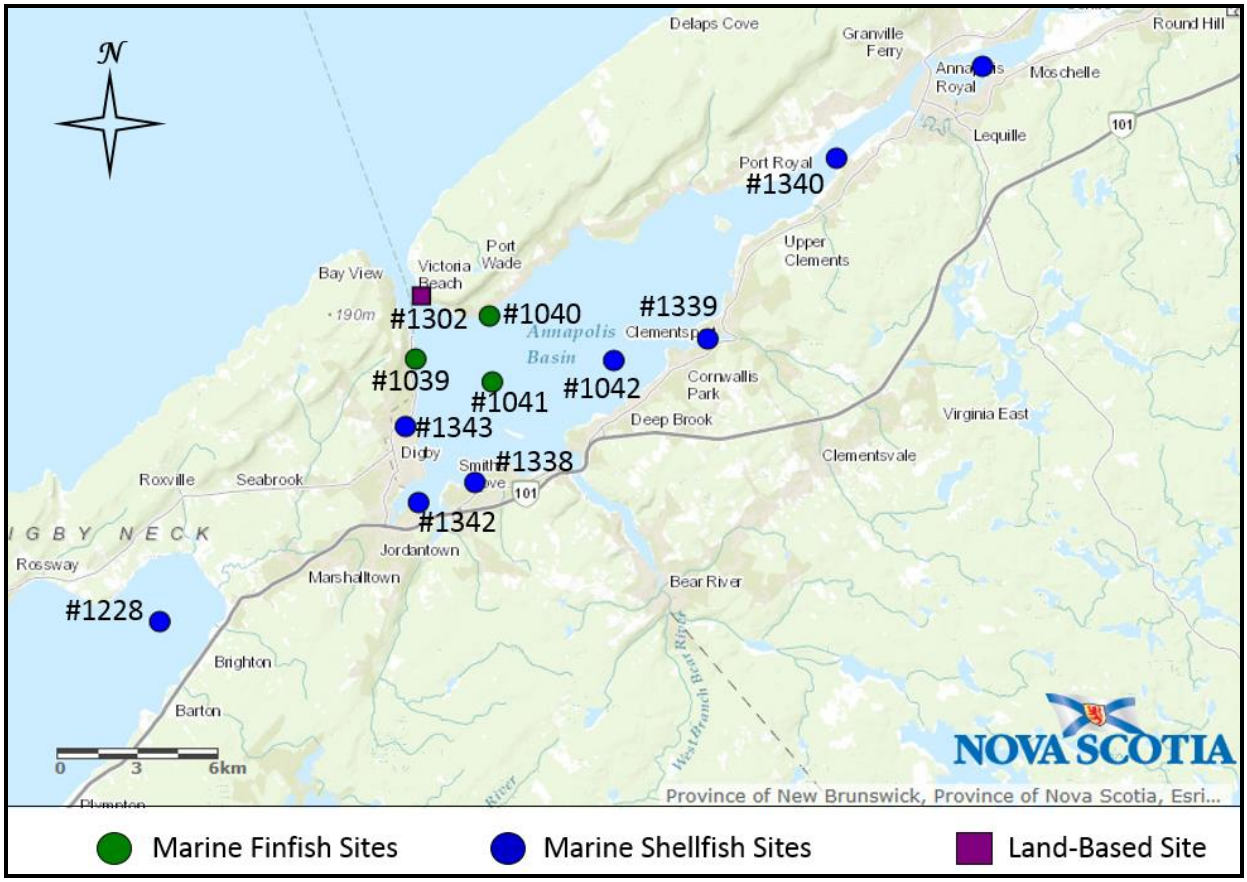


Table 15. Distance from Rattling Beach #1039 to nearby finfish and shellfish aquaculture sites

Site #	Distance to Rattling Beach (km)	Species	Owner
1302	2.2	Halibut	Pronet Micro Systems Inc.
1343	2.2	Soft-shelled clam	Innovative Fisheries Products
1041	2.7	Atlantic salmon	Kelly Cove Salmon
1040	2.8	Atlantic salmon	Kelly Cove Salmon
1042	3.9	Sea scallop, bay scallop, American oyster, European oyster	Innovative Fisheries Products
1338	5.9	Soft-shell clam	Innovative Fisheries Products
1342	6.6	Soft-shell clam	Innovative Fisheries Products
1339	7.5	Soft-shell clam	Innovative Fisheries Products
1340	11.1	Soft-shell clam	Innovative Fisheries Products
1228	14.2	Quahog	Innovative Fisheries Products

LIST OF CONTACTS

Table 16. Contacts

Contact Name	Affiliation	E-mail	Phone	Date of Contact	Reason for Contact
Andrew Hicks	Environment Canada	Andrew.Hicks@ec.gc.ca	(506) 364-5138	Oct 4, 2016	Bird Surveys
Justin Huston	NSDFA	hustonje@gov.ns.ca	(902) 424-2996	May 11, 2007	Rockweed harvesting
David MacArthur	Environment Canada	David.MacArthur@eg.gc.ca	(902) 426-6296	Jul 5, 2016	Shellfish Areas
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
Wendy Vissers	NSDFA	Wendy.Vissers@novascotia.ca	(902) 526-3617	Oct 4, 2016	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
Baseline Assessment Report

Baseline Assessment Report

Site #1039
Rattling Beach

Annapolis Basin
Digby County
Nova Scotia

October 20, 2016

Prepared for:
Kelly Cove Salmon Ltd.
P.O. Box 1546
Shelburne, NS
B0T 1W0

Prepared by:
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October 20, 2016

SIMCorp File #SW2016-059

Mr. Jeff Nickerson
Kelly Cove Salmon Ltd.
P.O. Box 1546
Shelburne, NS
B0T 1W0

Dear Mr. Nickerson,

Reference: **Rattling Beach (#1039) Baseline Report**

Please find enclosed the above noted report and attached video footage for the proposed boundary amendment of site #1039 at Annapolis Basin, N.S.

If you have any questions or comments on the above noted report please do not hesitate to contact me at 902-492-7865.

Sincerely,

[redacted]

Marine Environmental Biologist
Sweeney International Marine Corp.

cc: Jessica Feindel (NSDFA)
[redacted] (KCS)
[redacted] (SIMCorp)

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1.0 INTRODUCTION

The following baseline report and attached video have been prepared by SIMCorp for Kelly Cove Salmon Ltd. to summarize the findings of the formal baseline environmental survey required as part of the application for a boundary amendment of Rattling Beach (#1039). Marine aquaculture site #1039 is located on the western shore of the Annapolis Basin, near the mouth of Digby Gut channel in Digby County (Fig. 1). This area is shown on CHS chart #4396. The current lease has dimensions of approximately 160 x 460 x 210 x 460 m with an area of approximately 8.74 ha (Table 1).

Figure 1 – Current Rattling Beach (#1039) location in Annapolis Basin

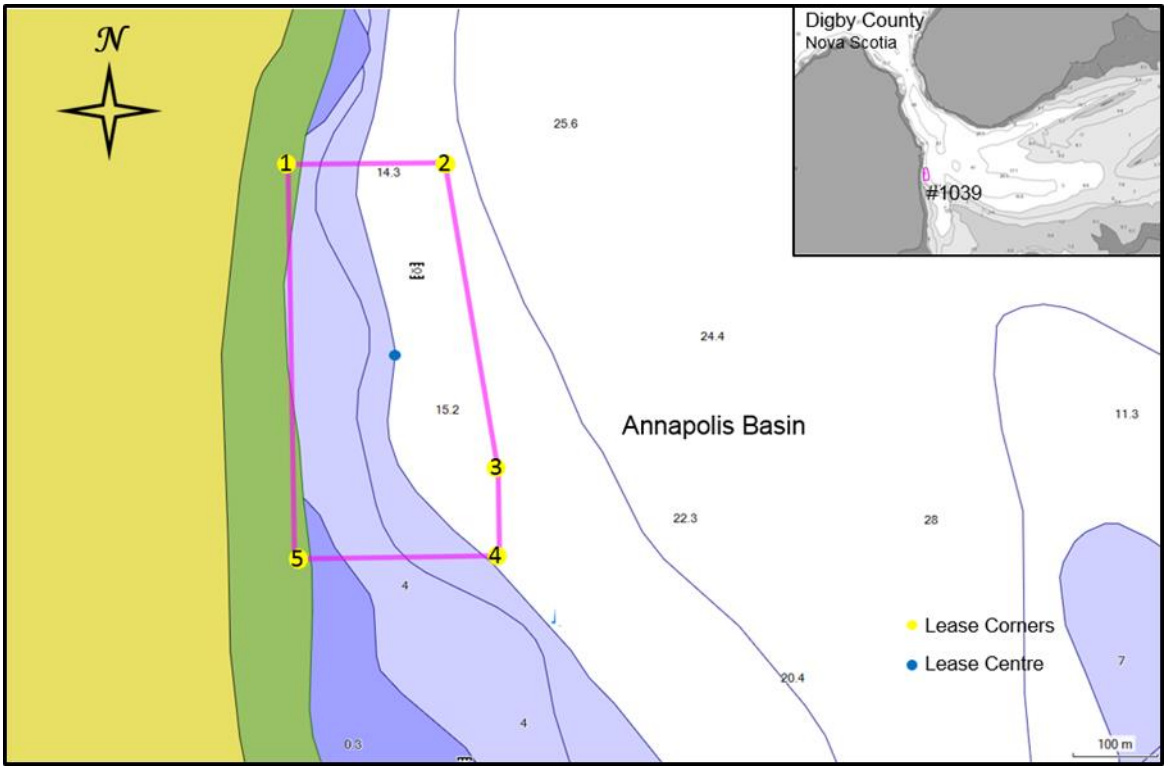


Table 1 – Current boundary and center coordinates of Rattling Beach (#1039)

SITE COORDINATES (NAD 83)		
Corner	**Latitude**	**Longitude**
1	44º 39’ 20.34”	65º 45’ 27.36”
2	44º 39’ 20.40”	65º 45’ 20.10”
3	44º 39’ 08.76”	65º 45’ 17.64”
4	44º 39’ 05.52”	65º 45’ 17.58”
5	44º 39’ 05.40”	65º 45’ 27.06”
Site Centre	44º 39’ 12.68”	65º 45’ 22.68”

The proposed boundary amendment extends the lease boundaries to accommodate all below surface gear. The dimensions of the proposed lease are approximately 140 x 180 x 725 x 590 x 260 m with an area of approximately 24.01 ha (Fig. 2, Table 2).

Figure 2 – Proposed boundary location for Rattling Beach (#1039)

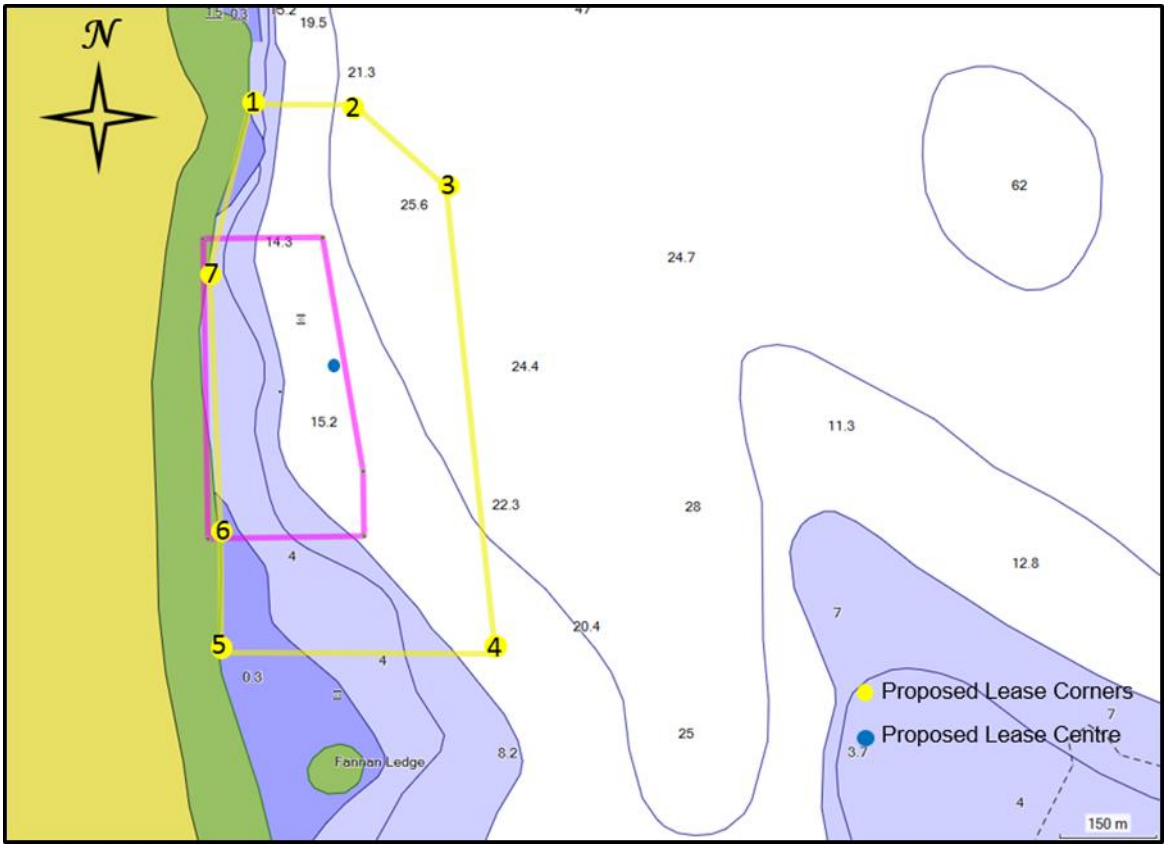


Table 2 – Proposed boundary and center coordinates of Rattling Beach (#1039)

SITE COORDINATES (NAD 83)		
Corner	**Latitude**	**Longitude**
1	44° 39’ 27.0”	65° 45’ 24.5”
2	44° 39’ 27.0”	65° 45’ 18.2”
3	44° 39’ 22.9”	65° 45’ 12.6”
4	44° 38’ 59.6”	65° 45’ 09.7”
5	44° 38’ 59.7”	65° 45’ 26.3”
6	44° 39’ 05.8”	65° 45’ 26.3”
7	44° 39’ 18.8”	65° 45’ 27.0”
Approximate Site Center	44° 39’ 13.8”	65° 45’ 19.2”

Benthic field data contained within this report were collected by SIMCorp Field Supervisor and Marine Environmental Biologist [redacted], B.Sc. and Marine Environmental Biologists [redacted] B.Sc. and [redacted] B.Sc., and Technician [redacted] on July 20, 2016. High tides were at 12:40 (7.7 m), low tides were at 18:49 (1.2 m).

Current speed and direction data presented in this document were collected with the use of an Acoustic Doppler Current Profiler (ADCP), deployed by Nova Scotia Department of Fisheries and Aquaculture (NSDFA) at site #1039 from June 29 to August 4, 2016 (37 days).

2.0 CONTACT INFORMATION

Proponent:

Company Name:	Kelly Cove Salmon Ltd.
Principal Contact:	Mr. Jeff Nickerson
Mailing Address:	P.O. Box 1546 Shelburne, Nova Scotia B0T 1W0
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
Cellular:	[redacted]
Facsimile:	(506) 467-9503
E-mail:	[redacted]@simcorp.ca

3.0 METHODOLOGY

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, from a combination of Appendix 2 of the New Brunswick Department of Agriculture, Aquaculture and Fisheries (NB DAAF) *Bay of Fundy Marine Aquaculture Site Allocation Application Guide* (SOPs) and Appendix B of the Nova Scotia Department of Fisheries and Aquaculture draft *Standard Operating Procedures for the Environmental Monitoring of Marine Aquaculture in Nova Scotia* dated June 2016.

3.1 Sampling Locations

A total of nine stations were investigated for the purpose of this baseline survey (Fig. 3). Currently, the site is stocked, therefore only the seven corners of the proposed boundaries and two reference stations were sampled. The sampling station coordinates

are present in Table 3; sampling at the approximate site center was omitted because gear is present on site.

Reference stations previously sampled for the site (ANB-01 and ANB-05) are approximately 374 and 100 m from the current lease boundaries (Table 4). Extending the lease boundaries to incorporate all aquaculture site specific gear, above and below the waterline, will decrease the distance of the reference station ANB-01 to 155 m. ANB-05 will be within the proposed boundary; therefore, a new reference station is required. It is proposed ANB-A be located at N44˚ 38' 56.5" W65 45' 13.5", which is approximately 105 m south of the lease boundary. The recommended locations of the reference stations to accommodate the proposed boundaries are illustrated in Figure 3 and Figure 4.

An ADCP was deployed by Nova Scotia's Department of Fisheries and Aquaculture at the coordinate N44º 39' 03.3" W65º 45' 14.8" in approximately 14 m of water on June 29 to August 4. The current meter could not be deployed at the center of the proposed site due to the presence of gear and fish. Therefore, the location between the current and proposed site boundaries was chosen which is greater than 100 m from the nearest aquaculture site gear to avoid distortion of data (Fig. 4).

Figure 3 – Baseline sampling stations at Rattling Beach (#1039)

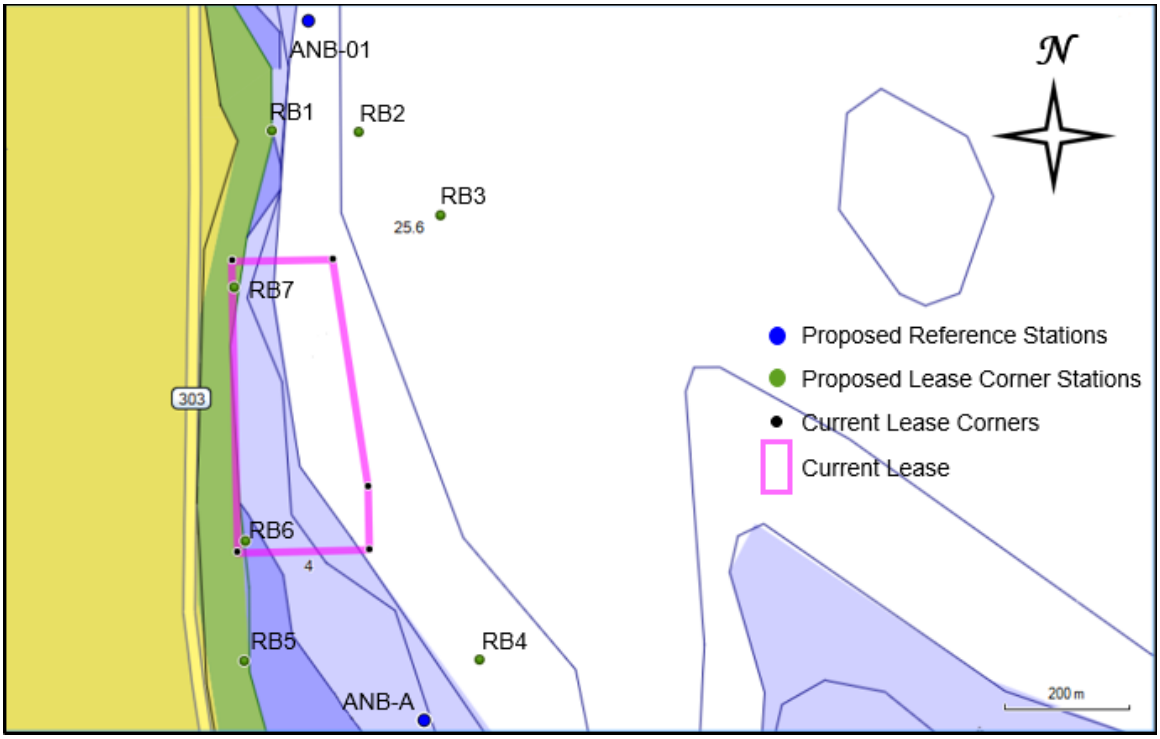


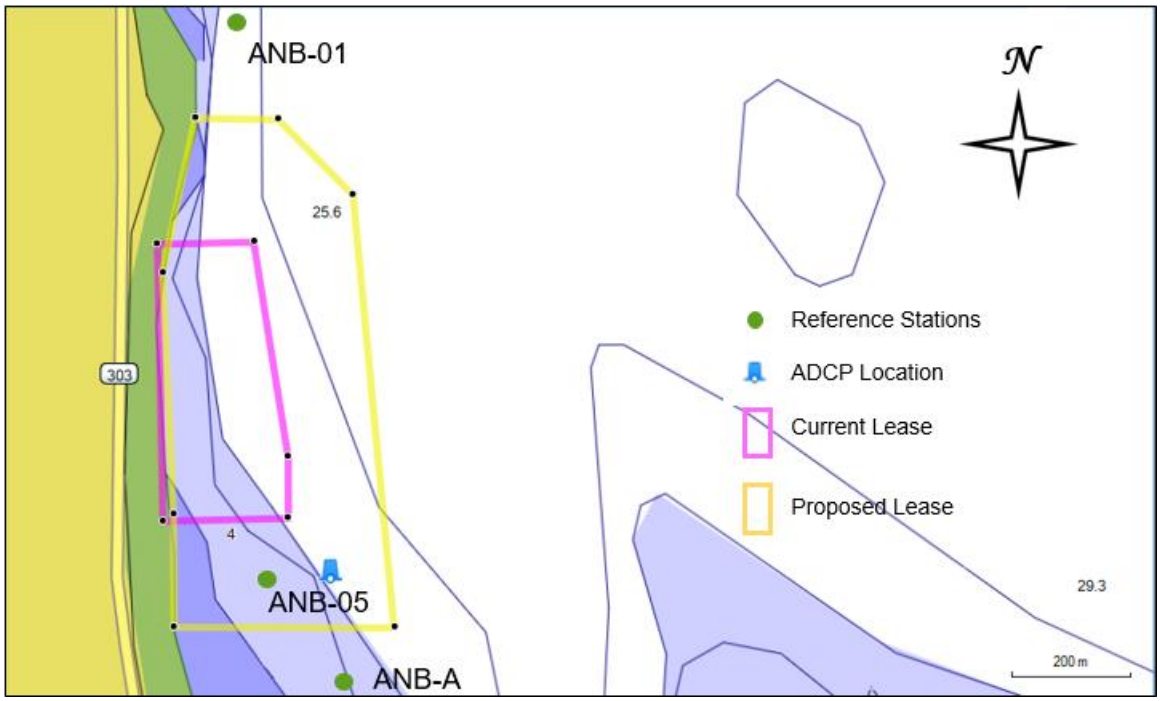
Table 3 - Baseline Sampling Coordinates at Site #1039, Annapolis Basin for Boundary Amendments

SITE COORDINATES (NAD 83)			
Station	**Location**	**Latitude**	**Longitude**
RB1	NW corner	44° 39' 27.0"	65° 45' 24.5"
RB2	NE corner	44° 39' 27.0"	65° 45' 24.5"
RB3	ENE corner	44° 39' 27.0"	65° 45' 18.2"
RB4	SE corner	44° 39' 22.9"	65° 45' 12.6"
RB5	ESE corner	44° 38' 59.6"	65° 45' 09.7"
RB6	SE corner	44° 38' 59.7"	65° 45' 26.3"
RB7	SSE corner	44° 39' 05.8"	65° 45' 26.3"
ANB-01	Upstream Reference	44° 39' 18.8"	65° 45' 27.0"
ANB-A	Downstream Reference	44° 39' 13.8"	65° 45' 19.2"

Table 4 – Reference station coordinates for current and proposed lease boundaries at Rattling Beach (#1039)

REFERENCE STATION COORDINATES (NAD 83)			
Station	**Latitude**	**Longitude**	**Lease Boundary**
ANB-01	44° 39' 32.5"	65° 45' 21.2"	Current and Proposed
ANB-05	44° 39' 02.3"	65° 45' 19.7"	Current
ANB - A	44° 39' 56.5"	65° 45' 13.5"	Proposed

Figure 4 – Proposed reference station locations for new lease boundaries and ADCP deployment location at Rattling Beach (#1039)



3.2 Sample Collection

A standard Ponar grab was used to collect sediment samples from all of the baseline stations; however, many of the samples could not be collected as the stations were located on hard bottom. 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 D). Notes were taken 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 analysed. Syringes were labelled and placed in a plastic cooler with ice. Samples were kept cool until analysed for redox, sulphide, porosity, and percent organic matter. The remaining top 2-cm of sediment was placed in 2-oz Whirl-Paks for use in grain size analysis.

Sample temperatures were recorded using HOBO ProV2 temperature loggers. Temperatures recorded from inside the sample cooler are presented graphically in Appendix F.

All reasonable efforts were made to conform to the SOPs, maintain storage temperature of samples, to collect samples that were as undisturbed as possible and to preserve the

integrity of the samples until analysed. However, site #1039 is characterized by coarse sediments, mainly of cobble stones, pebbles, and moderately packed medium-to-fine sand, gravel, and mud. Retrieving three undisturbed, soft sediment samples with minimal leakage from the grab and at least 5 cm sediment depth was not possible from at any of the stations. Samples were collected from both of the reference stations (ANB -01 and A) as well as three corner stations (Corners #2, 3, & 4) for redox, sulphide, porosity, percent organic matter, and grain size analyses. These samples came from grabs which failed to meet one or more of the criteria; achieving 5 cm of sediment penetration was not always possible and grabs were often leaking due to catching rocks and shells (Appendix G).

3.3 Video Surveillance

Video footage was recorded using a Seaviewer Underwater Camera System, which was mounted perpendicular with the seafloor in an aluminum frame; i-Torches were used for light. A 0.25-m^2 quadrat was visible in the field of view as a size reference. The video camera frame includes a scale bar demarcated with 5-cm segments. 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 "whiteboard" showing collection location information, followed by a 360° pan of the area at the sampling station and then 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 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 E. All on-site visual assessments have been recorded in the field notes and video assessments supplement the field data included in this report. Seafloor characteristics for each station are presented in Tables 6 - 14.

3.4 Bathymetric Profiling

Bathymetric profiling of the existing lease area was carried out on October 5, 2016 using a Hummingbird system Helix 5 SI-GPS to record X, Y, and Z coordinates throughout the lease. The data gathered during the scanning was then compiled and a three dimensional surface map and a two dimensional contour diagram produced by interpolation. Scanning of the Rattling Beach area began at the northern boundary of the proposed lease. Parallel transects were run the length of the 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.

4.0 SEDIMENT SAMPLE ANALYSIS AND DATA COLLECTION

4.1 Sediment Sample Analysis

All sediment samples were analysed within 72 hours of collection for redox potential and sulphide ion concentration (Table 15, Fig. 5). Temperatures were taken for each sample. 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 seen in Table 5. A copy of the laboratory data sheet for the redox and sulphide is presented in Appendix B.

Sediment samples from each station were sent to the SIMCorp Marine Benthic Sediments Laboratory for analysis of porosity, total organic content and grain size. The results of these analyses are presented in Table 16 and Appendix C.

Table 5 – 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 sulphur bacteria present	Patchy sulphur bacteria	Widespread bacterial mats
Macrofaunal Assemblage	Wide array of infauna and epifauna	Mixed group of mostly small infauna	Small infauna only
Sulfide, µM	**< 750 (A) 750 to 1500 (B)**	**1500 to 3000 (A) 3000 to 6000 (B)**	**> 6000**
Redox (Eh), mV	>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

4.2 Equipment and Calibrations

Redox measurements were taken using a combination meter (Fisher Accumet AP125) and probe (Orion Epoxy Sure-Flow Combination Redox/ORP Electrode), which was checked for electrical function just prior to and after use. Readings were taken according to the SOP protocols. Sulphide measurements were taken using a calibrated combination meter (Fisher Accumet AP125) and probe (Orion 96-16 Sure-Flow Combination Silver/Sulphide Electrode). Meter and sulphide probe calibration took place in accordance with SOP protocols at 09:55 on July 21, 2016. One probe was calibrated and used to analyse the samples. The calibration event resulted in a final slope range between -27 and -33 mV (-30.0 mV) the calibration curve was between -25 to -30 mV [500 to 5000 µM read: -25.6 mV, 1000 to 10000 µM read: -25.1 mV]. The results of the five-point, factor-calibration are located in Appendix A. The calibration temperature was 20.8°C.

4.3 ADCP Deployment

Measurements of the current speed and direction were collected at Rattling Beach using a 600 kHz Teledyne RDI Workhorse Sentinel ADCP unit deployed by the Nova Scotia Department of Fisheries and Aquaculture (Fig. 4). The current meter could not be deployed at the center of the proposed site due to the presence of gear and fish. Therefore, a location between the current and proposed site boundaries was chosen, greater than 100 m from the nearest aquaculture site gear to avoid distortion of data. This meter was deployed at site #1039 for a period of approximately 37 days between June 29 and August 4, 2016. The ADCP was configured to record the current speed and direction of the water column in one (1) meter bins, collecting a profile every fifteen (15) minutes. Once the unit was recovered, the data were downloaded and analysed 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 H and raw current speed and direction data is included in the supplementary material attached to this report (*RattlingBeach.xls*).

5.0 RESULTS AND OBSERVATIONS

The following are baseline sampling station benthic characteristics at proposed marine aquaculture lease #1039 in the order they were sampled.

Table 6 – ANB-A Benthic Log

Sampling Date:	July 20th, 2016
Water Body:	Annapolis Basin
Lease Name and Number:	Rattling Beach #1039
Water Temperature (°C)	14.4 °C
Wind Direction and Speed:	NW 15 knots shifting to SW 15-20 knots
Wave Action:	calm
Current Direction & Speed:	Strong SW->NE with the wind
Tide Schedule:	High: 12:40 Low: 18:49
Vessel:	Carolina Skiff

Lease # or Reference Site:	Reference	**Station Comments:**
Video Start Time:	10:36 AM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:**
Sampling Station ID:	ANB-A	Moderately easily disturbed, fine, brown sand & pebbles; scallop shells; rock crabs; macroalgae
Dist. and Dir. from Waypoint:	8 m @ 330°	
Sampling Coordinates:	N44 38.946 W65 45.228	**Benthic Descriptor Key:**
Station Depth (m):	11	[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.* Eelgrass, 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) Standard Ponar Grab	0.28	Y	ANB - A (1)	Brown mud, sand, gravel	None	4	Scallop shell
Benthic Replicate 2 (10 mL) Standard Ponar Grab	0.23	Y	ANB - A (2)	Brown mud, sand, gravel	None	1	Scallop shell
Benthic Replicate 3 (10 mL) Standard Ponar Grab	0.28	Y	ANB - A (3)	Brown mud, sand, gravel	None	1	Whelks, fish bone

Table 7 – Corner #4 Benthic Log

Lease # or Reference Site:	Corner						**Station Comments:**
Video Start Time:	11:28 AM						
Recorder Name(s):	[redacted]						
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]						**Video Notes:**
Sampling Station ID:	Corner #4						Moderately easily disturbed, brown sand, mud, pebbles, boulders & shell hash; rock crabs; scallop shells; macroalgae
Dist. and Dir. from Waypoint:	8 m @ 3.2 °						
Sampling Coordinates:	N44 38. 9977 W65 45.1614						**Benthic Descriptor Key:**
Station Depth (m):	20						[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:	3						[3] *e.g.* Eelgrass, 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) Standard Ponar Grab	0.28	Y	RB4 (1)	Brown mud, sand, pebbles, shell hash	None	2	Shell, whelk, barnacles
Benthic Replicate 2 (10 mL) Standard Ponar Grab	0.28	Y	RB4 (2)	Brown mud, sand, pebbles, shell hash	None	5	Whelks
Benthic Replicate 3 (10 mL) Standard Ponar Grab	0.27	Y	RB4 (3)	Brown mud, sand, pebbles, shell hash	None	3	Whelks, barnacles

Table 8 – Corner #5 Benthic Log

Lease # or Reference Site:	Corner	**Station Comments:** No sediment samples were able to be collected.
Video Start Time:	12:10 PM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:**
Sampling Station ID:	Corner #5	Moderately easily disturbed, brown mud, sand & boulders; kelp; algae;
Dist. and Dir. from Waypoint:	7 m @ 310°	macroalgae; barnacles; rock crabs; other crab species (possibly green crabs)
Sampling Coordinates:	N44 38.9975 W64 45.4425	**Benthic Descriptor Key:**
Station Depth (m):	7.4	[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.* Eelgrass, 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) Standard Ponar Grab		N					
Benthic Replicate 2 (10 mL) Standard Ponar Grab		N					
Benthic Replicate 3 (10 mL) Standard Ponar Grab		N					

Table 9 – Corner #6 Benthic Log

Lease # or Reference Site:	Corner	**Station Comments:** No sediment samples were able to be collected.
Video Start Time:	12:31 PM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:**
Sampling Station ID:	Corner #6	Moderately easily disturbed, light-brown sand, silt & boulders; kelp; red algae; periwinkles; sea star
Dist. and Dir. from Waypoint:	6 m @ 336°	
Sampling Coordinates:	N44 39.0996 W65 45.4401	**Benthic Descriptor Key:**
Station Depth (m):	7	[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.* Eelgrass, 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) Standard Ponar Grab		N					
Benthic Replicate 2 (10 mL) Standard Ponar Grab		N					
Benthic Replicate 3 (10 mL) Standard Ponar Grab		N					

Table 10 – Corner #7 Benthic Log

Lease # or Reference Site:	Corner	**Station Comments:** No sediment samples were able to be collected.
Video Start Time:	12:54 PM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:**
Sampling Station ID:	Corner #7	Mostly boulders covered in barnacles and crustose algae; small
Dist. and Dir. from Waypoint:	5 m @ 335	patches of brown sand and mud; rockweed, green crab
Sampling Coordinates:	N44 39.316 W65 45.452	**Benthic Descriptor Key:**
Station Depth (m):	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.* Eelgrass, 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) Standard Ponar Grab		N					
Benthic Replicate 2 (10 mL) Standard Ponar Grab		N					
Benthic Replicate 3 (10 mL) Standard Ponar Grab		N					

Table 11 – Corner #1 Benthic Log

Lease # or Reference Site:	Corner						**Station Comments:** No sediment samples were able to be collected.
Video Start Time:	1:11 PM						
Recorder Name(s):	[redacted]						
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]						**Video Notes:** Mostly boulders covered in barnacles; some light brown mud with sand patches; red algae and kelp
Sampling Station ID:	Corner #1						
Dist. and Dir. from Waypoint:	4 m @ 128°						
Sampling Coordinates:	N44 39.4502 W65 45.4058						**Benthic Descriptor Key:**
Station Depth (m):	6.7						[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) Standard Ponar Grab		N					
Benthic Replicate 2 (10 mL) Standard Ponar Grab		N					
Benthic Replicate 3 (10 mL) Standard Ponar Grab		N					

Table 12 – ANB-01 Benthic Log

Table 13 – Corner #2 Benthic Log

Lease # or Reference Site:	Corner	**Station Comments:**
Video Start Time:	2:10 PM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:**
Sampling Station ID:	Corner #2	Moderately to easily disturbed brown mud, sand & cobble; lots of
Dist. and Dir. from Waypoint:	4 m @ 153°	shell debris and scallop shells; some *Flustra*
Sampling Coordinates:	N44 39.4480 W65 45.3020	**Benthic Descriptor Key:**
Station Depth (m):	27	[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.* Eelgrass, 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) Standard Ponar Grab	0.3	Y	RB2 (1)	Brown mud, sand, rocks	Moderate	4.5	Rockweed, *Flustra* , quahog, whelk
Benthic Replicate 2 (10 mL) Standard Ponar Grab	0.28	Y	RB2 (2)	Brown mud, sand, pebbles, cobble, gravel	None	3	Quahog, scallop shell, amphipods
Benthic Replicate 3 (10 mL) Standard Ponar Grab	0.29	Y	RB2 (3)	Brown mud, sand, pebbles, rocks	None	1	Shells, whelks, worm tubes, barnacles

Table 14 – Corner #3 Benthic Log

Lease # or Reference Site:	Corner	**Station Comments:** 1st video was scrapped due to the camera shifting in the frame. Lots of strong current affecting this station at the time of sampling.
Video Start Time:	2:59 PM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:** Moderately easily disturbed mud, sand & cobble; shell debris; scallop shells; *Flustra;* rock crab; hermit crab
Sampling Station ID:	Corner #3	
Dist. and Dir. from Waypoint:	12 m @ 145°	
Sampling Coordinates:	N44 39.3764 W65 45.2049	**Benthic Descriptor Key:**
Station Depth (m):	31	[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:	3	[3] *e.g.* Eelgrass, 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) Standard Ponar Grab	0.27	Y	RB3 (1)	Brown mud, sand	None	1	Shells, whelks
Benthic Replicate 2 (10 mL) Standard Ponar Grab	0.28	Y	RB3 (2)	Brown mud, sand, shell debris, rocks	None	5	Whelks
Benthic Replicate 3 (10 mL) Standard Ponar Grab	0.29	Y	RB3 (3)	Brown mud, sand, gravel, shell debris	None	2	Whelks

Table 15 – Redox potential and sulphide ion concentration for samples collected at proposed marine aquaculture lease #1039

Site #1039 – Rattling Beach

Sample Collection: July 20, 2016 10:20 - 15:30
Sample Analysis: Redox: July 21 2016 10:05 - 10:55
Sulphides: July 21, 2016 10:10 - 10:55

Sample I.D.		Core Sample Temp	Redox	Redox	Sulphide	
Station	ID #	°C	mV	mV$_{NHE}$	µM	mV
ANB-01	1	8.9	11.6	226.7	313	-869.9
	2	10.5	-209.0	4.5	193	-864.2
	3	10.5	-75.8	137.7	467	-875.1
Means		10.0	-91.1	**123.0**	**324**	-869.7
ANB-A	1	8.2	-15.8	200.0	25	-837.1
	2	7.5	70.0	286.5	58	-848.1
	3	10.8	55.0	268.2	55	-847.2
Means		8.8	36.4	**251.6**	**46**	-844.1
Corner #1	1	NS	NS	NS	NS	NS
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		N/A	N/A	N/A	N/A	N/A
Corner #2	1	8.8	-35.8	179.4	343	-871.0
	2	12.0	-36.5	175.5	382	-872.4
	3	10.4	-119.6	94.0	292	-869.2
Means		10.4	-64.0	**149.6**	**339**	-870.9
Corner #3	1	8.2	-109.7	106.1	34	-840.8
	2	8.2	-66.9	148.9	19	-833.2
	3	9.9	-11.2	202.9	51	-846.2
Means		8.8	-62.6	**152.6**	**35**	-840.1
Corner #4	1	10.0	-125.4	88.6	29	-838.9
	2	8.0	-112.1	103.9	117	-857.0
	3	10.2	46.3	260.1	23	-835.5
Means		9.4	-63.7	**150.9**	**56**	-843.8
Corner #5	1	NS	NS	NS	NS	NS
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		N/A	N/A	N/A	N/A	N/A
Corner #6	1	NS	NS	NS	NS	NS
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		N/A	N/A	N/A	N/A	N/A
Corner #7	1	NS	NS	NS	NS	NS
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		N/A	N/A	N/A	N/A	N/A

Redox Test Solution
Prior to analysis: 220.8 mV @ 25°C
Post analysis: 220.8 mV @ 25°C

Sulphide Probe 1 Calibration:

Standard	mV
100	-855.3
500	-876.3
1000	-884.6
5000	-901.9
10000	-909.7

Sulphide Probe Calibration Temperatures: 20.8°C

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

Figure 5 – Mean redox potential and sulphide ion concentration at proposed marine aquaculture lease #1039

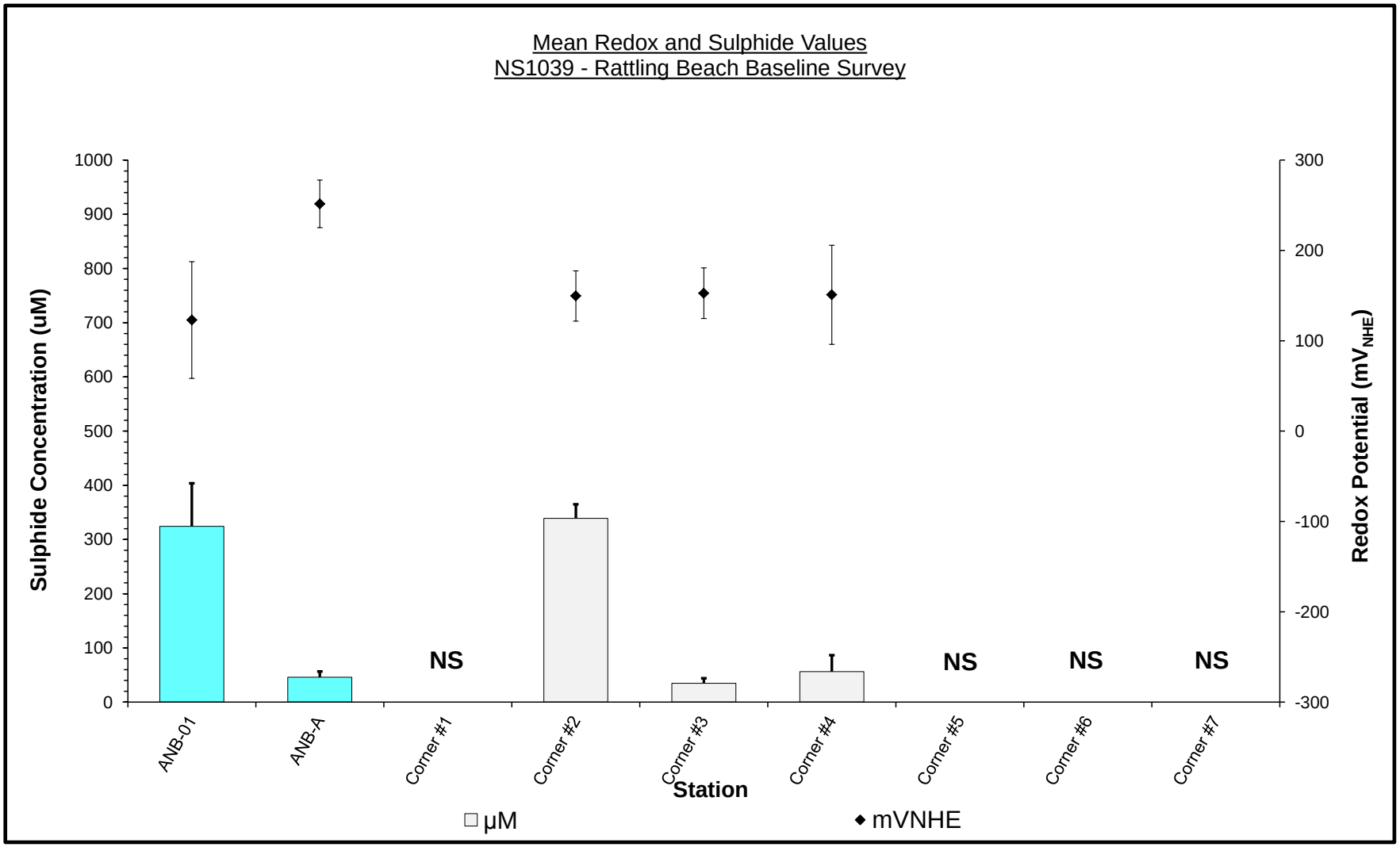


Table 16 – 2016 Baseline porosity and percent organic matter data for site #1039

Station	Sample #	Porosity Value (%)	% Organic Matter
ANB-01	1	30.16	2.29
ANB-01	2	25.83	1.99
ANB-01	3	44.22	4.34
ANB-A	1	21.40	1.65
ANB-A	2	20.01	1.27
ANB-A	3	17.84	1.55
Corner #1	1	NS	NS
Corner #1	2	NS	NS
Corner #1	3	NS	NS
Corner #2	1	17.61	1.39
Corner #2	2	15.59	1.94
Corner #2	3	19.18	1.45
Corner #3	1	12.61	0.77
Corner #3	2	21.22	1.36
Corner #3	3	18.67	1.16
Corner #4	1	18.16	1.31
Corner #4	2	25.01	1.78
Corner #4	3	26.12	1.88
Corner #5	1	NS	NS
Corner #5	2	NS	NS
Corner #5	3	NS	NS
Corner #6	1	NS	NS
Corner #6	2	NS	NS
Corner #6	3	NS	NS
Corner #7	1	NS	NS
Corner #7	2	NS	NS
Corner #7	3	NS	NS

Note: samples in turquoise are from reference stations

6.0 DISCUSSION

6.1 Benthic Observation and Analysis

Review of the video footage and grab observations collected from the proposed lease area in the Annapolis Basin reveal no evidence of waste feed, salmon faeces, or other organic deposits. The substrate beneath site #1039 consisted mainly of cobble stones and pebbles at the western most stations closer to shore where sediment was not retrievable by surface-deployed grab. The remaining stations, where sediment was obtained, consisted mostly of medium to fine sand, gravel, and mud that was moderately packed. Shell hash and scallop shells were also very common due to scallop shucking that occurs in the area. Grain size analysis results are presented in Appendix C and further support these observations.

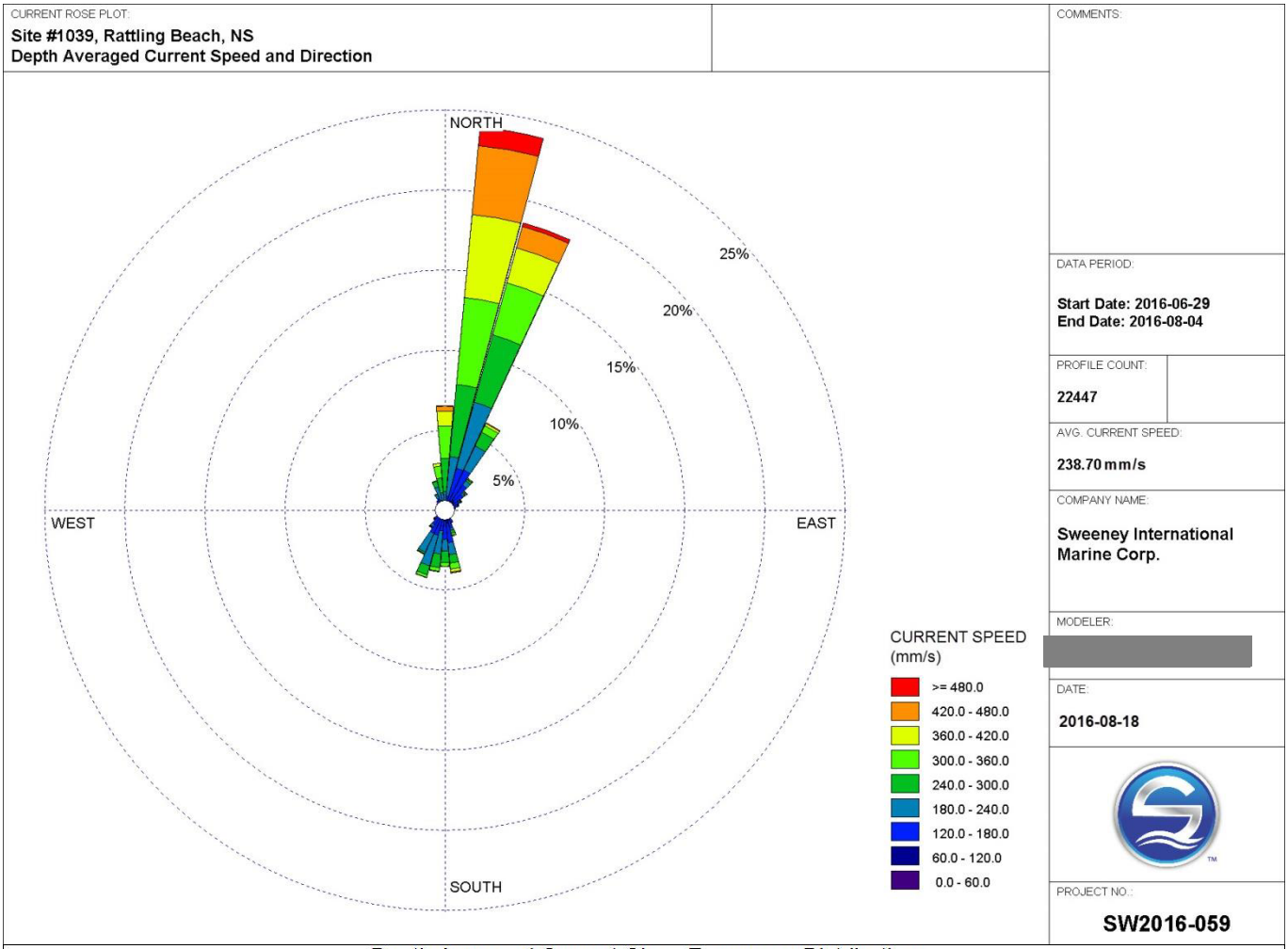
Flora and fauna observed in the video footage and in collected grab samples included rock crabs, green crabs, hermit crabs, whelks, barnacles, kelp, rockweed, sea stars, *Flustra,* periwinkles, and quahogs.

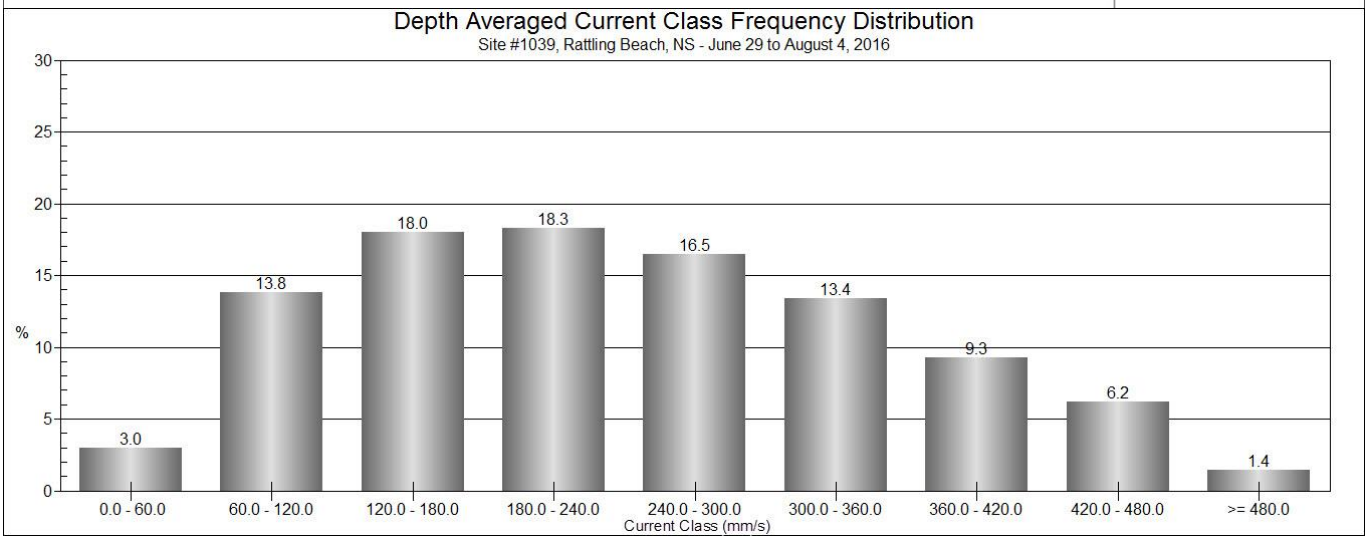
Analysis of the sulphide concentration and redox potential of the collected sediments revealed oxic conditions at every station where sediment could be collected. It should be noted that none of the grabs that yielded sediment met all of the necessary grab criteria; however, samples were collected when possible. The highest mean sulphide concentration obtained during this baseline assessment was 339 µM at the station located at corner #2 of the proposed lease.

6.2 Current Speed and Direction

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 are pointing to the east, then the current was flowing to the east). Analysis of the depth averaged current speed and direction at site #1039 shows that the majority of water flow experienced at this location flowed towards the north northeast, with approximately 42% of all recorded currents travelling between 5 and 25 degrees (NNE). The depth averaged current speed of all recorded profiles at this site was 23.87 cm/s (Fig. 6). In the depth profiles analysed, 3 – 10 m above the ocean bottom, the maximum recorded speed was 81.0 cm/s occurring 10 m from the bottom. The most frequently observed speeds were between 18 and 24 cm/s near the seafloor (25.3% at 3 m) and between 36 and 42 cm/s within the upper water column (22.2% at 10 m). The figures in Appendix H illustrate some of the trends in current flow throughout the water column at Rattling Beach. The direction of current flow remains relatively consistent throughout the water column, but the upper-most cell had a nearly unidirectional flow travelling between about 5 and 25 degrees. Data obtained from cells higher in the water column did not yield reliable data. Less than 75% of the data was present and was omitted from analysis. Average current speeds significantly varied with depth, with the cell nearest to the surface having the highest occurrence of currents greater than 80 cm/s.

Figure 6 – Average current speed and direction recorded at site #1039 within 3 – 10 m above the seafloor





6.3 Bathymetry

Side scan-based, depth profiling of lease #1039 was carried out on October 5, 2016 and the data gathered used to produce both a three-dimensional, surface map and a two-dimensional, contour diagram of the site. Figures 7 - 8 show the water depth within the survey area at the time of scanning, which ranged from approximately 2m at the northwest and southwest corners. The eastern side of site is in deeper water ranging from 20 m in the southeast corner to 36 m in the northeast corner.

It should be noted that the Z axis of the 3D surface map is not displayed at the same scale as that of the X and Y axes. This exaggerates relatively small and gradual depth changes over a large geographical area allowing for a more easily understood bathymetric profile. Depths in both the 2D and 3D contour diagrams have not been corrected for tidal influences, thus the soundings displayed represent the depths at the time of recording and not depth relative to chart datum.

Figure 7 – Interpolated 2D bathymetric profiles of site #1039 at Rattling Beach

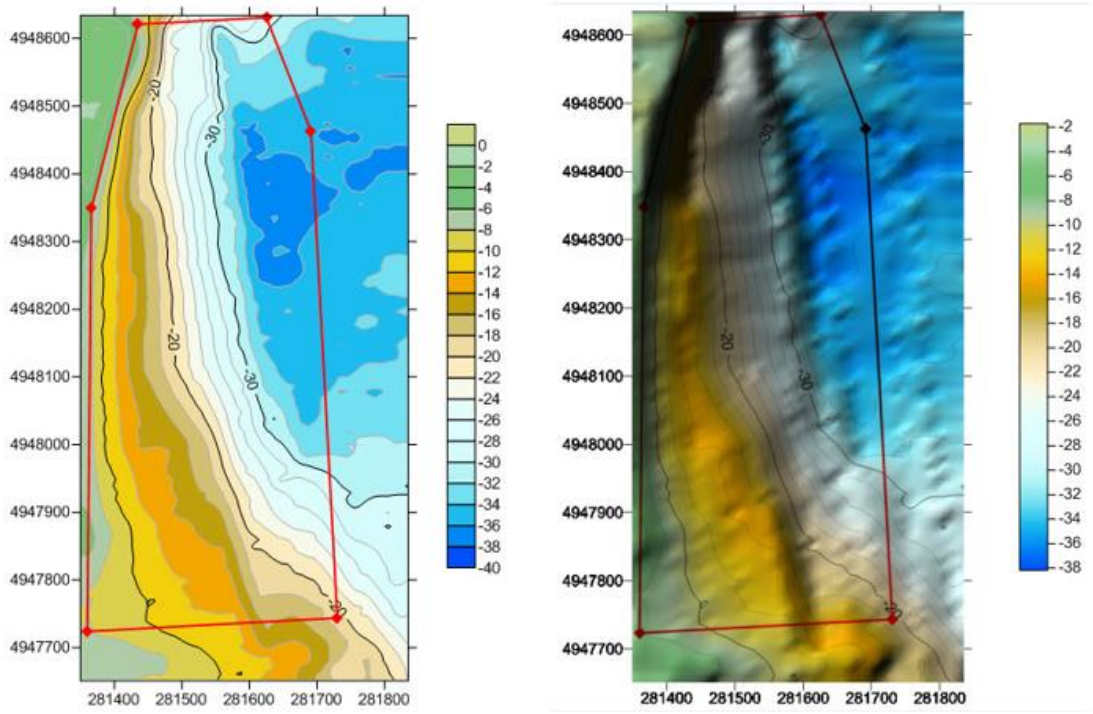
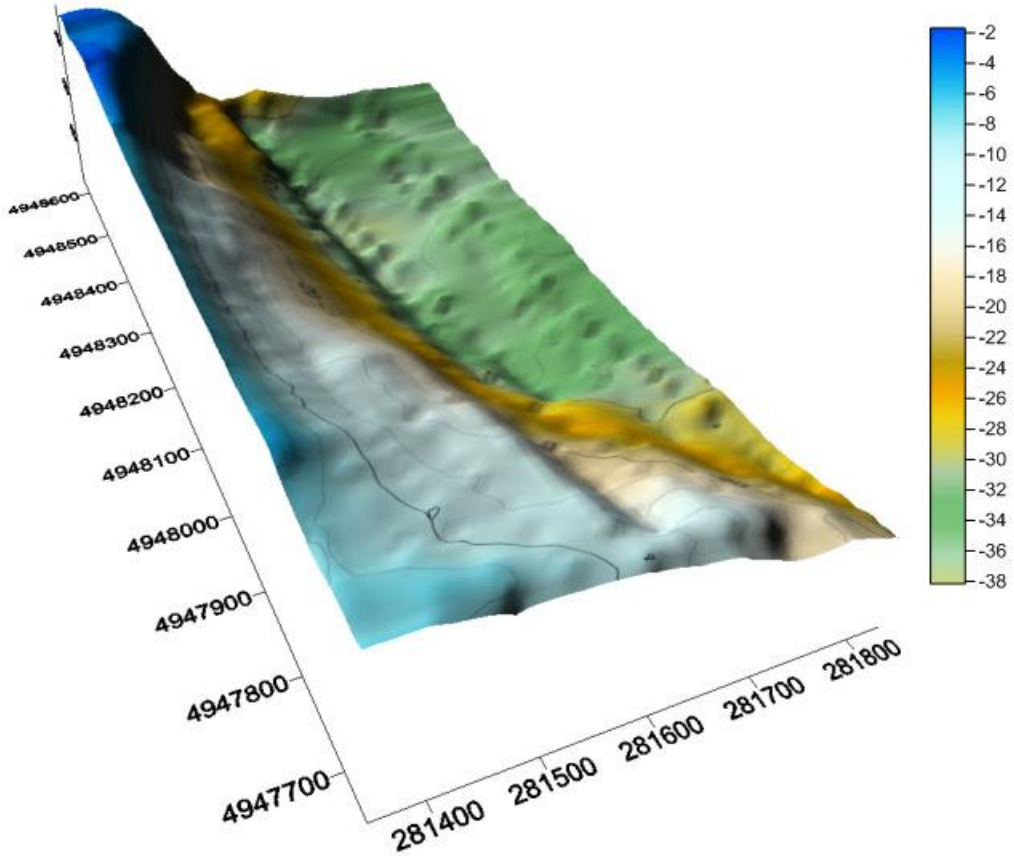


Figure 8 – Interpolated 3D surface map of site #1039 at Rattling Beach site



APPENDIX A
Sulphide Probe Calibration Certificate

NRC-IMB Research Facilities
1411 Oxford Street
Suite 367-368
Halifax, NS
B3H 3Z1
Tel: (902) 492-7865
(902) 492-0359
Fax: (902) 492-7734

Date: 21-Jul-16
Meter: 2007891
Sulfide Probe ID: RS1-12416

Project: SW2016-059 Rattling Beach (#1039)

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

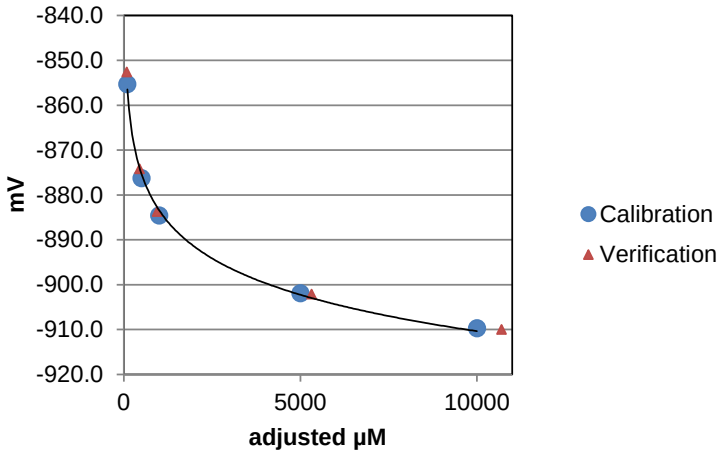
Date calibration performed: 21-Jul-16
Time calibration completed: 9:55am **Expiration time:** 12:55pm
Calibration performed by: [redacted]

Temperature calibration performed at: 20.8°C

Calibration -

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

10 µM (really 100 µM)	set at	-855.3 mV	read at	8.19 µM at	-852.6 mV
50 µM (really 500 µM)	set at	-876.3 mV	read at	44.2 µM at	-874.2 mV
100 µM (really 1000 µM)	set at	-884.6 mV	read at	94.3 µM at	-883.7 mV
500 µM (really 5 000 µM)	set at	-901.9 mV	read at	532 µM at	-902.1 mV
1 000 µM (really 10 000 µM)	set at	-909.7 mV	read at	1070 µM at	-910.0 mV



Final slope (meter) = -30.0 mV

10 fold slope (validation)

500 to 5 000 µM: -25.6 mV
1000 to 10 000 µM: -25.1 mV

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

Signed off by:

[redacted], M.Sc.
Senior Laboratory Manager

APPENDIX B
Redox and Sulphide Data Sheet

NRC-IMB Research Facilities
1411 Oxford Street
Suite 367-368
Halifax, NS
B3H 3Z1
Tel: (902) 492-7865
(902) 492-0359
Fax: (902) 492-7734
www.simcorp.ca

Site #: Rattling Beach (#1039)
Redox Start: 10:05am on 21-Jul-16
Sulphide Start: 10:10am on 21-Jul-16

Sample Collection: 20-Jul-16
Redox Stop: 10:55am on 21-Jul-16
Sulphide Stop: 10:55am on 21-Jul-16

Sample I.D.		Temp	Redox	Sulphide		
Station	ID #	°C	mV	unadjusted µM	mV	adjusted µM
ANB-01	1	8.9	11.6	31.3	-869.9	313
	2	10.5	-209.0	19.3	-864.2	193
	3	10.5	-75.8	46.7	-875.1	467
ANB-A	1	8.2	-15.8	2.48	-837.1	24.8
	2	7.5	70.0	5.80	-848.1	58.0
	3	10.8	55.0	5.52	-847.2	55.2
Corner #1	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-
Corner #2	1	8.8	-35.8	34.3	-871.0	343
	2	12.0	-36.5	38.2	-872.4	382
	3	10.4	-199.6	29.2	-869.2	292
Corner #3	1	8.2	-109.7	3.42	-840.8	34.2
	2	8.2	-66.9	1.86	-833.2	18.6
	3	9.9	-11.2	5.13	-846.2	51.3
Corner #4	1	10.0	-125.4	2.89	-838.9	28.9
	2	8.0	-112.1	11.7	-857.0	117
	3	10.2	46.3	2.31	-835.5	23.1
Corner #5	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-
Corner #6	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-
Corner #7	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-

Field Crew: [redacted]

Analysis Crew: [redacted]

Redox Check (mV):
Prior to analysis: 220.8 mV @ 25°C
Post analysis: 220.8 mV @ 25°C

Sulphide Temp: 20.8°C

Redox reading at 2 minutes

Equipment:

Sulphide Analysis
Probe kit: NSLAB004
Sulphide probe: RS1-12416
Temperature probe: T012

Redox Analysis
Meter number: 487142
Redox probe: R002
Temperature probe: T007

SAOB + L-AA mixture

Addition: 10:00am

Expiration: 1:00pm

Signed off by:

[redacted], M.Sc.
Senior Laboratory Manager

APPENDIX C
Sediment Grain Size Analysis

NRC-IMB Research
Facilities
1411 Oxford Street
Suite 367-368
Halifax, NS
B3H 3Z1
Tel: (902) 492-7865
(902) 492-0359
Fax: (902) 492-7734

Date: 02-Aug-16
File No.: SW2016-114
Site Name/#: Rattling Beach (#1039)
Province: Nova Scotia

Grain Size Analysis

			% Fraction								
		mm	**Corner #1**	**Corner #2**	**Corner #3**	**Corner #4**	**Corner #5**	**Corner #6**	**Corner #7**	**ANB-01**	**ANB-A**
Gravel	Pebble	>4	NS	40.745	22.918	22.694	NS	NS	NS	13.406	24.511
	Granule	2-4	NS	6.308	4.643	5.258	NS	NS	NS	2.759	4.891
Sand	Very Coarse	1-2	NS	4.365	2.687	4.147	NS	NS	NS	2.086	7.075
	Coarse	0.5-1	NS	5.592	8.040	6.531	NS	NS	NS	6.765	13.920
	Medium	0.25-0.5	NS	11.257	14.015	10.581	NS	NS	NS	32.562	19.261
	Fine	0.125-0.25	NS	12.377	22.035	17.301	NS	NS	NS	16.193	7.386
	Very Fine	0.063-0.125	NS	15.261	15.278	19.990	NS	NS	NS	13.742	12.561
Mud	Silt	0.004 - 0.063	NS	4.094	10.383	13.497	NS	NS	NS	12.486	10.396
% Gravel			NS	47.054	27.561	27.952	NS	NS	NS	16.165	29.402
% Sand			NS	48.852	62.055	58.551	NS	NS	NS	71.349	60.202
% Mud			NS	4.094	10.383	13.497	NS	NS	NS	12.486	10.396

Note: NS - No Sample Collected

Signed off by:

[redacted], M.Sc.
Senior Laboratory Manager

APPENDIX D
Grab Photos

ANB-A

Pre-siphon

Post-siphon

Grab leaked and was not siphoned

Grab leaked and was not siphoned

Grab leaked and was not siphoned

Corner #4

Pre-siphon

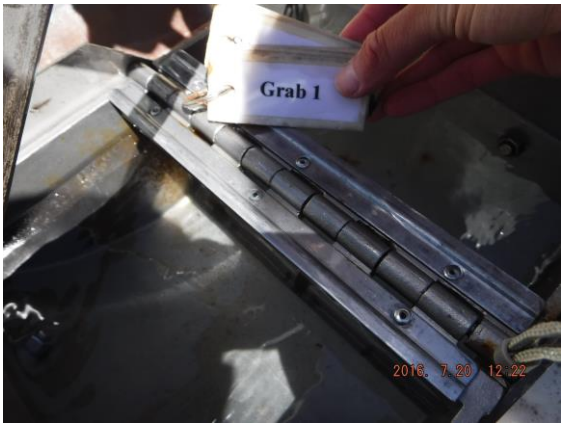
Post-siphon

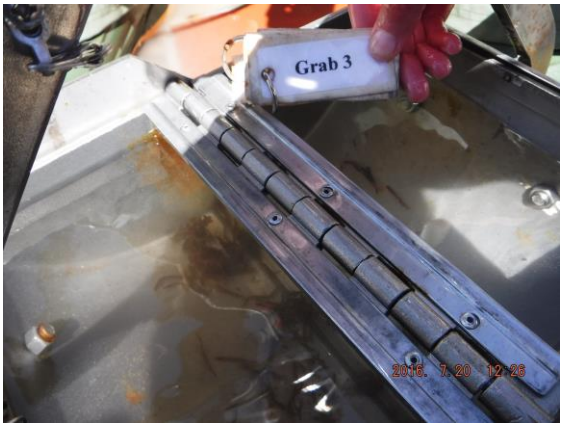
Grab leaked and was not siphoned

Grab leaked and was not siphoned

Corner #5

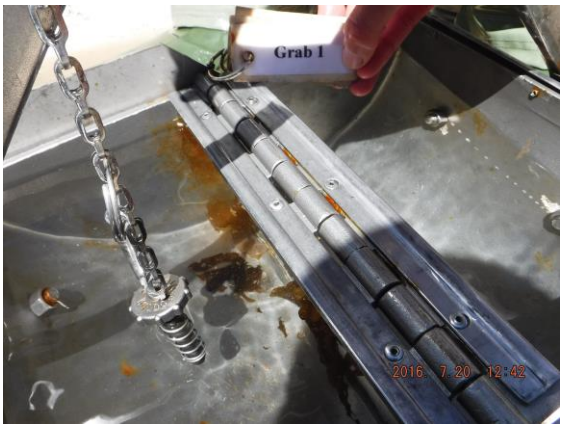
Grabs were not sampled

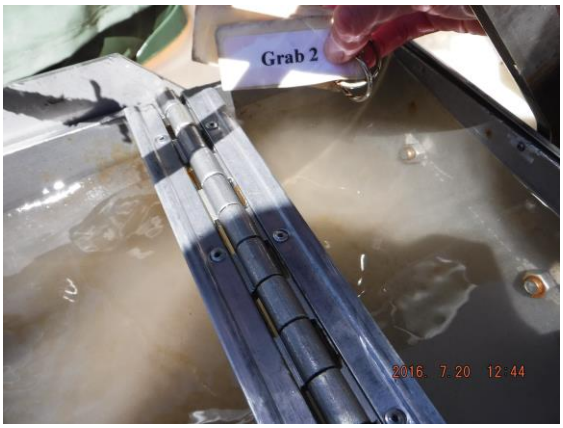




Corner #6

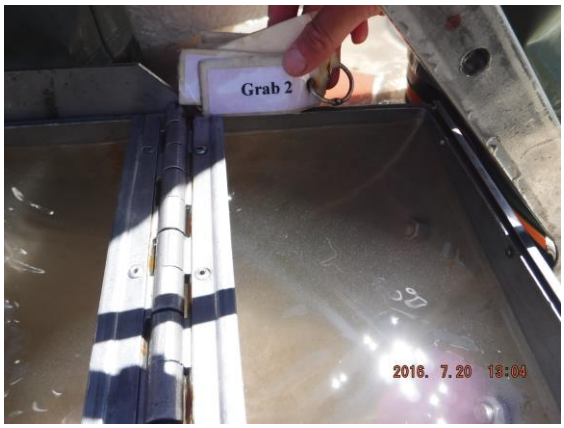
Grabs were not sampled





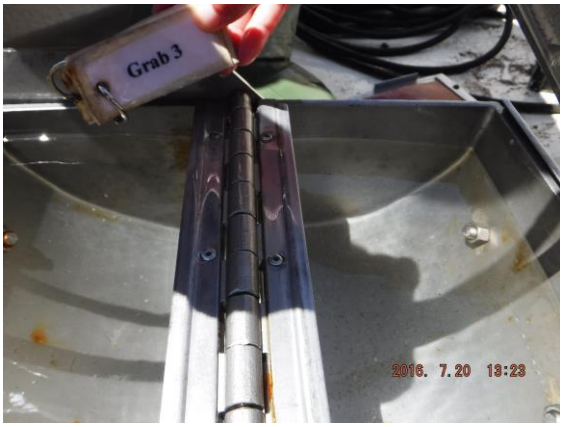
Corner #7

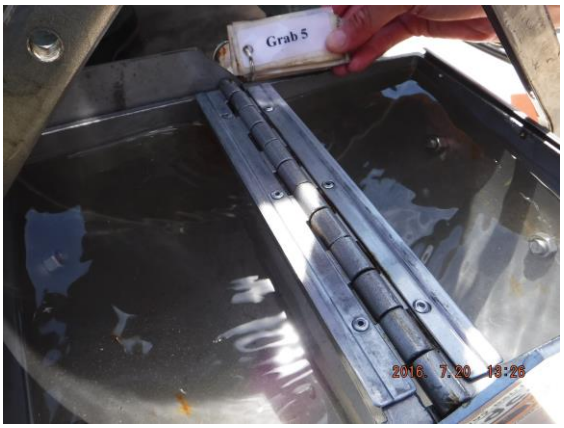
Grabs were not sampled



Corner #1

Grabs were not sampled





ANB-01

Pre-siphon

Post-siphon

Grab leaked and was not siphoned

Grab leaked and was not siphoned

Corner #2

Pre-siphon

Post-siphon

Grab leaked and was not siphoned

Grab leaked and was not siphoned

Grab leaked and was not siphoned

Corner #3

Pre-siphon

Post-siphon

Grab leaked and was not siphoned

.

Grab leaked and was not siphoned

Grab leaked and was not siphoned

APPENDIX E
Screen Captures of the Seafloor


ANB-A
44 38.9476 N
065 45.2351 W
2016/07/20 10:41:49


Corner #4
44 39.0016 N
065 45.1475 W
2016/07/20 11:33:37


Corner #5
44 38.9954 N
065 45.4358 W
2016/07/20 12:12:16


Corner #6
44 39.0980 N
065 45.4412 W
2016/07/20 12:36:28


Corner #7
44 39.3135 N
065 45.4520 W
2016/07/20 12:56:60

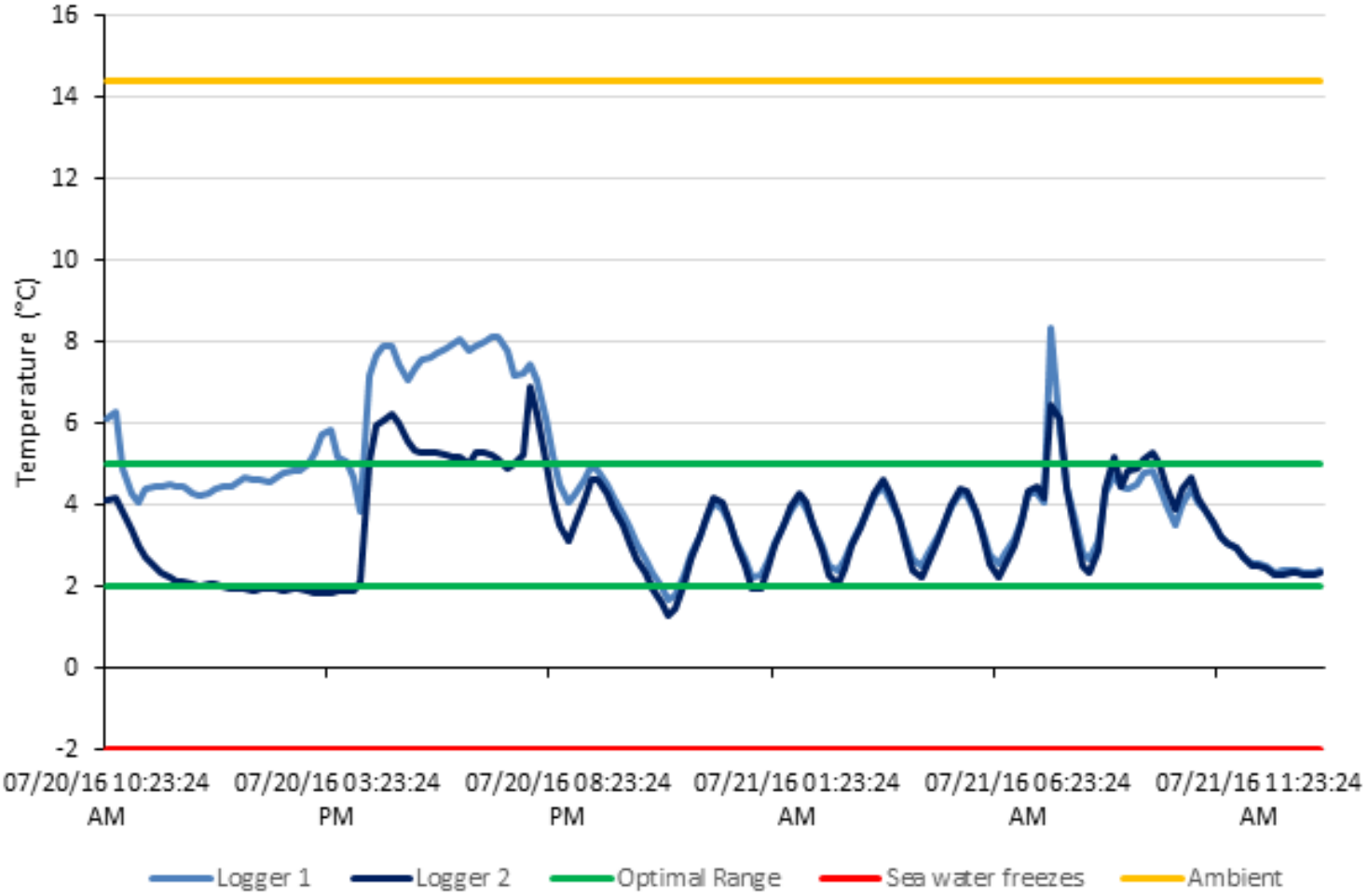

Corner #1
44 39.4482 N
065 45.4057 W
2016/07/20 13:14:29


ANB-01
44 39.5483 N
065 45.3614 W
2016/07/20 13:34:63


Corner #2
44 38.4607 N
065 45.3053 W
2016/07/20 14:12:22


Corner #3
44 39.3845 N
065 45.2038 W
2016/07/20 16:02:22

APPENDIX F
Sample Storage Temperature


16
14
12
10
8
6
4
2
0
-2
Temperature (°C)
07/20/16 10:23:24 AM
07/20/16 03:23:24 PM
07/20/16 08:23:24 PM
07/21/16 01:23:24 AM
07/21/16 06:23:24 AM
07/21/16 11:23:24 AM
Logger 1
Logger 2
Optimal Range
Sea water freezes
Ambient

APPENDIX G
Sediment Sample Quality Criteria

Station	Grab attempts	Grabs that were subsampled	Grab retrieval speeds (cm/s)	Flap position	Sediment depths (cm)	Reason for rejecting grab	Free-falls
ANB-A	6	4, 5, 6	28, 23, 28	Down	4, 1, 1	1 - no sediment 2 - no sediment 3 - no sediment	Yes
Corner #4	3	1, 2, 3	28, 28, 27	Down	2, 5, 3	N/A	No, yes, yes
Corner #5	5	None	N/A	N/A	N/A	1 - no sediment 2 - no sediment 3 - no sediment 4 - no sediment 5 - no sediment	N/A
Corner #6	5	None	N/A	N/A	N/A	1 - no sediment 2 - no sediment 3 - no sediment 4 - no sediment 5 - no sediment	N/A
Corner #7	5	None	N/A	N/A	N/A	1 - no sediment 2 - no sediment 3 - no sediment 4 - no sediment 5 - no sediment	N/A
Corner #1	5	None	N/A	N/A	N/A	1 - no sediment 2 - no sediment 3 - no sediment 4 - no sediment 5 - no sediment	N/A
ANB-01	4	2, 3, 4	26, 27, 25	Down	4, 3, 4	1 - no sediment	Yes
Corner #2	5	3, 4, 5	30, 28, 29	Down	4.5, 3, 1	1 - no sediment 2 - no sediment	Yes
Corner #3	3	1, 2, 3	27, 28, 29	Down	1, 5, 2	N/A	No, yes, yes

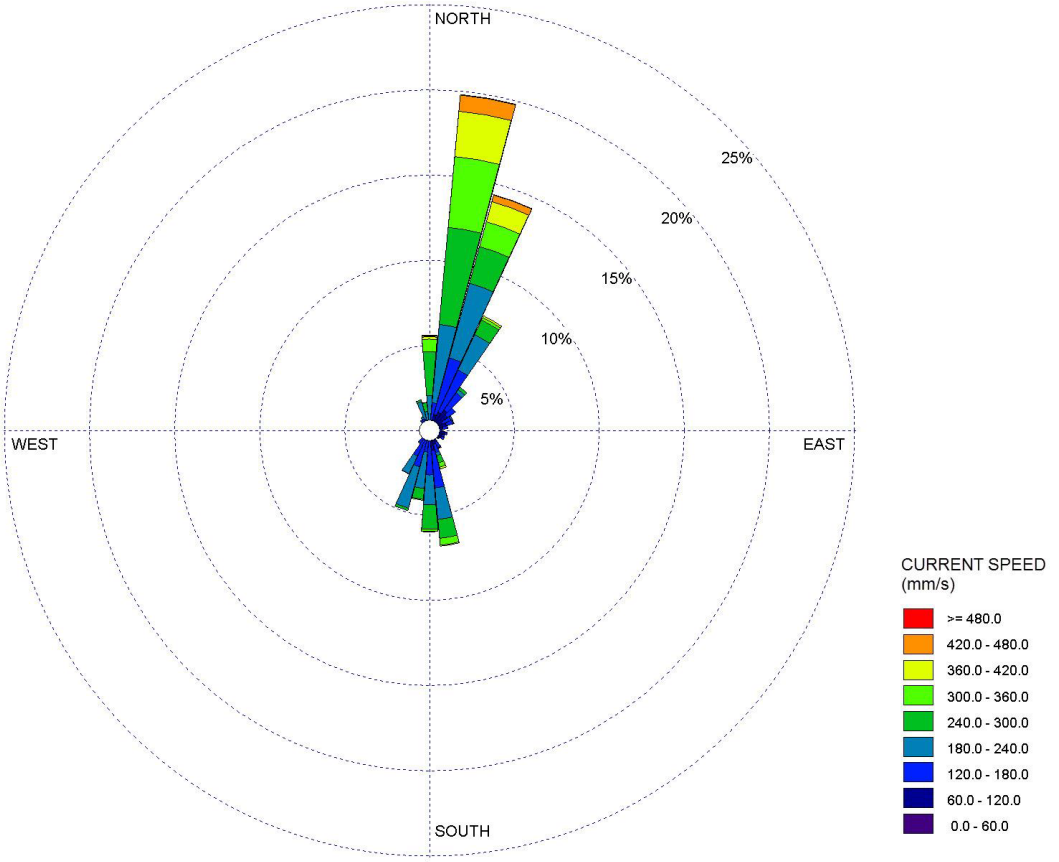
Station	Grab Attempt					
	Grab 1	Grab 2	Grab 3	Grab 4	Grab 5	Grab 6
ANB-A	SP	SP	SP	SP	SP	SP
Corner #4	SP	SP	SP	-	-	-
Corner #5	SP	SP	SP	SP	SP	-
Corner #6	SP	SP	SP	SP	SP	-
Corner #7	SP	SP	SP	SP	SP	-
Corner #1	SP	SP	SP	SP	SP	-
ANB-01	SP	SP	SP	SP	-	-
Corner #2	SP	SP	SP	SP	SP	-
Corner #3	SP	SP	SP	-	-	-

PP = Petite Ponar
SP = Standard Ponar
Grabs there were subsampled are highlighted in green

APPENDIX H
ADCP Data

CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 3m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

3455

AVG. CURRENT SPEED:

198.10 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

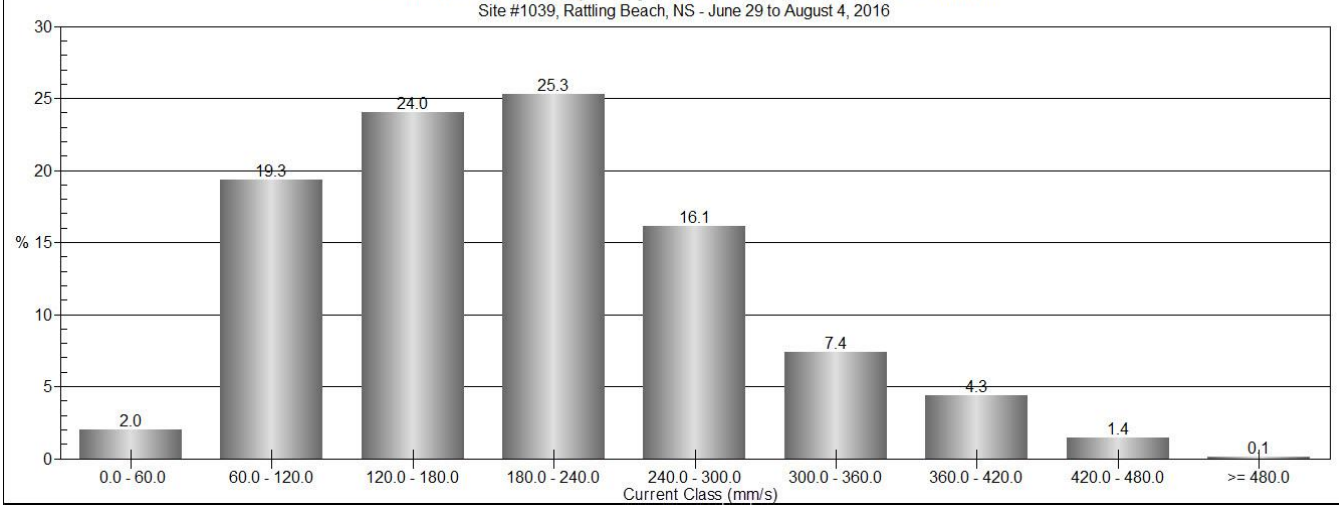
2016-08-18

PROJECT NO.:

SW2016-059

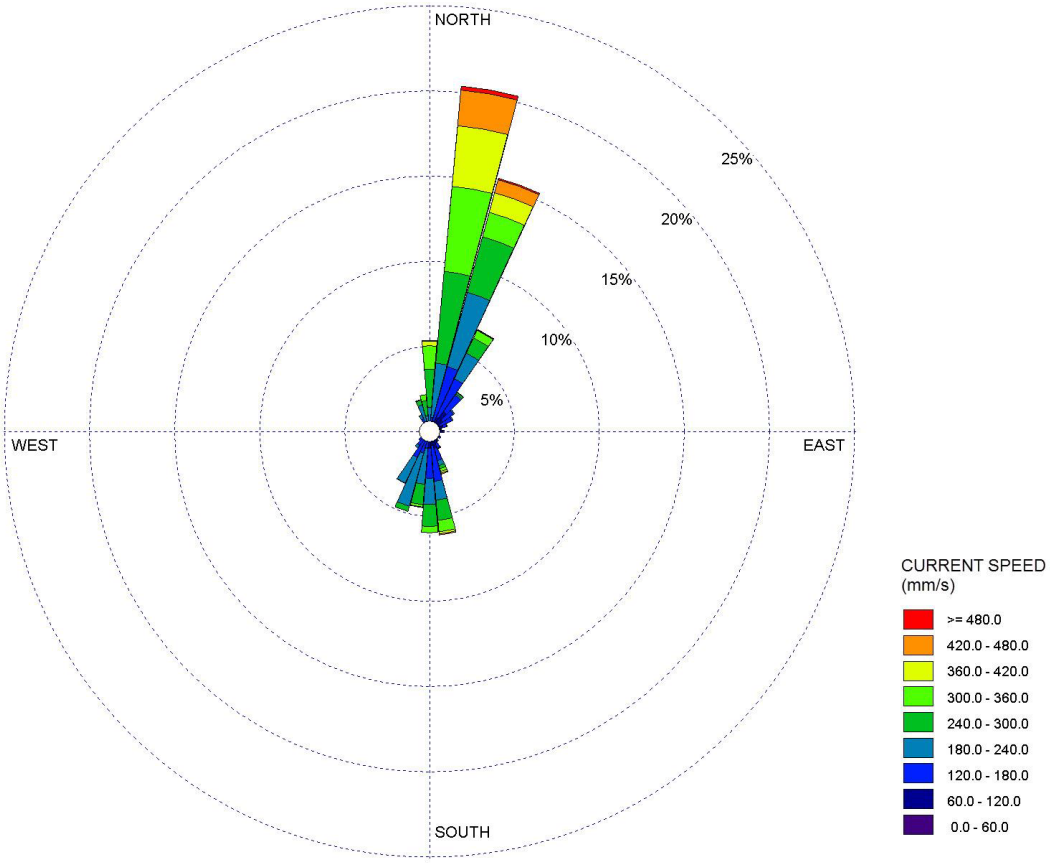
Current Class Frequency Distribution - 3m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 4m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

3440

AVG. CURRENT SPEED:

213.00 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

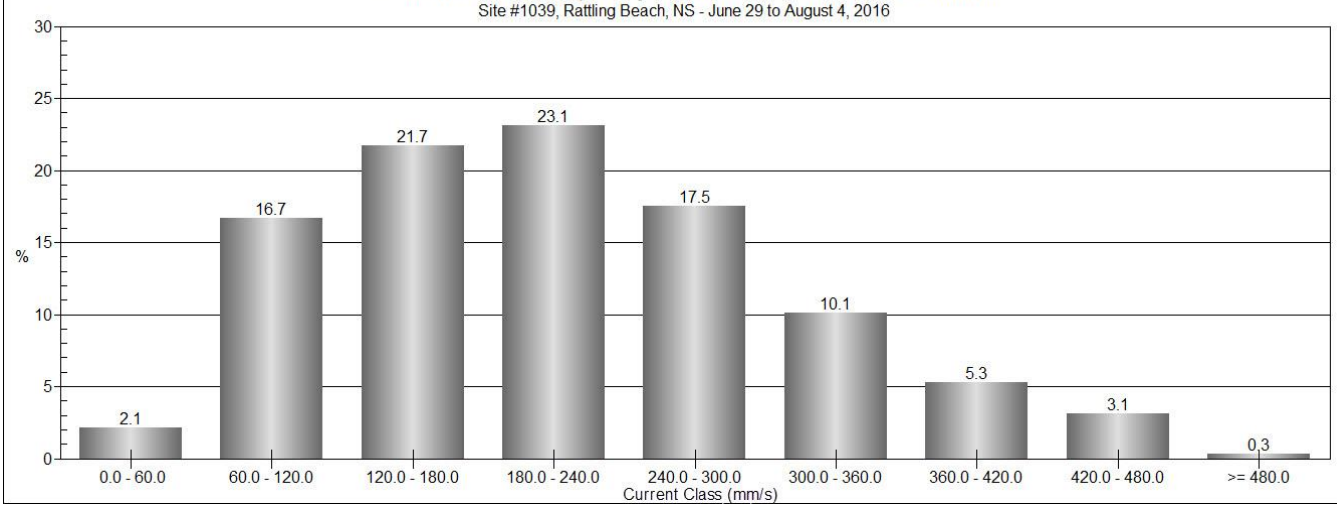
2016-08-18

PROJECT NO.:

SW2016-059

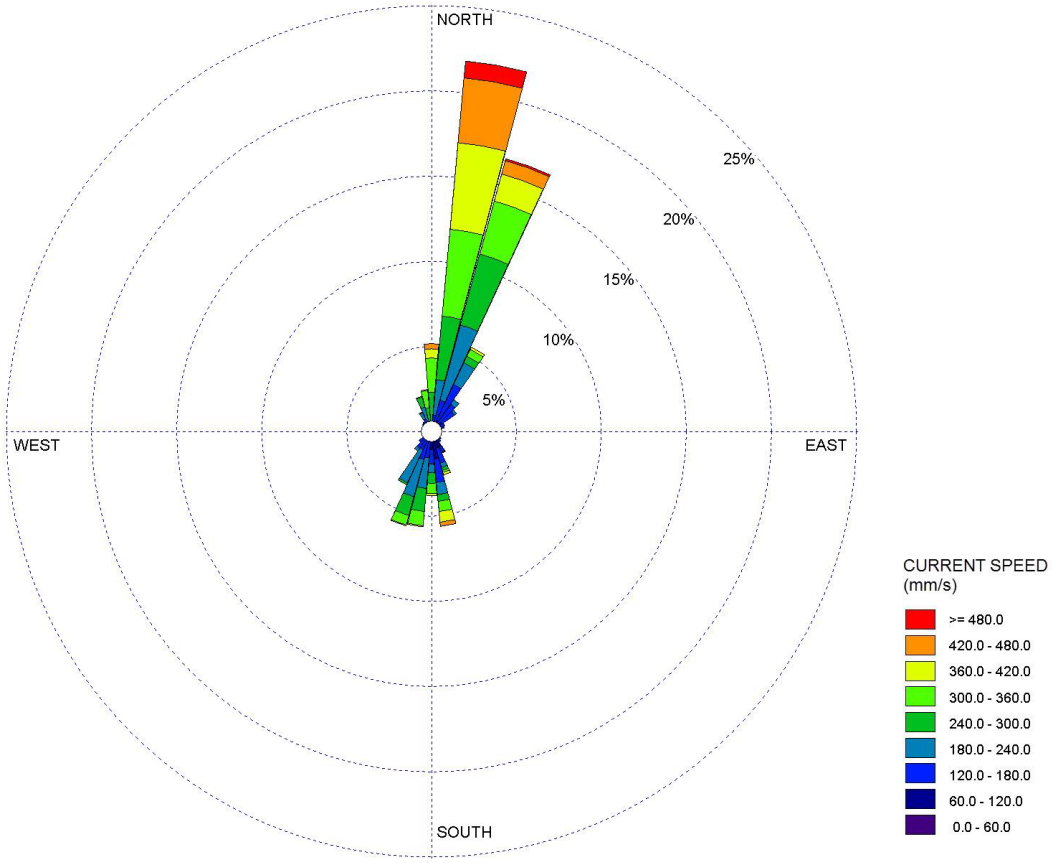
Current Class Frequency Distribution - 4m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 6m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

3337

AVG. CURRENT SPEED:

232.50 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

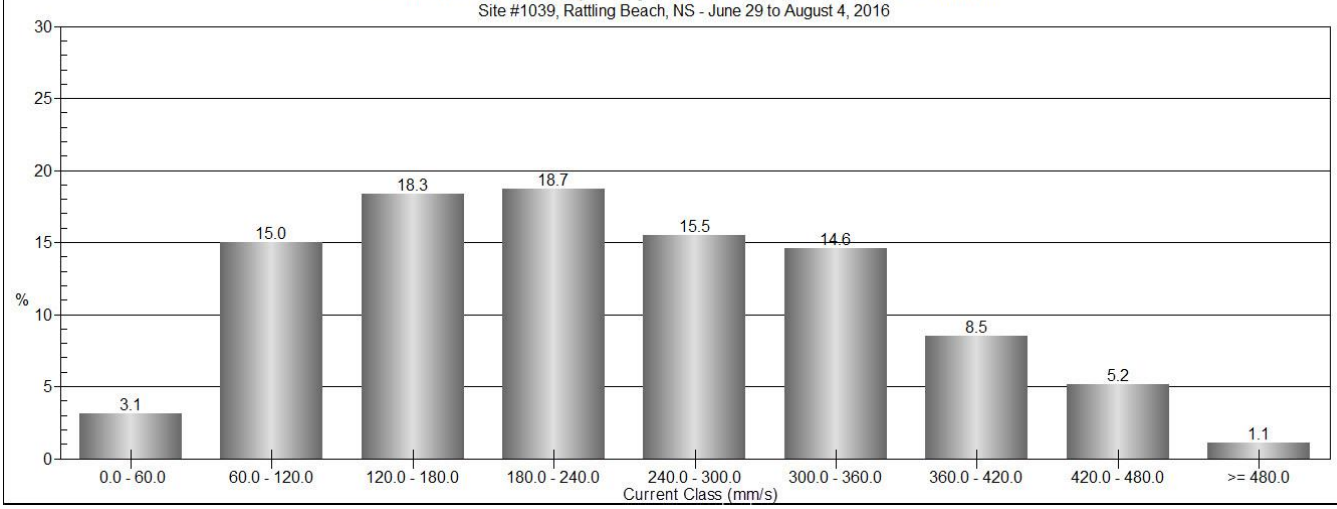
2016-08-18

PROJECT NO.:

SW2016-059

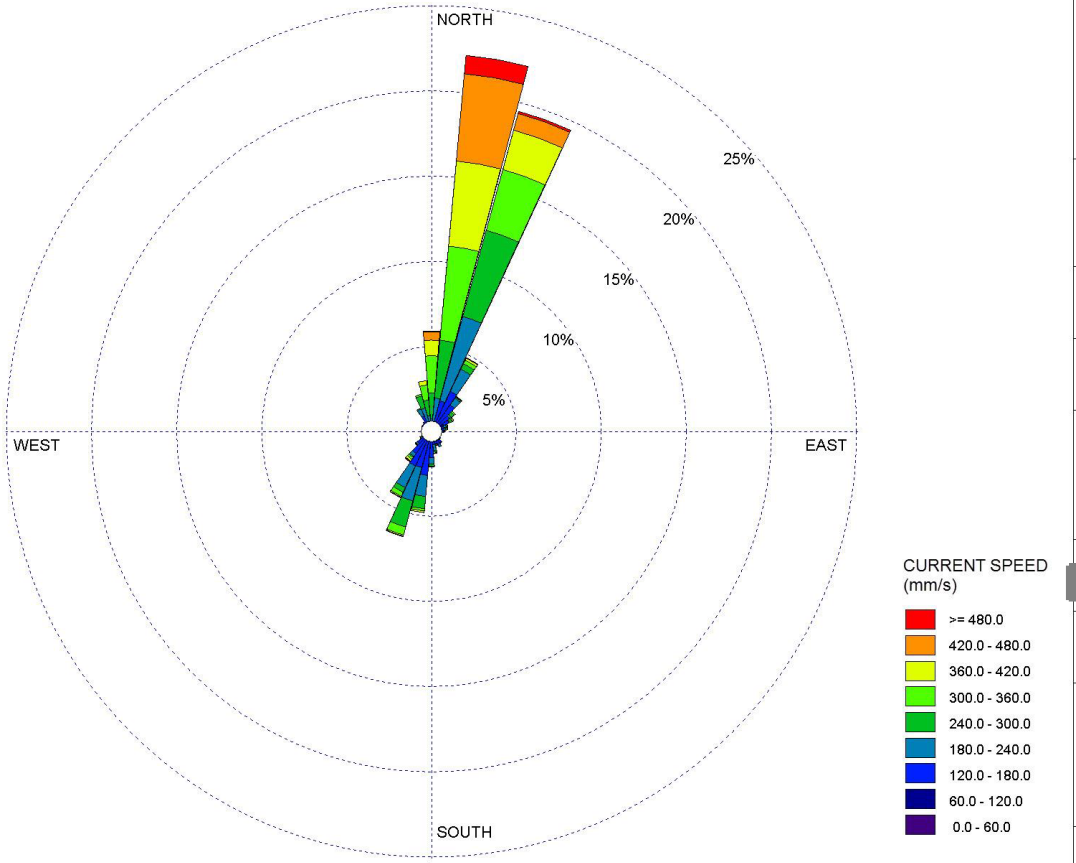
Current Class Frequency Distribution - 6m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 7m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

3060

AVG. CURRENT SPEED:

240.00 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

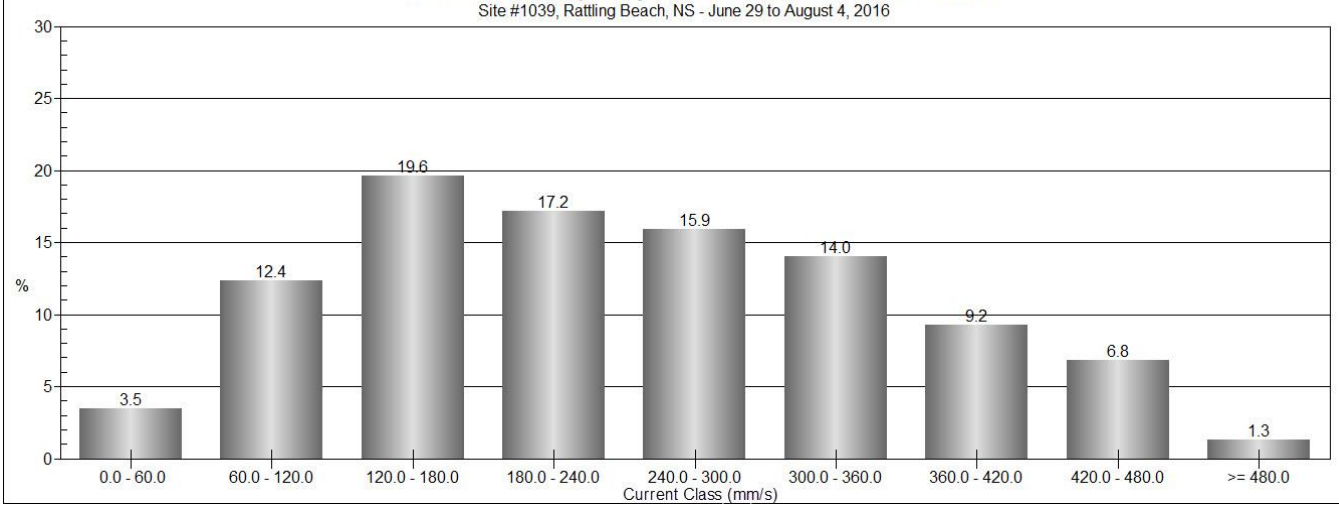
2016-08-18

PROJECT NO.:

SW2016-059

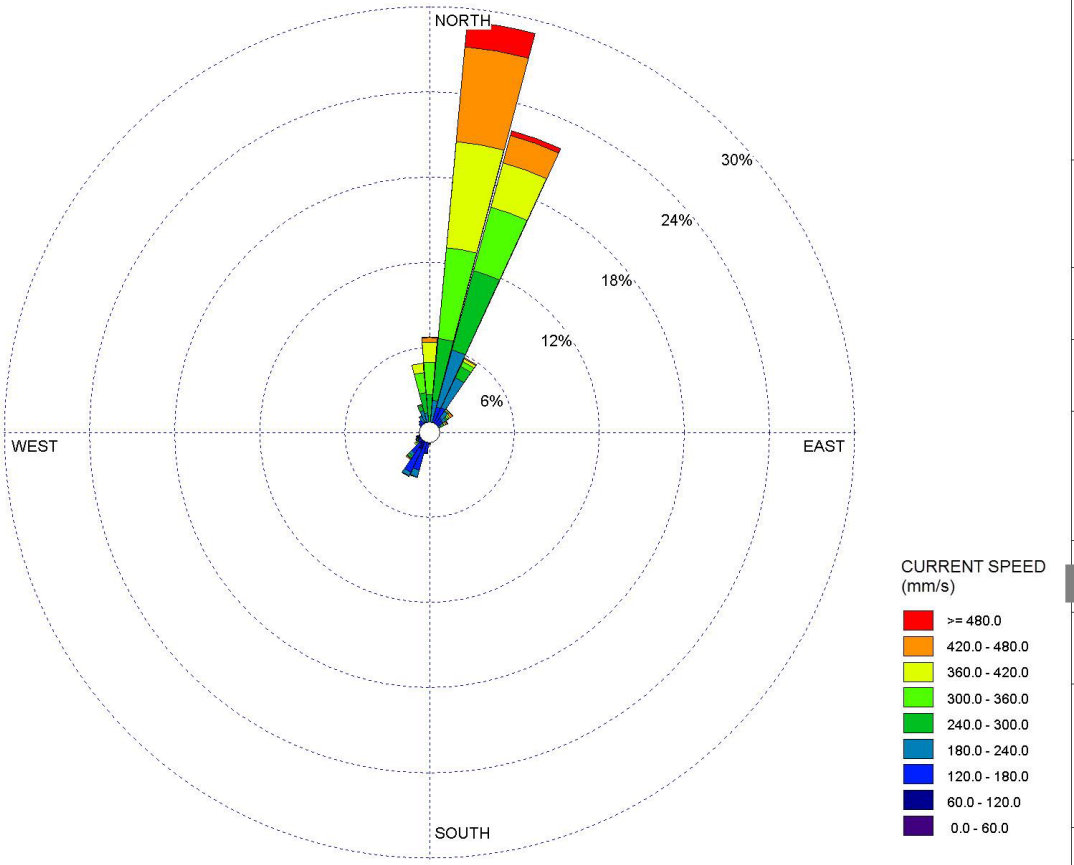
Current Class Frequency Distribution - 7m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 8m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

2406

AVG. CURRENT SPEED:

263.30 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

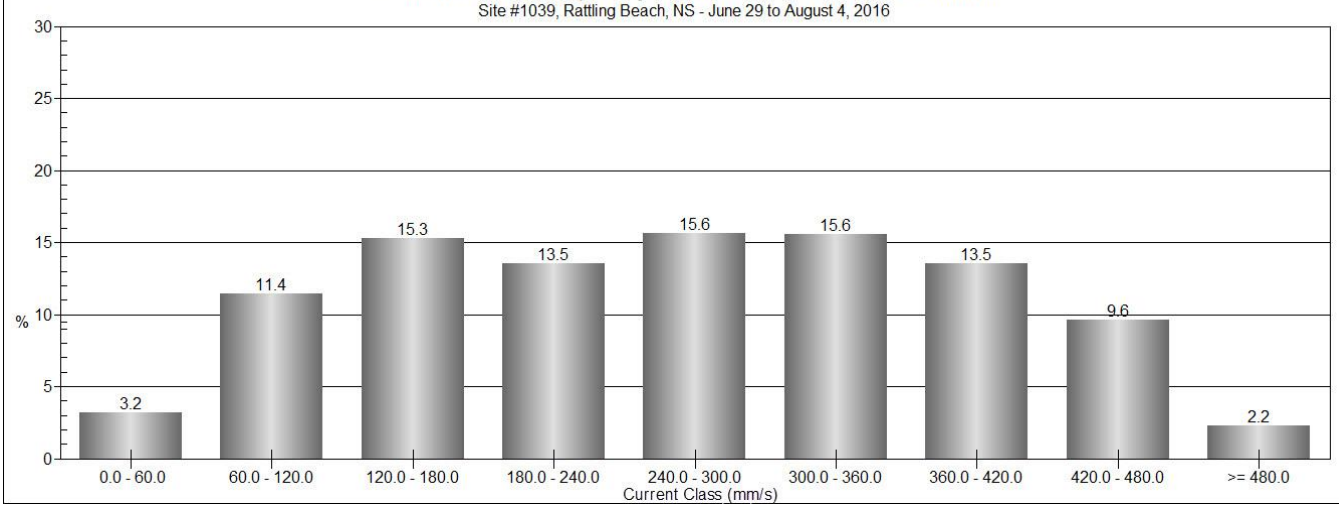
2016-08-18

PROJECT NO.:

SW2016-059

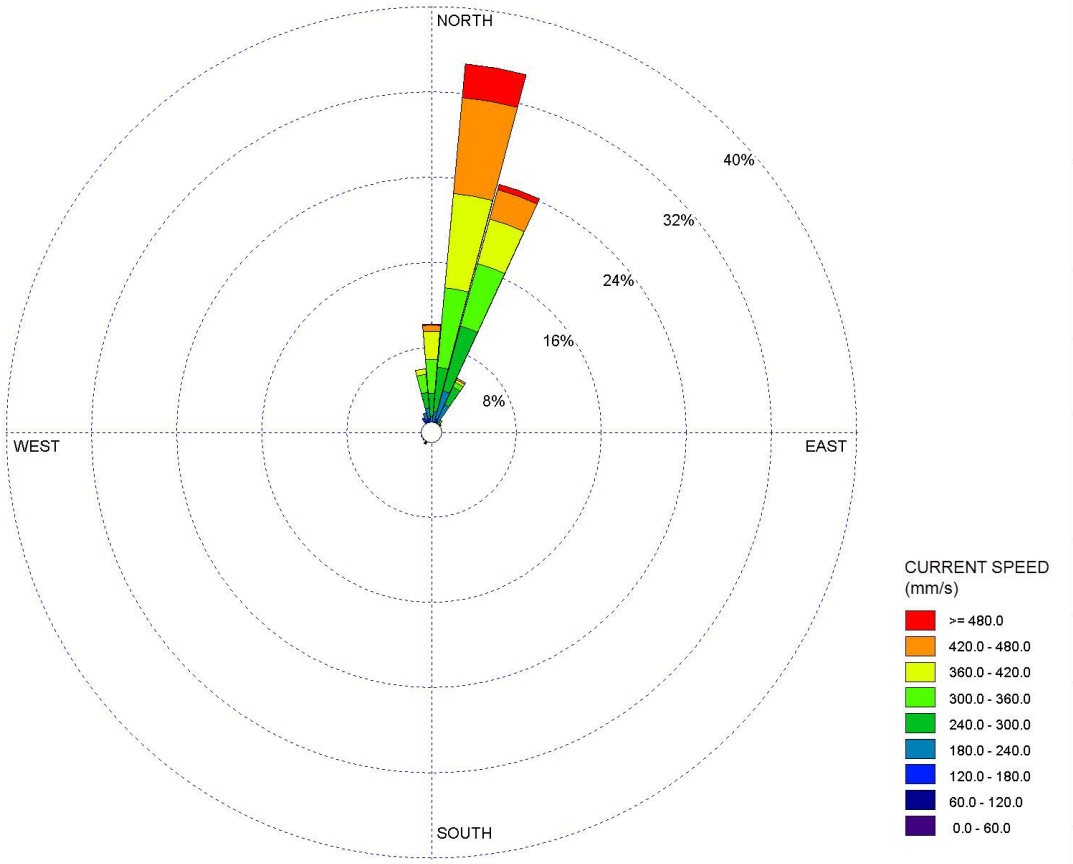
Current Class Frequency Distribution - 8m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 9m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

1894

AVG. CURRENT SPEED:

292.40 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

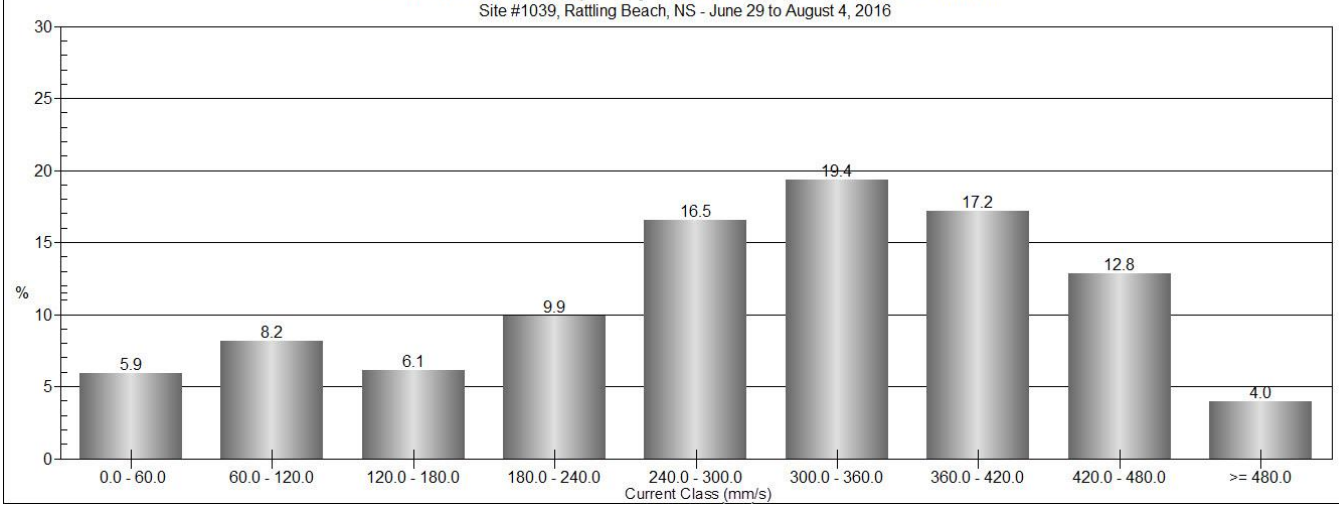
2016-08-18

PROJECT NO.:

SW2016-059

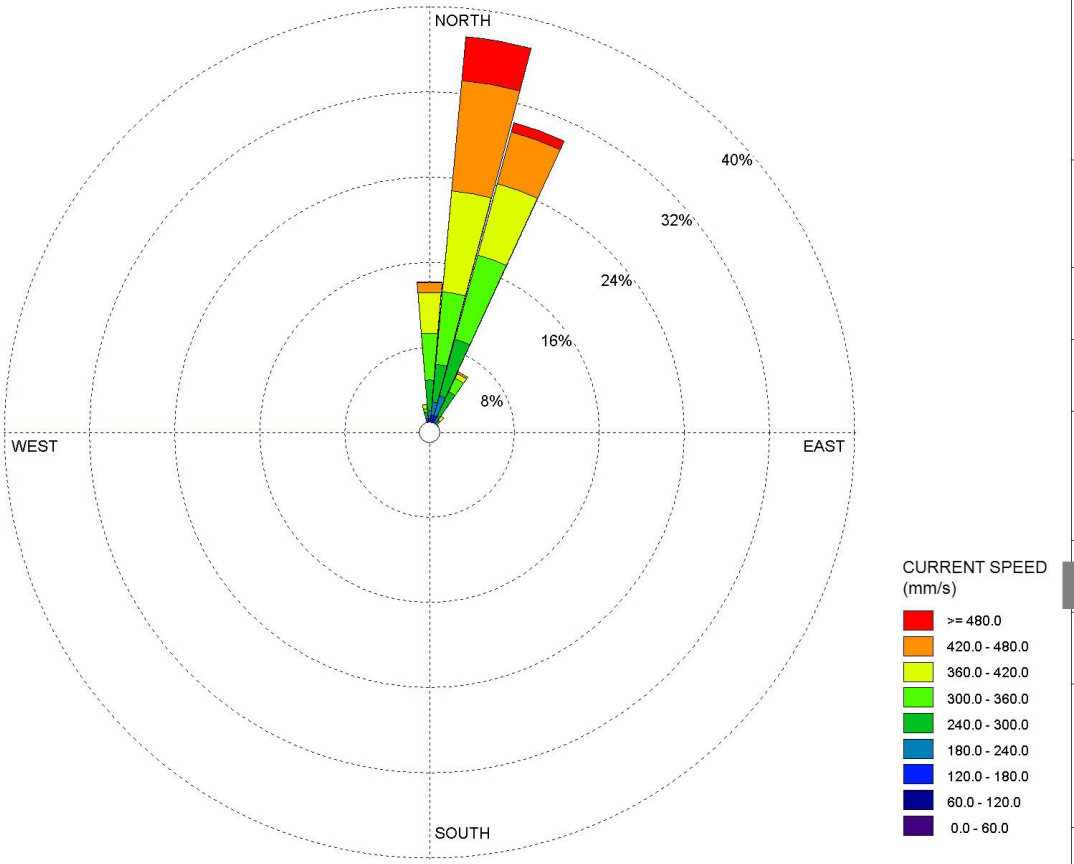
Current Class Frequency Distribution - 9m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 10m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

1455

AVG. CURRENT SPEED:

327.90 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

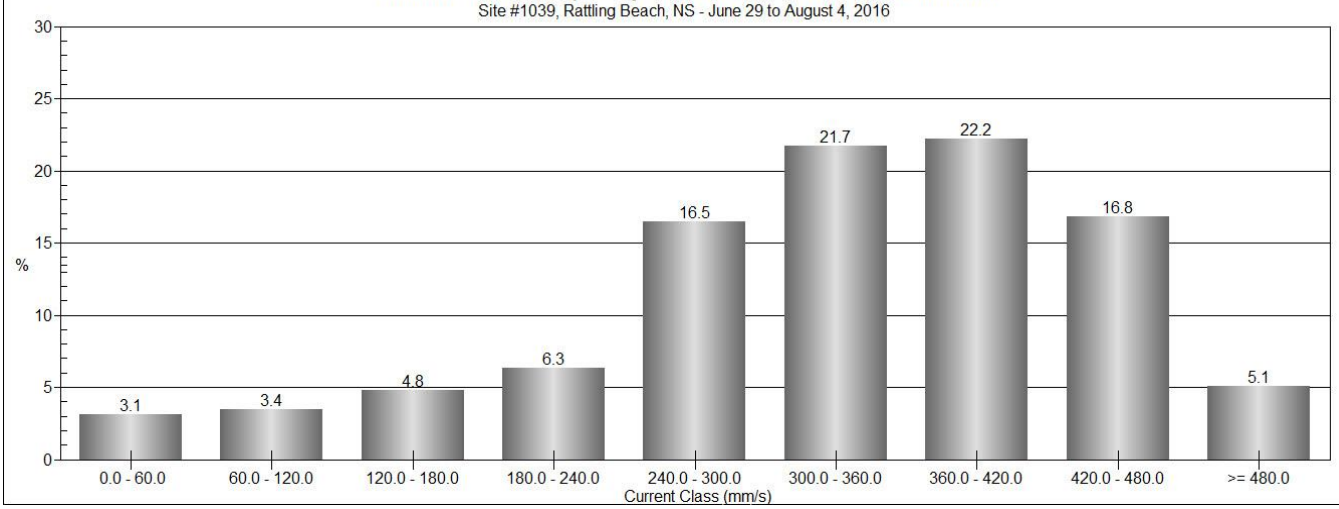
2016-08-18

PROJECT NO.:

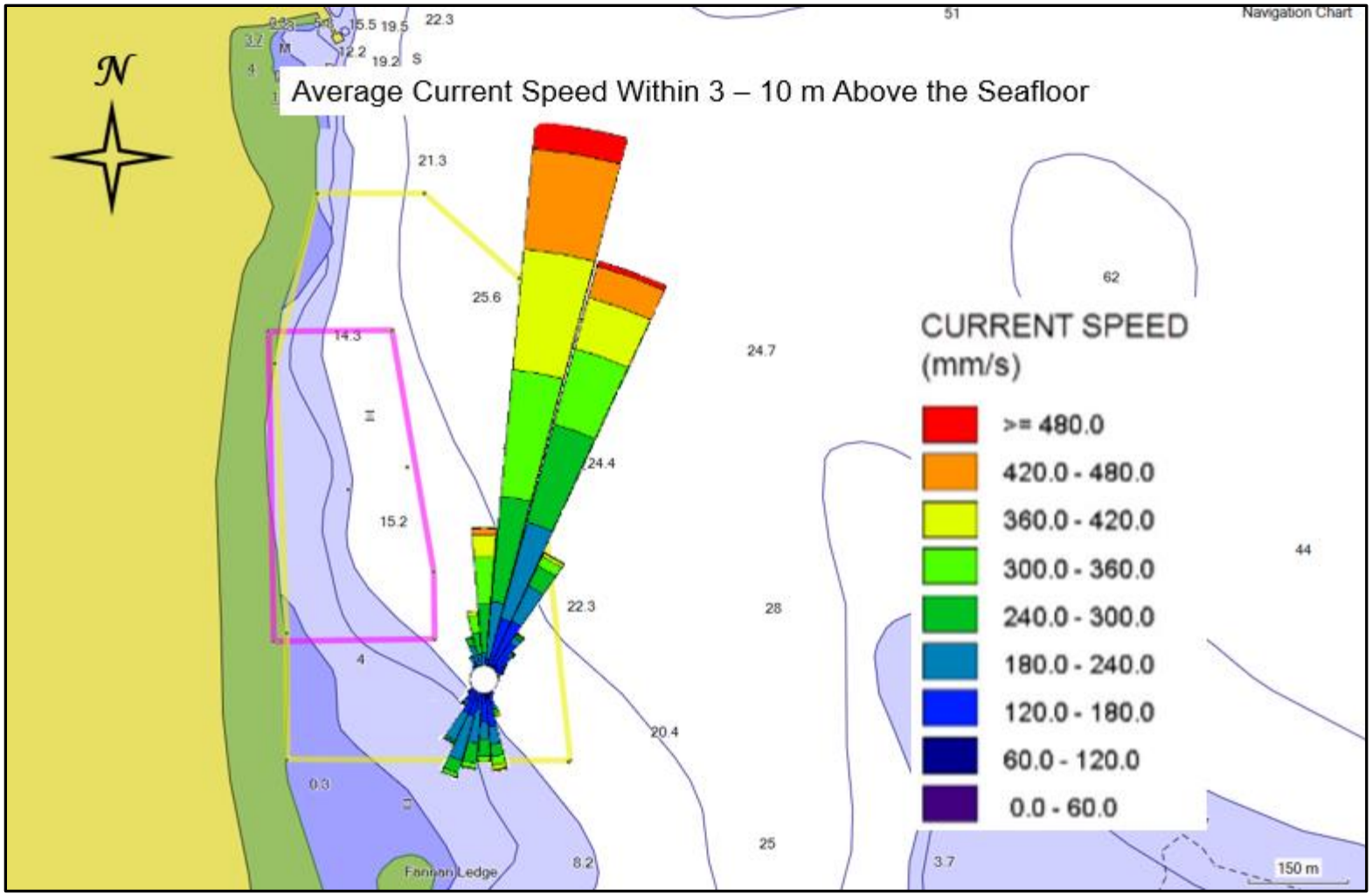
SW2016-059

Current Class Frequency Distribution - 10m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016

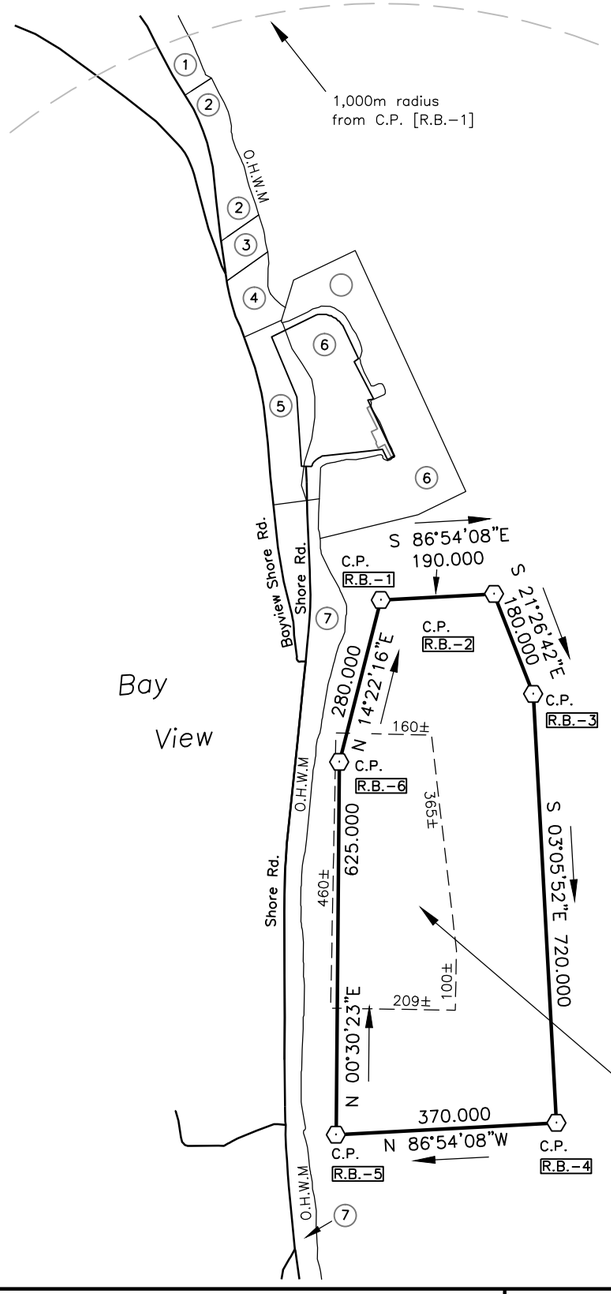


NS1039 Rattling Beach					
	Speed			Direction	
Distance from Bottom (m)	Most Frequent (cm/s)	% Occurrence	Average (cm/s)	Highest Frequency (°)	% Occurrence
3	18-24	25.3	19.8	5-15	19.7
4	18-24	23.1	21.3	5-15	20.2
5	18-12	20.6	22.5	5-15	20
6	18-24	18.7	23.3	5-15	21.0
7	18-12	19.6	24.0	5-15	19.6
8	30-36	15.6	26.3	5-15	20.2
9	30-36	19.4	29.2	5-15	19.0
10	36-42	22.2	32.8	5-15	15.7
Depth Averaged	18-24	18.3	23.9	5-15	19.4


N
Average Current Speed Within 3 – 10 m Above the Seafloor
Navigation Chart
CURRENT SPEED
(mm/s)
>= 480.0
420.0 - 480.0
360.0 - 420.0
300.0 - 360.0
240.0 - 300.0
180.0 - 240.0
120.0 - 180.0
60.0 - 120.0
0.0 - 60.0
150 m
Fanad Ledge

Sweeney International Marine Corp.
46 Milltown Blvd.
St. Stephen, NB
E3L 1G3

NRC-IMB Research Facilities
1411 Oxford Street
Suite 367-368
Halifax, NS
B3H 3Z1



NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
R.B.–1	4,948,620.731	281,435.104
R.B.–2	4,948,630.999	281,624.827
R.B.–3	4,948,463.461	281,690.636
R.B.–4	4,947,744.513	281,729.545
R.B.–5	4,947,724.518	281,360.086
R.B.–6	4,948,349.493	281,365.608

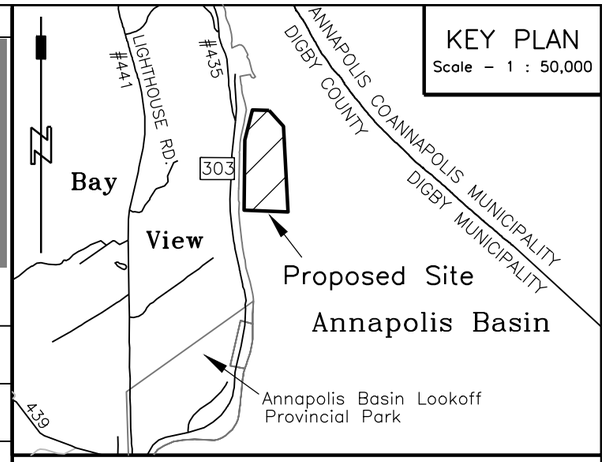
NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co–ordinates

Point	Latitude (N)	Longitude (W)
R.B.–1	44°39'27.6296"	65°45'24.2922"
R.B.–2	44°39'28.1697"	65°45'15.7031"
R.B.–3	44°39'22.8183"	65°45'12.4616"
R.B.–4	44°38'59.5875"	65°45'09.5951"
R.B.–5	44°38'58.5358"	65°45'26.3187"
R.B.–6	44°39'18.7731"	65°45'27.0277"

Proposed Marine Aquaculture Site
Rattling Beach Aquaculture Site
Kelly Cove Salmon Ltd.
Area = 29.08 hectares

A n n a p o l i s B a s i n
(Atlantic Ocean)

#	P.I.D. #	OWNER / ADDRESS
1	30194823	[redacted]
2	30194807	
3	30286546	
4	30194781	
5	30194799	Crown Land (N.S.) P.O. Box 634 Stn. Central Charlottetown, PEI, C1A 7L3
6	30357008	Crown Land (P.W.G.S.C.) P.O. Box 634 Stn. Central Charlottetown, PEI, C1A 7L3
7	30294185	Road Parcel Bayview Shore Road
8	30130058	Crown Land (D.N.R.) PO Box 698, Halifax, N.S. B3J 2T9



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 . . . . . □
JAYCO ANCHOR . . . . . ⚓

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED BOUNDARY AMENDMENT TO LEASE #1039
KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016.

[redacted]

Jeff Nickerson

A&D JOB #149–16–1039

SHEET 1 OF 7 | DATE: October 19, 2016

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 20 NORTH (UTM Z20N).

KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen Acker
Stephen D.F. Acker
N.S.L.S.
639
MEMBER

PURPOSE OF PLAN (SHEET 1 OF 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND TO THE NORTH, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 2 THROUGH 7.

200 0 200 400 600

SCALE – 1 : 10,000 (METRIC)

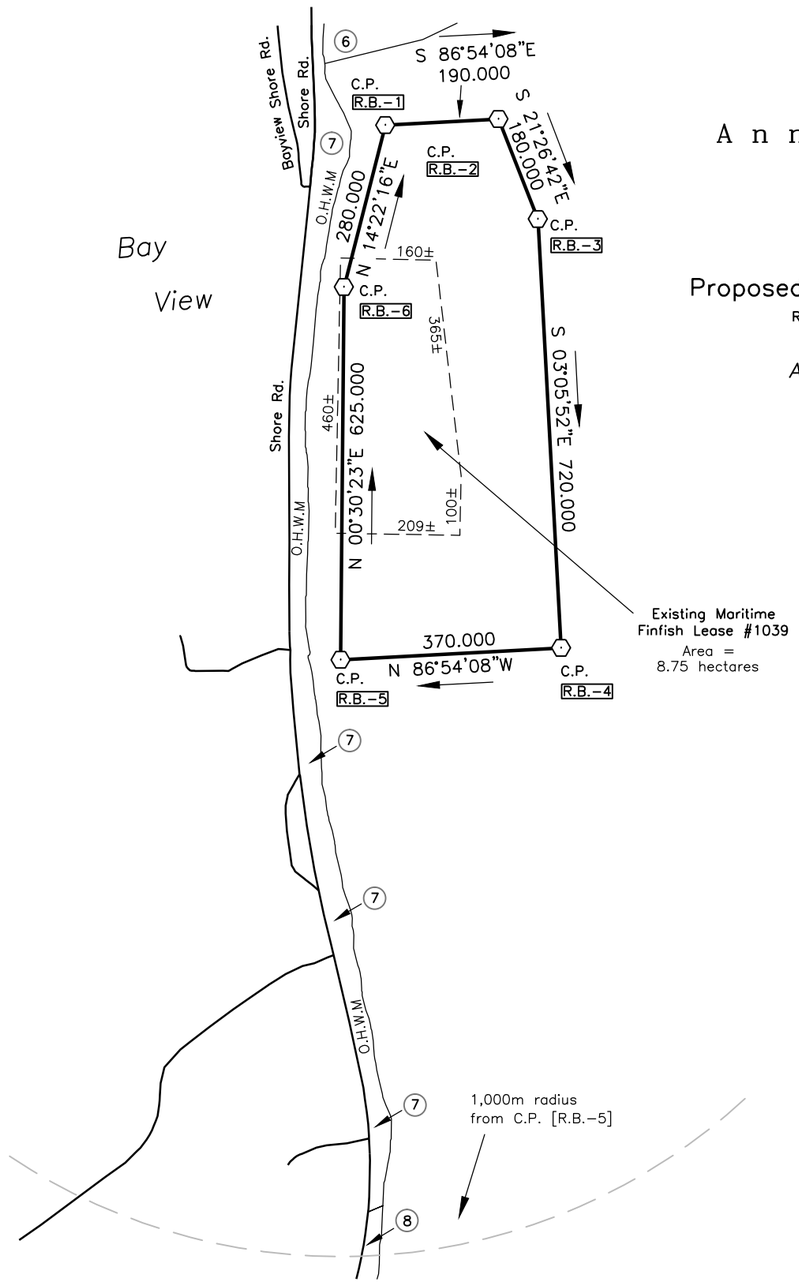
Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

240 Belleville Road, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

Phone: (902) 648–2186
www.adsurveying.ca

180 Mowatt Street, P.O. Box 154
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Fax: (902) 648–0185
info@adsurveying.ca



Annapolis Basin

(Atlantic Ocean)

Proposed Marine Aquaculture Site

Rattling Beach Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 29.08 hectares

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
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NORTH UTM zone 20N

GRID NAD83 (CSRS)

Annapolis Basin

(Atlantic Ocean)

#	P.I.D. #	OWNER / ADDRESS
1	30194823	[redacted]
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3	30286546	
4	30194781	
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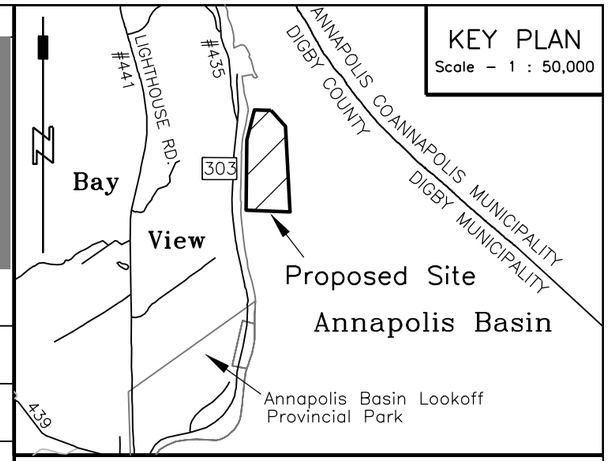

Legend:

- 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
- JAYCO ANCHOR

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED BOUNDARY AMENDMENT TO LEASE #1039

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016

_____ [redacted] _____

Jeff Nicke

A&D JOB #149-16-1039

SHEET 2 OF 7 | DATE: October 19, 2016

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 Acker
StepHen D.F. Acker
N.S.L.S.
639
MEMBER

PURPOSE OF PLAN (SHEET 2 OF 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND TO THE SOUTH, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1 AND 3 THROUGH 7.

200 0 200 400 600

SCALE - 1 : 10,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

240 Belleville Road, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

Phone: (902) 648-2186
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180 Mowatt Street, P.O. Box 154
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Fax: (902) 648-0185
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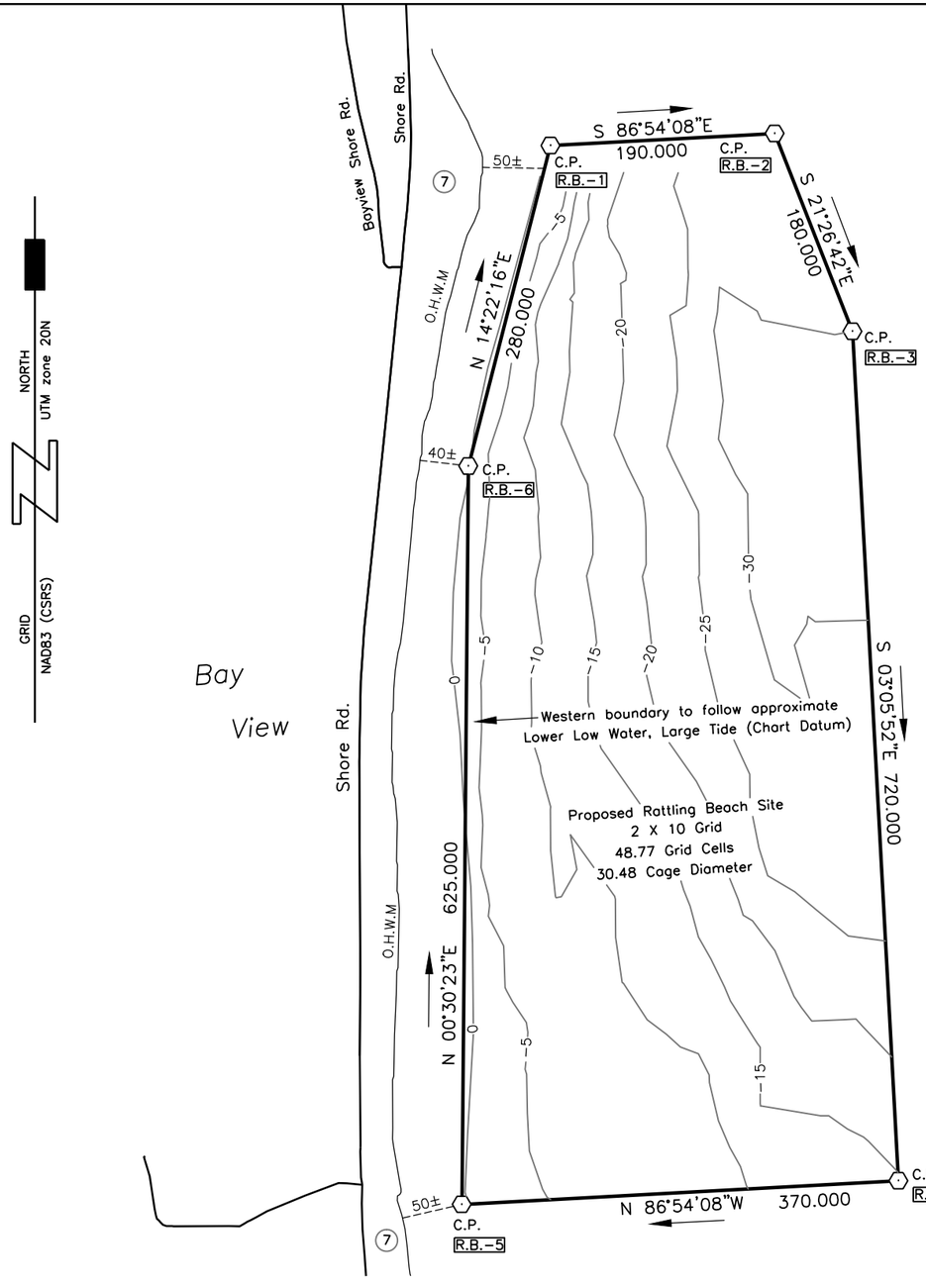


Annapolis Basin

(Atlantic Ocean)

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
R.B.–1	4,948,620.731	281,435.104
R.B.–2	4,948,630.999	281,624.827
R.B.–3	4,948,463.461	281,690.636
R.B.–4	4,947,744.513	281,729.545
R.B.–5	4,947,724.518	281,360.086
R.B.–6	4,948,349.493	281,365.608

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

Point	Latitude (N)	Longitude (W)
R.B.–1	44°39'27.6296"	65°45'24.2922"
R.B.–2	44°39'28.1697"	65°45'15.7031"
R.B.–3	44°39'22.8183"	65°45'12.4616"
R.B.–4	44°38'59.5875"	65°45'09.5951"
R.B.–5	44°38'58.5358"	65°45'26.3187"
R.B.–6	44°39'18.7731"	65°45'27.0277"

Proposed Marine Aquaculture Site

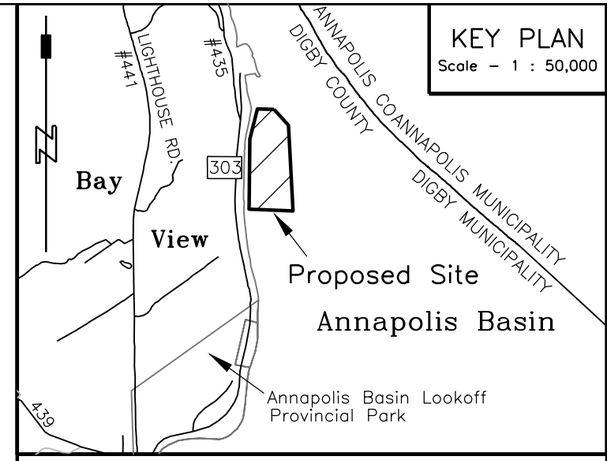
Rattling Beach Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 29.08 hectares

Annapolis Basin

(Atlantic Ocean)



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
JAYCO ANCHOR

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

BASIC SEAFLOOR TOPOGRAPHY

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016

_____
Jeff Nickerson

A&D JOB #149–16–1039

SHEET 3 OF 7 | DATE: October 19, 2016

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 20 NORTH (UTM Z20N).

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 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND BASIC SEAFLOOR TOPOGRAPHY, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1–2 & 4–7.

100 0 100 200 300

SCALE – 1 : 5,000 (METRIC)

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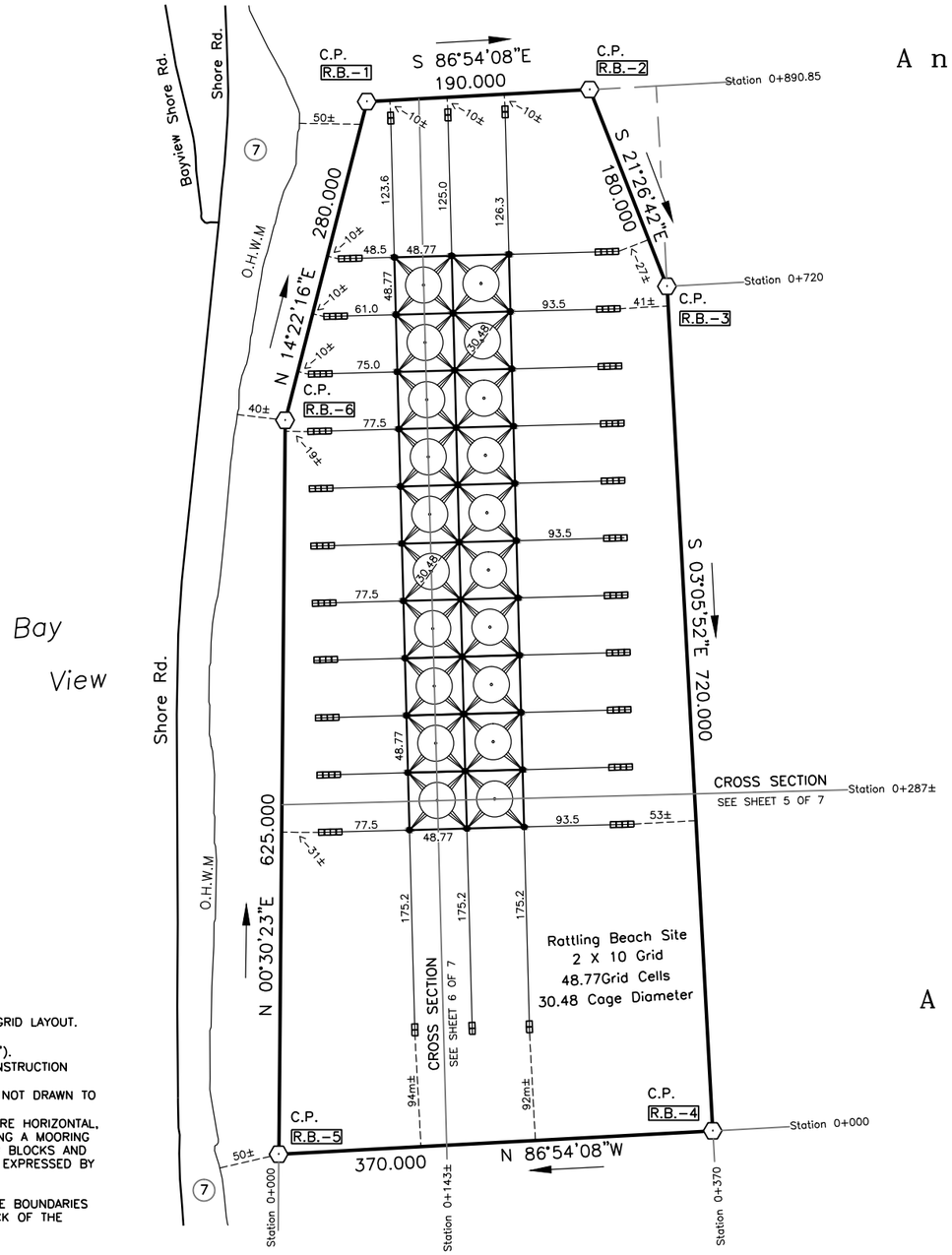

SHEET 3 OF 5 NOTES:

(1.) 20 PROPOSED CAGES IN A 2x10 SUNKEN GRID LAYOUT.
(2.) CAGE DIAMETER IS 30.48m.
(3.) GRID SIZE IS 48.77m x 48.77m (160'X160').
(4.) THIS PLAN SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
(5.) ANCHOR BLOCKS AND MOORING LINES ARE NOT DRAWN TO SCALE.
(6.) DIMENSIONS OF MOORING SYSTEM SHOWN ARE HORIZONTAL, BASED ON WATER DEPTH AT HIGH TIDE USING A MOORING SCOPE OF 5:1, 1 SHOT OF CHAIN, ANCHOR BLOCKS AND THE DESIRED LENGTH OF POLYSTEEL ROPE EXPRESSED BY THE CLIENT.

SUBSEQUENTLY, THE OFFSETS TO THE LEASE BOUNDARIES ARE HORIZONTAL DISTANCES FROM THE BACK OF THE ANCHOR BLOCK.

A n n a p o l i s B a s i n

(Atlantic Ocean)

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
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Proposed Marine Aquaculture Site

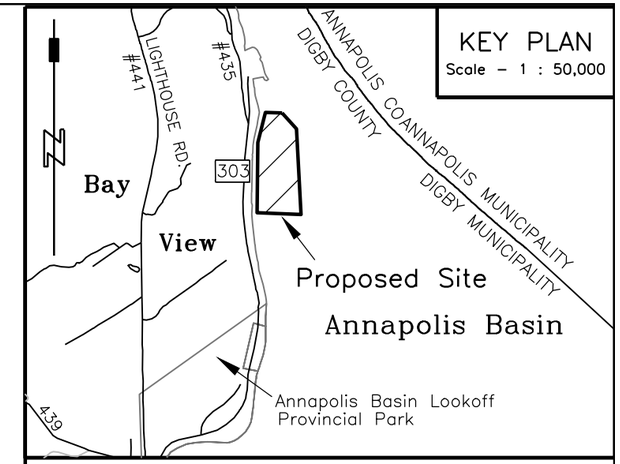
Rattling Beach Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 29.08 hectares

A n n a p o l i s B a s i n

(Atlantic Ocean)



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 . . . . . □
JAYCO ANCHOR . . . . . ⛵

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

AQUACULTURE CAGE CONFIGURATION

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016

[redacted]

Jeff Nickerson

A&D JOB #149–16–1039

SHEET 4 OF 7 | DATE: October 19, 2016

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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(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 20 NORTH (UTM Z20N).

KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen D.F. Acker
Stephen D.F. Acker
N.S.L.S.
639
MEMBER

PURPOSE OF PLAN (SHEET 4 OF 7)

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.
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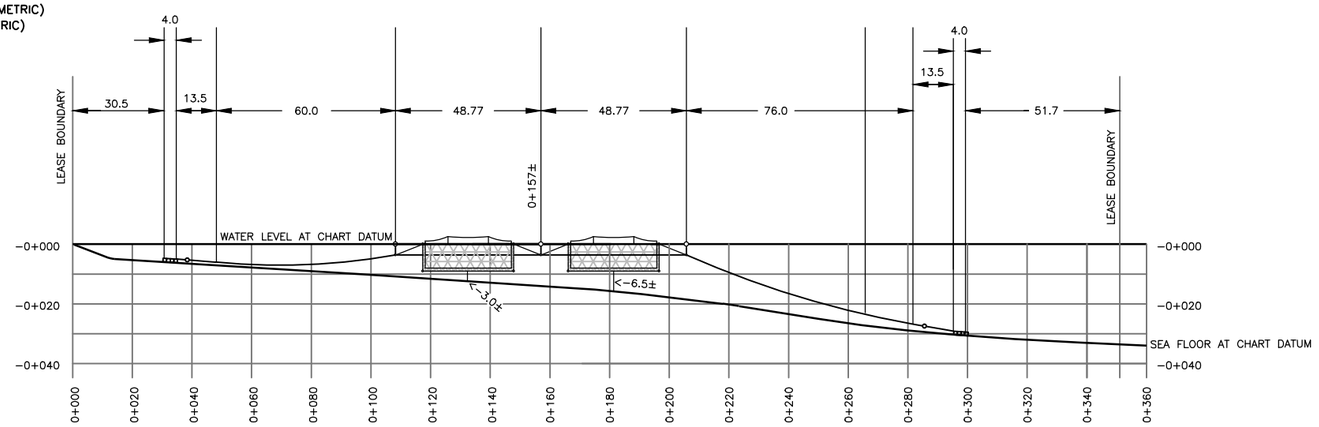
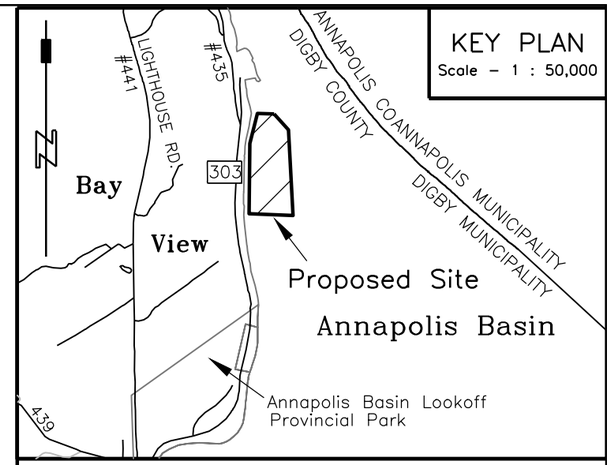
CROSS SECTION

HORIZONTAL SCALE – 1 : 2,000 (METRIC)
VERTICAL SCALE – 1 : 2,000 (METRIC)



40 0 40 80 120

SCALE – 1 : 2,000 (METRIC)



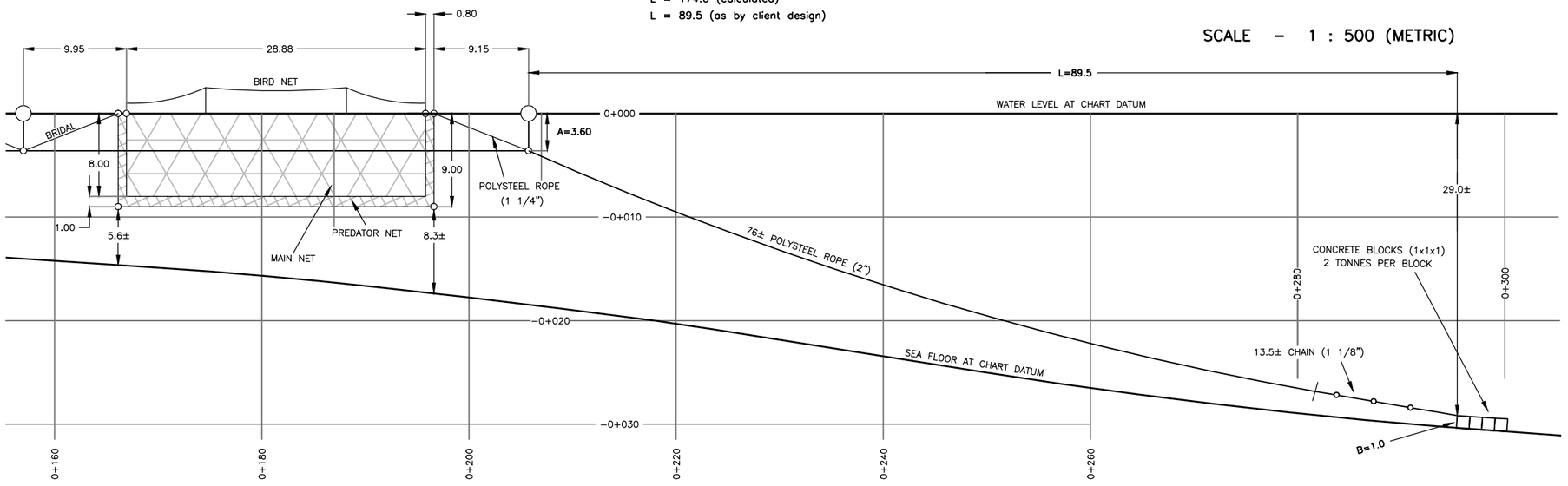
Legend:

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 . . . . . □
JAYCO ANCHOR . . . . . ⛵

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 = [(30± + 9.4) – 3.6 – 1.0] x 5
L = 174.0 (calculated)
L = 89.5 (as by client design)



10 0 10 20 30

SCALE – 1 : 500 (METRIC)

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

LATERAL CROSS–SECTION

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 1[redacted]

_____ _____
Jeff Nickerson

A&D JOB #149–16–1039

SHEET 5 OF 7 | DATE: October 19, 2016

NOTES:

(1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
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(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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(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 20 NORTH (UTM Z20N).

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 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LATERAL CROSS SECTION AS SHOWN ON SHEET 4 OF 7, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR BLOCKS 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 4 OF 7.
(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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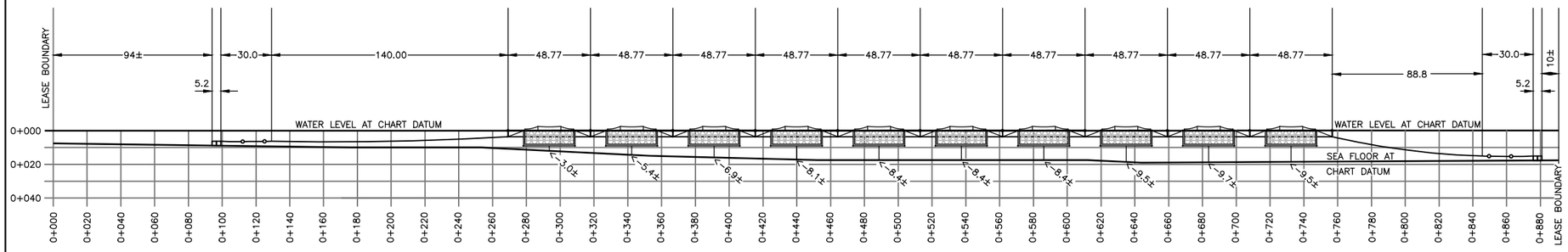
CROSS SECTION

HORIZONTAL SCALE – 1 : 3,000 (METRIC)
VERTICAL SCALE – 1 : 3,000 (METRIC)



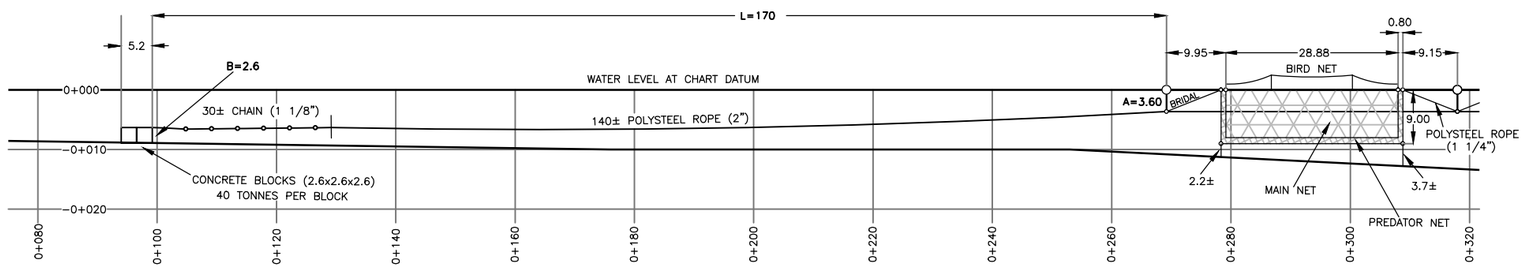
60 0 60 120 180

SCALE – 1 : 3,000 (METRIC)

DETAILED CROSS SECTION

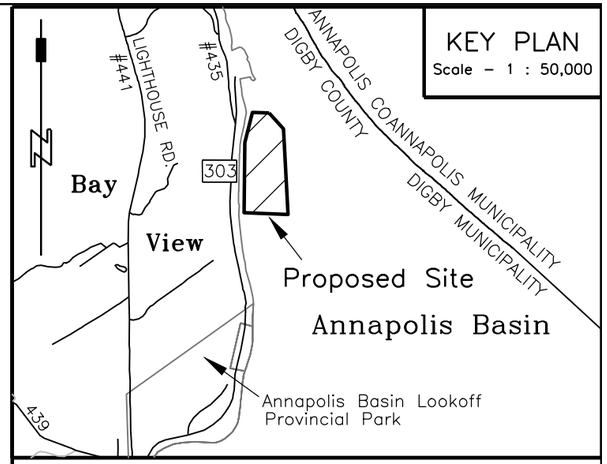
HORIZONTAL SCALE – 1 : 1,000 (METRIC)
VERTICAL SCALE – 1 : 1,000 (METRIC)

5:1 Mooring Scope Calculation
L = [(max depth + max tide range) – A – B] x 5
L = [(30± + 9.4) – 3.6 – 2.6] x 5
L = 166.0 (calculated)
L = 170.0 (as by client design)



20 0 20 40 60

SCALE – 1 : 1,000 (METRIC)



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	□
JAYCO ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

LONGITUDINAL CROSS-SECTION

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
DIGBY COUNTY, NOVA SCOTIA

Client's Statement

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Dated this 19th day of October, 2016

_____ _____
Jeff Nickerson

A&D JOB #149-16-1039

SHEET 6 OF 7 | DATE: October 19, 2016

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 6 OF 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LONGITUDINAL CROSS SECTION AS SHOWN ON SHEET 4 OF 7, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR BLOCKS AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

(1.) THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
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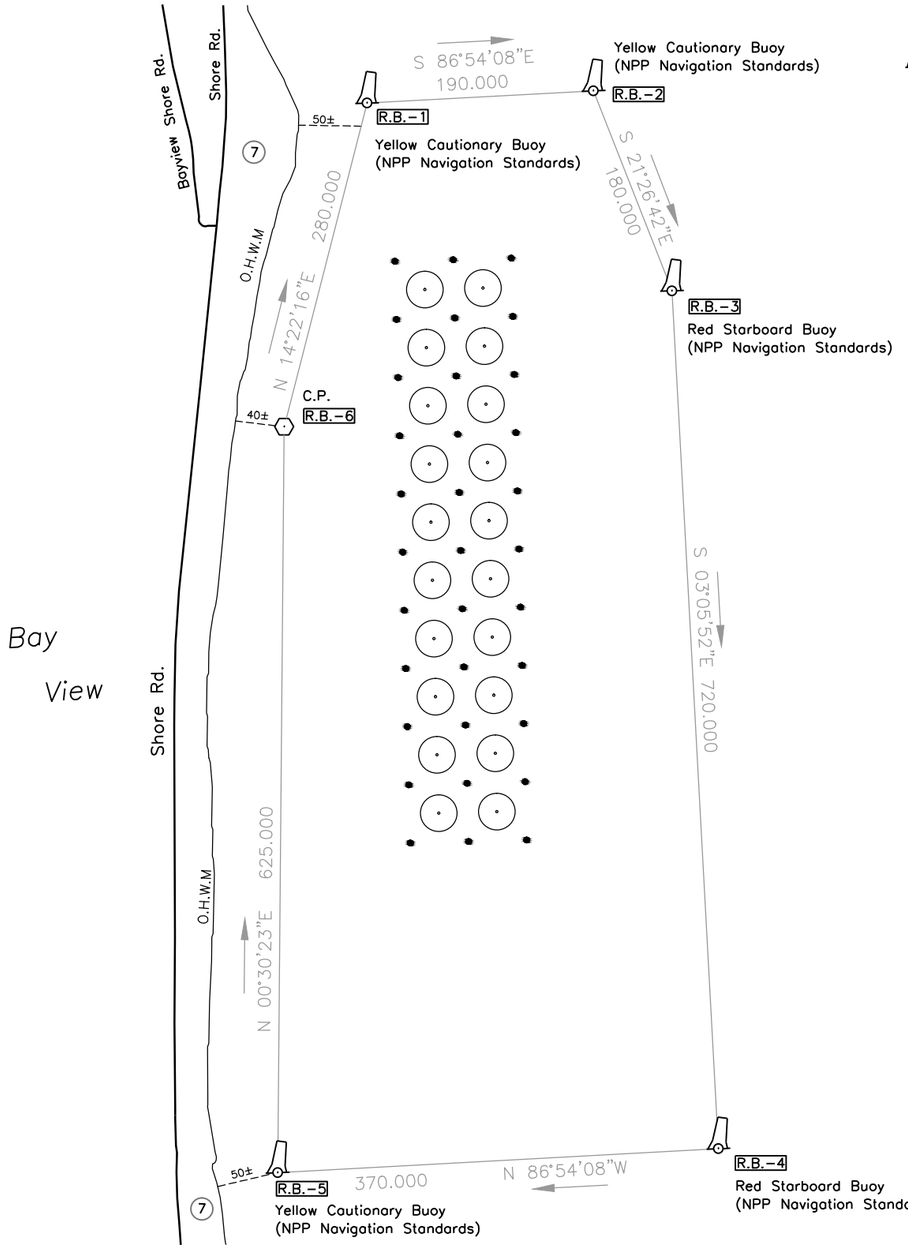

Annapolis Basin

(Atlantic Ocean)

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Canadian Spatial Reference System (CSRS)
UTM Zone 20N

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R.B.–3	4,948,463.461	281,690.636
R.B.–4	4,947,744.513	281,729.545
R.B.–5	4,947,724.518	281,360.086
R.B.–6	4,948,349.493	281,365.608

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

Point	Latitude (N)	Longitude (W)
R.B.–1	44°39'27.6296"	65°45'24.2922"
R.B.–2	44°39'28.1697"	65°45'15.7031"
R.B.–3	44°39'22.8183"	65°45'12.4616"
R.B.–4	44°38'59.5875"	65°45'09.5951"
R.B.–5	44°38'58.5358"	65°45'26.3187"
R.B.–6	44°39'18.7731"	65°45'27.0277"

Proposed Navigational Aids Marking

Rattling Beach Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 29.08 hectares

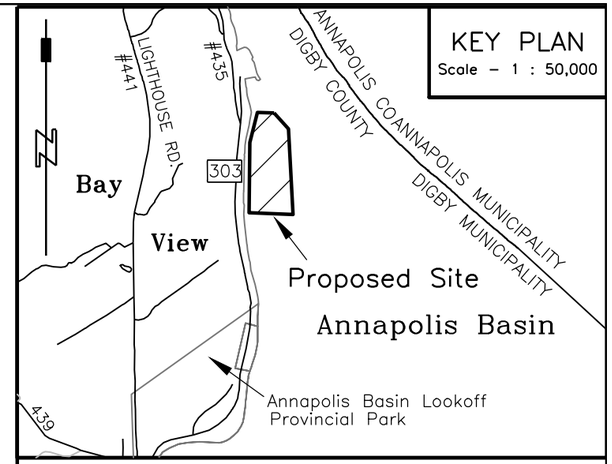
Annapolis Basin

(Atlantic Ocean)

● = compensator buoys (yellow)

⊙ = aquaculture cages (30.48m diameter)

= cautionary buoy (yellow)



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 . . . . . □
JAYCO ANCHOR . . . . .

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED NAVIGATIONAL AIDS MARKING PLAN

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016

[redacted]

Jeff Nickerson

A&D JOB #149–16–1039

SHEET 7 OF 7 | DATE: October 19, 2016

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 20 NORTH (UTM Z20N).

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 7)

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)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

240 Belleville Road, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

Phone: (902) 648–2186
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Nova Scotia, Canada
B0T 1W0

Fax: (902) 648–0185
info@adsurveying.ca

NS1039 Rattling Beach – Boundary Amendment

Finfish Marine Aquaculture Development Plan

Kelly Cove Salmon
134 North Street. Bridgewater. NS. B4V2V6

Table of Contents

Section 1: Optimum Use of Marine Resources

Aquaculture site Rattling Beach (#1039) is owned and operated by Kelly Cove Salmon Ltd. (KCS). The marine farm consists of twenty, 49-m grid cells in a 2 x 10 configuration. The proposed lease incorporates all aquaculture-related gear, above and below the water line, with lease dimensions of 190 x 180 x 720 x 370 x 630 x 280 m, resulting in a farm area of 29.08 ha. The boundary amendment is necessary to incorporate all gear within the lease. KCS is not requesting an increase in production nor additional cages on site.

The general area around site #1039 appears on Canadian Hydrographic Service (CHS) Nautical chart #4396 (Annapolis Basin) and National Topographic System Map, Sector 021A (Annapolis Royale, Nova Scotia). The coordinates, obtained using DGPS, of the corners of the proposed lease area are located in Table 1.

Site #1039 is located on the western side of the Annapolis Basin, near the mouth of the Digby Gut channel in Digby County, Nova Scotia (Fig. 1). The site is approximately 2.5 km north of Digby. Rattling Beach is located in the Annapolis Basin, along with seven marine shellfish and two other marine finfish aquaculture sites. The basin also provides many different resources for humans and animals. Fishing, specifically lobster, scallops, and harvesting of rockweed, are also important activities contributing to the economic wellbeing of cities and towns surrounding the basin. In addition, this area is a significant habitat for migratory birds supported by the presence of unique microenvironments such as salt marshes, bogs, and fens. The basin is a tourist destination, were people enjoy whale watching, kayaking, camping, recreational fishing, and boating to name a few activities, in and surrounding Annapolis Basin. KCS has implemented policies and procedures to manage their farms and protect wildlife.

Aquaculture in the Annapolis Basin has been able to successfully co-exist with other resources in the area, providing increased employment and industry diversity. KCS is Cooke Aquaculture's farming division, and Cooke employs 152 people in Nova Scotia through its various divisions. Rattling Beach 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 various operational measures to ensure wildlife interaction is as minimal and positive as possible.

Table 1. Coordinates for the Boundary Amendment in Annapolis Basin

APPROXIMATE SITE CO-ORDINATES (NAD 83)		
Corner	Latitude	Longitude
1	44° 39' 27.6"	65° 45' 24.3"
2	44° 39' 28.2"	65° 45' 15.7"
3	44° 39' 22.8"	65° 45' 12.5"
4	44° 38' 59.6"	64° 45' 09.6"
5	44° 38' 58.5"	64° 45' 26.3"
6	44° 39' 18.8"	64° 45' 27.0"
Approximate Site Center	44° 39' 13.6"	65° 45' 19.8"

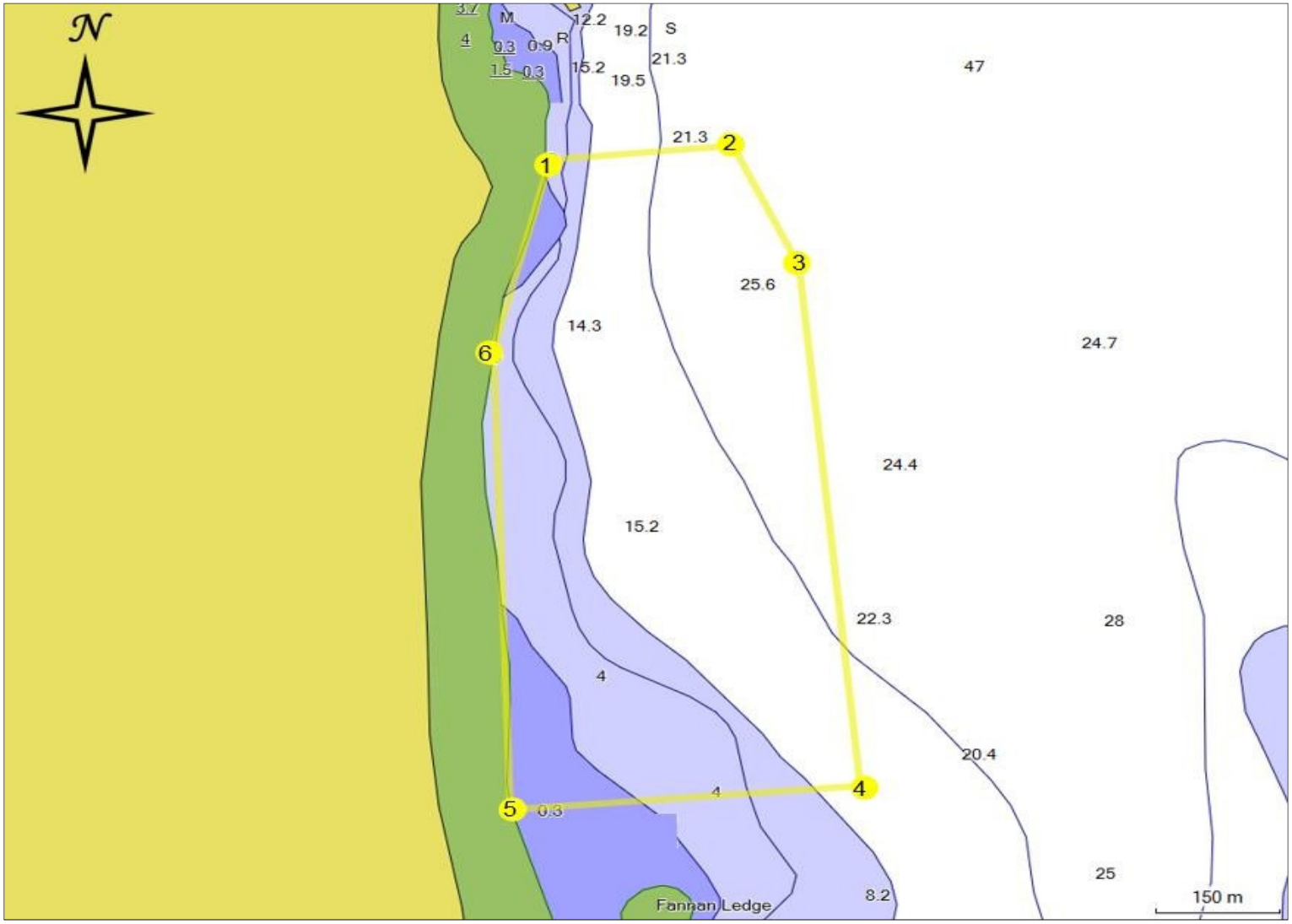

Figure 1. Proposed Boundary Location for Rattling Beach #1039 in Annapolis Basin

Section 2: The Contribution of the Proposed Operation to Community and Provincial Economic Development

2.1 Production Plan

The expected grow out period is 22 months. In future years, actual stocking number may be lower or higher than projections and is determined by operational performance outcomes experienced at the site.

Table 2. Projected maximum values for production cycle (assuming a mortality of 10% and an FCR of 1.2)

Species and Strain	Stock Source (hatchery)	Number of Cages and Type	Cage Size (m)	Rearing & Predator Net Volume (m^3)		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)	Average Harvest Weight (kg)
Atlantic Salmon, Saint John River	Any KCS owned and operated hatchery	20, HDPE	100m	Pred.	8042	**660,000**	**150**	**20-21 months**	**25**	**3,504,000**	**6**
				Rear.	7238						

*Approximate time frame

Table 3. Harvest Plan Details

End Date	Date of Re-entry	Expected Fallow Period (months)
Jan 2018	June 2018	4

2.2 Infrastructure

Rattling beach is an existing site with the required infrastructure required to support operations already in place. Site infrastructure includes a feed barge and net cages. A lobster boat and/or skiff is used for transportation to and around the site.

Containment is an essential part of a marine finfish farm. The equipment and infrastructure must be of sturdy construction and take many factors into consideration, such as the weather, currents, ice flow, etc. to make sure the fish will stay contained.

In addition to the essential containment of fish in the marine environment, the equipment and infrastructure must be considered from a fish health perspective. Mechanical damage from either ill repaired equipment or infrastructure or improper choice of equipment or infrastructure is a welfare and fish health concern.

Cage enclosures must account for the control of predators in the natural environment as predators such as birds and seals can cause stress, injuries and losses.

GMG is the Fish Services division of Cooke Aquaculture Inc. and a sister company to Kelly Cove Salmon Ltd. GMG provides the moorings for installation and the specifications were determined to be adequate based on product testing completed by GMG.

The moorings were designed based on historical winds, wave heights, oceanography, currents and KCS's 30 years of farming experience. Each area of the grid was designed to withstand different maximum loads based on the previous criteria.

The composition of the cage components such as the hand rail, float pipes, bird stands and weight rings are HDPE.

Multiple KCS vessels are used to service the cages at the site depending on the required task. Vessels included are; feeding boats, feed barge, skiffs and maintenance barge.

While in use, the vessels will be moored to the cages, otherwise they will be moored to the wharf or in service at other locations. A feed barge has its own unique mooring system and will remain on site with the cages.

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 wharf used by this facility is the Digby Town Wharf.

2.3 Services and Suppliers

Although Kelly Cove Salmon is a vertically integrated company, it utilizes local suppliers whenever possible. Types of suppliers used by KCS in Nova Scotia include: 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.

2.4 Employment

Rattling Beach site is an important component of Kelly Cove Salmon's success in Nova Scotia. Kelly Cove Salmon (KCS) is Cooke Aquaculture's farming division. Cooke Aquaculture employs over 1600 people in Atlantic Canada, with 152 people employed in NS. Kelly Cove Salmon's positions range from feed and maintenance technicians, fish health and environmental management professionals and technical support to administrative positions. The majority of 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 2.3 – Services and Suppliers. In addition, our feed division, Northeast Nutrition Inc., is based in Truro and our 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 Nova Scotia by utilizing the services and suppliers listed in section 2.3 – Services and Suppliers. Services and suppliers are located within Nova Scotia, and whenever possible, Digby.

2.6 Financial Viability

See Appendix B for a letter asserting financial viability of the operation.

2.7 Adverse Economic Impacts

The Rattling Beach site does not displace any other industry. Kelly Cove Salmon actively communicates with other local industries and permits local fishers to utilize the lease area for fishing. There are no expected adverse economic impacts.

Section 3: 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 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 bottom.

Various shellfish and seaweeds also support commercial fisheries. In 2015, the top five groundfish and pelagic species landed included herring, haddock, hake, redfish spp. and pollock (Table 4; Fisheries and Oceans 2017a).

Table 4. Atlantic Coast Commercial Landings for 2015
Note: sourced from Fisheries and Oceans (2017a)

2015 ATLANTIC COAST COMMERCIAL LANDINGS, BY REGION (metric tonnes, live weight)				
	Maritimes	Nova Scotia Gulf	Total	Atlantic Total
Groundfish				
Atlantic Cod	1,458	22	1,480	12,234
Haddock	17,460	0	17,460	17,689
Redfish spp.	5,971	0	5,972	10,406
Halibut (Atlantic)	2,651	68	2,718	3,942
Flatfishes	1,612	130	1,742	9,124
Greenland turbot	X	X	X	14,059
Pollock	3,855	0	3,855	4,046
Hake	7,842	6	7,848	8,089
Cusk	X	0	0	200
Catfish	0	0	0	0
Skate	X	0	0	241
Dogfish	X	X	0	0
Other	2,150	90	2,240	2,299
Total	**43,292**	**319**	**43,611**	**82,330**
Pelagic & other finfish				
Herring	40,939	5,638	46,576	114,200
Mackerel	852	332	1,183	4,143
Swordfish	1,579	0	1,579	1,579
Tuna	574	76	650	879
Alewife	X	X	434	2,202
Eel	19	2	21	241
Salmon (Atlantic)	0	0	0	0
Smelt	X	X	0	114
Silversides	0	0	0	254
Shark	89	0	89	89
Capelin	0	0	0	36,942
Other	27	0	27	67
Total	**44,511**	**6,049**	**50,560**	**160,709**
GRAND TOTAL	**246,581**	**16,497**	**263,078**	**687,967**

Note: X = Values have been suppressed to meet confidentiality requirements

Groundfish

There are many commercially harvested species of groundfish off the south shore 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 (Fisheries and Oceans Canada 2014. Haddock in 4X is in a rebuilding phase with a positive outlook; recruitment trends look very positive with spawning stocks continuing to increase in biomass since the last decade (Fisheries and Oceans Canada 2017c. However, fish size is decreasing at age (Showell et al. 2013). Cod in 4X demonstrate poor juvenile recruitment and low biomass levels, although there is considerable uncertainty regarding stock status; this stock is accessed by a very large number of fishing vessels and sectors (Clark et al. 2015). O'Boyle (2012) listed Western Scotian Shelf cod as critical. The pollock fishery in the Western Scotian Shelf (WSS), which reached historic lows in 2000, has since increased due to improved recruitment; though, it is still considered to be in the cautious (i.e. considered neither healthy nor critical) state (O'Boyle 2012). The commercial value for haddock, cod and pollock for the Maritimes region of Nova Scotia is $26 million, $3 million and $4 million, respectively (Fisheries and Oceans 2017b).

Flatfish are also important commercial groundfish but they are caught mostly on the fishing banks and deeper areas (Fisheries and Oceans Canada 2014). In NAFO Divisions 4X5Y, these species are halibut, yellowtail flounder, American plaice, winter flounder, and witch flounder (Fisheries and Oceans Canada 2014). Overall, most flatfish species in this area are in decline or at low levels. Winter flounder is better in overall status with some positive indicators present (O'Boyle 2012), but American plaice stock status was still in decline as of 2009 and COSEWIC considers the Maritime population to be threatened (COSEWIC 2009a). O'Boyle (2012) had considered silver-hake stock status to be critical; however, recent biomass estimates have shown a large increase in number in 2014 (DFO 2015a). Halibut stocks, however, appear to be improving and the biological information for this species continues to develop (DFO 2015b). The commercial value for halibut and flatfishes for the Maritimes region of Nova Scotia is $37 million and $2.5 million, respectively (Fisheries and Oceans 2017b).

The Rattling Beach site is present in the Maritimes Statistical Districts 38 & 39. For 2015, 177,099 kg of groundfish was landed in this district with a value of $420,741. Key species landed include: Atlantic cod, witch flounder, haddock, halibut, monkfish, Pollock, redfish, sculpin, skate, white hake, and winter flounder. Both sculpin and winter flounder were noted as species caught for bait (C. O'Neil, pers. com.).

Figures 2 – 5 show the approximate groundfish landings off the coast of Nova Scotia between 1999 and 2003 (Fisheries and Oceans Canada 2014.)

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*)
Monkfish (*Lophius americanus*)
Skate (unknown species)
Cusk (*Brosme brosme*), restricted to by-catch only Sculpin (unknown species)
Redfish (*Sebastes* sp.)
Silver hake (*Merluccius bilinearis*)
White hake (*Urophycis tenuis*), restricted to by-catch only

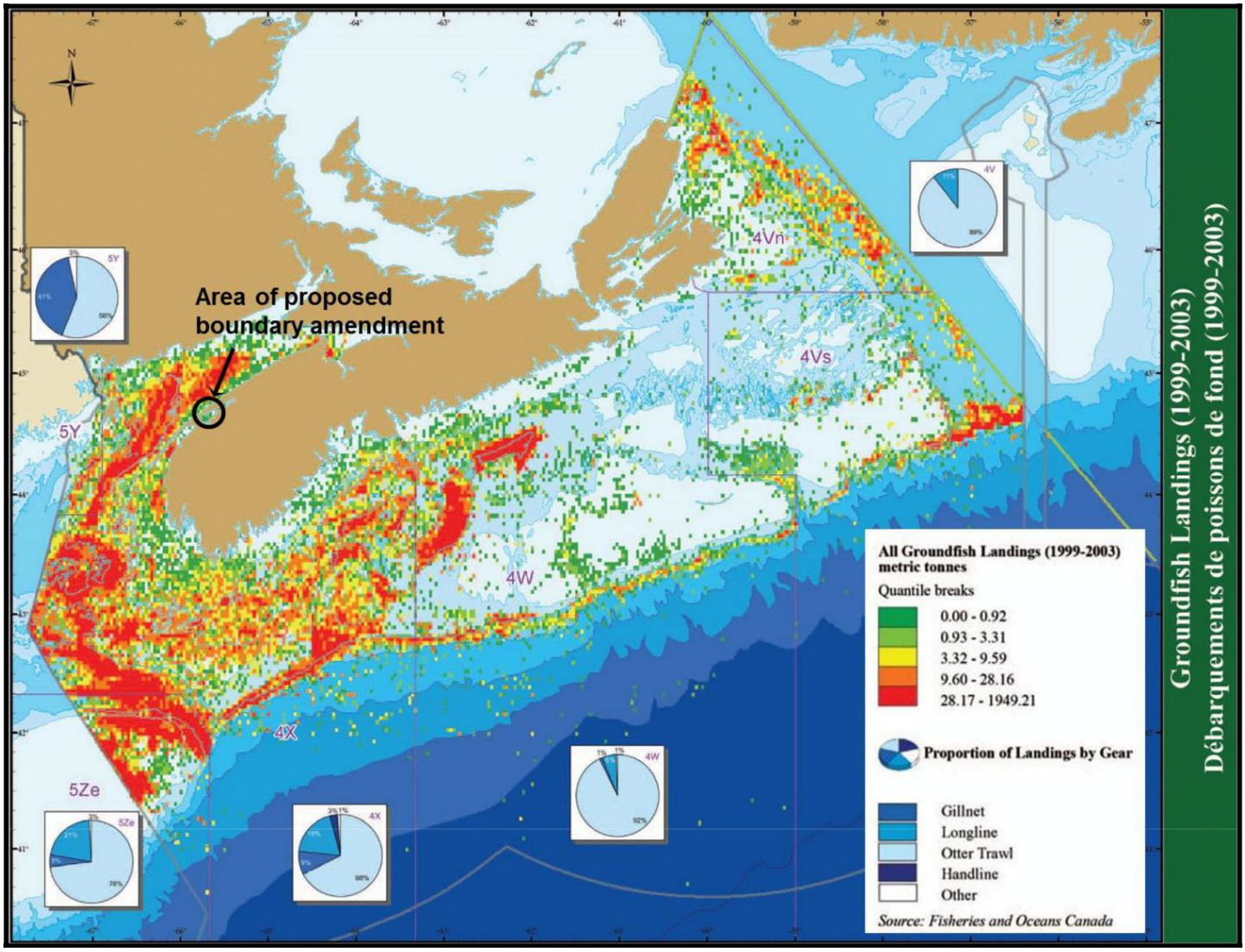

Figure 2. Commercial Groundfish Landings (1999 – 2003)

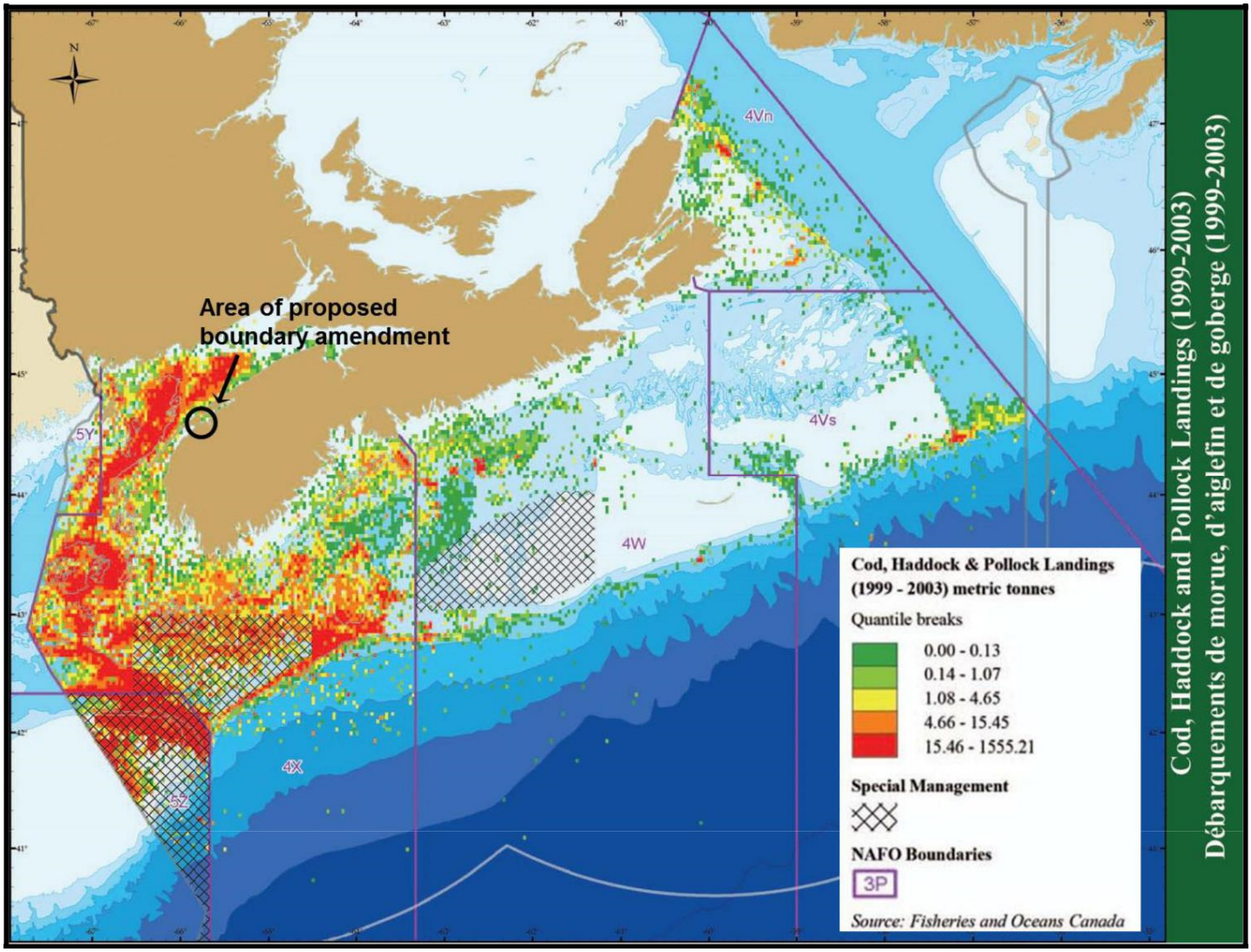

Figure 3. Commercial Cod, Haddock, and Pollock Landings (1999 – 2003)

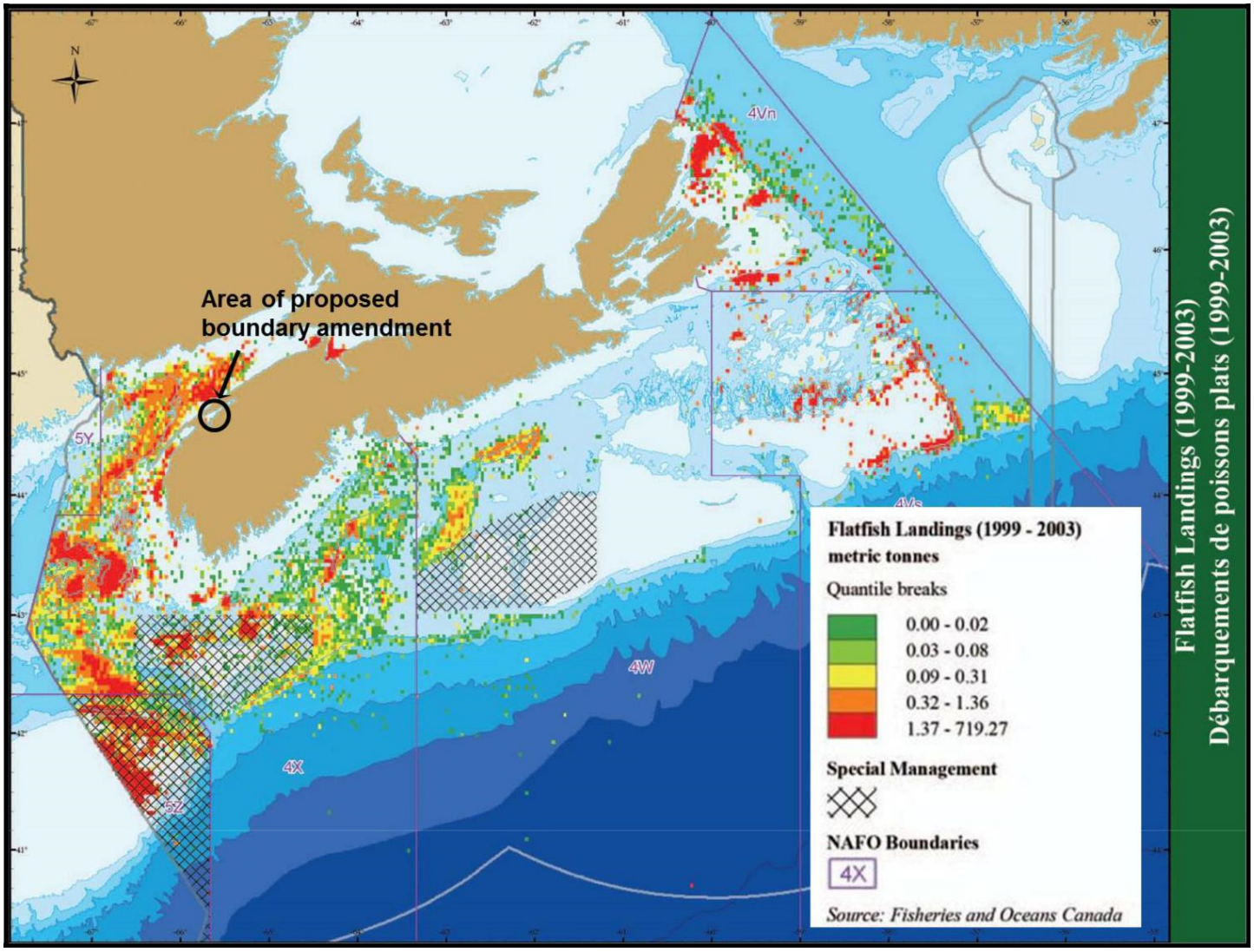

Figure 4. Commercial Flatfish Landings (1999 – 2003)

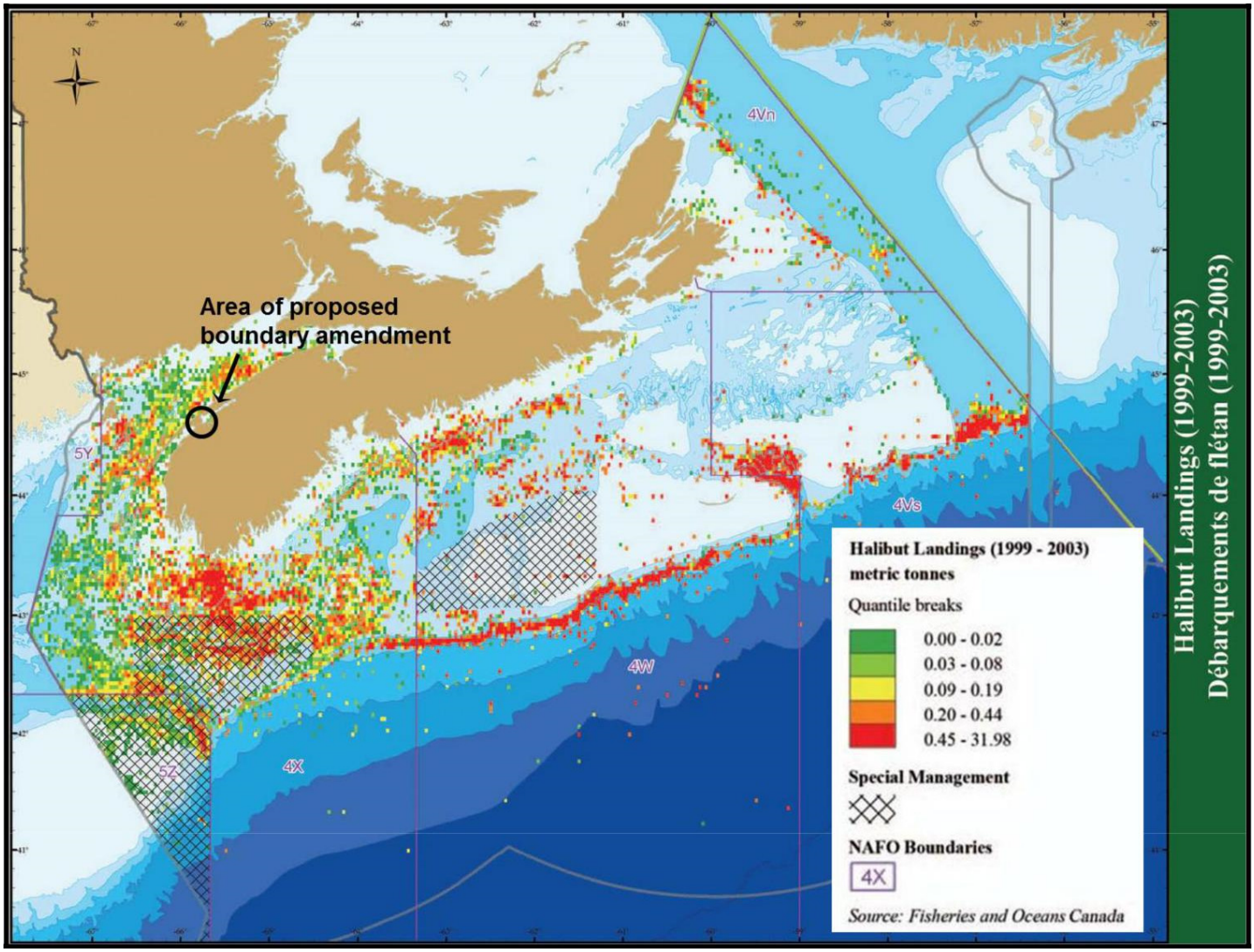

Figure 5. Commercial Halibut Landings (1999 – 2003)

Pelagics

Southwest Nova Scotia / Bay of Fundy herring spawning component have been of concern for a decade or more, and stock status reports have indicated the need for rebuilding (Clark et al. 2012). Clark et al. (2012) presented evidence of the decline in spawning grounds, targeting of juveniles in the fishery, and declines in catches. Recent biomass estimates have shown uncertainty; however, long-term trends show a general decrease in German Bank from 1999 and an increase in Scots Bay from 2005 (DFO 2016). Approximated moving biomass averages for the Southwest Nova Scotia / Bay of Fundy area have indicated slight decreases over the past three years (DFO 2016c). The herring fishery largely takes place on dense summer feeding, overwintering, and spawning locations and is dominated by purse seine, gillnet, and weir (Figure 6; DFO 2016). Commercial value of the herring fishery for the Maritimes region of Nova Scotia is $14 million (Fisheries and Oceans 2017b).

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 critical condition due to low abundances in egg and spawning biomass and appropriate reconstruction methods are being implemented (DFO 2017a). The mackerel fishery is conducted with traps, gillnets, and handlines and is primarily an inshore fishery of the spring and summer months and extends into more offshore waters for the fall and winter (Fisheries and Oceans Canada 2014a). Because of high fishing mortality, mackerel landings of recent years (2011 - 2016) have decreased within the Northwest Atlantic region when compared to numbers from years previous (DFO 2017a). Figure 7 illustrates the general distribution of mackerel fishing activities in Atlantic waters. Commercial value of the mackerel fishery for the Maritimes region of Nova Scotia is $4.5 million (Fisheries and Oceans 2017b).

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

The North Atlantic swordfish stock has been rebuilt after a 10-year recovery plan commencing in 1999. This fishery is now sustainable and well controlled with Canadian annual landings of 1,505 t in 2013 being exported to the United States at a value of $12.3 million (Fisheries and Oceans Canada 2015a). Swordfish (Fig. 8) are caught using longline and harpoon primarily along the edge of Georges Bank, the Scotian Shelf, and the Grand Banks in vessels often less than 65 feet; DFO lists principal ports in Nova Scotia as Woods Harbour, West Head, and Pubnico (Lower East, Lower West, East) (Fisheries and Oceans Canada 2016a). The bluefin tuna (Fig. 9) is the most common tuna found off the coast of Nova Scotia and is fished with tended line, rod and reel, harpoon, longline, and trap nets (Fisheries and Oceans Canada 2014). The International Commission for the Conservation of Atlantic Tunas (ICCAT 2014) consider Atlantic bluefin and albacore tuna stocks overfished from 2010 and 2012 stock assessments, which indicated low recruitment. The bluefin and albacore tuna stocks are of a critical status whereas the bigeye and yellowfin tuna stocks are considered healthy (O'Boyle 2012). Commercial value of swordfish and tuna for the Maritime region of Nova Scotia is $12.9 million and $4.8 million, respectively.

In Maritimes Statistical Districts 38 & 39, pelagic landings and associated value was not separated in the provided "other species" category. For 2015, 11,262,144 kg was landed comprising of species other than groundfish and lobster with a value of $29,096,031. Key species include: Elver and herring (C. O'Neil, pers. com.).

Species list

North Atlantic bluefin tuna (*Thunnus thynnus*)
Swordfish (*Xiphias gladius*)
Elver (*Anguilla rostrata*)
Atlantic herring (*Clupea harengus*)
Atlantic mackerel (*Scomber scombrus*)
Alewife (*Alosa pseudoharengus*)

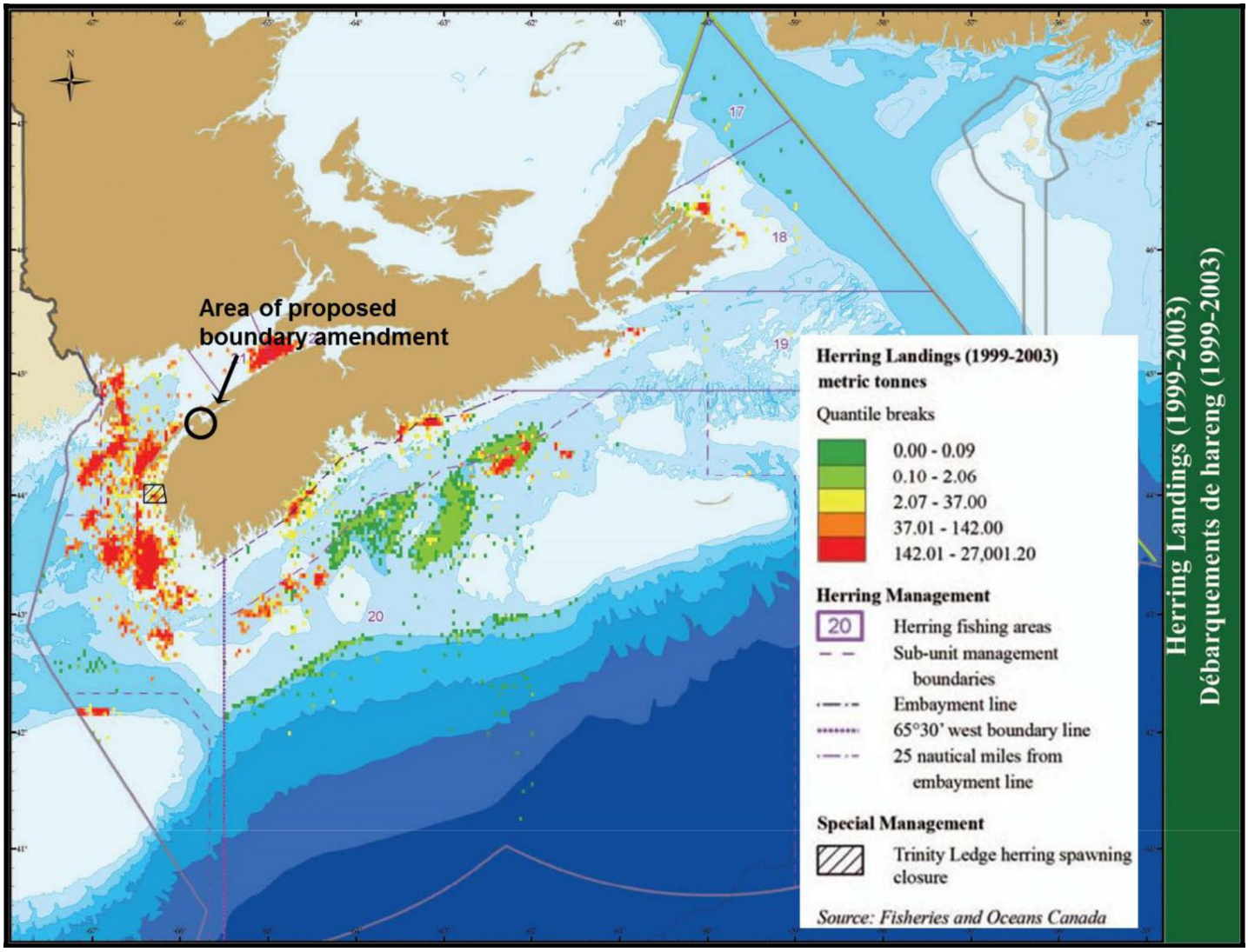

Figure 6. Commercial Herring Landings (1999 – 2003)

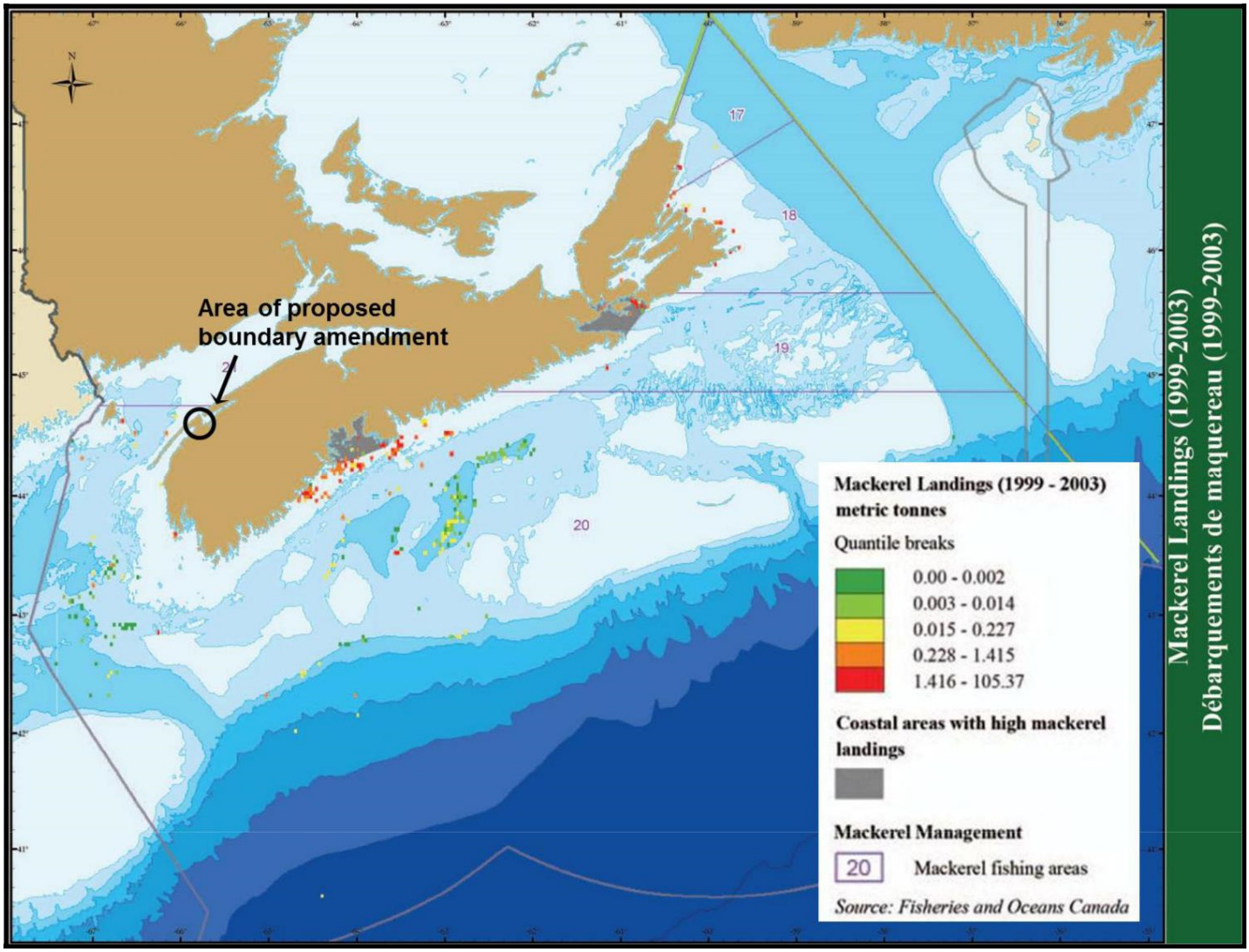

Figure 7. Commercial Mackerel Landings (1999 – 2003)

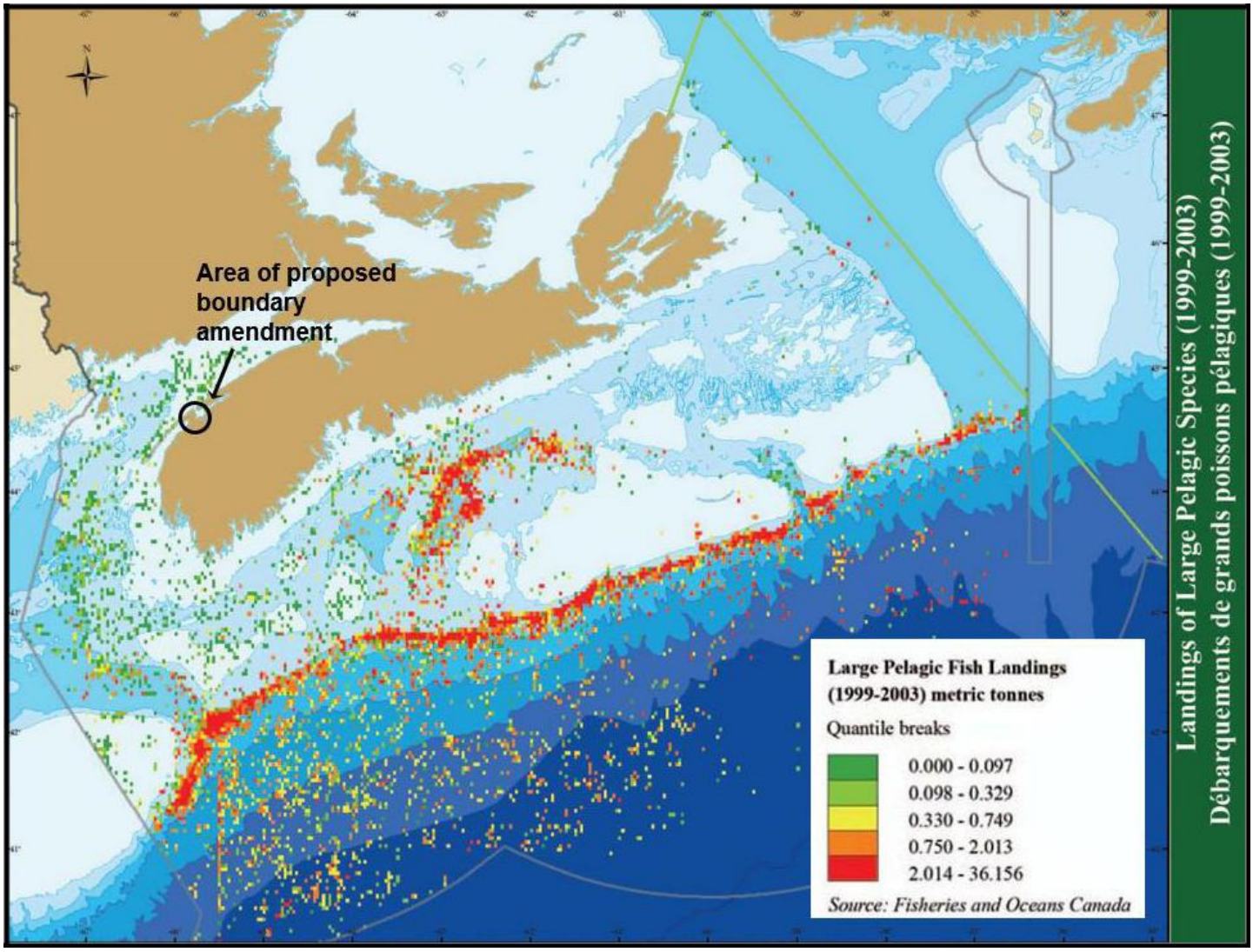

Figure 8. Commercial Large Pelagic Fish Landings, Excluding Bluefin Tuna (1999 – 2003)

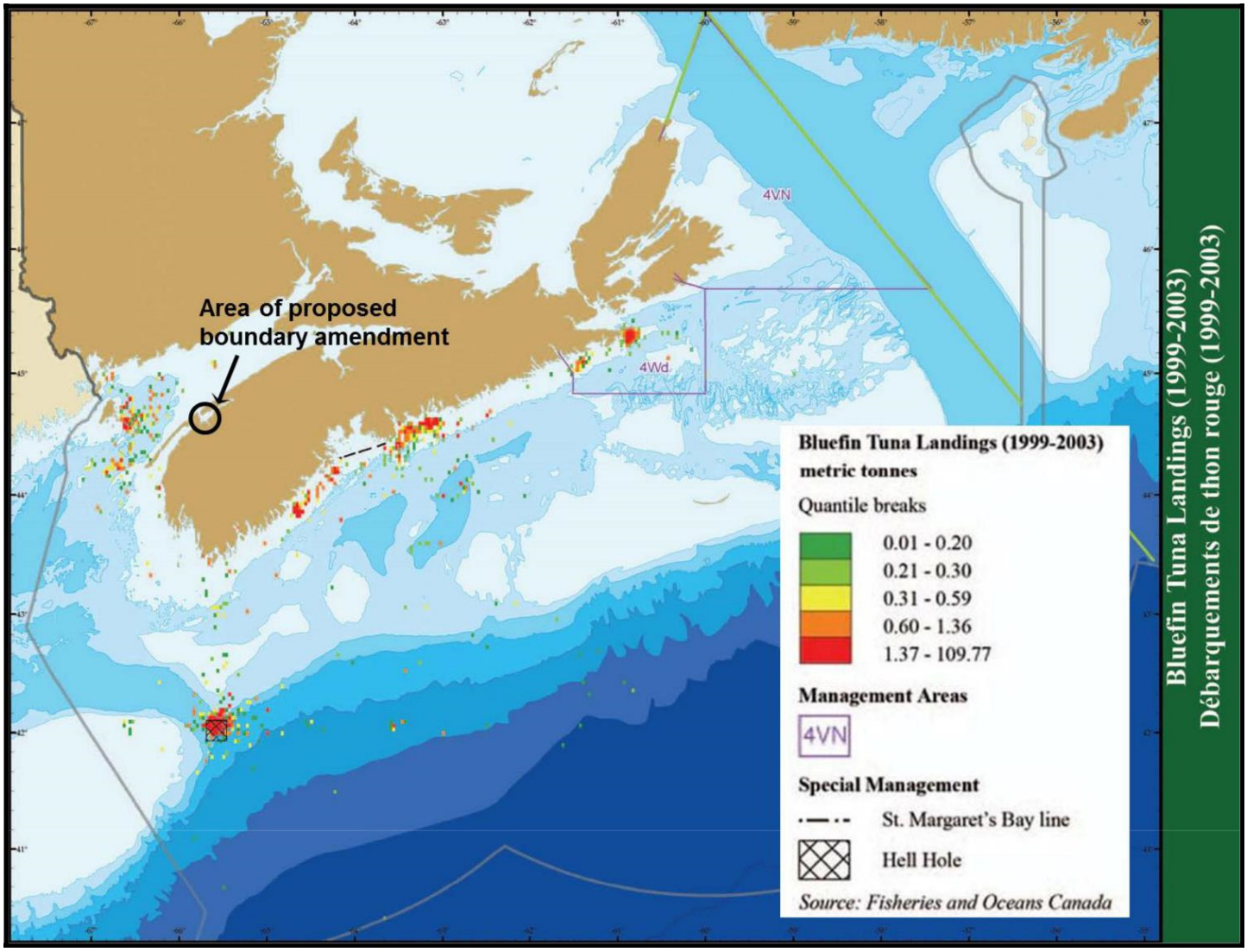

Figure 9. Commercial Bluefin Tuna Landings (1999 – 2003)

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, clams/quahaug and crabs (Table 5; Fisheries and Oceans 2017a). Also harvested are sea cucumber and sea urchins.

Table 5. Atlantic Coast Commercial Landings for 2015
Note: Source from Fisheries and Oceans (2017a)

2014 ATLANTIC COAST COMMERCIAL LANDINGS, BY REGION (metric tonnes, live weight)				
Species	**Nova Scotia**			**Atlantic**
	Maritimes	**Gulf**	**Total**	**Total**
Shellfish				
Clams / quahaug	16,424	9	16,433	31,292
Oyster (1)	0	X	48	1,370
Scallop (2)	55,233	64	55,297	61,061
Squid	X	0	X	15
Mussel (3)	0	0	0	0
Lobster	45,355	3,900	49,255	90,875
Shrimp	X	X	25,711	134,603
Crab, Queen	12,036	5,586	17,623	93,519
Crab, Other	435	326	761	5,167
Whelks	X	0	X	3,607
Cockles	X	0	X	124
Sea cucumber	2,551	0	2,551	6,504
Sea urchin	X	0	X	2,319
Other	0	0	0	0
Total	**157,984**	**10,129**	**168,113**	**430,455**
Subtotal	**245,787**	**16,497**	**262,284**	**673,495**
Others				
Marine plants	150	0	150	11,579
Lumpfish roe	0	0	0	33
Miscellaneous (4)	644	0	644	2,860
Total	794	4	298	14,472
GRAND TOTAL (5)	**246,581**	**16,497**	**263,078**	**687,967**

Note: X = Values have been 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) Miscellaneous value includes seal value.
(5) Totals may not add up due to rounding.
Source: Fisheries and Oceans Canada (DFO), Economic Analysis and Statistics

Invertebrate fisheries constitute the largest piece of the Nova Scotia fishery (Fisheries and Oceans Canada 2014), of which the lobster fishery is the primary component. In 2015, Nova Scotia landed over ~50,000 t of lobster valued at $695 million (Fisheries and Oceans Canada 2017a, Fisheries and Oceans Canada 2017d). The inshore lobster fishery accounts for ~ 90% of the lobster landings (Coffen-Smout et al. 2013, Serdynska & Coffen-Smout et al. (2017)) (Fig. 10), in which the landings have more than doubled in the past 20 years (NSDFA 2014). The proposed farm falls within lobster fishing area (LFA) 35. 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 mostly gravel and sandy conditions. 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.).

The Jonah-crab fishery occurs in both offshore and coastal areas of southwestern Nova Scotia; the rock crab is primarily found in shallow, nearshore areas (Fisheries and Oceans Canada 2014d) (Fig. 11). An exploratory snow-crab fishery in NAFO Division 4X (the western portion of CFA 24) was initiated in 1994; catches are relatively low from 4X (generally less than 350 t per year), the season extends from November to May and only one area is considered commercially important (DFO 2017c) (Fig. 12). Commercial snow (queen) crab landings for 2015 and 2016 are illustrated in Figure 13, which indicates that the proposed boundary amendment of Rattling Beach does not fall within a snow crab fishing area. Snow crab is the second most valuable Canadian fishery export product, and the Scotia-Fundy fishable biomass has increased in most areas (Fisheries and Oceans Canada 2015b). The commercial value of snow crab for the Maritimes region of Nova Scotia is $38.9 million.

Shrimp represents Canada's fourth most valuable seafood export, with the northern shrimp being the most abundant in Atlantic Canadian waters. The fishery uses demersal otter trawl fishing vessels both in the inshore and offshore fishery. Initially, SFA 16 was the primary area for shrimp fishing on the Scotian Shelf (Fisheries and Oceans Canada 2014b). In shrimp fishing area 16, several licenses are largely inactive due to low shrimp abundance in this area (Seafish 2015; Fig 14); however, Fisheries and Oceans maintain the stock biomass as being in the healthy zone (Fisheries and Oceans Canada 2015c).

The commercial fishery for scallops is typically offshore, although a smaller inshore fishery does occur along parts of the Atlantic coast (Fig. 15). Historically, the area off Digby, in the Bay of Fundy, has been the key area for the inshore fishery (Fisheries and Oceans Canada 2014). SPA 4 and 5 were joined under one Total Allowable Catch (TAC) limit for the 2013/2014 fishing season (Fisheries and Oceans Canada, 2017e). Scallop production areas (SPAs) 4 and 5 are located off Digby and in Annapolis Basin, respectively. Scallops caught in SPA 4 were 227 t and in SPA 5 were 6.5 t for the 2016 fishing season (Fisheries and Oceans Canada, 2017d; Fig. 16). The catch rate increased in both SPA 4 and 5 in comparison to 2015. The commercial biomass in SPA 4 is in the healthy zone (Fisheries and Oceans Canada, 2017e). In 2016, the number and weight per ton of commercial scallop in SPA 5 were significantly above the medians of the 1996 to 2008 survey series, while recruit number and weight per ton were above historic long-term recruit medians in 1990 to 2008. The commercial value of the scallop fishery for the Maritimes region of Nova Scotia is $167 million dollars.

In Maritimes Statistical Districts 38 & 39, invertebrate landings and associated value was not separated in the provided "other species" category except for lobster. For 2015, 11,262,144 kg was landed comprising of species other than groundfish and lobster with a value of $29,096,031. Key invertebrate species landed include: clams (Bar, quahaugs, soft

shell and unspecified), rock crabs, sea scallops and sea urchins. Bait fisheries for rock crab were noted for these districts. In 2015, reported lobster landings weighed 2,898,078 kg with a value of $40,951,586 (C. O'Neil, pers. com.).

The area of the proposed fish farm falls within shellfish harvesting area NS-18-010-001 (Fig. 17). The majority of Annapolis Basin is classed as conditionally approved waters for harvesting shellfish; however, the Rattling Beach site is between waters to the north and the south which are prohibited for harvesting. Figure 17 was produced by Environment Canada (D. MacArthur, pers. comm.).

Species list

Lobster (*Homarus americanus*) Shrimp (*Pandalus borealis*)
Rock crab and Jonah crab (*Cancer irroratus* and *C. borealis*)
Green crab (*Carcinus maenas*)
Scallop (*Placopecten magellanicus*)
Sea urchin (*Strongylocentrotus droebachiensis*)
Soft-shell clam (*Mya arenaria*)
Bar clam (*Spisula solidissima*)
Quahaug (*Mercenaria mercenaria*)

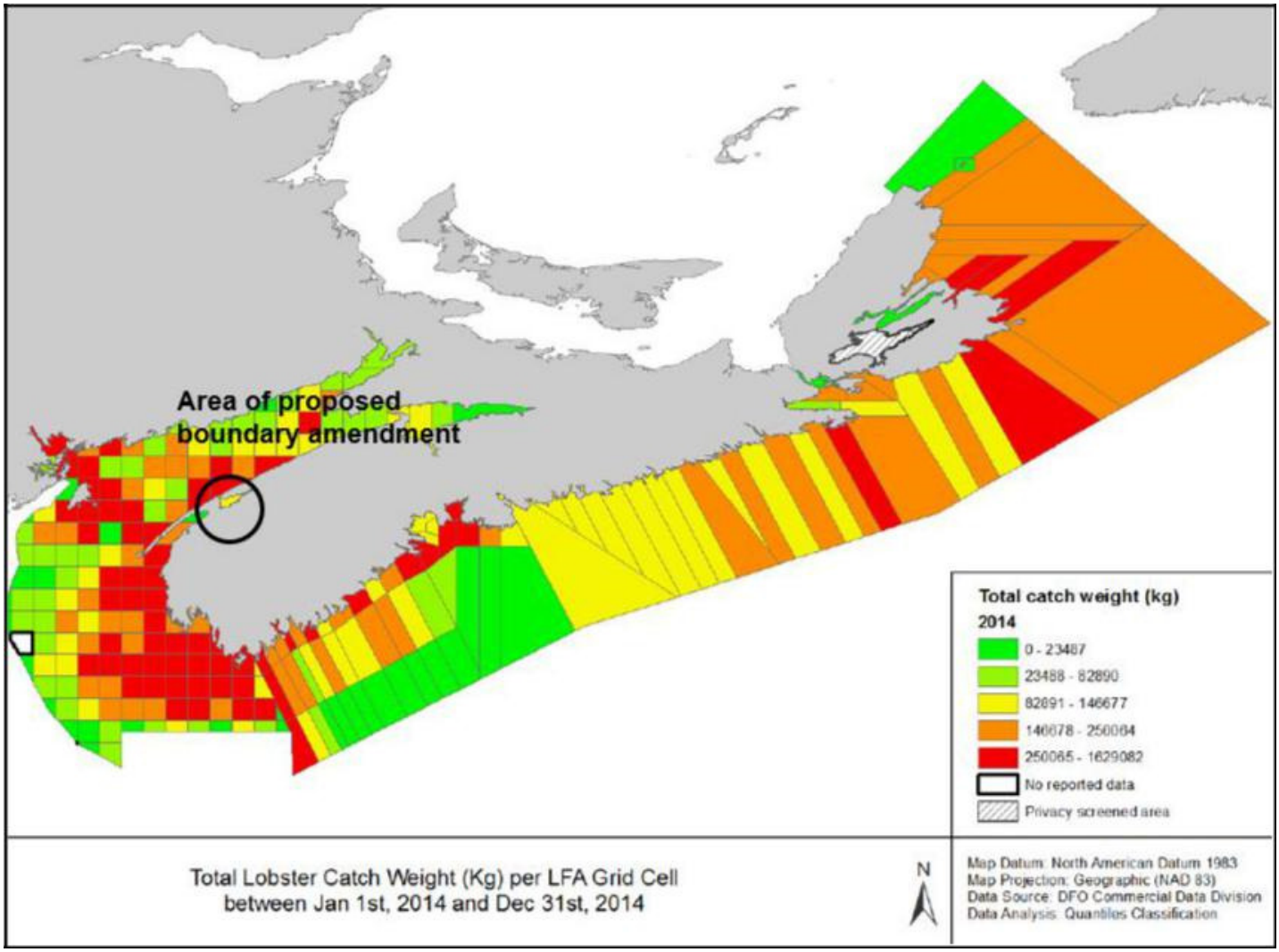

Figure 10. Total Lobster Catch
Note: sourced from Serdynska & Coffen-Smout et al. (2017)

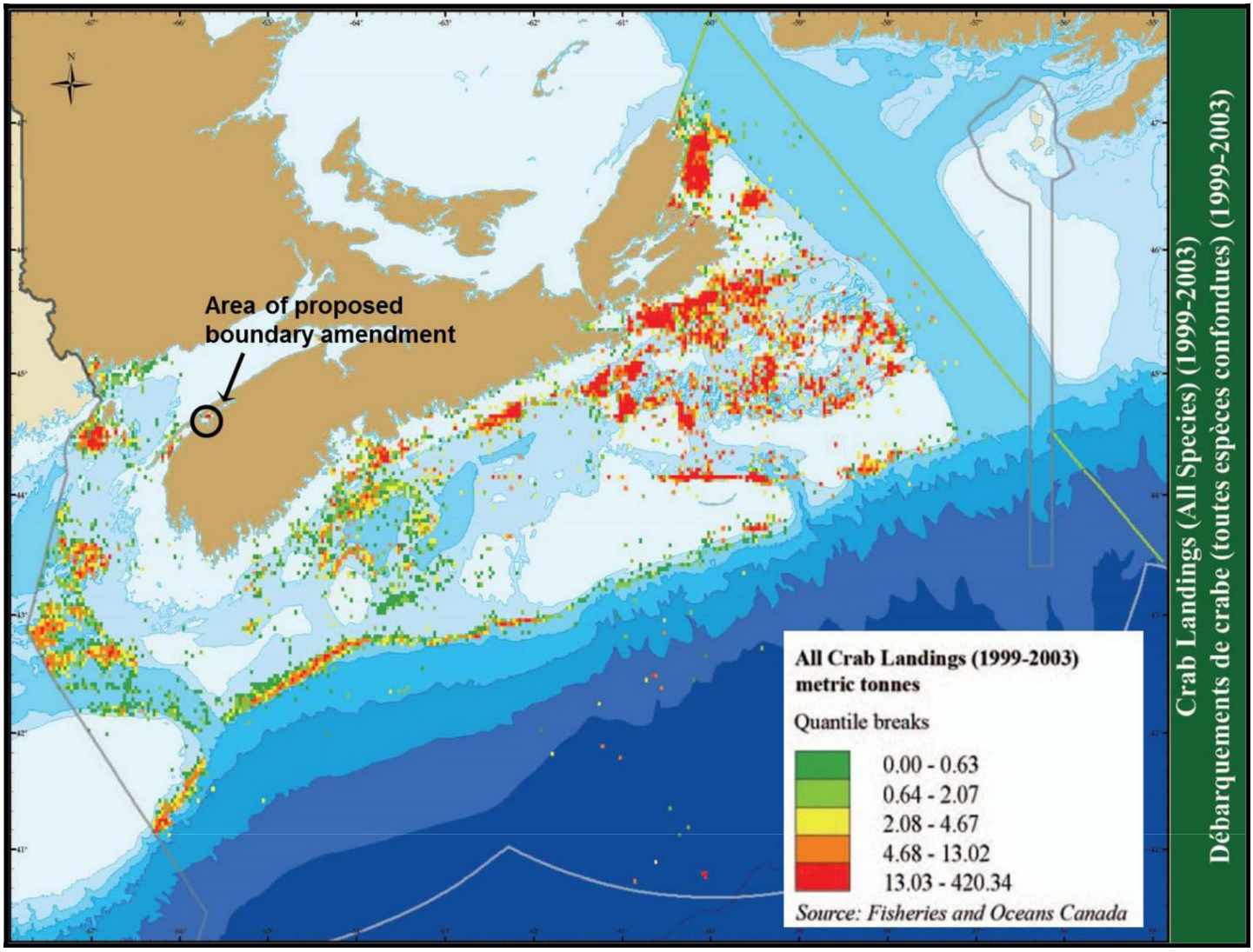

Figure 11. Commercial Crab Landings (1999 – 2003)

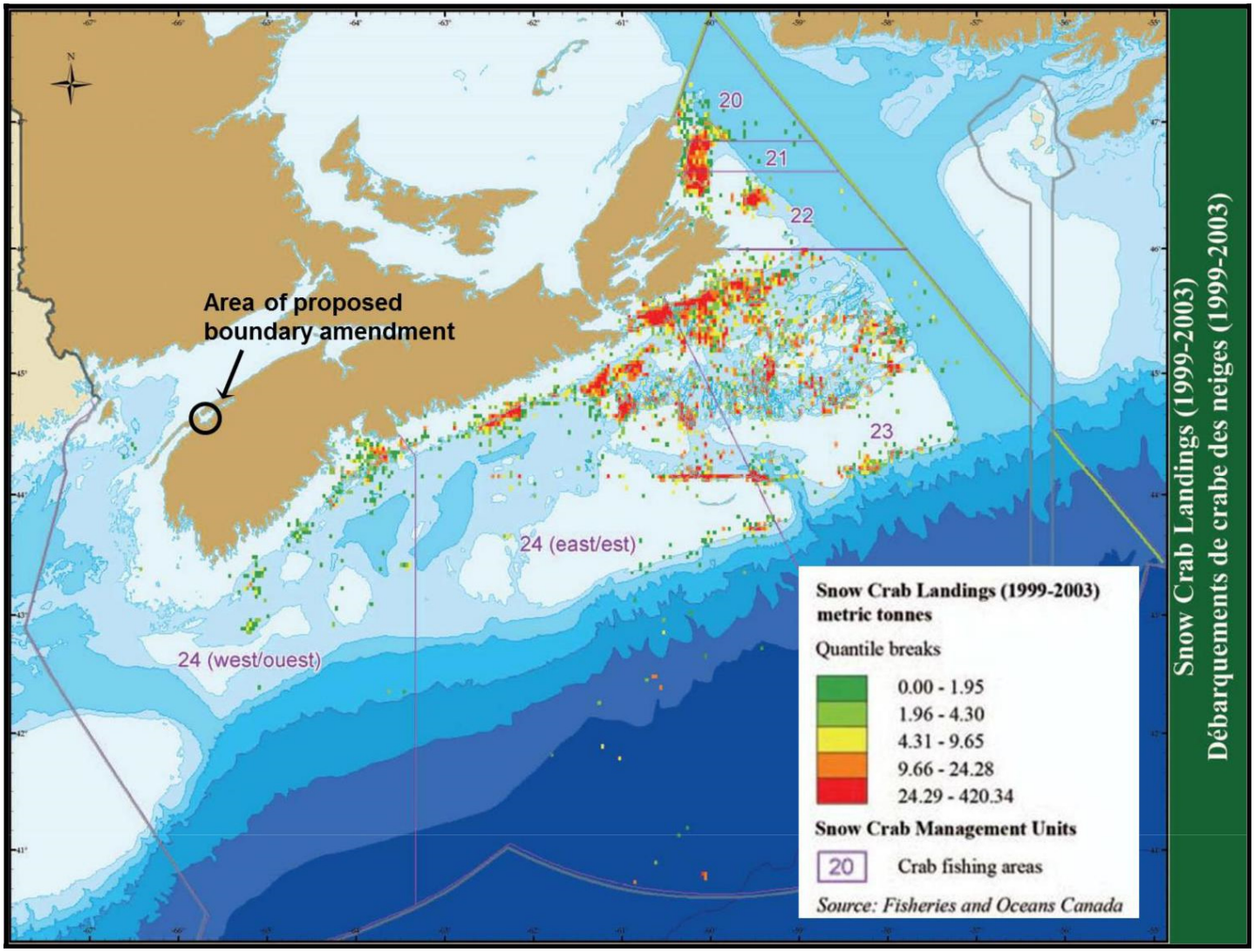

Figure 12. Commercial Snow Crab Landings (1999 – 2003)

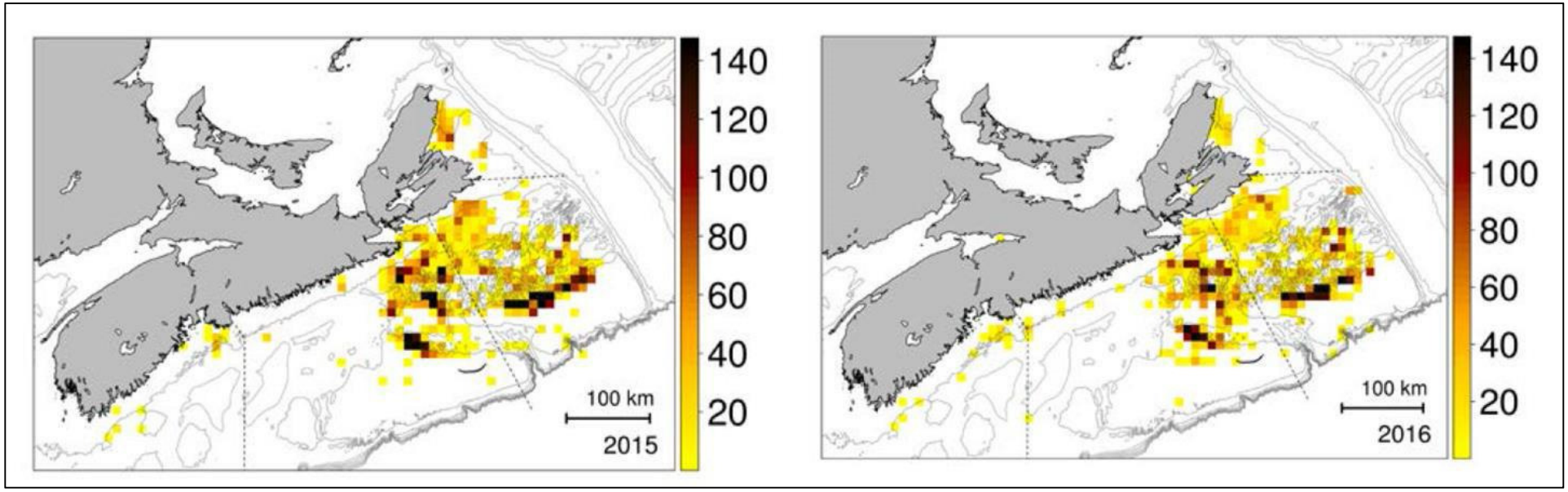

Figure 13. Commercial Snow Crab Landings (DFO 2017b)

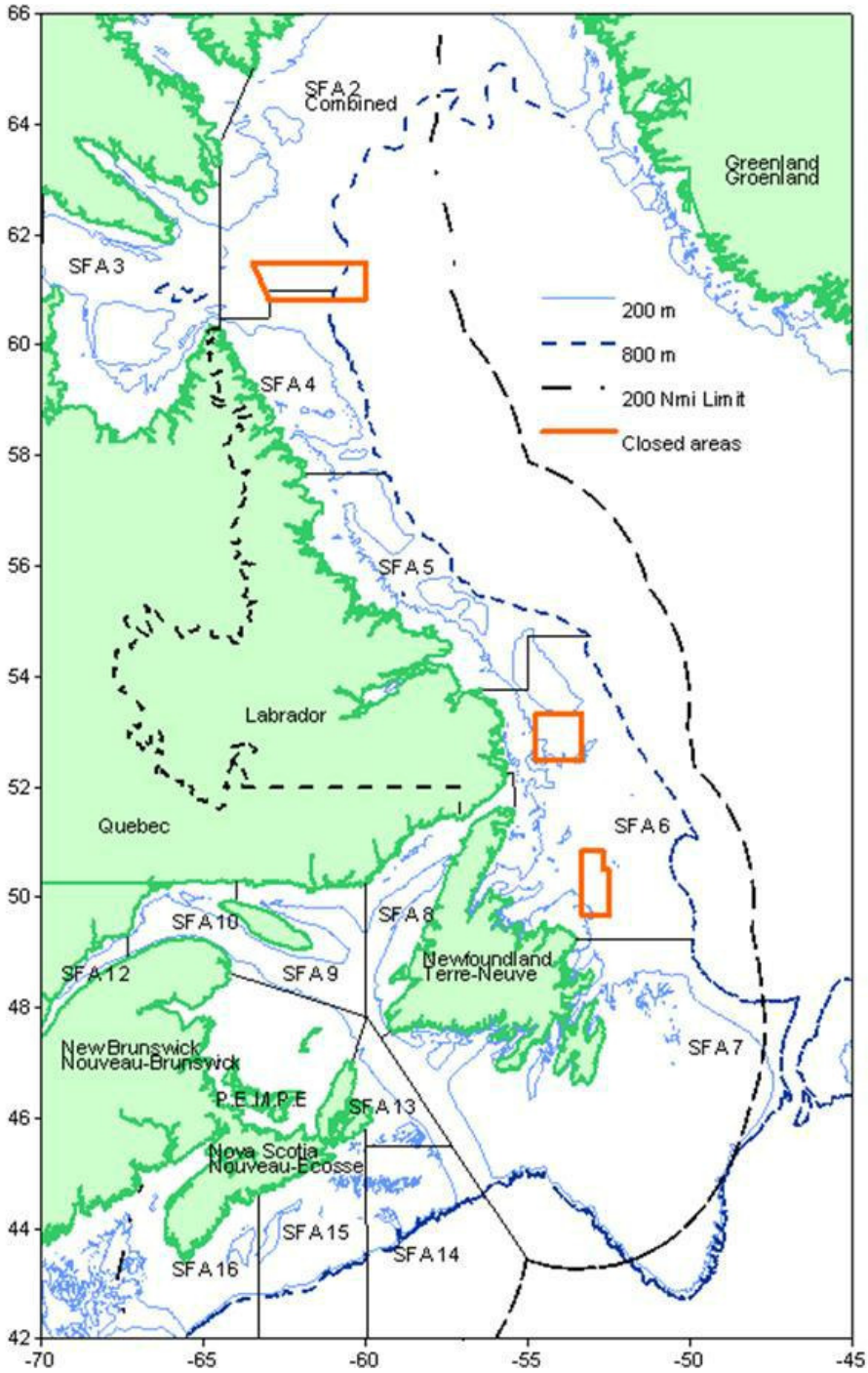

Figure 14. Shrimp Fishing Areas in Atlantic Canada
Note: Sourced from Fisheries and Oceans Canada (2015c)

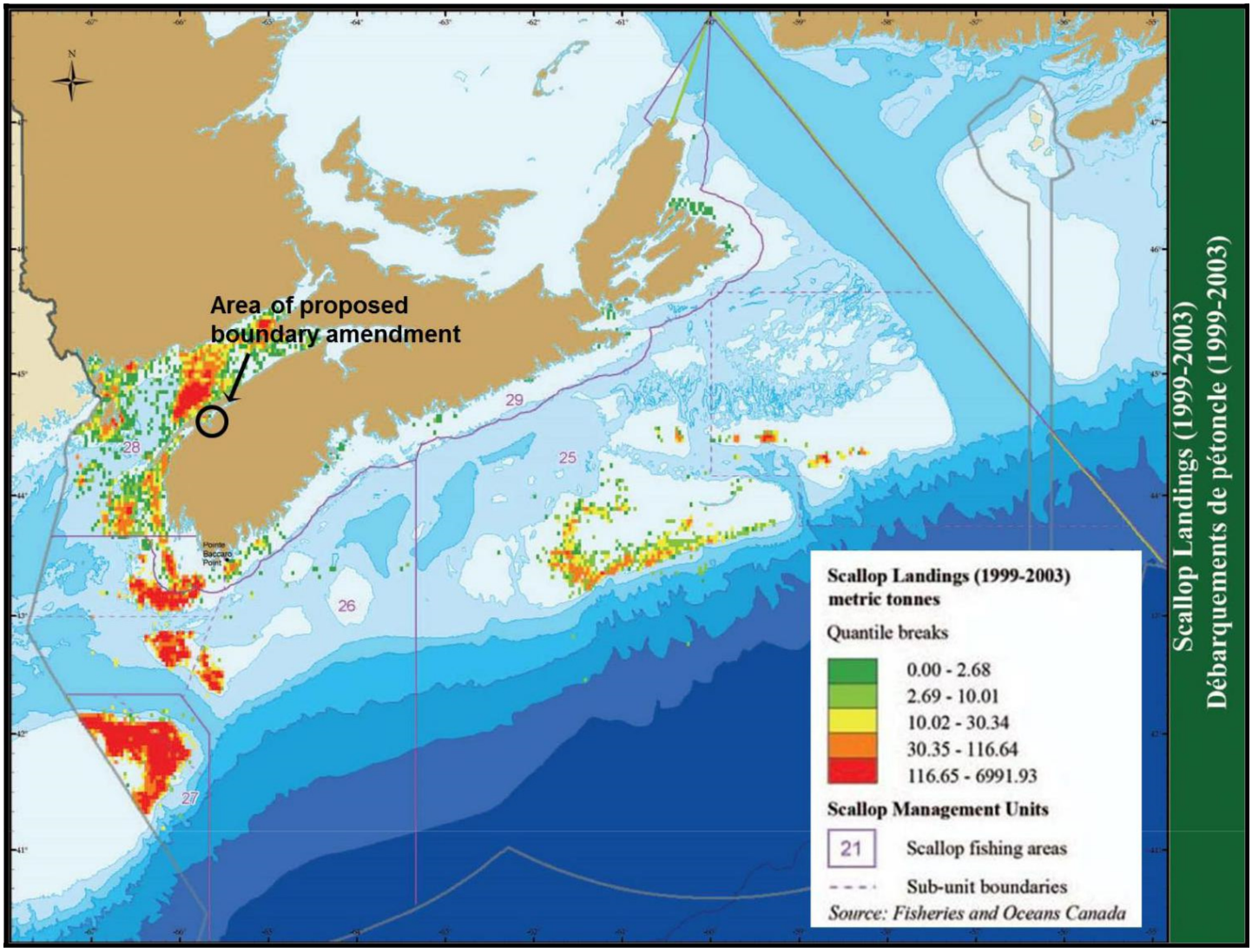

Figure 15. Commercial Scallop Landings (1999 – 2003)

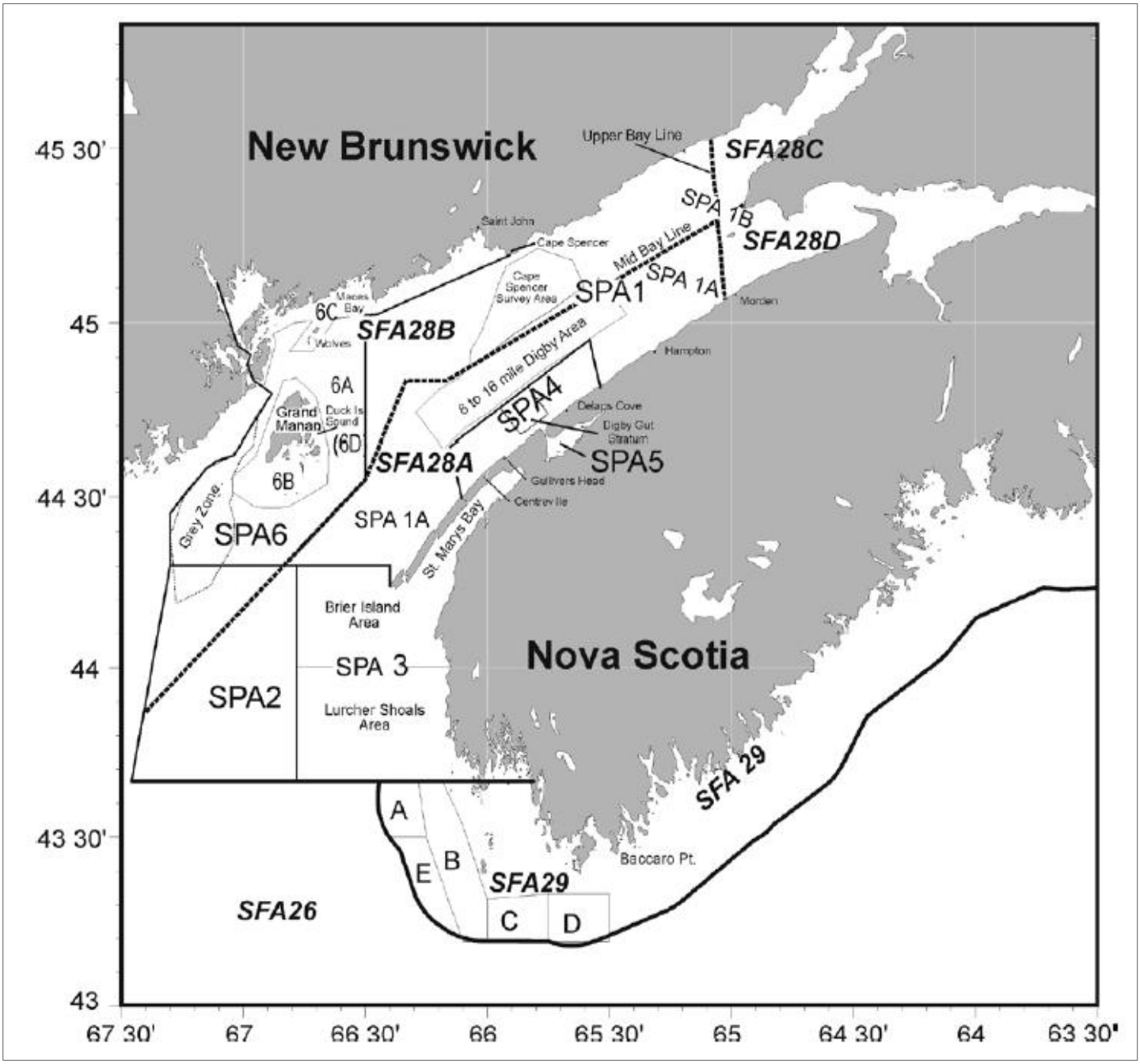

Figure 16. Scallop Production Areas
Note: sourced from Fisheries and Oceans (2017e)

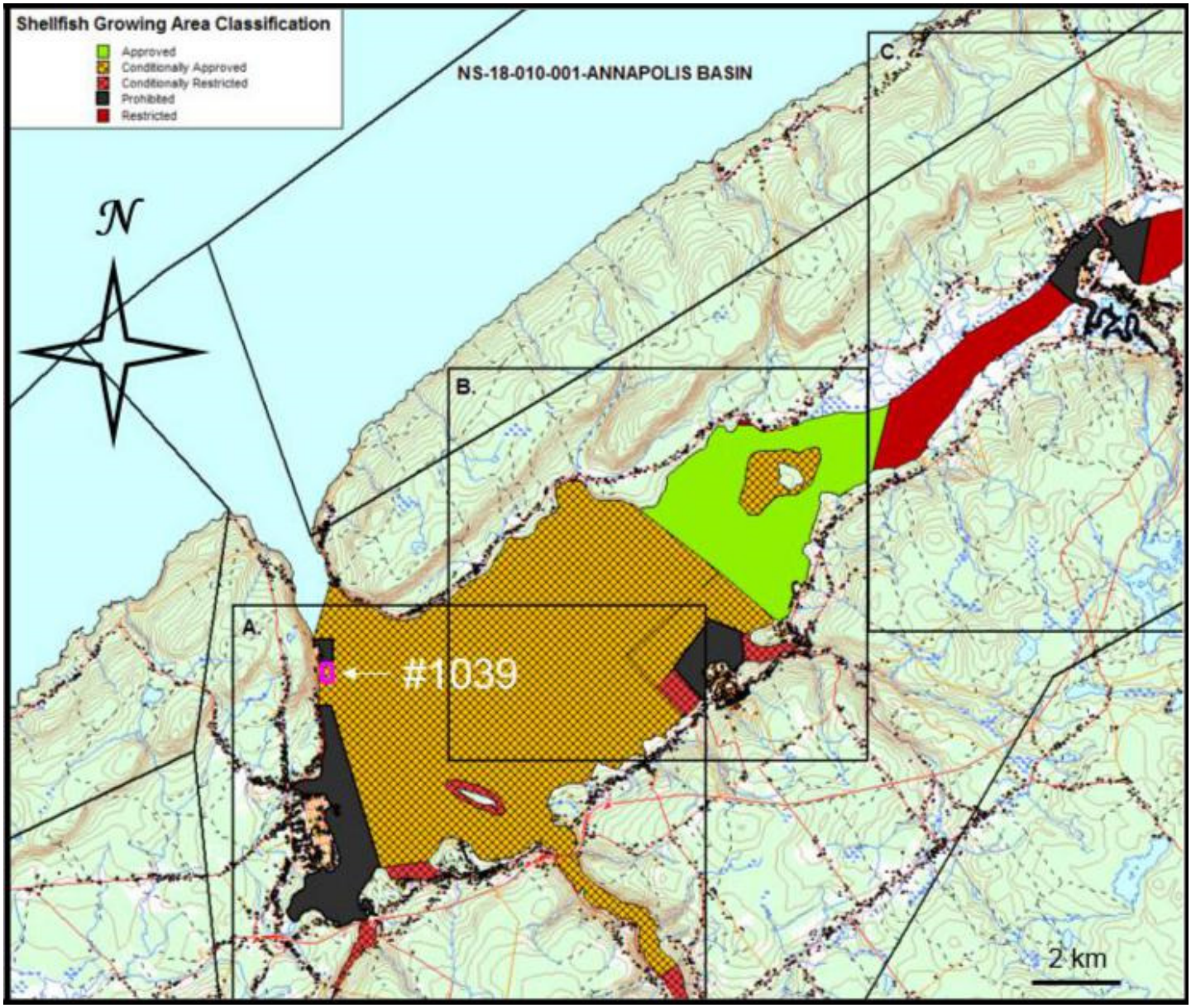

Figure 17. Shellfish Harvesting Classifications of the Annapolis Basin Area
Note: DFO is the central CSSP agency with respect to the real-time status of shellfish growing area classifications. DFO should be contacted directly for information on shellfish area closures.

Seaweeds

Marine plants harvested commercially in Nova Scotia include rockweed (*Ascophyllum nodosum*), Irish moss (*Chrondus Chrispus*), dulse (*Palmaria palmata*), and kelp (*Saccharina latissima, S. groenlandica* and *Laminaria digitata*). In 2013, approximately 332 t of marine plants were landed in Nova Scotia at a value of nearly $107,560 (NSDFA 2013).

In Nova Scotia, *Ascophyllum* is harvested for animal fodder, fertilizer, and other specialty products. Irish moss is commonly harvested for carrageenan, which is used in the food industry for its thickening and stabilizing properties. Though the species is not under any immediate threat, Nova Scotian Irish moss populations are beginning to experience signs of increase in site-specific harvesting pressure, and protection methods are beginning to be recognized (Fisheries and Oceans Canada 2013). Harvest rates of rockweed in Annapolis Basin have remained high over the past 30 years; however, these rates indicate that the habitat value of these beds is significantly altered and takes years to recover. Reassessment of long-term impacts on habitat and the ecosystem are important in determining future harvest rates.

The province of Nova Scotia has jurisdiction over the issuing of rockweed licenses. 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.). This is because rockweed harvesting takes place in shallow, intertidal water but aquaculture farms require deeper water. Irish moss also occurs low in the intertidal and into the shallow subtidal and is harvested with a hand rake (Fisheries and Oceans Canada 2013). Harvesting *Ascophyllum* is considered a high-risk activity as these plants and other biota can be damaged due to harvest. Annapolis Basin has a history of overharvest impacts; one full closure of the basin resulted when harvest rates were greater than 50%. Therefore, mitigation actions such as seasonal closures during peak growth or reproductive effort may be necessary to ensure population status (Fisheries and Oceans Canada 2013). There are currently no rockweed leases in place for Annapolis Basin; however, two (2) applications have been received for this area and are currently being processed by the Province of Nova Scotia (W. Vissers, pers. com.; Fig.18).

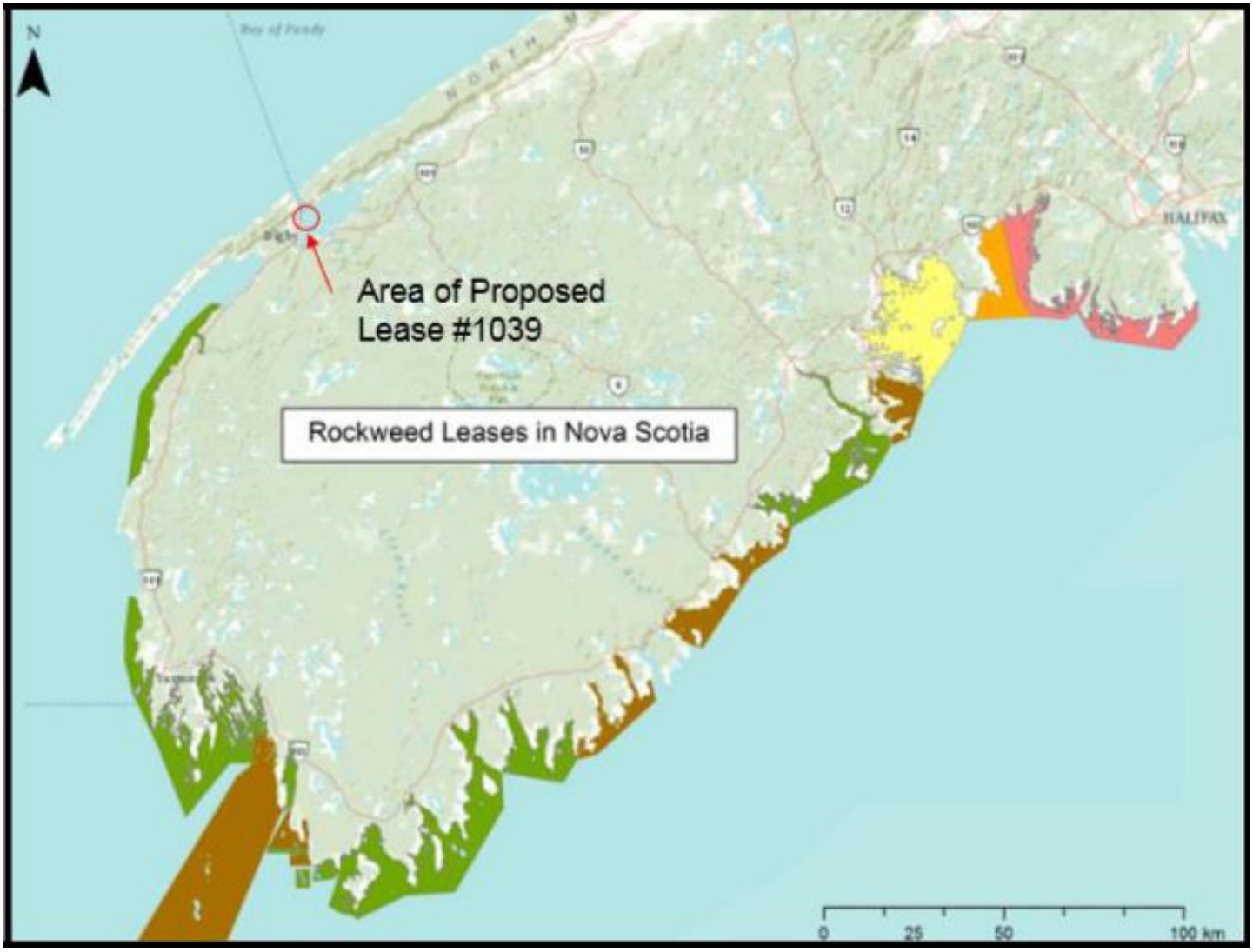

Figure 18. Rockweed Licences in Nova Scotia
Note: sourced from Nova Scotia Department of Fisheries and Aquaculture

3.1.2 Recreational Fisheries

Department of Fisheries and Oceans Canada was contacted for recreational fishing landings; however, this data is not available through their database (C. O'Neil, pers. com.). Local angling associations, such as the Nova Scotia Association of Anglers and Hunters, have been contacted but they do not record landing numbers.

Nova Scotia is divided into six recreational fishing areas (RFA's) to all for regional management. The Annapolis Basin is surrounded by two counties – Annapolis and Digby. The recreational fishing Area 4 encompasses Digby, Queens, Shelburne and Yarmouth while Area 5 is comprised of Annapolis, Kings and Hants. There were approximately 80,000 anglers in 2014 (NSDFA 2017). The most common freshwater species being fished in Areas 4 and 5 include: trout (rainbow, speckled and brook), small mouth bass, chain pickerel and shad are the most common freshwater species being fished by

recreational fishermen. The season for smallmouth bass, all species of trout, and chain pickerel is April 1 to October 31. There is no closed season for tidal waters, however in non-tidal water the season runs from April 1 to October 31. The bag limit is 5 fish for shad, bass and trout species and 25 fish for those fishing chain pickerel. NSDFA encourages anglers to visit their website on a regular basis, to ensure they are knowledgeable about current laws and regulation.

Table 6 provides a list of number of recreational fishing guides in Areas 4 and 5 and species fished (NSDFA 2017).

Table 6. Recreation Fishing Guides in Areas 4 &5

Company	Name of Guide	Contact Information	Area	Species
NS Wilderness Guide Service		@bellaliant.net	5	-Speckled, rainbow & brown trout -smallmouth bass -other freshwater and saltwater species
N/A			5	-speckled & brown trout -rainbow trout -Atlantic salmon
N/A			5	-Speckled & brown trout -small mouth bass -Shad; chain Pickerel -Atlantic salmon
Natures Point of View		Naturespointofview@yahoo.ca	4	-bass -trout
N/A			4	-speckled trout -smallmouth bass
N/A		@eastlink.ca	4	-saltwater species
N/A		@yahoo.ca	4	-trout -smallmouth bass -chain pickerel -mackerel
Munro's Mountain Maple		@ns.sympatico.ca	5	-speckled & brown trout -small mouth bass
Hurricane Harvesting		@raydesign.org	5	-speckled, brown, & rainbow trout -smallmouth bass -chain pickerel
N/A			5	-speckled trout -smallmouth bass -chain pickerel
Dave's Guiding Service			5	-speckled and rainbow trout -smallmouth bass -Atlantic salmon -chain pickerel
N/A		@eawstlink.ca	5	-salmon -trout -striped bass -shad

Tight Lines Guide Service	[redacted]	[redacted]@tightlines.ca [redacted]	5	-speckled, brown & rainbow trout -chain pickerel -smallmouth bass

Salmon angling seasons in all salmon fishing areas (SFA) in the Maritimes Region (SFA – 23) are closed due to conservation concerns with the exception of three rivers in SFA 19 (Cape Breton East; Fisheries and Oceans 2015e).

Department of Fisheries and Oceans Canada was contacted for recreational fishing landings; however this data is not available through their database (C. O'Neil, pers. com.). In addition,

Nova Scotia Federation of Anglers & Hunters (NSFAH) was contacted to obtain information regarding recreational fishing efforts in the Digby and Annapolis Counties. [redacted], the chair of the fish committee for the NSFAH, indicated the species fished in the area can be obtained on the NSDFA website which is summarized in Table 8 (NSDFA 2017). He was unable to provide number of fishermen or specific information regarding landings.

3.1.3 Aboriginal Fisheries

Aboriginal landings were reported in Maritimes Statistical Districts 38 & 39 however the landing data, species fished, value and fishing effort was not provided by the Department of Fisheries and Oceans Canada (C. O'Neil, pers. com.).

The DFO Area Director for Acadia, Annapolis Valley and Bear River DFO was contacted for information on Aboriginal fisheries, but at the time of this report, an answer had not been received (pending communications with F. Quinn).

Relative fishing efforts cannot be reported as the information is unavailable.

The Bear River First Nation was contacted multiple times with no response.

3.2 Impact on Fisheries Activities

The Environmental Monitoring Program Framework for Marine Aquaculture in Nova Scotia -June 2017 (NS EMP Framework 2017) lays out a series of principles and criteria to guide the management process and to determine levels of monitoring and mitigation for each aquaculture site. The document Standard Operating Procedures for the Environmental Monitoring of Marine Aquaculture in Nova Scotia -June 2017 (NS EMP SOP 2017) describes the procedures that support the application of the framework.

The NS EMP Framework 2017 focuses on benthic marine habitat in the immediate vicinity of the aquaculture site. Although sediment sulfide concentration is the key indicator for this environmental monitoring program, a suite of sediment variables are used to validate sulfide. In addition, benthic video collected at each monitoring station is required.

Benthic monitoring allows the assessment of organic loading beneath and around areas of aquaculture production, one of the primary concerns regarding aquaculture impacts on the environment. KCS adheres to the NS EMP Framework 2017 in Nova Scotia.

The monitoring strategy for this KCS sites follows the guidelines and procedures outlined in NS EMP Framework and NS EMP SOP 2017. An annual EMP monitoring event will occur during July 1st to October 31st of each year.

The site follows standard best management practices for rearing fish in a marine environment. These practices have controls in place to mitigate potential environmental effects. However, the site must also have a selection of additional mitigation strategies to apply if an environmental compliance threshold is exceeded.

In the event poor environmental performance is determined through monitoring, the site must implement mitigation. Furthermore, the site must update their mitigation plan to address the poor environmental performance and submit the updated plan to NSDFA.

These mitigation strategies must be based on best management practices and a hazard analysis of Environmental Impacts. For the Environmental Impact mitigation plan, this must be followed by an examination of each hazard to determine which process steps have the most significant hazards and therefore could have additional controls to reduce environmental impact.

Each site has a different risks of algae blooms and therefore algae monitoring requirements should be determined on a site by site basis, according to history and best available knowledge.

Algae monitoring will take place at the site on a weekly basis from May to October. Water samples will be collected by the Site Manager at the surface of the water near the center of the farm; once the sample is collected it may be stored on ice – depending on time until samples are delivered. Samples are sent to the office in Bridgewater where they are analyzed by trained staff and recorded.

Due to natural cycles and processes such as seasons, thermoclines, weather, haloclines, algal blooms, etc., it is of utmost importance to monitor water quality. Monitoring specific water parameters will aid the farmer in preparedness for dealing with health issues, assist with feeding regimes, and allow mitigative actions to be taken when conditions are less than optimum.

KCS provides detailed maps and diagrams of their sites when requested. These maps and diagrams show the location of all above and underwater infrastructure, thus aiding in fishing efforts. KCS reports harmful algal blooms to the province of Nova Scotia which can benefit invertebrate fishing activities within the Annapolis Basin.

A healthy marine environment is paramount to the site's operation. If the marine environment is poor enough to affect fisheries activities, it would also be detrimental to the site's production.

Section 4: Oceanographic and Biophysical Characteristics of the Public Waters

4.1 Oceanographic Environment

4.1.1 Wind

The proposed boundary amendment of NS aquaculture site #1039 is located near the channel at the entrance to Annapolis Basin, on the Fundy shore of Nova Scotia. The site is sheltered from the south around to the northwest due to its proximity to the mainland of Nova Scotia. The most significant wind directions for this site are from the east-northeast around to the south-southeast, to which the site is exposed to the greatest fetches.

The following wind speed data, including Figures 19 and 20, were collected from the Wind and Wave Climate Atlas – Volume I: The East Coast of Canada, for the Nova Scotian Shore, prepared by MacLaren Plansearch Ltd. (1991). Winds speed of less than 25 knots occur 90.9% of the time on the south shore of Nova Scotia. Storm force winds (i.e. > 45 knots) occur only 0.2% of the time. The most common wind directions are southwest (~20% occurrence) and west (~17.5% occurrence) while the least common wind directions are from the northeast (~7.5% occurrence), east (~6% occurrence), and southeast (~5.5% occurrence). Historically, the months with the highest mean wind speeds in the area have been January and December. During these months, the most frequent wind directions are from the northwest, north, and west, respectively. Annual wind statistics for the Fundy shore of Nova Scotia are presented in Figure 19 and summary graphs of average monthly wind speeds are presented in Figure 20.

Wind speed and direction data were also collected from the Brier Island weather station (Environment Canada 2017a) at Digby Neck, located at N44° 17’ 09.000” W66° 20’ 48.000”. Data collected between April 1, 2011 and August 31, 2018 were used to produce the wind-rose plot of Figure 21. Based on this data, the most common and strongest winds in the Annapolis Basin area occur between 145 and 175˚(coming from approximately the south-southeast through the southwest). Most commonly, wind speeds are between 2 and 8 km/h (Fig. 22). Maximum wind speed and direction recorded at the Brier Island weather station is presented in Table 6.

Table 7. Maximum Wind Speed and Direction Measured at the Brier Island Weather Station

Date of Maximum Wind of the Year	Wind Speed (km/hr)	Wind Direction
February 13, 2017	91	N
February 16, 2016	92	SE
February 15, 2015	95	NNW
March 26, 2014	107	NNW
February 17, 2013 March 26, 2013	95	NW
December 30, 2012	91	NNW
October 10, 2011 December 8, 2011	83	NW

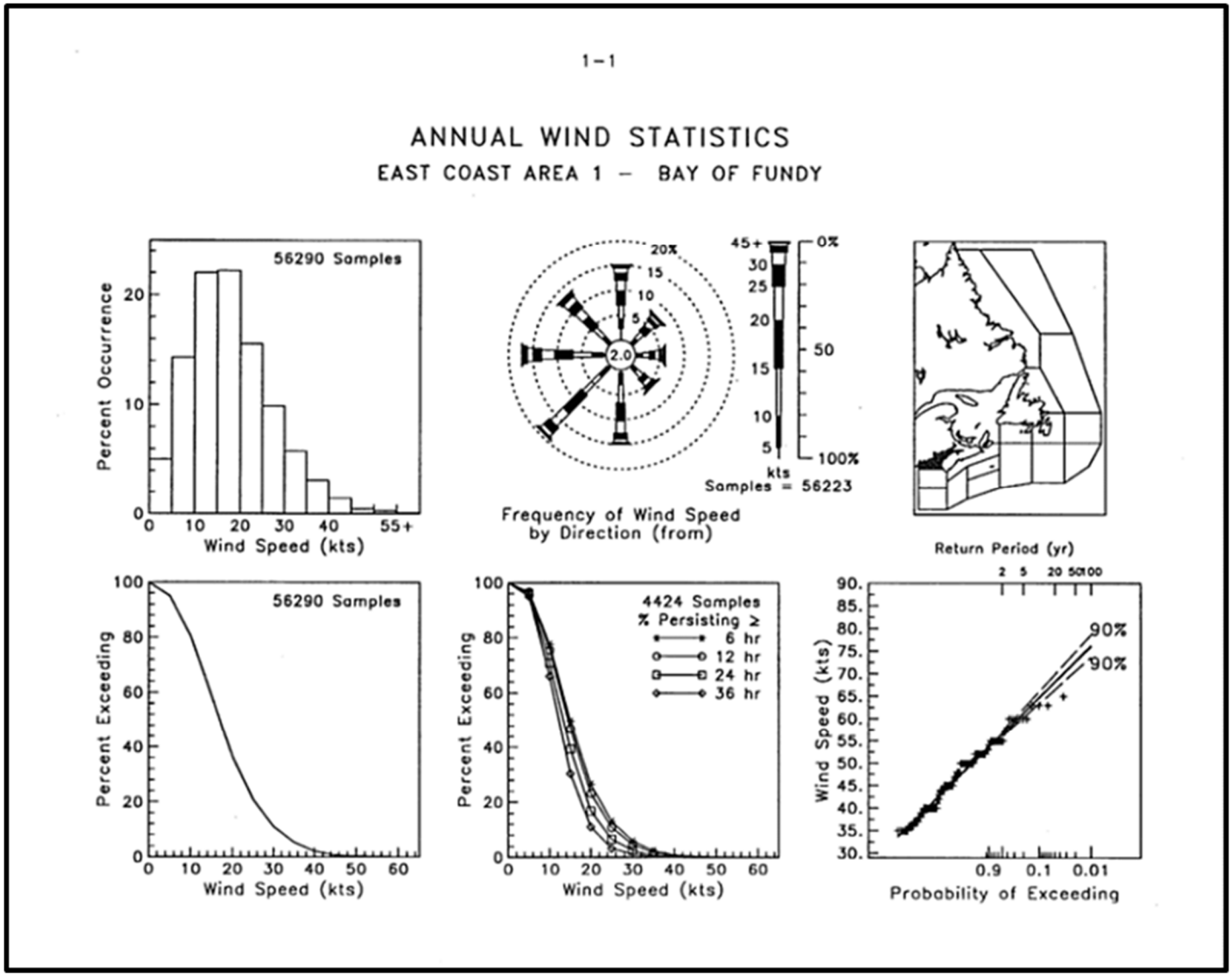

Figure 19. Annual Wind Statistics for the Bay of Fundy Shore
Note: sourced from MacLaren Plansearch Ltd. (1991)

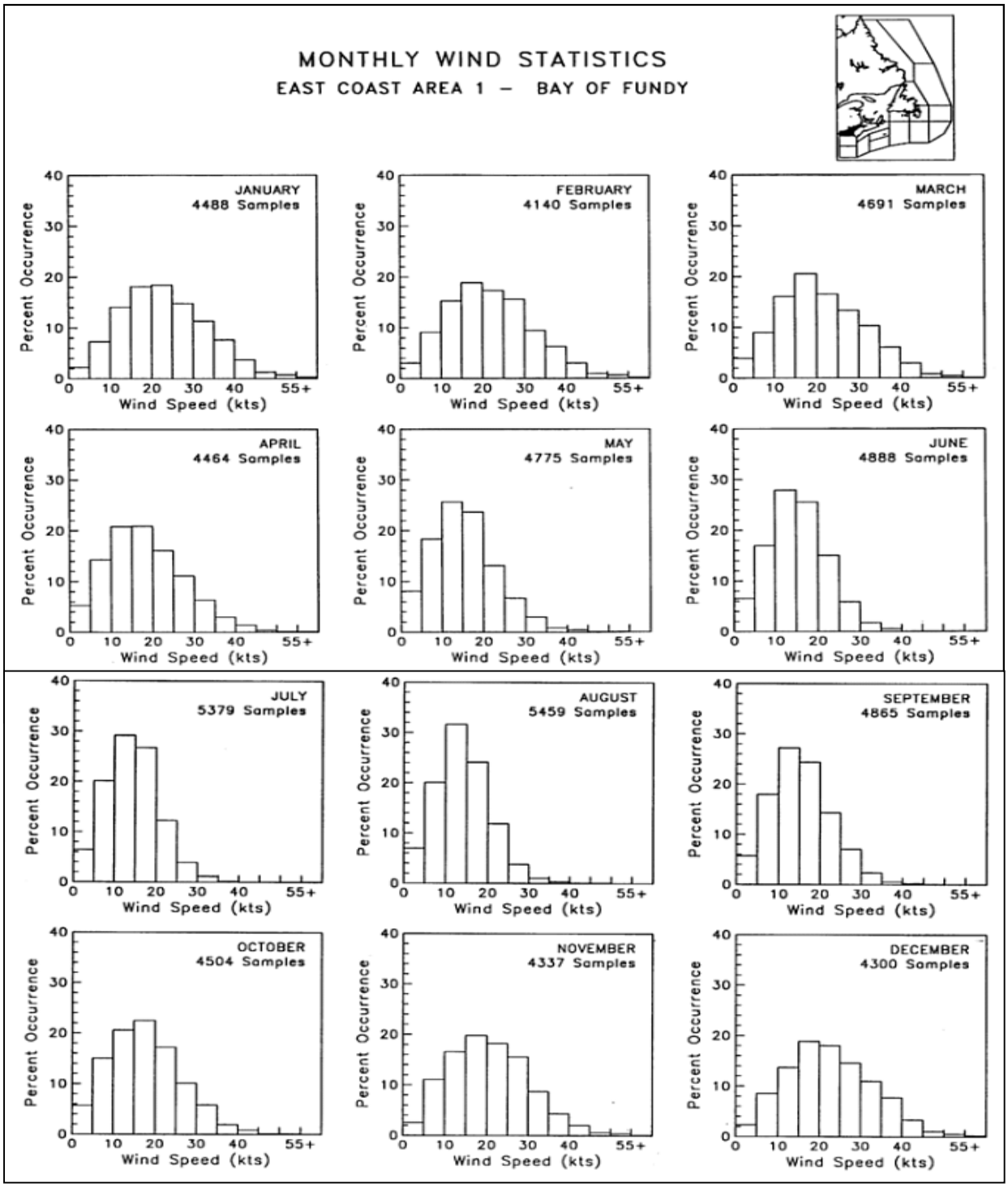

Figure 20. Average Monthly Wind Statistics for the Bay of Fundy Shore
Note: sourced from MacLaren Plansearch Ltd. (1991)

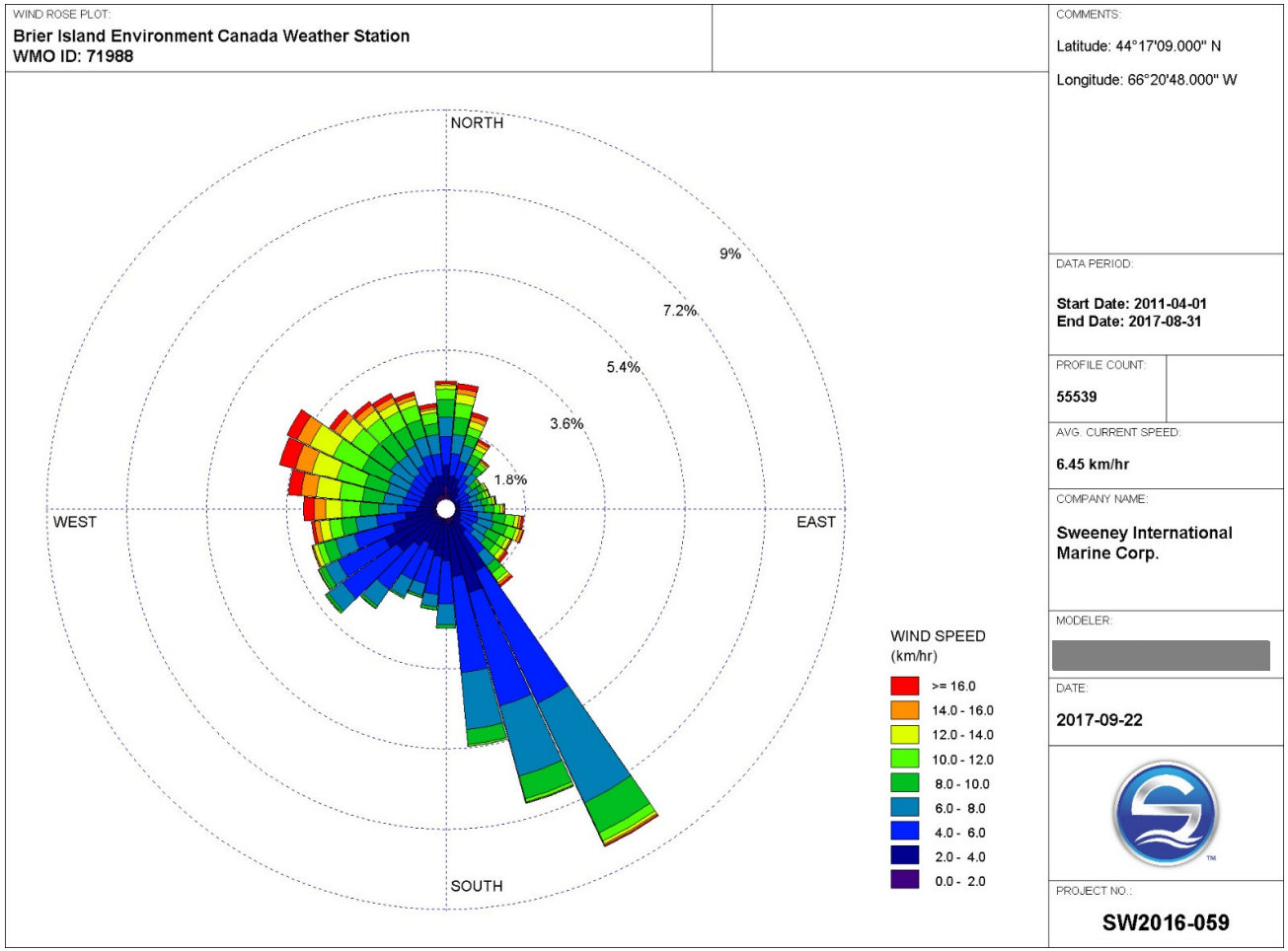

Figure 21. Wind-rose Plot of Brier Island Weather Station Data Collected Between April 1, 2011 and August 31, 2017
Note: the bars on the plot indicate the direction the wind was coming from
Data sourced from Environment Canada (2017a)

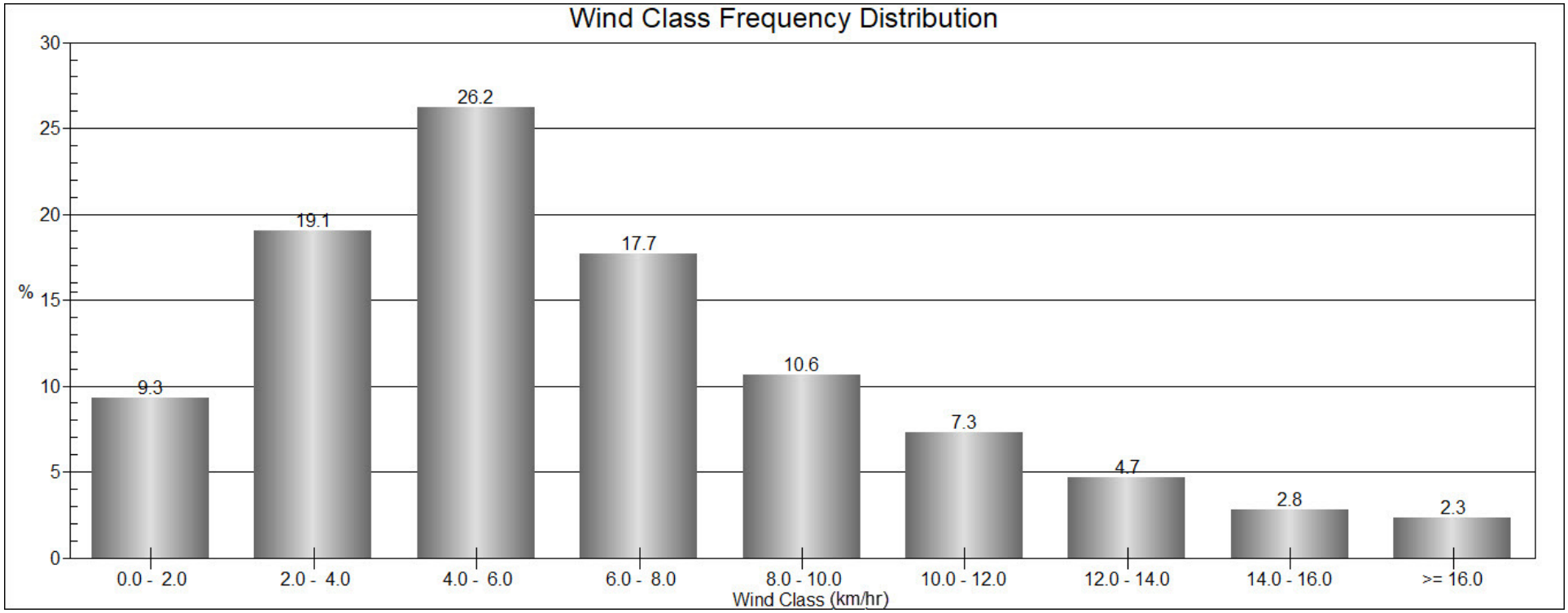

Figure 22. Frequency of Wind Speed Observed at the Brier Island Weather Station between April 1, 2011 and August 31, 2017
Data sourced from Environment Canada (2017a)

4.1.2 Waves

The following wave height data, including Figures 23 and 24, were collected from the Wind and Wave Climate Atlas – Volume I: The East Coast of Canada, prepared by MacLaren Plansearch Ltd. (1991).

Wave heights of 6 m and greater are generally associated with winds speeds of 30 knots or more. Waves of less than 3 m in height were recorded 89.9% of the time while waves greater than 5 m were recorded only 1.0% of the time. Waves reaching the Fundy shore of Nova Scotia most commonly come from the southwest (24.7%) and west (18.9%). The aquaculture site at Rattling Beach is sheltered by land for these directions. The largest wave heights (i.e. > 5 m) generally come from the east. Waves coming from west, southwest, northwest, northeast, and southeast very rarely exceed 3.5 m in height. The greatest monthly average wave height for the Nova Scotian shore is 1.1 m, which occurs in the months of January, and December. Annual wave height statistics for the Nova Scotia shore are presented in Figure 23 and summary graphs of the average monthly wave heights are presented in Figure 24

Wave height data was also obtained from the National Data Buoy Center (NOAA 2017) to determine maximum waves. Data presented in Table 7 were collected by the Jonesport, Maine station 44027 buoy, which is located 20 nautical miles southeast of Jonesport (N44° 17’ 13” W67° 18’ 27”). The Jonesport, Maine buoy is the nearest buoy to the Rattling Beach site for which wave data is available.

Table 8. Wave Height Data from Buoy 44027 near Jonesport Maine

Date of Maximum Wave of the Year	Wave Height (m)	Mean Wave Direction	Wave Period (s)	Sustained Wind Speed (knots)	Gusts (knots)	Wind Direction
March 15, 2017	5.78	SSE	7.16	28.2	35.6	N/A
December 30, 2016	5.78	SSW	6.3	38.9	48.6	N/A
January 27, 2015	8.43	N/A	9.09	38.9	48.2	N
February 15, 2014	6.12	N/A	12.12	33.2	42.6	WNW
November 27, 2013	6.55	N/A	10.0	15.6	45.1	SSE
January 14, 2012	7.18	N/A	11.43	35.0	42.0	WSW
November 23, 2011	4.8	N/A	8.33	15.0	43.3	NNE
January 26, 2010	6.07	N/A	9.09	33.6	41.8	SSE
December 10, 2009	6.29	N/A	10.0	N/A	N/A	N/A
January 8, 2009	5.66	N/A	11.43	30.5	38.9	WSW
October 29, 2008	8.08	N/A	11.43	33.0	39.7	SSW
February 15, 2007	6.88	N/A	10.81	34.8	42.6	SE
October 29, 2006	7.81	N/A	11.43	36.0	43.9	SW
November 23, 2005	6.82	N/A	12.12	23.9	30.3	SSW

SIGNIFICANT WAVE HEIGHT STATISTICS

EAST COAST AREA 1 – BAY OF FUNDY

PERCENTAGE FREQUENCY OF OCCURRENCE BY DIRECTION

Annual
ODGP

	Direction – coming from									Num
	N	NE	E	SE	S	SW	W	NW	Total	Obs
0.0 – < 0.5 m	0.5	0.7	0.3	0.5	0.6	2.0	1.6	1.0	7.2	313
0.5 – < 1.0 m	2.0	1.6	1.8	2.1	2.5	6.8	5.1	3.1	24.7	1078
1.0 – < 1.5 m	2.3	1.7	2.3	1.0	1.7	7.0	5.0	4.0	24.9	1084
1.5 – < 2.0 m	1.7	1.5	2.0	0.8	1.1	4.0	3.3	2.7	16.9	735
2.0 – < 2.5 m	0.9	1.4	1.2	0.8	1.0	2.4	1.7	1.8	10.7	467
2.5 – < 3.0 m	0.4	0.8	0.7	0.4	0.8	1.4	1.0	1.1	6.1	265
3.0 – < 3.5 m	0.1	0.5	0.8	0.5	0.7	0.7	0.6	0.7	4.7	205
3.5 – < 4.0 m	0.1	0.3	0.5	0.3	0.2	0.2	0.2	0.3	2.1	91
4.0 – < 4.5 m	–	0.2	0.2	0.1	0.1	0.1	0.1	0.1	1.0	43
4.5 – < 5.0 m	–	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.7	31
5.0 – < 5.5 m	–	0.0	0.1	0.1	0.0	0.0	0.1	–	0.3	15
5.5 – < 6.0 m	–	0.0	0.1	0.0	0.0	0.0	0.0	–	0.3	11
6.0 – < 6.5 m	–	0.0	0.1	0.0	–	–	–	–	0.2	10
6.5 – < 7.0 m	–	–	0.0	–	–	0.0	0.0	–	0.1	4
7.0 – + m	–	–	–	–	0.0	0.0	0.0	–	0.1	4
Total	8.0	8.7	10.3	6.2	8.7	24.7	18.9	14.6	100.0	4356

MONTHLY DATA STATISTICS

Waverider

	Mean m	Std Dev m	Med m	Max m	Min m	Upper 95% Lim m	Lower 95% Lim m	Most Freq Dir from	Num Obs
January	1.1	0.7	1.0	4.5	0.1	2.4	0.2	—	901
February	0.9	0.7	0.7	6.6	0.1	2.0	0.2	—	980
March	0.9	0.6	0.7	4.5	0.1	2.0	0.2	—	1177
April	0.7	0.4	0.5	2.8	0.1	1.4	0.1	—	844
May	0.6	0.4	0.4	2.6	0.0	1.2	0.1	—	1007
June	0.5	0.3	0.3	2.8	0.0	1.0	0.0	—	814
July	0.4	0.3	0.3	2.7	0.0	0.9	0.0	—	1140
August	0.4	0.2	0.3	1.7	0.0	0.8	0.0	—	1086
September	0.5	0.4	0.4	2.7	0.0	1.2	0.0	—	1169
October	0.7	0.5	0.5	3.7	0.0	1.7	0.1	—	1261
November	0.9	0.7	0.8	3.7	0.0	2.3	0.1	—	1072
December	1.1	0.7	0.9	3.8	0.1	2.5	0.2	—	849
Annual	0.7	0.6	0.5	6.6	0.0	1.8	0.1	—	12300

Figure 23. Significant Wave Height Statistics for the Fundy Shore
Note: sourced from MacLaren Plansearch Ltd. (1991)

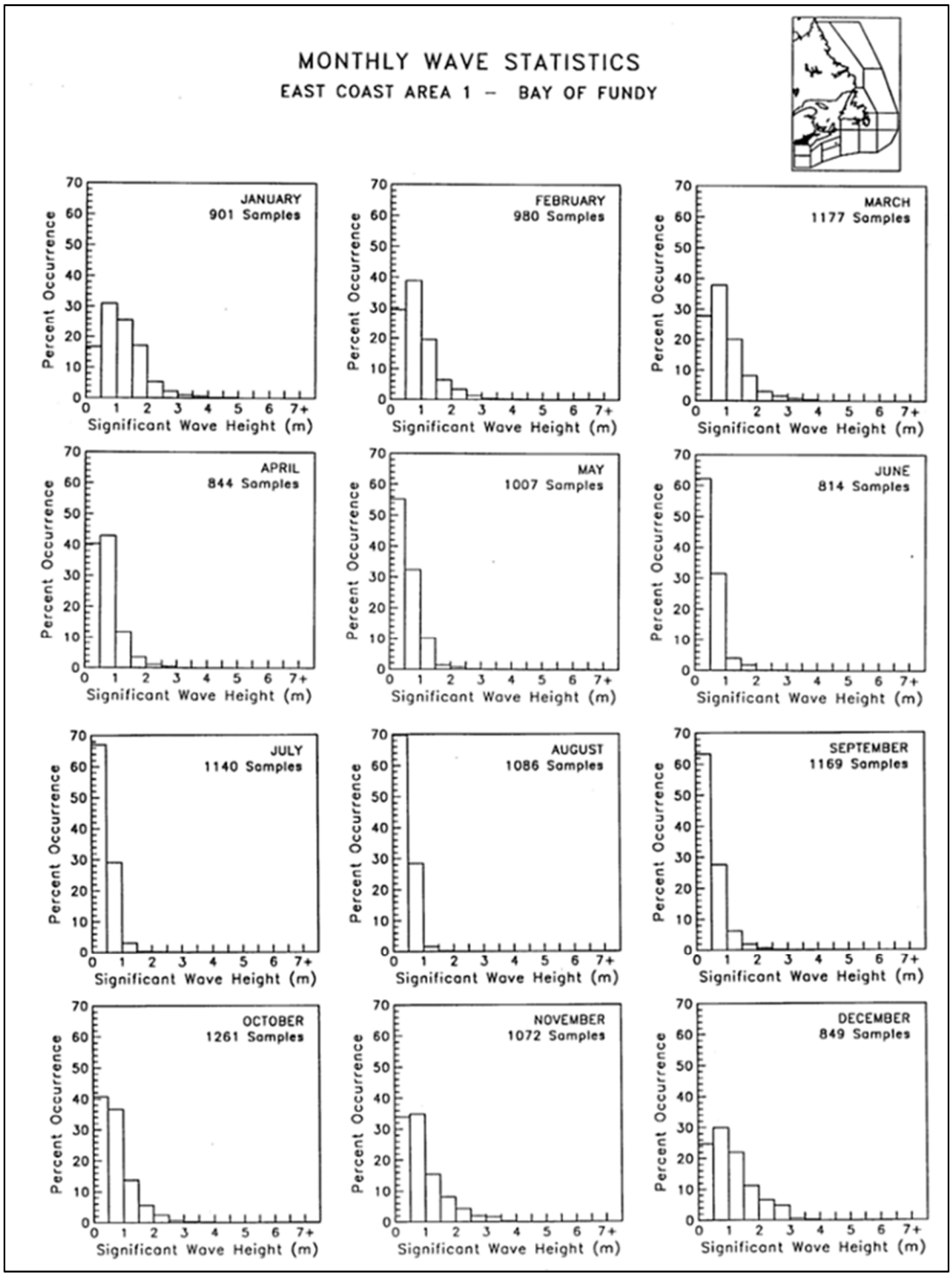

Figure 24. Average Monthly Wave Height Statistics for the Bay of FundyShore
Note: sourced from MacLaren Plansearch Ltd. (1991)

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 that could cause unwanted changes to the project. However, 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 to the project caused by weather and climate extremes. KCS has several high energy sites in New Brunswick, Nova Scotia, and Newfoundland, which are exposed to strong winds and large waves. The grid and anchoring systems used at Rattling Beach have been proven successful at these high energy sites. The plastic, circular cages and grid components employed by KCS have been tested and shown to withstand wave heights of 8 m. 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. In the event damage is sustained, repairs will be carried out as necessary. Any significant damage will be reported to NSDFA.

4.1.4 Tides

Based on Canadian Hydrographic Service Tide Tables (Fisheries and Oceans Canada 2017f) for Digby (Station #325), the predicted highest high tide for 2017 is 9.2 m and the lowest low tide is -0.3 m, giving a maximum tidal range of 9.5 m. Typically, the tidal range is between 6 and 9 m. In 2016, the highest high tide was 9.4 m and the lowest low tide was -0.4 m, giving a tidal range of 9.8 m. However, storm surges, should they co-occur with the highest high water, 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 between June 29 and August 4, 2016 using a 600-kHz Acoustic Doppler Current Profiler (ADCP) deployed by NSDFA. The current meter could not be deployed at the center of the proposed lease due to the presence of gear and fish. The current meter was located ~ 100 m to the southeast of the original lease boundaries (N44˚ 39’ 03.3” W65˚ 45’ 14.8”).

At depths 3 – 10 m above the seafloor, most water flowed towards the NNE, with approximately 39% of all recorded currents travelling between 5 and 25 degrees. The depth-averaged current speed of all recorded profiles at this site was 22.65 cm/s. In depth profiles 3 – 10 m above the seafloor, the maximum recorded speed was 81.0 cm/s occurring 10 m from the bottom. The most frequently observed speeds were between 18 and 24 cm/s near the seafloor (25.3% at 3 m) and 24 and 36 cm/s within the mid water column (18.3% at 10 m). Data obtained from the upper water column did not yield reliable data with less than 75% of the data present; therefore, it was omitted from the analysis. Average current speeds significantly varied with depth, with the cell nearest to the surface having the highest occurrence of currents greater than 80 cm/s.

The maximum current speed observed was 81.0 cm/s while the minimum was 0.2 cm/s (Table 3). The overall mean current speed was 23.9 cm/s but currents in the uppermost cell presented (i.e. 10 m above the seafloor) were considerably faster at 32.8 cm/s. This may have been due to the influence of the wind. Overall, current speeds < 5 cm/s occurred 1.94% of the time. Graphs illustrating the current directions and current speed frequency distributions are located in Section 4.2 – Baseline Environmental Monitoring.

Table 9. Current Data Summary Statistics for Rattling Beach

Rattling Beach	Current Speed Statistics						
Depth from Seafloor	Mean	Min	Max	Mode	< 2 cm/s	< 5 cm/s	Directional Modes
(m)	(cm/s)	(cm/s)	(cm/s)	(cm/s)	(%)	(%)	(Cardinal or Intercardinal)
3	19.8	2.4	51.6	18.3	0	0.83	NNE
4	21.3	0.4	55.9	19.1	0	1.04	NNE
5	22.5	0.4	60.1	20.3	0	1.71	NNE
6	23.2	0.4	64.4	11.7	0	2.14	NNE
7	24	0.2	67.5	17.1	0	2.3	NNE
8	26.3	0.3	71.5	29.5	0	2.01	NNE
9	29.2	0.9	75.1	40.7	0	3.56	NNE
10	32.7	0.7	81	33.1	0	1.94	NNE
Overall	**24.9**	**1**	**66**	**24**	**0**	**1.94**	**NNE**

4.1.6 Salinity

KCS reported salinities for Rattling Beach site between 30 and 32‰. According to the monthly, average, salinity data gathered from the DFO OSD Atlantic Zone Monitoring Program, (Fisheries and Oceans Canada 2017g; Fig. 25) for Prince 5, Bay of Fundy, salinity ranges between 30.9 and 32.9‰. In general, salinity is lowest in April to June and highest between the months of August to December. The existing, successful, aquaculture site at Rattling Beach would indicate that the salinities in the area are tolerable for Atlantic salmon. Monthly, average, salinity data from Subarea 55 are presented in Figure 26 (Fisheries and Oceans Canada 2007).

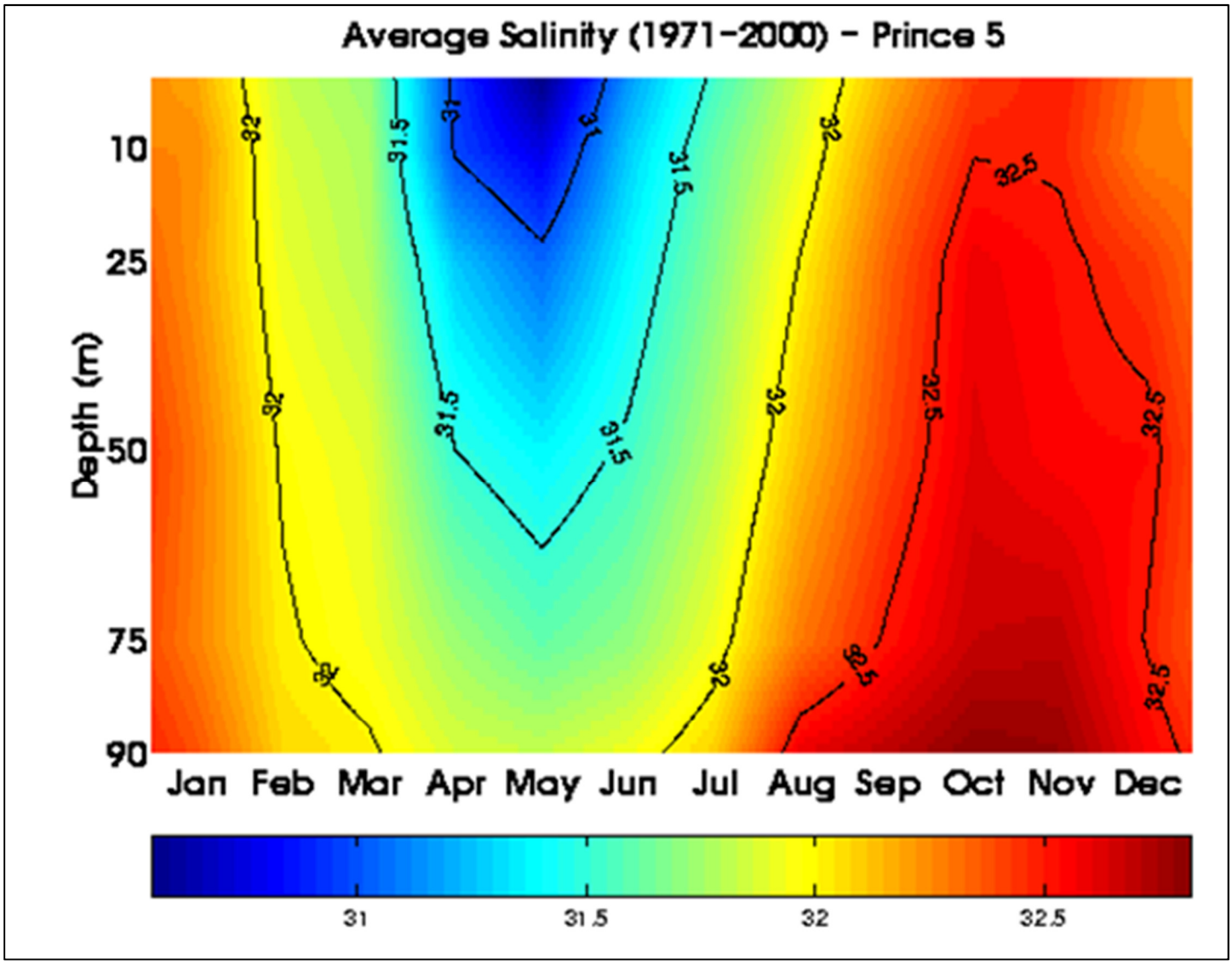

Figure 25. Contour Plot of Average Monthly Salinity of Prince 5 Station of DFO's Atlantic Zone Monitoring Program
Note: Graph was obtained from the Fisheries and Oceans Canada (2017g), Marine Environmental Data Services website

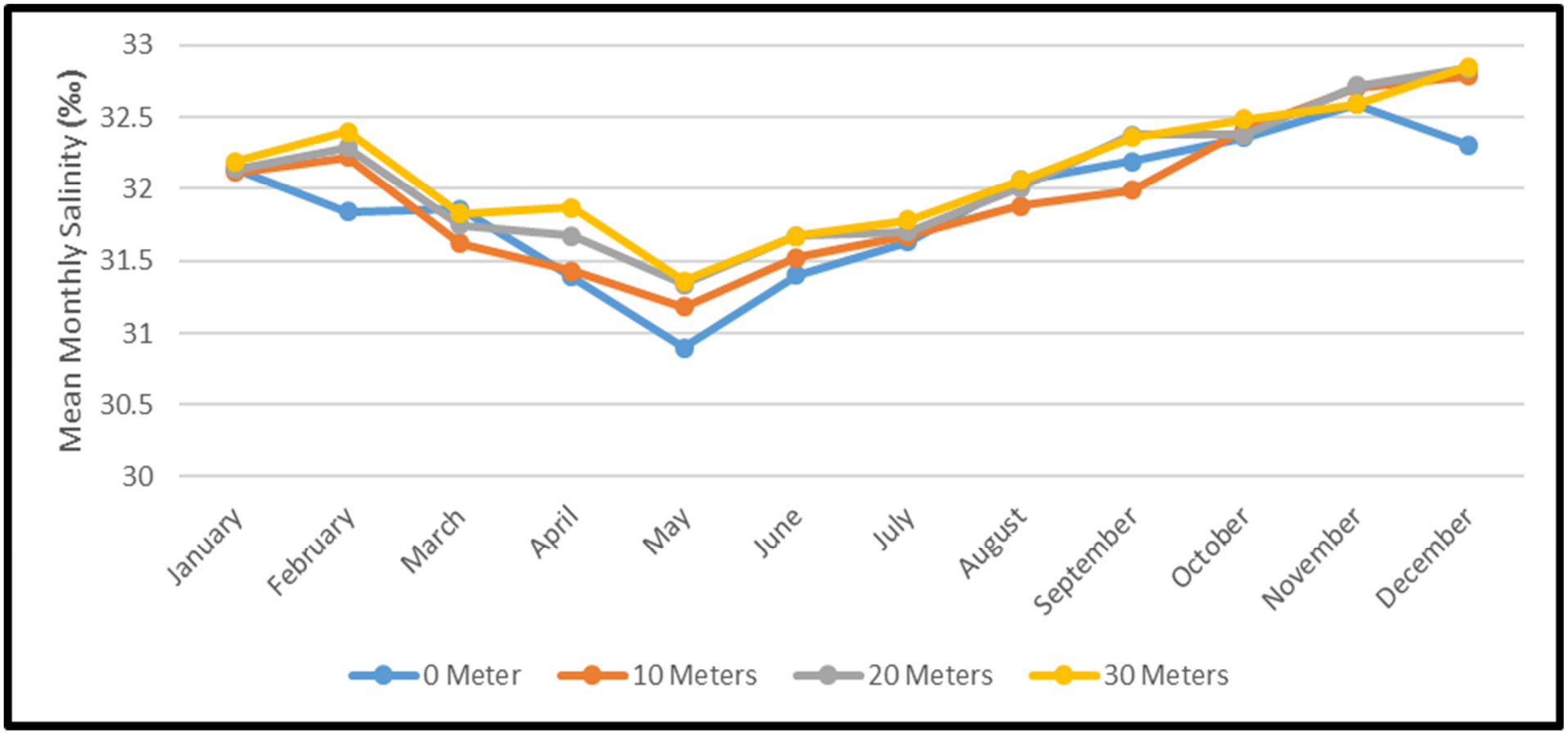

Figure 26. Average Monthly Salinity of OES Subarea 55 (Bay of Fundy) at Various Depths
Note: Data was obtained from the Oceans and Ecosystem Science website (Department of Fisheries 2007)

4.1.7 Temperature

Temperatures at the Rattling Beach aquaculture site were recorded and collected by KCS staff during site operations. The minimum water temperature was recorded in February 2015 and was approximately 0˚C. The maximum water temperature was recorded in August 2016 and was approximately 16.6˚C. Figure 27 displays the historical water temperature trends from the Rattling Beach site.

Long-term temperature data for the Fundy shore area (Prince 5) were sourced from the DFO OSD Atlantic Zone Monitoring Program and are presented in Fig. 29 (Fisheries and Oceans Canada 2017g). Monthly, average, temperature data provided in Fig. 28 were derived from climatology data of the DFO Maritime Oceans and Ecosystem Science (OES) project, Hydrographic Database, Subarea 55 (Fisheries and Oceans Canada 2007). Figures 28 and 29 display average and monthly water temperature data for the Fundy shore of Nova Scotia. Mean water temperatures from this data range between 1.8 and 12.7°C. The lowest temperatures of the year are normally experienced in February to March and the highest temperatures in August. The existing, successful, aquaculture site at Rattling Beach would indicate that the temperatures in the area are tolerable for Atlantic salmon.

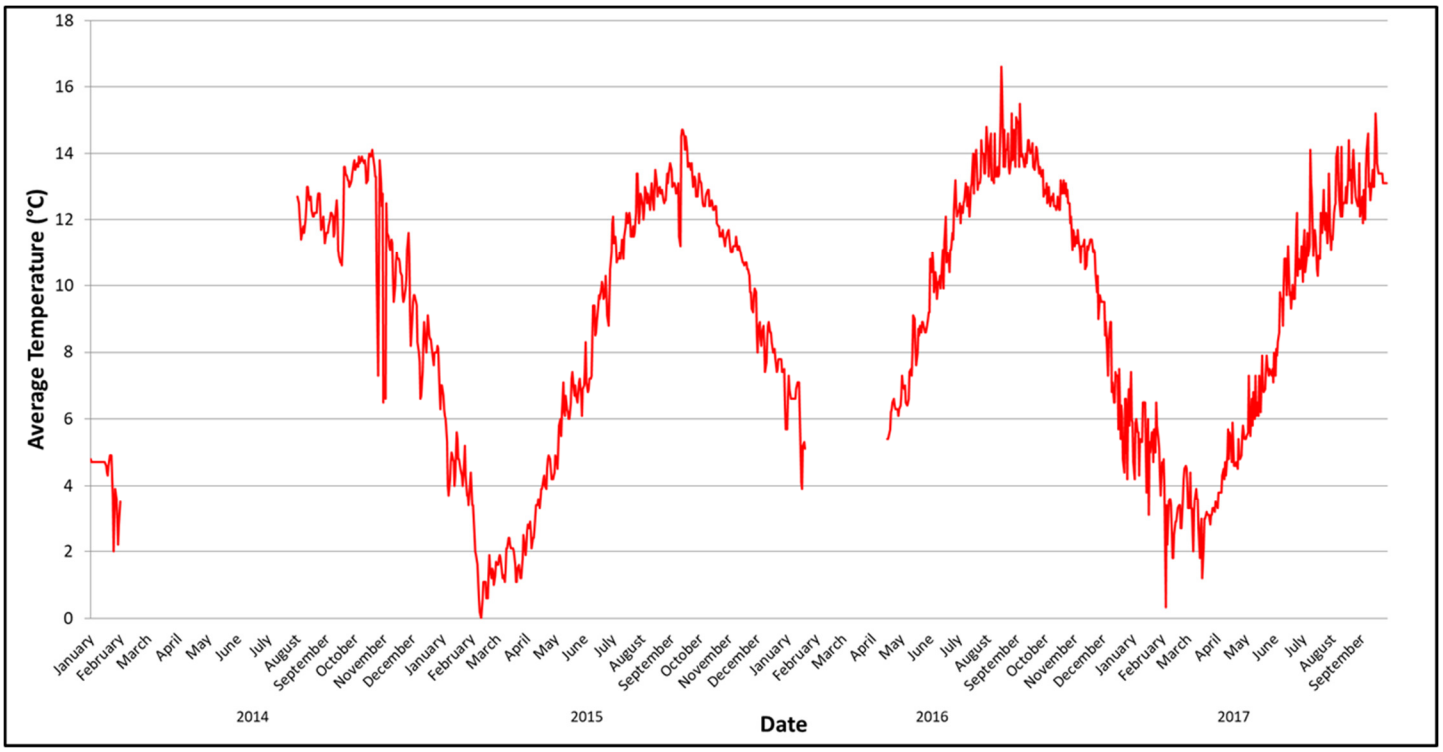

Figure 27. Daily Water Temperature Data from the Rattling Beach Aquaculture Site #1039

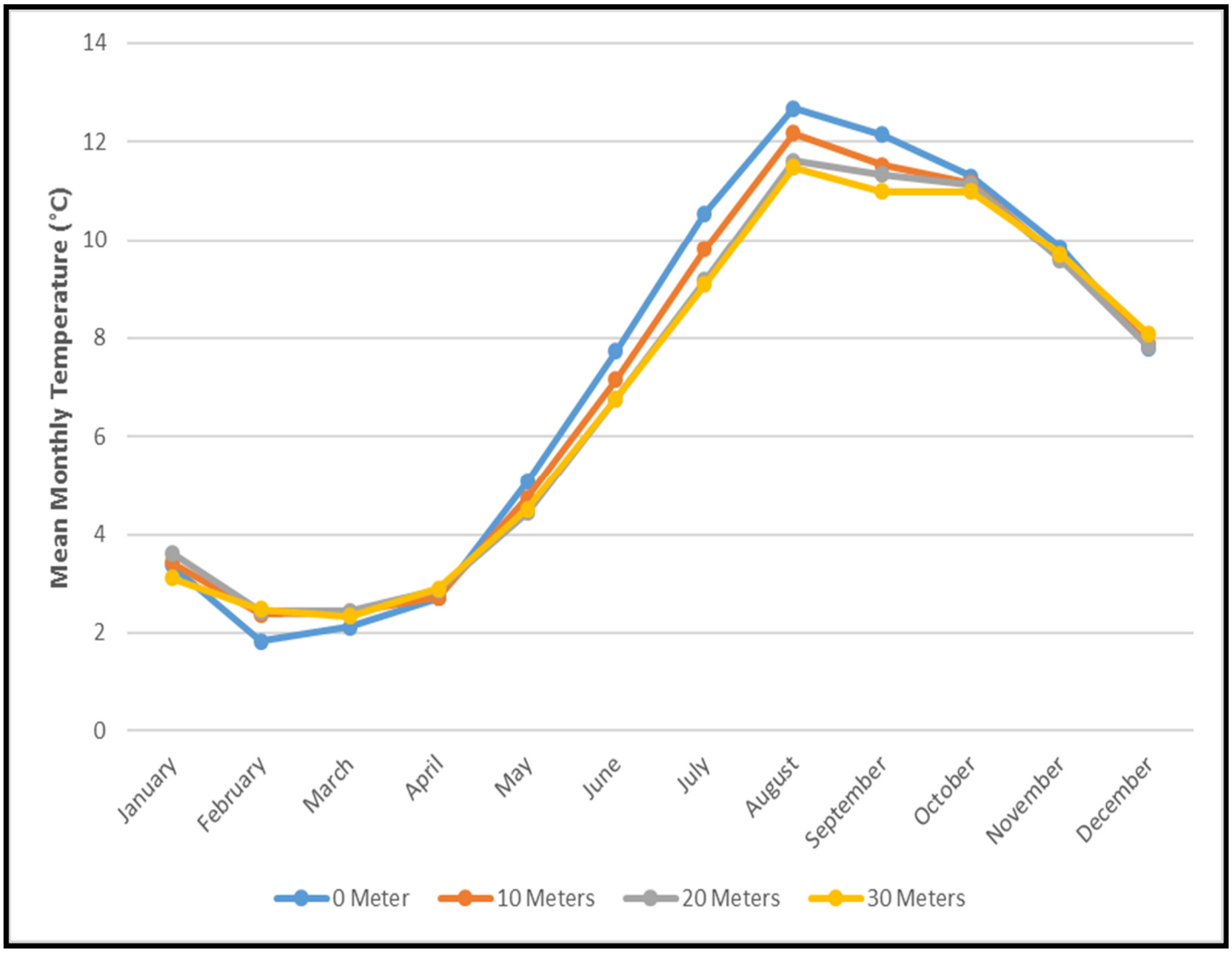

Figure 28. Average Monthly Temperature Data of OES Subarea 55 (Bay of Fundy) at 0 to 30 m Deep
Note: Data was obtained from the Oceans and Ecosystem Science website (Fisheries and Oceans 2007).

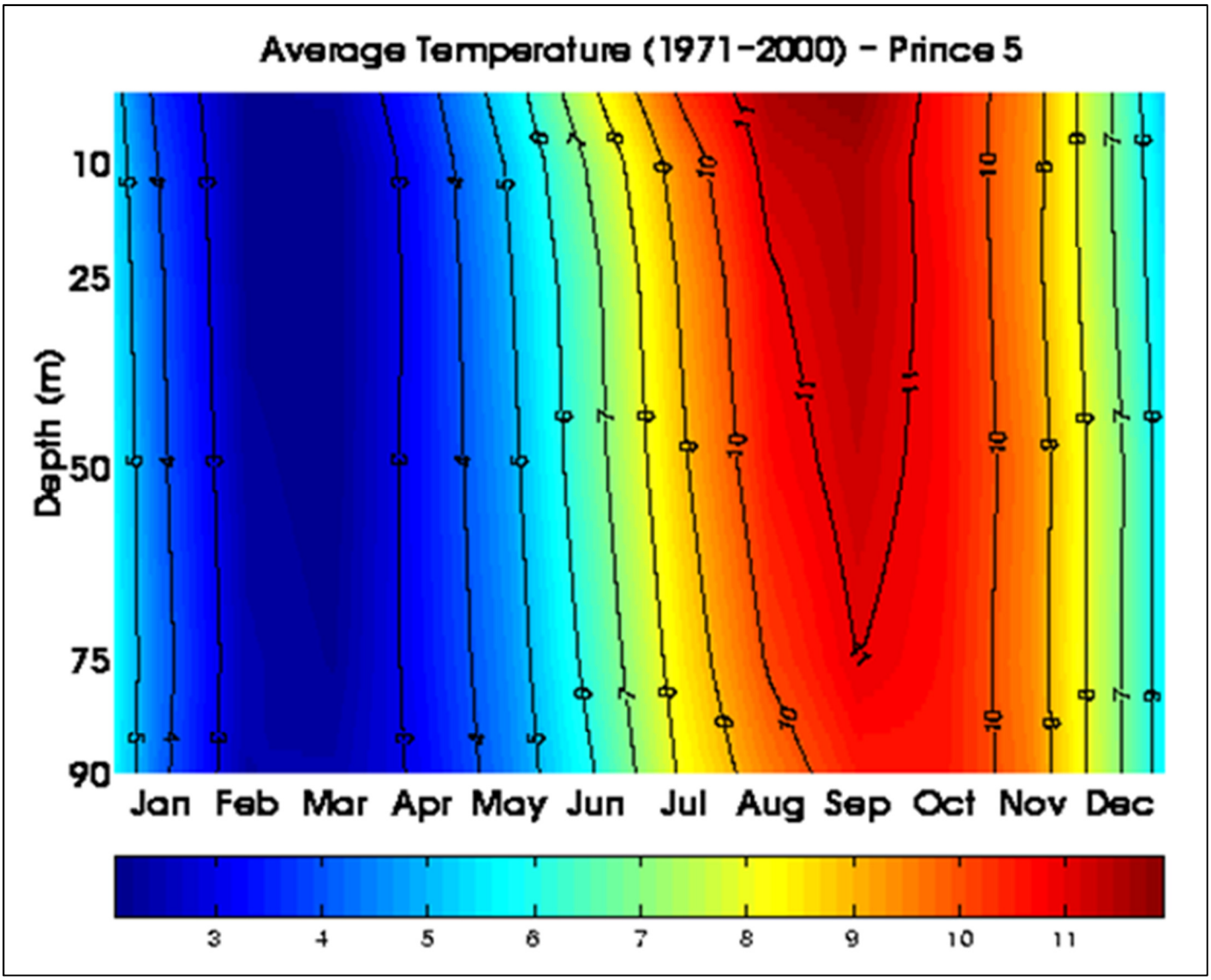

Figure 29. Contour Plot of Average Monthly Temperatures from Prince 5 Station of DFO's Atlantic Zone Monitoring Program
Note: Graph was obtained from Fisheries and Oceans Canada (2017g).

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.

Sea ice is typically not a problem in Annapolis Basin. The thirty-year frequency of presence of sea ice (Fig. 30) and predominant ice type (Fig. 31) for the Bay of Fundy and Annapolis Basin are unknown. Both Figures 30 and 31 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 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.

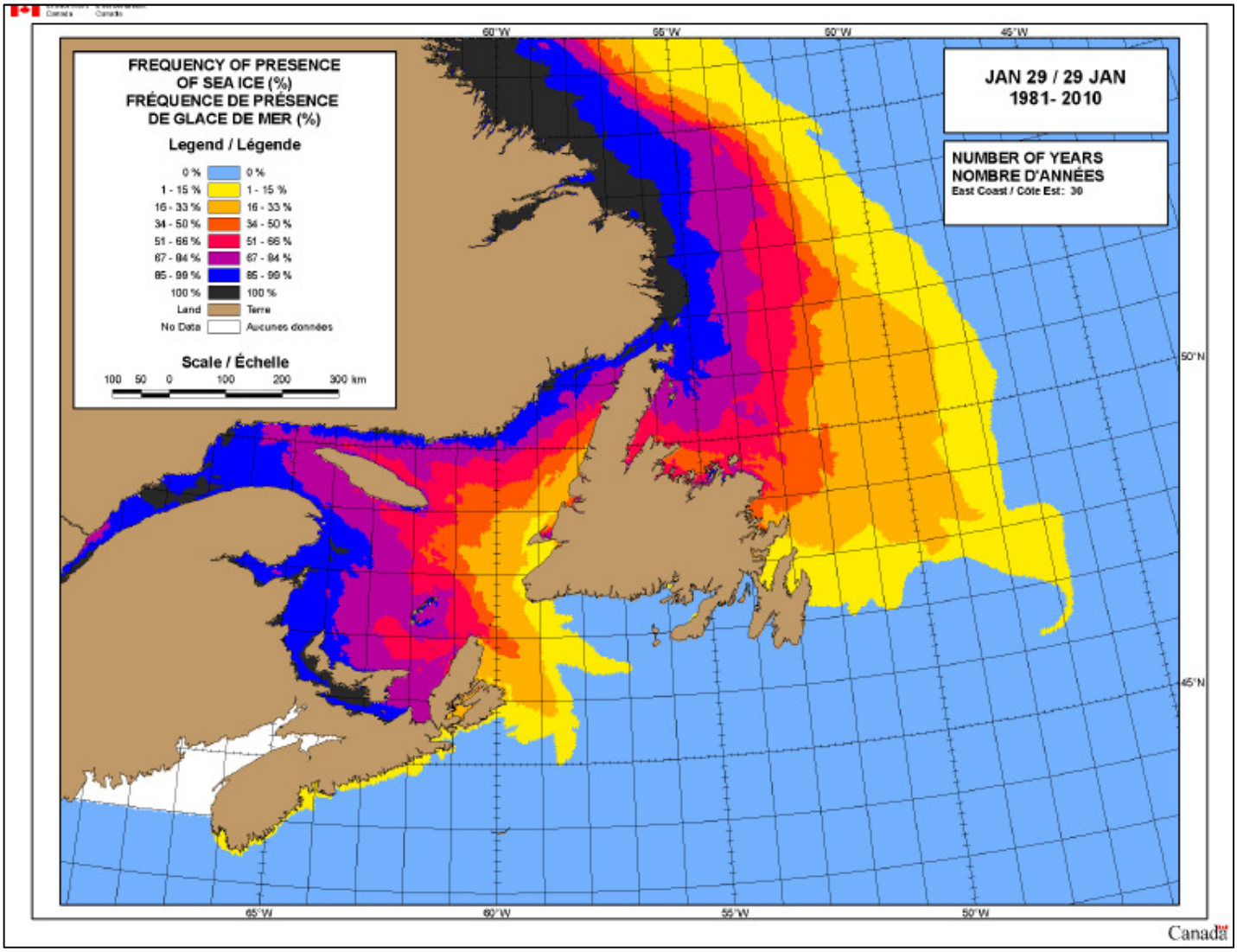

Figure 30. Frequency of presence of sea ice in Atlantic Canada
Note: Figure sourced from Environment Canada, Canadian Ice Service (2010)

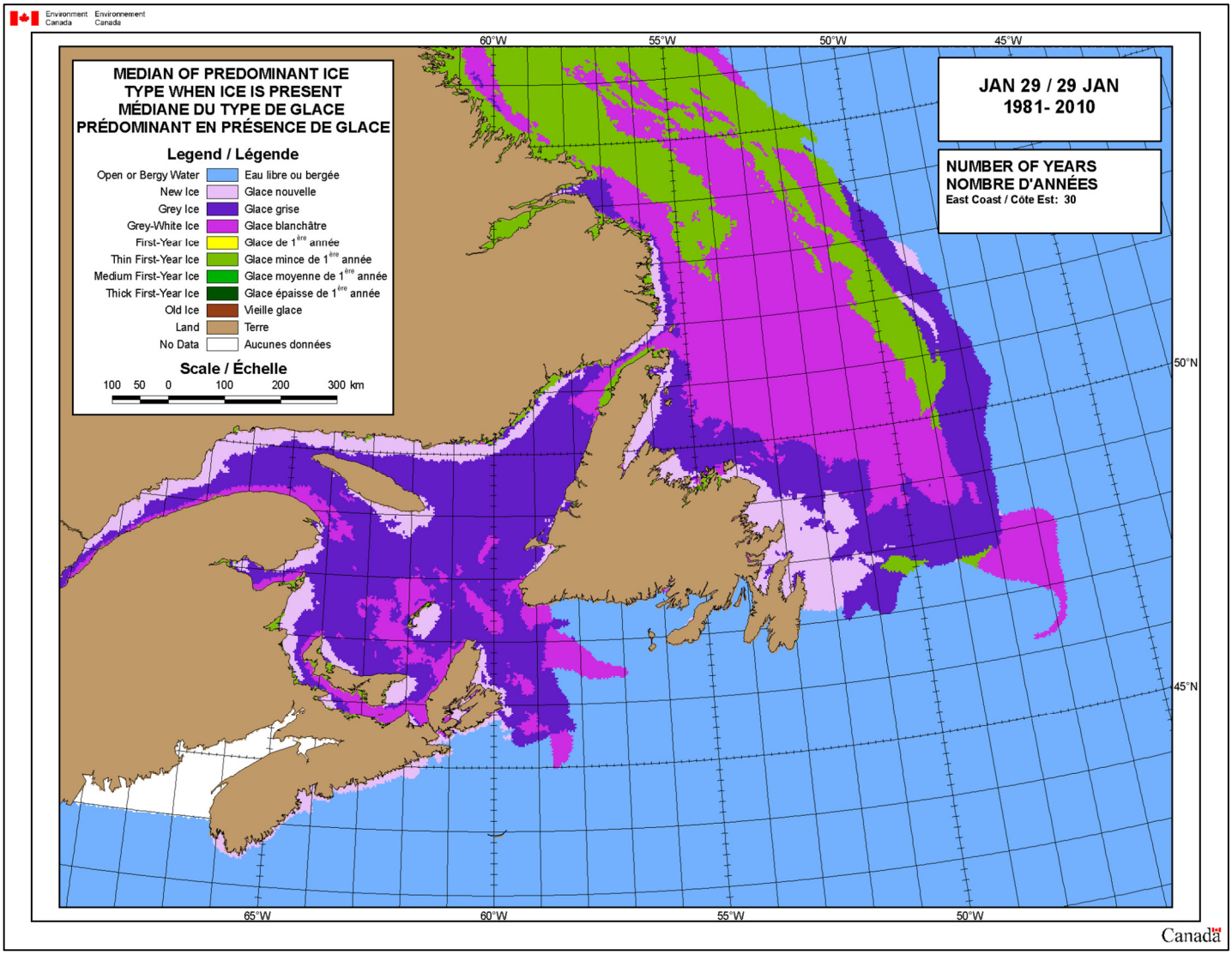

Figure 31. Median of Predominant Ice Type in Atlantic Canada
Note: Figure sourced from Environment Canada, Canadian Ice Service (2010)

4.1.8 Oxygen

Long-term, monthly, average, dissolved-oxygen data presented in Figure 32 are from the Fundy Prince 5 Station located at 44.93˚N 66.85˚W (Fisheries and Oceans 2017g). This was the closest monitoring station to the proposed location and was therefore chosen over alternate monitoring stations as a source of oceanographic data. From this averaged data, the lowest dissolved oxygen appeared in September - November, while the highest concentrations of dissolved oxygen were present in March - May.

Dissolved oxygen concentrations at the Rattling Beach aquaculture site were collected and reported by KCS staff during the site operations. The minimum DO value recorded was approximately 0 mg/L; however, an equipment malfunction is suspected for this date making the lowest, reliable concentration 6.98 mg/L. The maximum concentration recorded was

approximately 13.4 mg/L. For adult salmon, the lower limit of DO for optimal growth is generally accepted as 6 mg/L. The Rattling site typically displays DO values well above this threshold. Figure 33 illustrates the historical, DO trends from the Rattling Beach site.

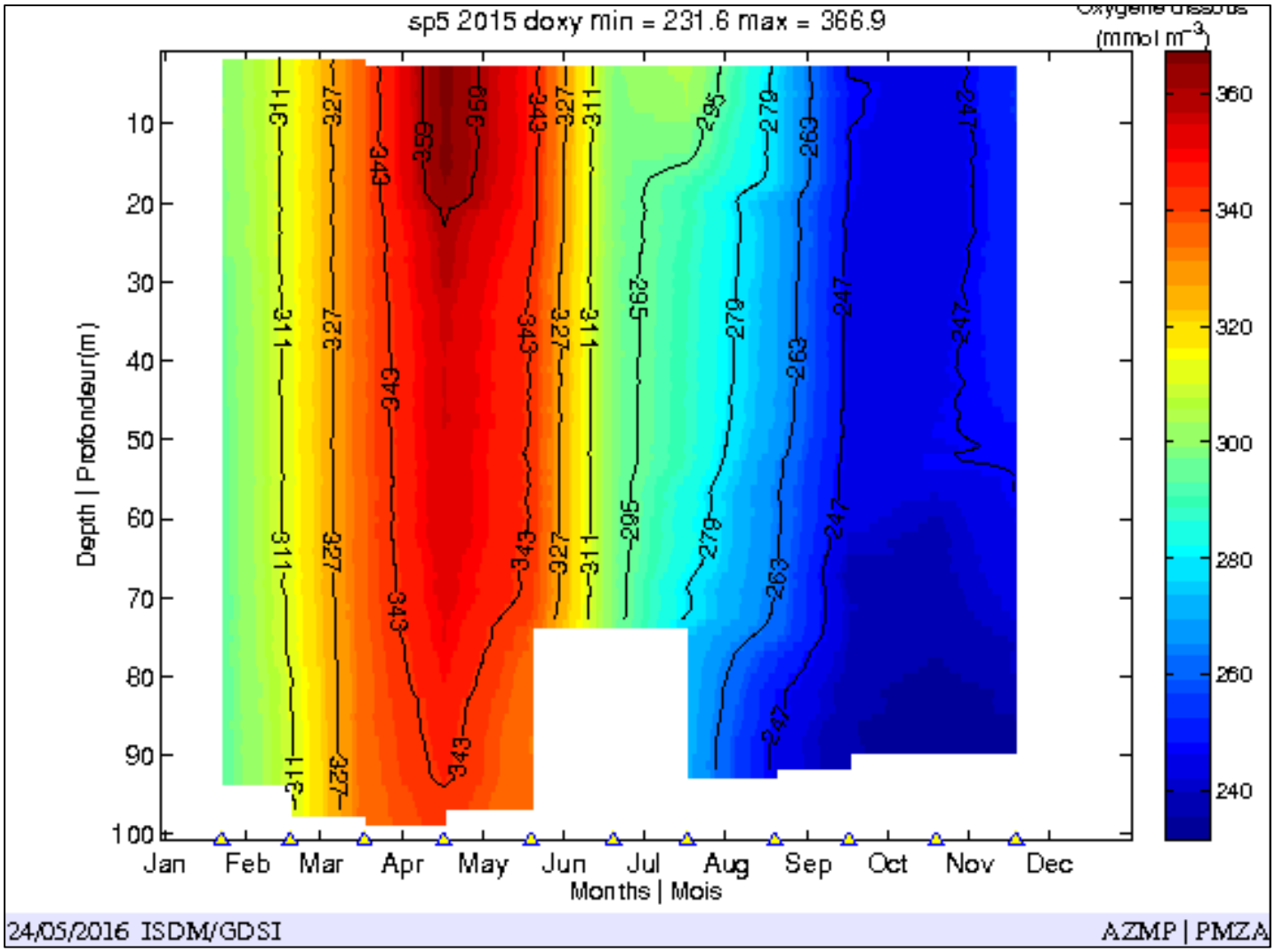

Figure 32. Dissolved Oxygen Concentrations as Measured at the Prince 5 Station
Note: Graph was obtained from the Fisheries and Oceans Canada (2017g), Marine Environmental Data Services Website

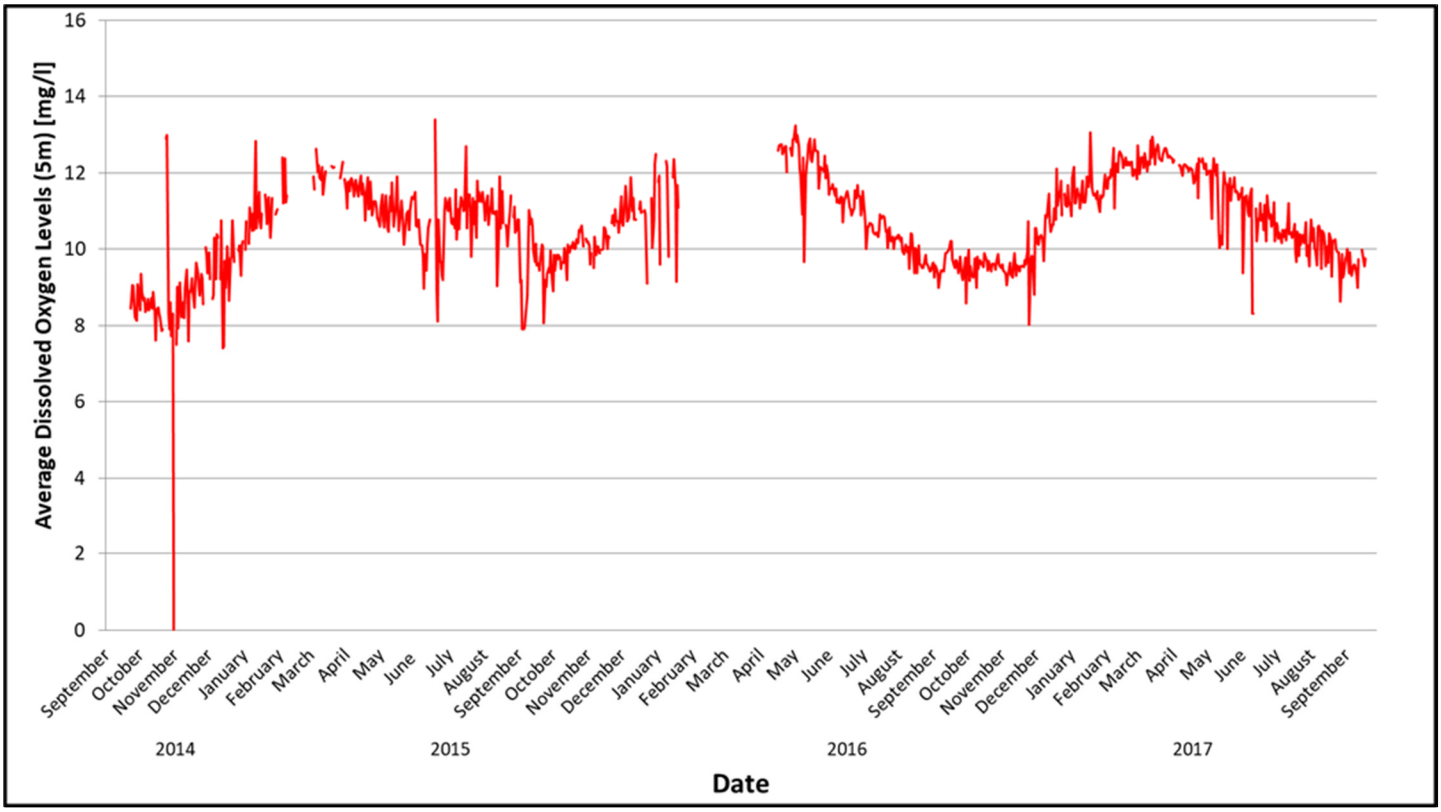

Figure 33. Dissolved Oxygen Levels as Measured at the Rattling Beach Aquaculture Site #1039

4.1.9 Bathymetry

Basic seafloor topography around the Rattling Beach aquaculture site is present in Figure 34. Section 4.2 – Baseline Environmental Monitoring provides additional information.

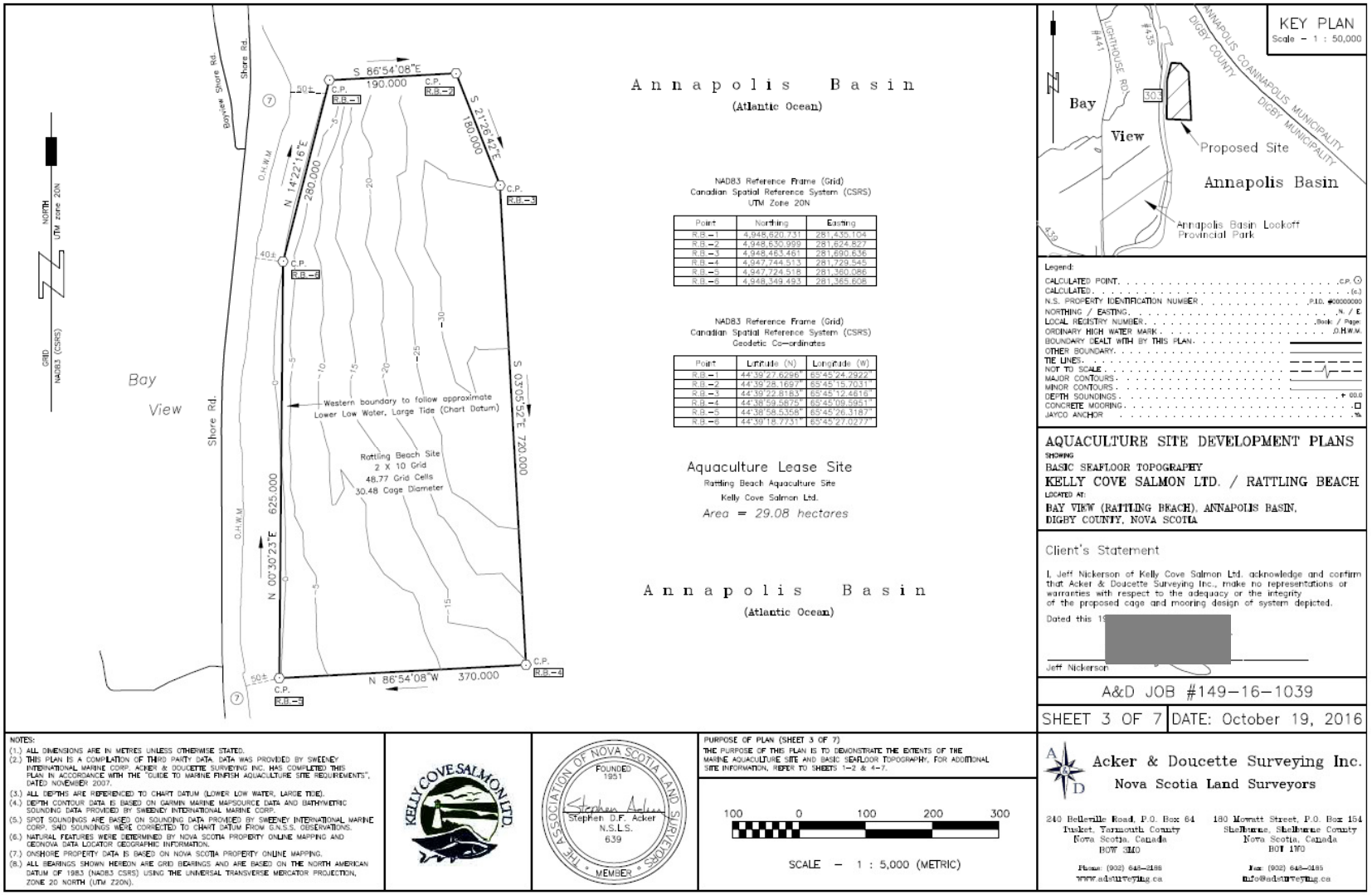

Figure 34. Basic Seafloor Topography

4.2 Baseline Monitoring

A baseline survey of the proposed lease area was conducted on July 20, 2016. The baseline survey report is entitled Baseline Assessment Site #1039 Rattling Beach and dated October 20, 2016 (Appendix A).

4.3 Site Design

The design of the Rattling beach site is a direct result of the known local bathymetry, oceanographic and benthic environment information. Additional information has been gathered in the baseline survey. This information is contained in Sections 4.1 & 4.2, and the baseline survey is included in Appendix A.

Section 5: The Other Users of the Public Waters Surrounding the Proposed Aquacultural Operations

5.1 Description of Other Users

5.1.1 Adjacent Property Owners

In October 2016, Acker & Doucette Surveying produced aquaculture site development plans which were submitted as a package with the signed notice of works to Transport Canada. In the development plans, adjacent property owners within 1,000-m were identified to the North (Figure 35) and South (Figure 36) of the proposed aquaculture lease for Rattling Beach #1039.

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

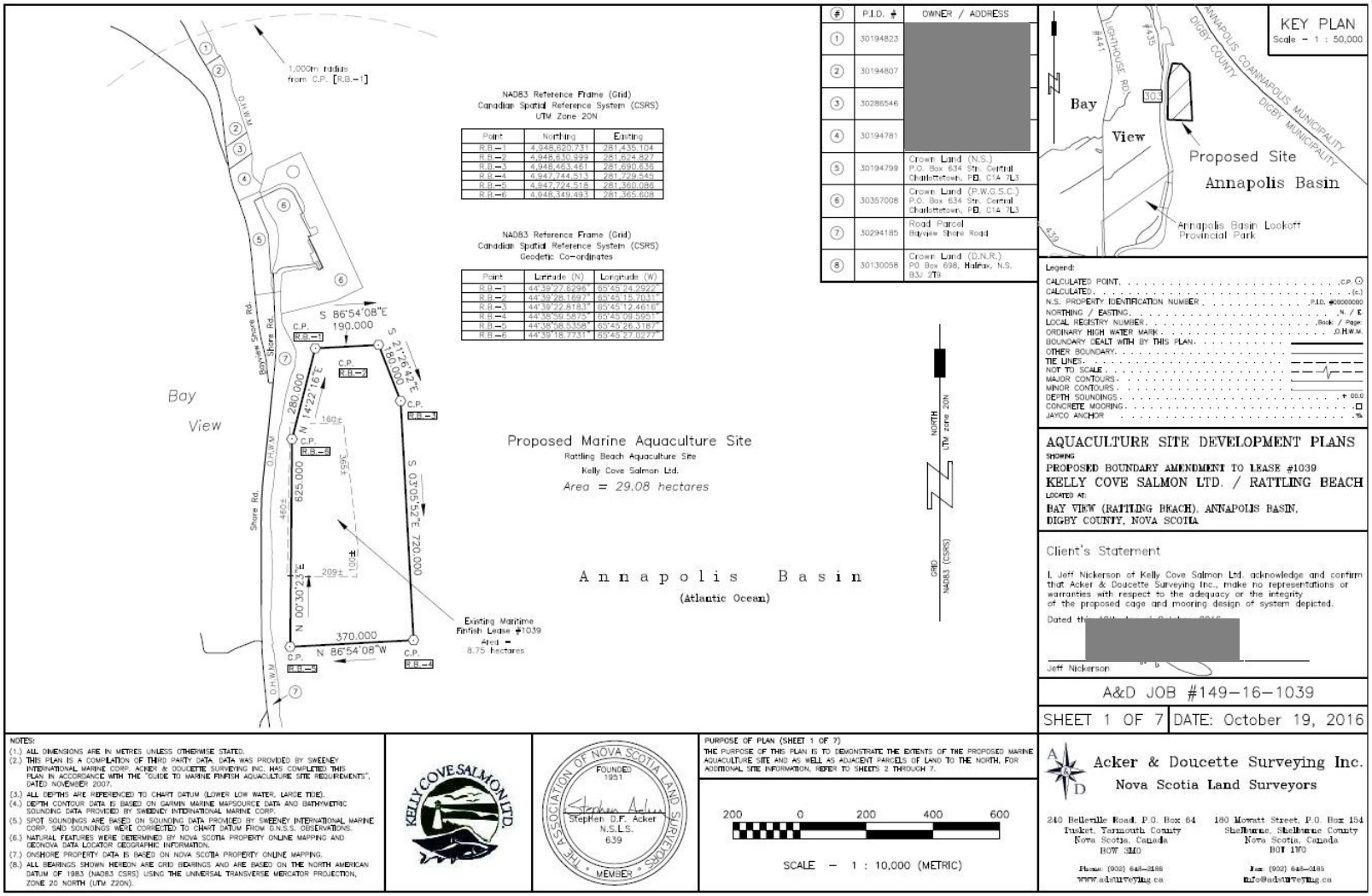

Figure 35. Plan View of the Proposed Boundary Amendment of the Rattling Beach Aquaculture Site Showing Nearby Property Owners

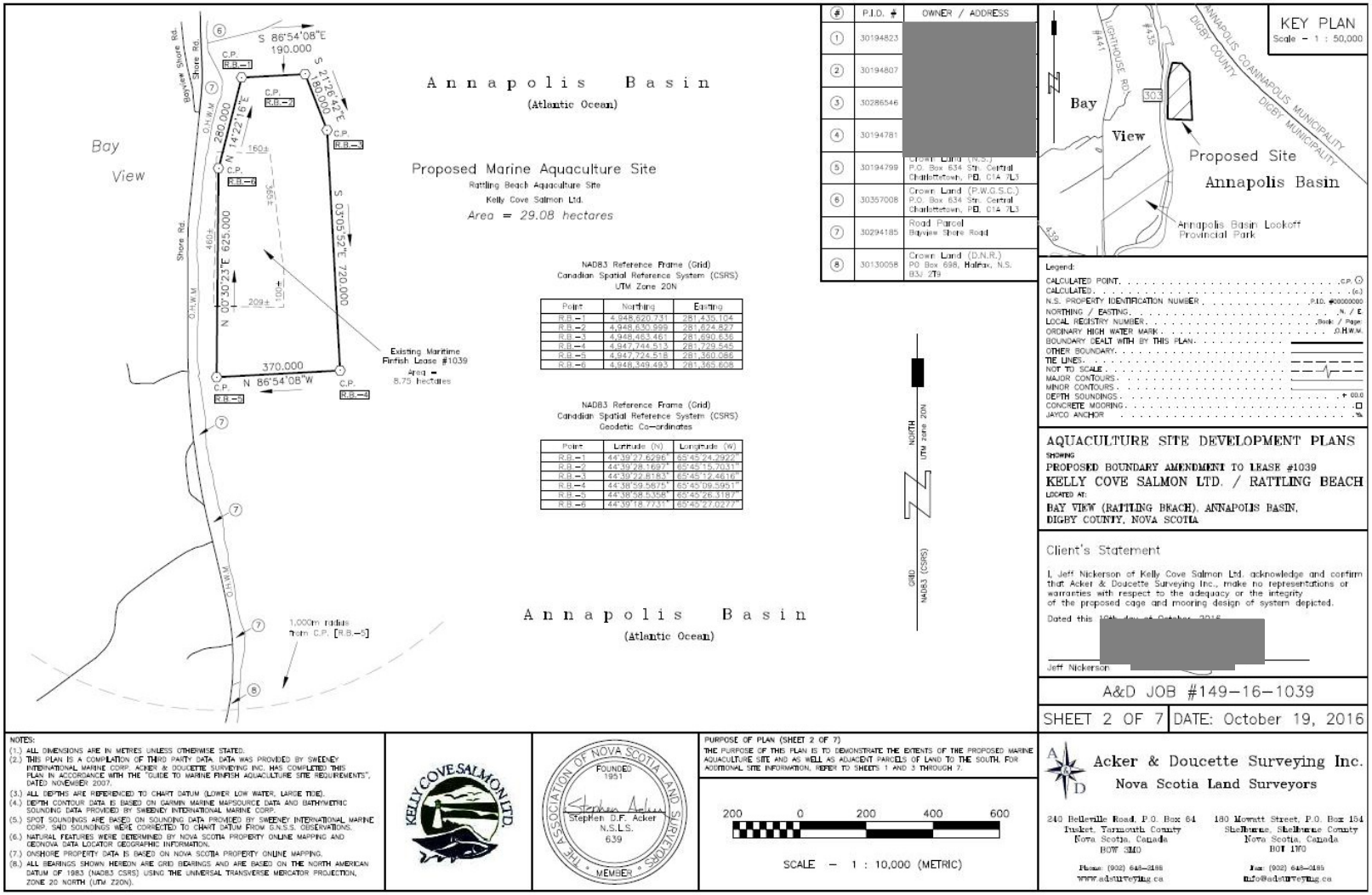

Figure 36. Plan View of the Proposed Boundary Amendment of the Rattling Beach Aquaculture Site Showing Nearby Property Owners

5.1.2 Pleasure Craft and Commercial Vessels

Within 10-km of the Rattling Beach site, four (4) active wharves and/or boat landings are present (Figure 3). Culloden wharf is a community fishing wharf, Battery Point (Victoria Beach) is used for small crafts but mostly consists of fishing boats, Royal Western Nova Scotia Yacht Club (RWNSYC) for pleasure craft and The Port of Digby which accommodates community vessels including fishing vessels as well as Kelly Cove Salmon Ltd's working vessels for Victoria Beach (#1040) and Rattling Beach (#1039). Historic wharves in the area: Clementsport, Port Wade and Deep Cove Wharf (Coastal Communities Network 2005).

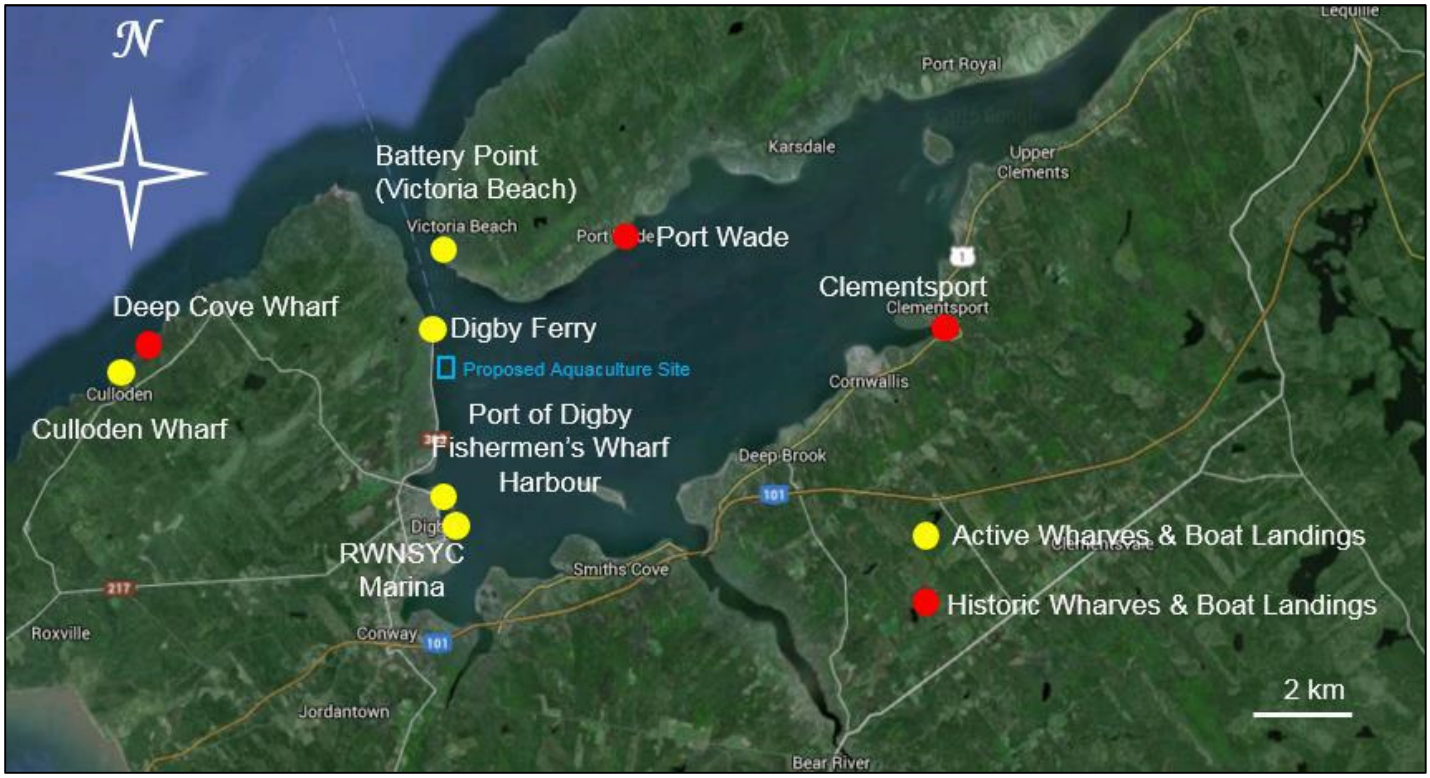

Figure 37. Current and Historic Wharves and Boat Landings near Rattling Beach Aquaculture Site

The Digby Ferry is located north of the site. The Fundy Rose ferry travels between Saint John, New Brunswick and Digby, Nova Scotia, once or twice daily depending on the time of year. The ferry route is outlined in Figure 38 (Bay Ferries 2017).

All pleasure crafts and commercial vessels must abide by the navigation buoys and markers present within the basin. The general route to enter and exit the basin is present in Figure 39. The Port of Digby has published a detailed map of Annapolis Basin, outlining anchorage areas and navigation buoys (Figure 40; i-Boating 2017).

Figure 38. Bay Ferries ferry route between Digby and Saint John

Figure 39. Pleasure Craft and Commercial Boat Traffic in Annapolis Basin

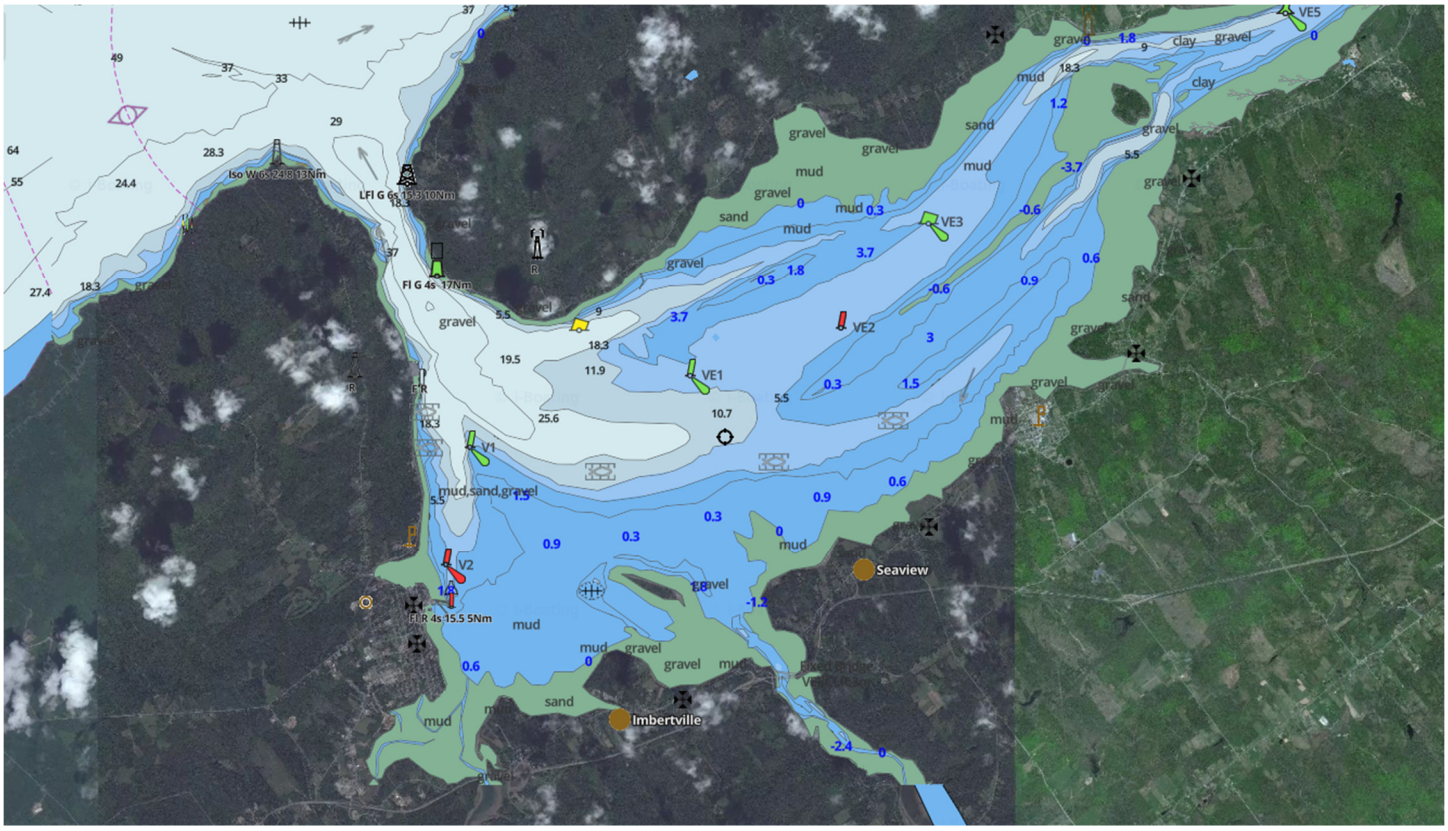

Figure 40. Navigational Buoys and Anchorage Areas in the Annapolis Basin
Note: Figure was sourced from i-Boating (2017)

5.1.3 Fish & Seafood Processors

Fish and seafood processors within the area of the proposed Rattling Beach site were identified using Nova Scotia Fisheries Sector Council as a resource (Figure 41). The nearest processors are O'Neil Fisheries Ltd. and Casey Fisheries Ltd, at approximately 2.6-km from the proposed boundaries of the Rattling Beach site. O'Neil Fisheries Ltd. is located at 144 Water St. Digby. O'Neil Fisheries Ltd. primarily process scallop and haddock, however their multispecies groundfish vessels also land pollock, redfish, winter flounder, witch flounder and Atlantic halibut. Casey Fisheries Ltd. is located at 146 Water Str. Digby. The company specializes in Digby scallops, clams, cod, haddock, Pollock, flounder, lobster and rock crab. Other products include sea urchin roe, periwinkles and dulse.

Other processors include Mosher Longmire Fisheries Ltd. which is located at 11 1st Ave. Digby, approximately 4.0-km from the proposed boundaries of the Rattling Beach site. This company provides fresh or frozen fish and seafood. Broad Cove Fisheries is located at 1631 Culloden Road, approximately 7-km from the proposed Rattling Beach boundaries. Products include groundfish, live lobster, periwinkle and Mako shark.

While the processors are in relatively close proximity to the proposed Rattling Beach boundaries, no negative interactions have been documented.

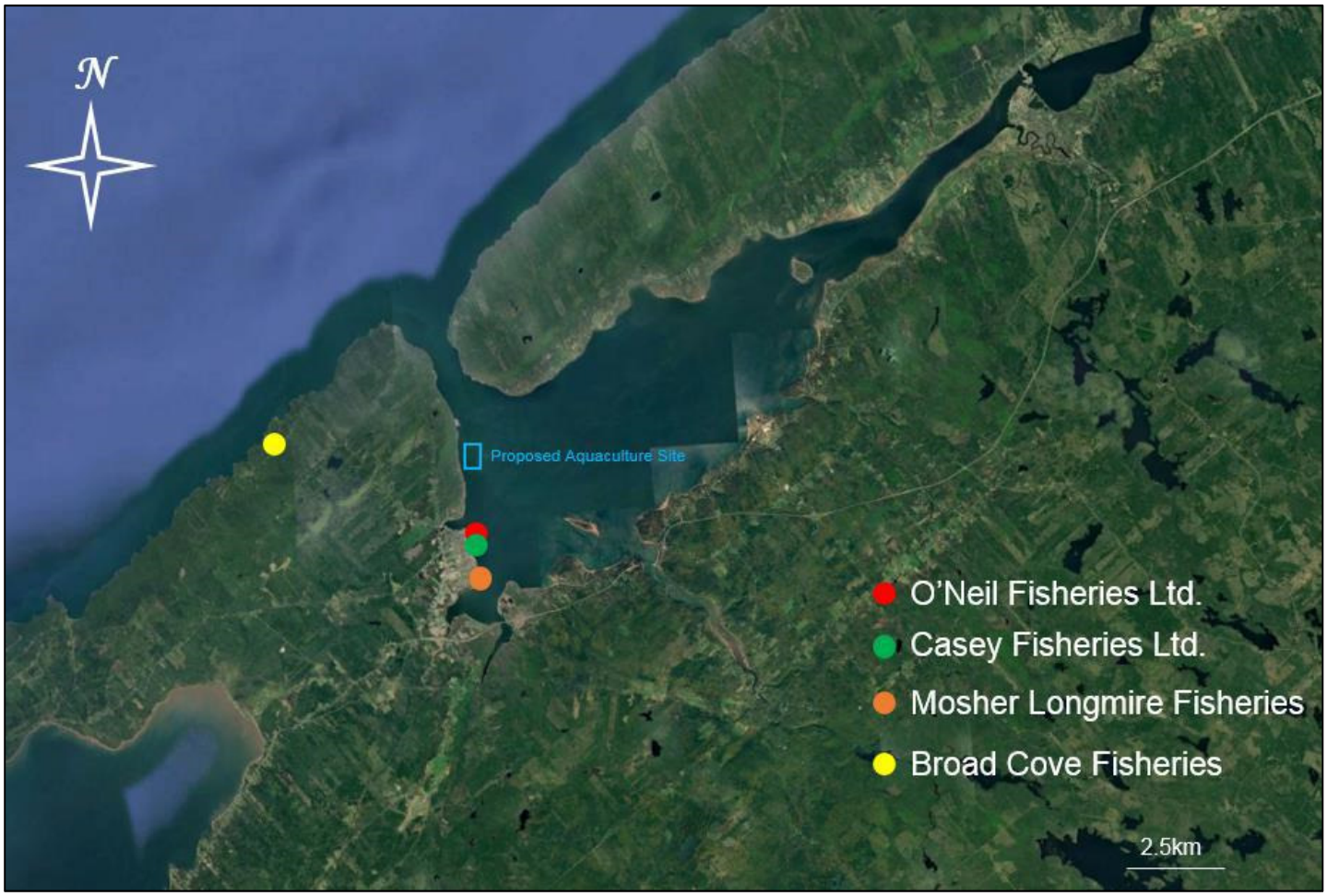

Figure 41. Fish and Seafood Processors in Digby County

5.1.4 Recreation and Tourism

The Annapolis Basin area offers an extensive list of recreational and tourism activities. Perhaps the most well-known tourist attraction in the area of Annapolis Basin is whale watching tours. Opportunities are offered by Brier Island Whale Watching and Seabird Cruises, Ocean Explorations, Mariner Cruises Whale Watching and Seabird Tour, Gael Tours, Dockside Whale Watching & Charters, and Fundy Adventures.

The area of Annapolis Basin is also known to have tourism activities such as yachting out of the Royal Western Nova Scotia Yacht Club & Marina, located in Digby (~2.7 km from proposed site). Many different provincial and historic parks are around Annapolis Basin. Provincial Parks in the area include the Central Grove Provincial Park located on Digby neck and the Annapolis Basin Look Off in Digby (~1.2 km from proposed site). Historic sites include the Port Royal Habitation and National Historic Site, the Forte Anne Historic Site, and the Annapolis Royal Historic Gardens. Kayaking and canoeing rentals and routes for the Annapolis River, Bear River, and other rivers in the area are offered by Canoe Annapolis County. Private kayak tours are also offered throughout Annapolis Basin by Kayak Annapolis Royal and Dockside Kayak Rentals.

There are several lighthouses in the areas of Annapolis and Digby county, including the Prim Point Lighthouse in Victoria Park (~ 4.5 km from proposed site), the Bear River Lighthouse in Smiths Cove (~ 6.2 km from proposed site), and the lighthouse located in Gilberts Cove. Camping areas within Annapolis and Digby Counties are provided by Digby Campground and Fun Park, Fundy Trail Campground and Cottages in Delaps Cove, and Jaggers Point Ocean Front Campground in Smiths Cove.

Public beaches in the general vicinity of the Annapolis Basin include Sandy Cove Beach, a well-known tourist destination, and Smiths Cove, where clam digging is offered by the team of Fundy Adventures (~ 6.5 km from proposed site). Walking trails can be found in the Historical Association of Annapolis Royal's Historic Walking Trails. Hiking opportunities are also available on a large trail extending from the tail of Bear River in Smiths Cove to Harbourview (~ 6.6 km from proposed site). Many tourists come to enjoy freshly caught local seafood, which is offered at a number of restaurants around Annapolis Basin. Some of the more famous restaurants include Restaurant Composé, in Annapolis Royal, and Shore Road Seafood, in Hillsburn.

Annapolis Royal offers various places to stay the night, including Digby Pines Gold Resort and Spa, Coastal Inn Digby, Bayside Inn Bed and Breakfast, Seawinds Motel, Croft House Bed and Breakfast, The Garrison House, the Hillside House Inn, the Annapolis Royal Inn, At the Turret Bed & Breakfast, The Bailey House, and The Queen Anne Inn. Other Bed and Breakfasts in the area of Annapolis Basin include the Seafaring Maiden near Granville Ferry, the Harbour View Inn in Smiths Cove, Headley House by the Sea in Smiths Cove, and Ocean Hillside Bed and Breakfast in Digby. Figures 42 & 43 illustrates a number of tourist and recreational attractions, as well as other resources, in the area of the Rattling Beach aquaculture site.

Digby's tourism is an important economic sector. Specific events, such as the Wharf Rat Rally and Scallop Days, attract many visitors specifically in the summer time (Municipality of Digby, 2017a).

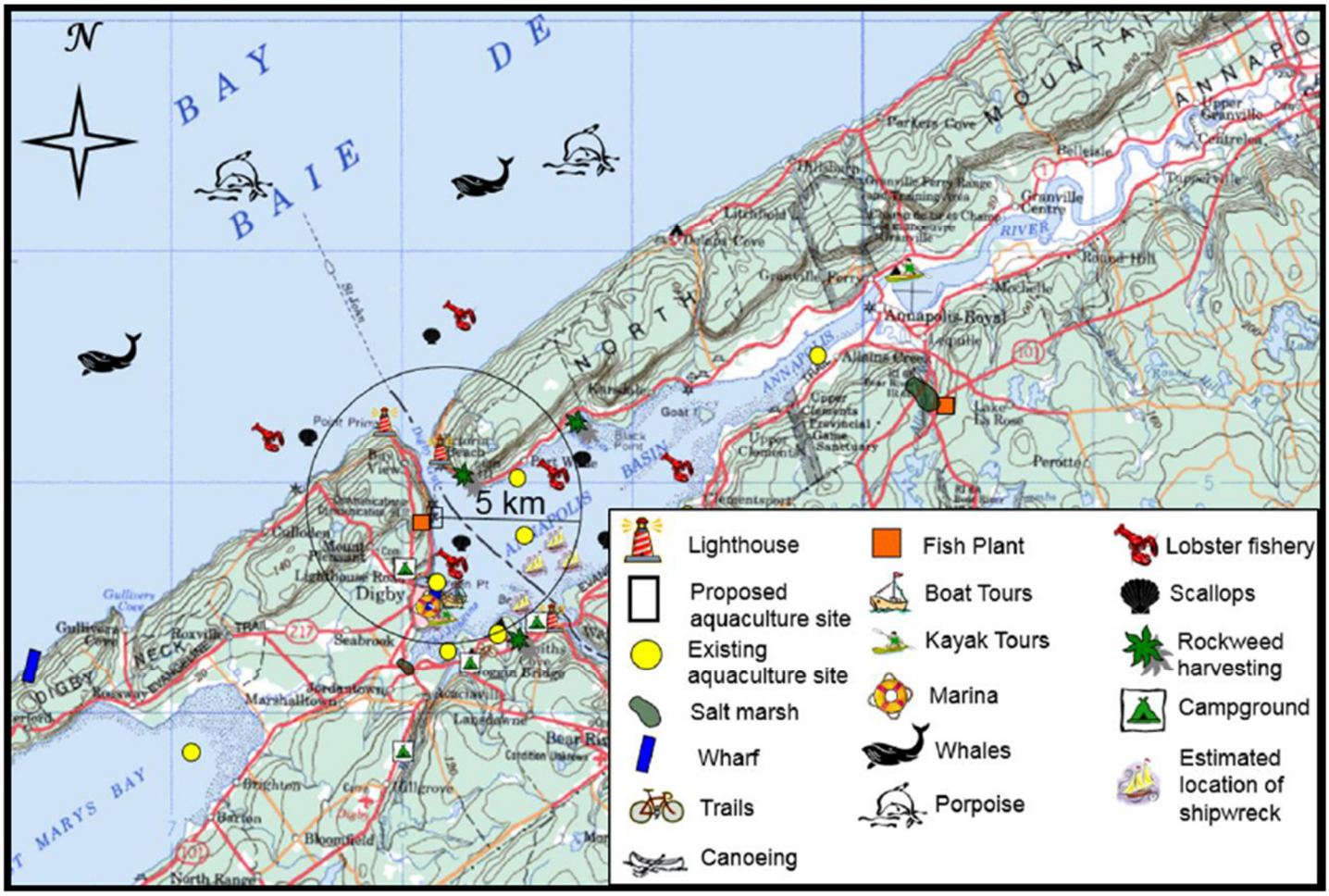

Figure 42. Resource Map of Annapolis Basin (Map: National Topographic System Map Sector 021A and Sector 020P)

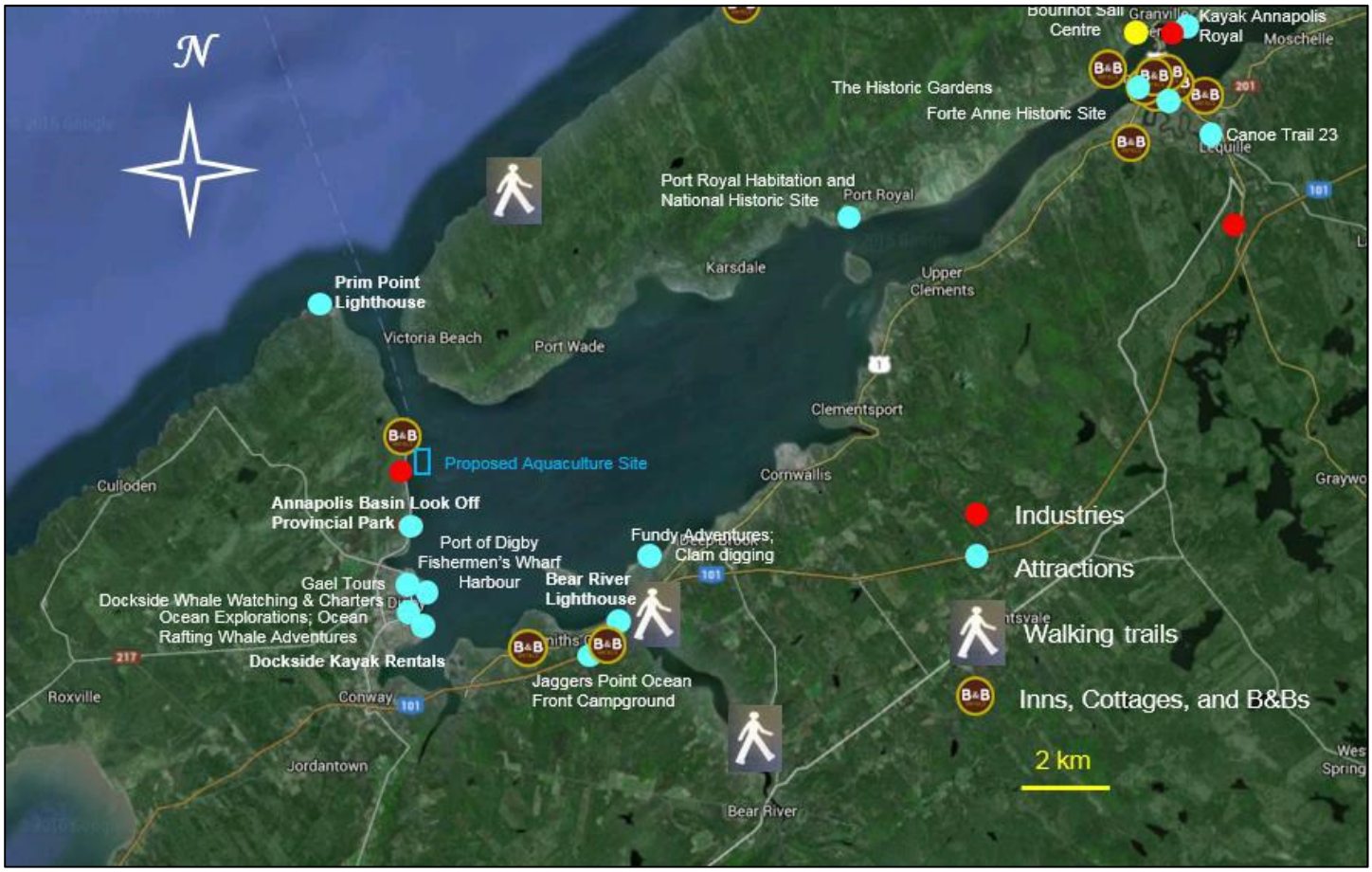

Figure 43. Tourism and Recreation

5.1.5 Communities and Lodging

The Rattling Beach site is located approximately 2.5-km north of Digby, Nova Scotia. The population of the town of Digby is 2,060, however 17,323 people live in the county of Digby (Statistics Canada 2017a).

In Digby county, a number of cottages and campgrounds are available for use throughout the year. Table 9 lists lodging options within 10-km of the proposed Rattling Beach boundaries. Refer to Section 5.1.4 Recreation and Tourism for details regarding inns, bed and breakfasts and hotels.

Table 10. Cottages and Campgrounds near Rattling Beach #1039.

Type of Lodging	Lodging	Distance and Location in Relation to the Site	General Location
Cottages	Birch Village	4.9 km – south	Smiths Cove
	The Villages of Mountain Gap Resort	5.5 km – south	Near Big Joggins overlooking Annapolis Basin
	Still Point Lodge	6.2 km – south southeast	Bear River
Campgrounds	Fundy Spray Camp Ground	5.3 km - south	Near Joggins Bridge
	Jaggars Point Oceanfront Campground	5.4 km– south southeast	Smiths Cove
	Digby Campground and Fun Park	2.5 km – west southwest	North of the town of Digby
	Red Roof Campground	4.5 km – west southwest	Inland off of Scenic Dr.
	Wild Coast Tents	7.5 km – east southeast	Bear River
	Bear River Millyard Recreation Campground and Camp Cottages	10.8 km – east southeast	Bear River

5.1.6 Municipal, Industrial and Agriculture

5.1.6.1 Municipal

Residents and businesses have access to proper disposal of any residential, commercial, and industrial waste in this area. Waste removal which includes green bin, recycling, and garbage is available throughout the town of Digby and Digby County. Collection days is dependent upon location within this area. Alternatively, a public drop off and transfer station is located in Seabrook as well as a full collection site at Conway Workshop Association (Digby) for residential eWaste and waste from the industrial-commercial-institutional (ICI) sector. Bottle exchanges are also accessible in the area.

One of the largest sources of pollution, by volume, originates from municipal wastewater (Environment Canada 2012a). The Government of Canada manages the risks associated with effluent discharge under the Canadian Environmental Protection Act 1999 (CEPA 1999). Municipal wastewater treatment plants operate in accordance to the Wastewater Systems Effluent Regulations which have been established under the Fisheries Act, which state minimum quality standards. A waste treatment plant located in Smith's Cove, 4.7-km south southeast of the aquaculture boundaries, services the town of Digby and the county of Digby. The plant was being upgraded in 2013 to transfer Digby's waste directly to the Smith's plant so that the town's sewage treatment plant at the south end could be closed (Digby Courier

2013). As stated on the Municipality of Digby website, Digby "…takes pride in being a green, clean, active, secure, accessible, and healthy place to live, work and visit" (Municipality of Digby 2017b).

5.1.6.2 Industrial

According to the Municipality of Digby, fishing has been the main contributor to Digby's economy. While traditional fishing, food processing and manufacturing remain important, Digby has become a destination for tourists (Municipality of Digby 2017a). Refer to Sections 5.1.3 Fish and Seafood Processors and 5.1.4 Recreation and Tourism for additional details.

5.1.6.3 Agriculture

In 2010, diverse agricultural activities in Digby County accounted for approximately $63.1 million in farm receipts. Animal production, greenhouse, nursery/floriculture, and agri-tourism such as wineries, U-picks, and farmers markets are the predominant activities within this area. Table 10 indicates the number of farms in the town of Digby and Digby County (Statistics Canada 2017b). In general, "other" animal production is the principal farm type mostly comprised of mink farming (Nova Scotia Federation of Agriculture 2014).

Table 11. Total Number of Farms in Digby and Digby County
Note: Table recreated from Statistics Canada Census of Agriculture (Statistics Canada 2017b)

	Digby	Digby County
Cattle ranching/farming	6	14
Poultry and egg production	1	2
Pig/hog farming	2	2
Sheep and goat farming	1	2
Other animal production	39	68
Oilseed and grain farming	0	1
Vegetable/melon farming	5	7
Fruit/tree nut farming	9	21
Greenhouse, nursery and floriculture	5	10
Other crop farming	8	10
Total Farms	76	137

No known interactions between municipal, industrial or agriculture with the Rattling Beach site.

5.1.7 First Nations Territories/Reserves

The closest First Nations communities to the proposed project aquaculture site are the Bear River First Nations reserve from the Confederacy of Mainland Mi'kmaq, five Acadia First Nations reserves (Gold River 21, Medway River 11, Ponhook Lake 10, Wildcat 12, and Yarmouth 33) and Annapolis Valley First Nations Reserve. Statistics Canada reports that the Bear River reserve had a population of 102 individuals and a total private dwelling count of 44 (Statistics Canada 2013a). Statistics Canada reports that the Acadia First Nation reserves had a population of 157 individuals and a total private dwelling count of 62 in Yarmouth 33 Reserve (Statistics Canada, 2013b) and a population of 77 individuals and a total private dwelling count of 27 in Gold River 21 Reserve (Statistics Canada, 2013c). The other three Acadian First Nation reserves are inhabited with less than 33 individuals with no available labour force activity or occupation statistics. The Annapolis Valley First Nation Reserves had a population of 145 individuals. From the National Household Survey, the only reported reserve relying on natural-based resources was the Yarmouth 33.

Bear River First Nation has launched a project to re-establish traditional canoe routes for ecotourism named "7 Paddles". At present time, the community is focusing their efforts inward to build the foundation for the project, such as building of canoes and a cookhouse.

5.1.8 Geology and Archaeology

In the area of Annapolis Basin, the bedrock geology consists of alluvial and lacustrine clastic sedimentary rocks and local basalt, granite, syenite, gabbro, and minor felsic volcanic rocks of the Newark Supergroup (Hibbard et al. 2006). Closest to the Rattling Beach marine site are the

North Mountain (basalt) and Blomidon (lacustrine playa, sandflat, and deltaic clastic rocks, minor aeolian sandstone and conglomaerate) formations (Keppie 2000).

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 examined by Nova Scotia Communities, Culture, and Heritage (CCH) (S. Weseloh-McKeane, pers. com.). In general, most cage-based aquaculture sites, like Rattling Beach, cause minimal damage to submerged archaeological resources as the anchors are the only portion of the site in contact with the seafloor.

5.1.9 Shipwrecks

Several shipwrecks may be in the area of the proposed site (Maritime Museum of the Atlantic 2016); however, detailed locations or coordinates are not available. Estimates of some of the wreck locations are shown on Figure 43. Several shipwrecks reported in the Annapolis and Digby areas took place within Annapolis Basin. These include, but are not limited to, the Clarence A Shafner, the James Muir, the Lizzie Wharton, the Lorne B. Snow, the Marie Delphin, the Martha D. Mclain, the Meldon G., the Ora, the Ronald Eugene, the Robert Leonard, the Singer, and the Wanda Elaine.

The Clarence A. Shafner was stranded in Annapolis basin due to broken moorings in 1902 while on a voyage to Cuba. The schooner was considered a partial loss. In 1874, a barque, known as the James Muir, was stranded in Pond Cove of Bear Island in Annapolis Basin due to stress of weather; the ship was declared a partial loss, with approximately $4500 of cargo lost. The schooner, Lizzie Warton, was in Annapolis Basin when it caught fire in 1901. The disaster resulted in the total loss of the ship along with $800 worth of cargo. While out on a fishing voyage in 1914, the Lorne B. Snow was stranded in Annapolis Basin by unknown causes. The event led to the partial loss of the schooner. Similarly, the Marie Delphin was stranded at Hardy's Point in Annapolis Basin in 1894 for unknown reasons. The event led to the total loss of the schooner. The wreck of the Martha D Mclain at Sulis Point of Annapolis Basin was induced by stress of weather in 1899; the schooner was on a fishing voyage when it suffered a total loss. In 1968, the Meldon G. foundered in Annapolis Basin resulting in the total loss of the ship. The brigantine, Ora, was wrecked in 1902 in Annapolis Basin due to stress of weather; the result was a partial loss. The Ronald Eugene was stranded at Man O' War Rock in Annapolis Basin in 1948 due to unknown causes resulting in the total loss of the ship. Also due to unknown causes, the Robert Leonard was stranded in Annapolis Basin in 1879; the event was deemed a partial loss. The fishing vessel, Singer, was lost due to heavy seas and stress of weather when it smashed ashore in Annapolis Basin in 1972. Also in 1972, the engine room of the Wanda Elaine caught fire while the ship was in Annapolis Basin, resulting in the wreckage and total loss of the fishing vessel.

5.1.10 Important Habitats and Conservation Areas

There are a few significant habitats within 5-km of the Rattling Beach site. The whole of Annapolis Basin (9,273.2 ha) has been designated as significant habitat for migratory birds. This area is part of an important migratory route called the Atlantic Flyway which follows the Atlantic Coast of North America and the Appalachians Mountains with end points at the Eastern Artic Islands/the coast of Greenland and the Gulf of Mexico. A salt marsh is present approximately 2.2 km south-

southeast of the Rattling Beach site and a number of marshes, bogs/fens, and swamps surround the basin (Fig. 44; NSDNR 2016). The only existing protected area within 5 km of the site is the Annapolis Basin Look-Off Provincial Park, which offers exceptional views of the whole basin on a clear day (Fig. 45).

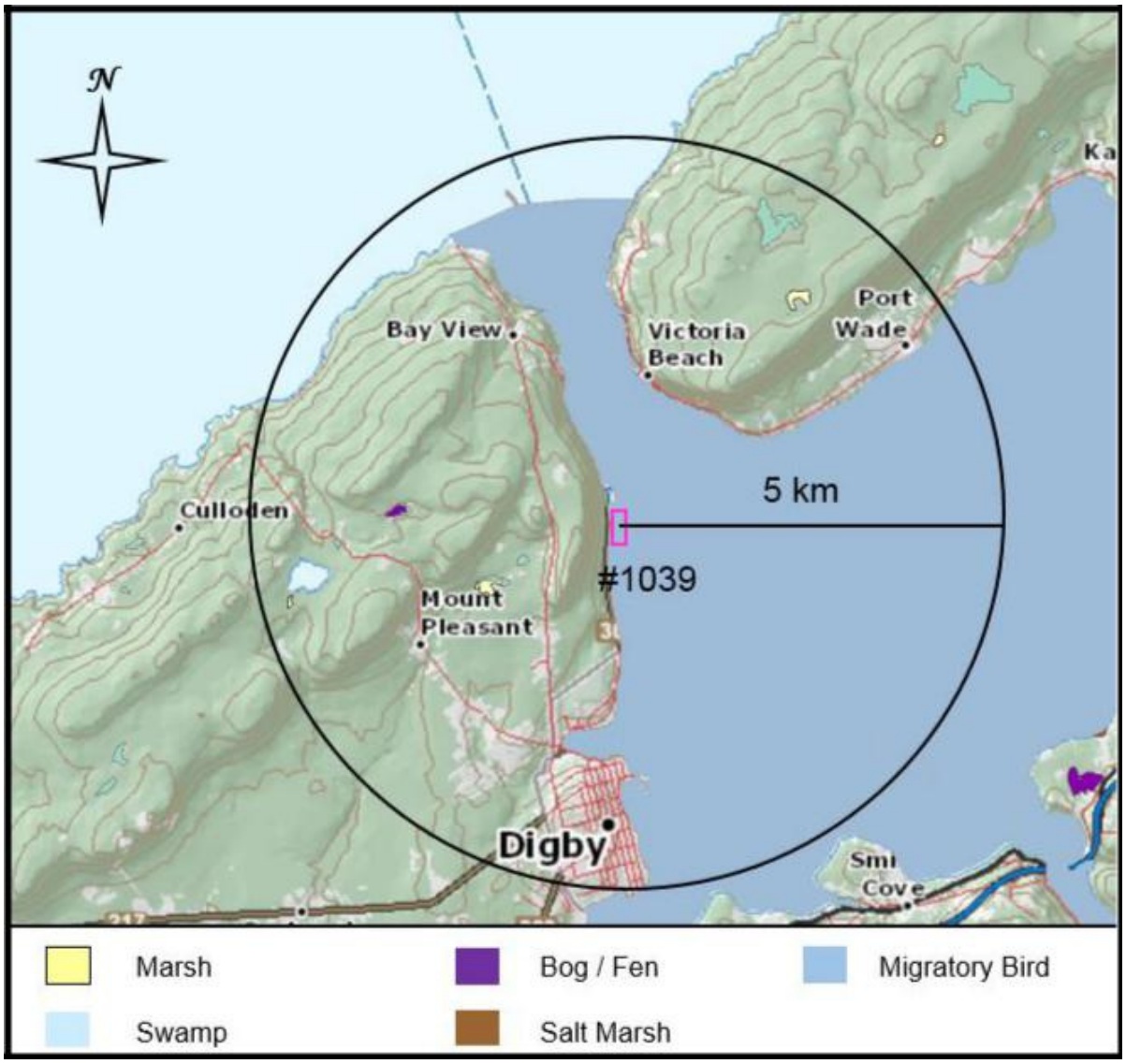

Figure 44. Significant Habitats
Note: Base map was obtained from NSDNR (2016)

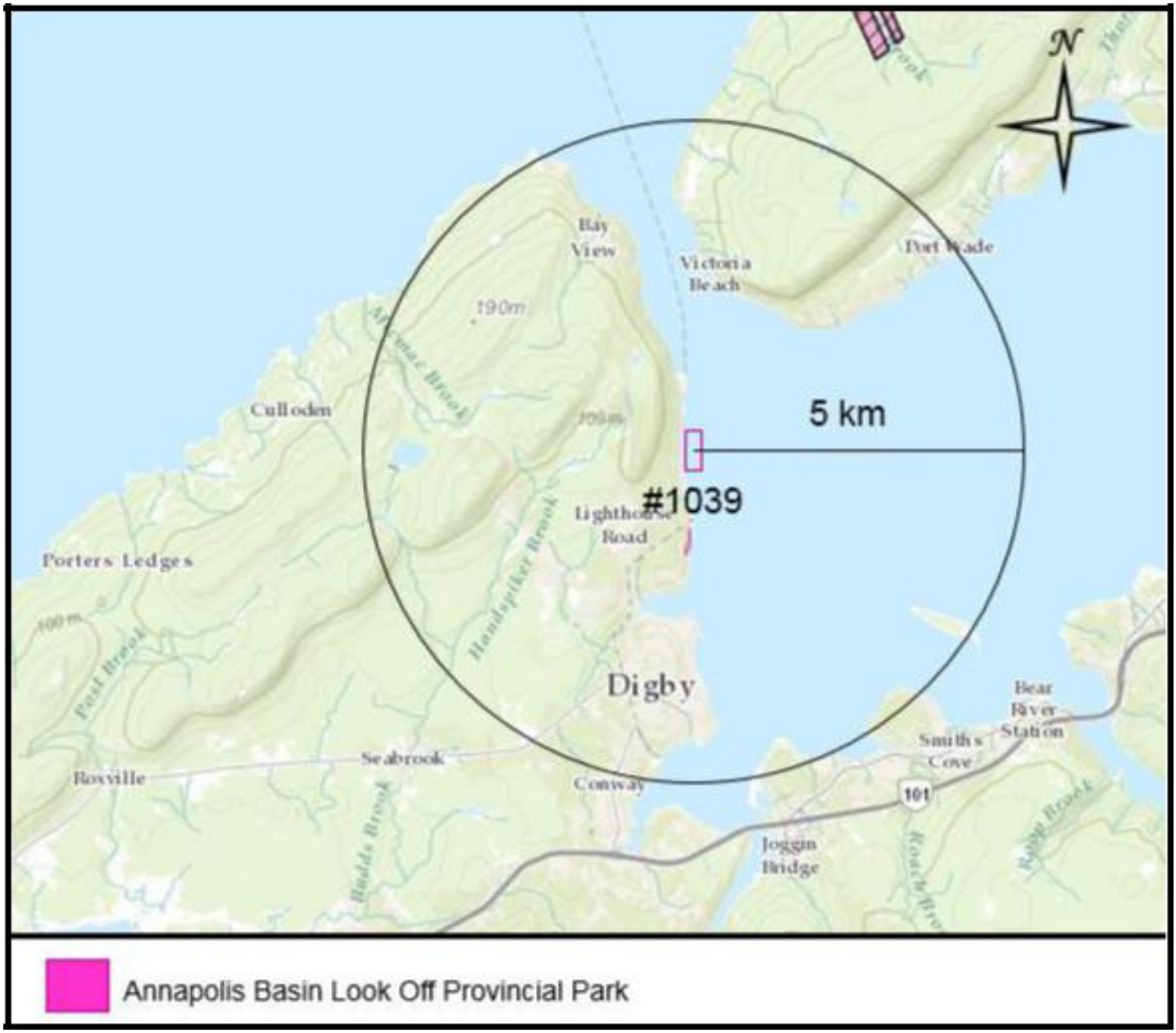

Figure 45. Existing and Pending Protected Areas
Note: Base map was obtained from NS Environment (2016)

5.2 Significance of Proposed Area to Wildlife

5.2.1 National Wildlife Area

Currently, there are 54 designated National Wildlife Areas (NWA) in Canada. A total of six (6) NWAs are present in the province of Nova Scotia, however none of the NWAs are within 50-km of the proposed aquaculture site (Environment Canada 2017b).

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 2017).

5.2.3 Marine Protected Areas

As defined by DFO, marine protected areas (MPAs) are geographic areas dedicated to and managed for the long-term conservation of nature. Fisheries and Oceans Canada establishes and manages MPAs under the Oceans Act in order to conserve numerous aspects of the areas. The aspects 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 Minister's mandate of scientific research (Fisheries and Oceans Canada 2016c).

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 just 20 km southwest of Saint John, New Brunswick.

The Sable Gully is a submarine canyon formed by glacial ice 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. The MPA is a crucial habitat to a number of 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 it 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 DFO 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 DFO, with the help of the management 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.

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 2016a). Many 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 Chignecto Bay in New Brunswick and Cumberland Basin and Minas Basin in Nova Scotia as WHSRN sites. Both areas are greater than 100-km in distance from the proposed aquaculture site (WHSRN, 2017).

The location of the proposed farm falls within block 113 of the Canadian Wildlife Service survey areas (Fig. 46). This bird block is not considered an Important Bird Area (IBA) by Bird Studies Canada (2014); however, the Province of Nova Scotia (NSDNR 2016; Fig. 46) recognizes Annapolis Basin as a significant habitat for migratory birds. Surveys, completed between February 2000 and March 2010 by the Canadian Wildlife Service (CWS) and Nova Scotia's Department of Natural Resources, identified several species of birds in blocks 113 (Table 11). Due to funding deficiencies, few surveys have been performed since March 2010 and no additional data are available for this block (A. Hicks, pers. comm.). The long-tailed duck was the most common bird noted followed by the merganser and scaup.

Kelly Cove Salmon operates with a Wildlife Interaction Plan in place. The WIP outlines all control measures and special requirements as they relate wildlife encounters at the site. Birds are specifically addressed in the WIP.

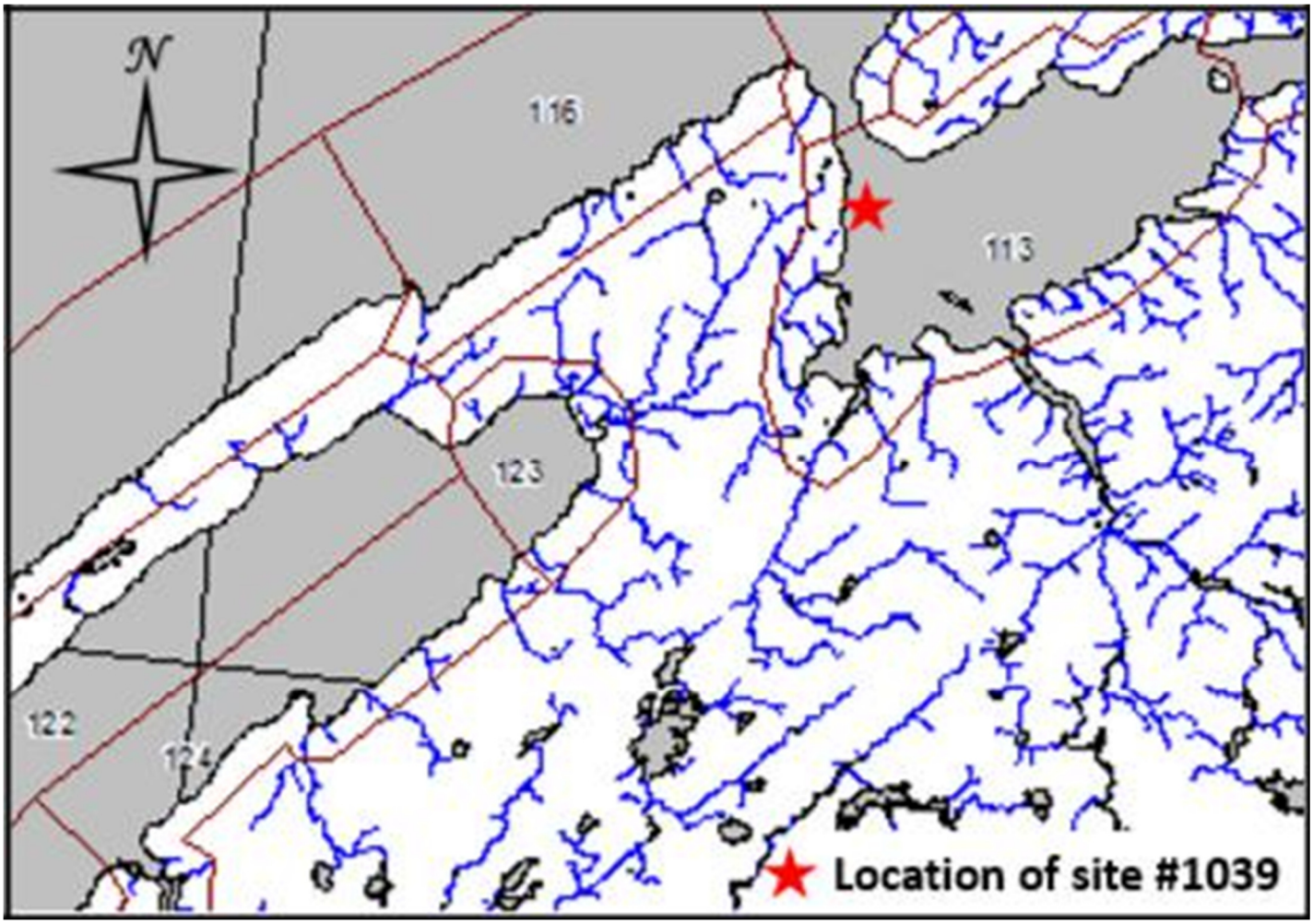

Figure 46. Map of Canadian Wildlife Service Survey Area Block 113

Table 12. Waterfowl Identified in Block 113

Canadian Wildlife Service – Block 113							
	Numbers of Sightings per Survey						
Bird Name	**02-Feb-00**	**16-May-00**	**04-Mar-04**	**26-Feb-07**	**18-Feb-09**	**22-Jan-10**	**Grand Total**
American Black Duck		0	81	98	424	312	**915**
American Green-winged Teal	0	0	0	0	0	0	**0**
American Wigeon	0	0	0	0	0	0	**0**
Atlantic Brant	0	0	0	0	0	0	**0**
Barrow's Goldeneye	0	0	0	0	0	0	**0**
Black Scoter	0	0	0	75	61	137	**273**
Blue-winged Teal	0	0	0	0	0	0	**0**
Bufflehead	130	0	44	0	37	0	**211**
Canada Goose	44	0	0	0	0	0	**44**
Common Eider	0	0	5	47	18	0	**70**
Common Goldeneye	0	0	48	9	111	22	**190**
Common Loon	0	0	9	9	21	2	**41**
Common Merganser	11	0	0	0	0	0	**11**
Female Common Eider	2	0	0	0	0	0	**2**
Gadwall	0	0	0	0	0	0	**0**
Greater Scaup	0	0	0	0	0	0	**0**
Harlequin Duck	0	0	0	0	0	0	**0**
Hooded Merganser	0	0	0	0	0	2	**2**
King Eider	0	0	0	0	0	0	**0**
Lesser Scaup	0	0	0	0	0	0	**0**
Long-tailed Duck	0	0	306	224	88	0	**618**
Male Common Eider	2	0	0	0	0	0	**2**
Mallard	0	0	0	0	0	0	**0**
Northern Pintail	0	0	0	0	0	0	**0**
Northern Shoveler	0	0	0	0	0	0	**0**
Red-breasted Merganser	0	0	0	0	11	0	**11**
Ring-necked Duck	0	0	0	0	0	0	**0**
Snow Goose	0	0	0	0	0	0	**0**
Surf Scoter	0	0	0	0	8	0	**8**
Unidentified Cormorant	0	0	0	1	2	0	**3**
Unidentified Diving Duck	0	0	0	0	0	0	**0**
Unidentified Duck	0	0	0	0	0	0	**0**
Unidentified Goldeneye	5	0	0	0	0	0	**5**
Unidentified Merganser	0	0	91	317	139	1	**548**
Unidentified Scaup	62	0	52	192	33	0	**339**
Unidentified Scoter	0	0	2	85	0	0	**87**
Unidentified Teal	0	0	0	0	0	0	**0**
White-winged Scoter	1	0	0	0	0	0	**1**
Wood Duck	0	0	0	0	0	0	**0**
Grand Total	**257**	**0**	**639**	**1057**	**953**	**476**	**3382**

5.2.5 Significance of Proposed Area to SARA

The Species at Risk Act (SARA) prevents species from becoming threatened, endangered, or extirpated by preventing destruction of their habitat and prohibit 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 12 - 15 list those species, their status, and their occurrence in the area of interest.

Table 13. 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 (Nova Scotia Canada 2016)

COMMON NAME	SCIENTIFIC NAME	COMMENTS
Endangered Species		
Atlantic whitefish	*Coregonus huntsmani*	-Last COSEWIC designation (Nov 2010): endangered -Historically found only in the Tusket and Petite Rivière watersheds, and their adjacent estuaries and bays, but was extirpated from the Tusket River system sometime after 1982 (Fisheries and Oceans Canada 2006) -Poor damming practices and insufficient fish ladders have led to declines (Fisheries and Oceans Canada 2010) -Protected under the Species at Risk Act (Schedule 1) -Not known to frequent the study area
Blue whale	*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* -Not known to frequent the study area
Leatherback sea Turtle (Atlantic population)	*Dermochelys coriacea*	-Last COSEWIC designation (May 2012): endangered -Is the most common sea turtle recorded in Nova Scotian coastal waters (NS Museum 2016) -Atlantic Canada supports one of the largest seasonal foraging populations of leatherbacks in the Atlantic (NOAA 2016b)

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 under the *Fisheries Act* -Not known to frequent the study area
Piping plover	*Charadrius melodus*	-Last COSEWIC designation (Nov 2013): endangered -Nests above high-water mark on exposed gravel or sandy beaches -On the Atlantic coast, they often nest in association with small cobble and other small beach debris on ocean beaches, sand spits or barrier beaches; they also forage for food on these beaches -Protected under the federal Species at Risk Act (Schedule 1), the federal Migratory Birds Convention Act and the Nova Scotia Endangered Species Act -No known beaches in the vicinity of the site (BSC 2014)
Red knot rufa	*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 -Protected under the federal Species at Risk Act (Schedule 1) and the Nova Scotia Endangered Species Act -Proximity to the study area is unknown
White shark	*Carcharodon carcharias*	-Last COSEWIC designation (Apr 2006): 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 14. 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 (Nova Scotia Canada 2016)

COMMON NAME	SCIENTIFIC NAME	COMMENTS
Threatened Species		
Canada warbler	*Wilsonia anadensis*	-Last COSEWIC designation (Apr 2008): threatened -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) and the *Migratory Birds Convention Act, 1994* -Protected under *Canada National Parks* Act -Confirmed sightings throughout the Annapolis Basin area (BSC 2014)
Chimney swift	*Chaetura pelagica*	-Last COSEWIC status (Apr 2007): 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* Confirmed sightings throughout the Annapolis Basin area (BSC 2014)
Common nighthawk	*Chordeiles minor*	-Last COSEWIC designation (Apr 2007): threatened -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 river banks; 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* -Confirmed sightings ~ 4 km south of the site (BSC 2014)

Olive-sided flycatcher	*Contopus cooperi*	-Last COSEWIC designation (Nov 2007): threatened -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 -Confirmed sightings ~ 4 km south of the site (BSC 2014)

Table 15. 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 (Nova Scotia Canada 2016)

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
Fin whale	*Balaenoptera physalus*	-Last COSEWIC designation (May 2005): 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)
Harbour porpoise	*Phocoena phocoena*	-Last COSEWIC designation (Apr 2006): Special concern -Sometimes frequents bays and harbours, particularly during summer -Protected from certain activities under the Marine Mammal Regulations of the Fisheries Act -Protected by Species at Risk Act Schedule 2
Humpback whale	*Megaptera novaeangliae*	-Last COSEWIC designation (May 2003): not at risk -Humpback whales form distinct populations and live close to coastlines -SARA schedule 3

Rusty blackbird	*Euphagus carolinus*	-Last COSEWIC status (Apr 2006): Special concern -The breeding range of the rusty blackbird includes a vast portion of Canada; a very small number of rusty blackbird's winter, albeit sporadically, in the southern part of most Canadian provinces -Protected under the federal Species at Risk Act (Schedule 1) -Confirmed sightings near the aquaculture site (BSC 2014)
Short-eared owl	*Asio flammeus*	-Last COSEWIC designation (Apr 2008): Special concern -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 -Confirmed sightings ~ 4 km south of the proposed site
Sowerby's beaked whale	*Mesoplodon bidens*	Last COSEWIC designation (Nov 2006): 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 16. 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 (Nova Scotia Canada 2016)

COMMON NAME	SCIENTIFIC NAME	COMMENTS
Species with no SARA status		
American eel	*Anguilla rostrate*	-Last COSEWIC designation (May 2012): threatened -Canadian range includes all fresh, estuarine, and coastal marine waters that are accessible to the Atlantic Ocean -Blockage of migratory streams is a major threat to the species
American plaice	*Hippoglossoides platessoides*	-Last COSEWIC designation (Apr 2009b): threatened
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 (COSEWIC 2011a)
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 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 (ASF 2016a) -The Annapolis, Round Hill, Moose, Bear, and Acacia Brook Rivers are listed as present salmon rivers and the Lequille as extirpated (ASF 2016b)

Atlantic sturgeon (Maritime Populations)	*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 (COSEWIC 2011b)
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 Coast of New Brunswick and Nova Scotia -Bird Studies Canada records indicate bank swallows have been observed around Annapolis Basin (BSC 2014)
Barn swallow	*Hirundo rustica*	-Last COSEWIC designation (May 2011): threatened -Protected under the *Migratory Birds Convention Act, 1994* -Bird Studies Canada records indicate confirmed occurrences of barn swallows on the shore nearest the aquaculture site (BSC 2014)
Basking Shark (Atlantic population)	*Cetorhinus maximus*	-Last COSEWIC designation (Nov 2009): special concern -Uses coastal, temperate waters (COSEWIC 2009c) -Mortality caused by fishing by-catch and boat strikes are cited as the major threats to the species (COSEWIC 2009b
Blue shark	*Prionace glauca*	-Last COSEWIC designation (Apr 2006): special concern -In Atlantic Canada, they are regularly found in almost all waters but are most often encountered offshore; fishing by-catch is the largest threat (COSEWIC 2006)
Eastern wood peewee	*Contopus virens*	Last COSEWIC designation (Nov 2012): special concern Bird Studies Canada (2014) considers occurrences of the bird in the area to be possible
Killer whale (Northwest Atlantic population)	*Orcinus orca*	-Last COSEWIC designation (Nov 2008): special concern -Northwest Atlantic distribution includes Nova Scotian waters (COSEWIC 2008)

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 (COSEWIC 2010b)
Peregrine Falcon (anatum subspecies)	*Falco peregrinus anatum*	-Last COSEWIC designation (Apr 2007): non-active -Prefer open habitats, such as sea coasts, for hunting -Protected under the Nova Scotia Endangered Species Act -Protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Appendix I)
Porbeagle shark	*Lamna nasus*	-Last COSEWIC designation (May 2014): Endangered -Can be found from the coast to the open sea migrating annually to further inshore; seasonally ranging from the Scotian shelf and Bay of Fundy to Newfoundland on the continental shelf occasionally close to shore -Is 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 still continues -Currently no fisheries management measures for this species
Shortfin mako (Atlantic population)	*Isurus oxyrinchus*	-Last COSEWIC designation (Apr 2006): threatened -Found in both inshore and offshore waters -COSEWIC identified fishing, pelagic long-lining in particular, as being the most significant threat to the species; 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 (Natanson et al. 2007) -By-catch mortality contributes to population decline (Natanson et al. 2007) -No direct fisheries for this species, however captured as by-catch in fisheries directed towards groundfish (Fisheries and Oceans Canada 2015d) -Population of the Laurentian-Scotian has accounted for 90% of the smooth skates in Canada, while covering 70% of the Canadian smooth skate range (Fisheries and Oceans Canada 2015d) -Area of abundance along the Scotian Shelf has drastically declined since 1970 (Fisheries and Oceans Canada 2015d)
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 (BIO 2015a) -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 (COSEWIC 2010c) -Target of direct fisheries in Atlantic Canada (Fisheries and Oceans Canada 2015)
Thorny skate	*Amblyraja radiata*	-Last COSEWIC designation (May 2012): special concern -One of the most common skates in the Northwest Atlantic (BIO 2015b) -Both a target of directed fisheries and caught as by-catch, although directed fisheries along the Scotian Shelf stopped in 2005 (BIO 2015b) -Regarded as over fished and landing of this species is prohibited throughout the Gulf of Maine (BIO 2015b)
White hake	*Urophycis tenuis*	-Last COSEWIC designation (Nov 2013): threatened -Adjust their depth distribution to find temperatures in the range of 4 - 8°C (COSEWIC 2013a)

Winter skate (Georges Bank- Western Scotian Shelf-Bay of Fundy populations)	*Leucoraja ocellata*	-Last COSEWIC designation (May 2015): special concern -Estimated to have declined by 90% since 1970, now at a historic low (IUCN 2009) -Caught as by-catch in groundfish targeting fisheries (IUCN 2009) -Bottom-dwelling species usually found on sand and gravel and at depths less than 111 m (COSEWIC 2005) -Landings under quota control on the Scotian Shelf (IUCN 2009)

5.3 Impacts to Other Users Including Wildlife

5.3.1 Critical Habitat and Mitigation Plans for Wildlife

Atlantic Whitefish

Atlantic whitefish are protected under the federal Species at Risk Act (Schedule 1). The Nova Scotia Fishery Regulations under the Fisheries Act prohibit the taking of Atlantic whitefish from all provincial waters by any method at any time of the year. This species is also protected under the Nova Scotia Endangered Species Act. Under this Act, it is prohibited to kill, harm or collect this species. While the Mersey River is not listed as habitat for the Atlantic whitefish, there are reports of Atlantic whitefish moving along the shores of Liverpool Bay towards the Mersey River (C. Reynolds, pers. com.). Neither KCS nor any of its employees will attempt to harm or capture Atlantic whitefish.

Leatherback Sea Turtle

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 given details of the sighting.

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. 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.

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), 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. KCS personnel will abide by the Migratory Birds Convention Act and the associated regulations.

Piping Plover

Suitable piping-plover habitat can be approximated as a beach with the following attributes: a gently sloping foredune, wide stretches of beach that afford protection from flooding during high water, sand and/or gravel and/or cobble substrate, and a lack of vegetation (Environment Canada 2012b). A number of sites in Nova Scotia have been identified as meeting these criteria. Distribution often fluctuates due to changes in habitat. These changes may include, but are not limited to, beach width, composition of substrate, feeding areas, vegetation coverage, and human disturbance (COSEWIC 2013b). There is no known piping-plover beach near the proposed aquaculture site.

The piping plover is protected under the Species at Risk Act and the federal Migratory Birds Convention Act. KCS employees of the proposed aquaculture site will not kill, harm, or collect adults, young, or eggs of the piping plover.

Sharks

No federal or provincial laws explicitly protect white sharks in Canadian waters (COSEWIC 2006). In Atlantic Canada, there are only three directed shark fisheries. One is a recreational fishery for the blue shark which is primarily in the form of annual derbies; the others are commercial fisheries aimed at the porbeagle shark and spiny dogfish (Canadian Shark Research Laboratory 2012). 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 (Fisheries and Oceans 2002). KCS personnel will not attempt to attract, capture or harass any sharks in any way.

Whales

Blue whales are protected under the Marine Mammals Regulations of the Fisheries Act. KCS will comply with these regulations and will not attempt to harvest, kill, or harass any blue whales (or any other whales, such as right whales) 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 in order 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 known whale areas (i.e. 9.9 knots).

5.3.2 Impacts to Other Users

5.3.2.1 Right to Navigation

The following figures provide information regarding navigation routes that are used by KCS while servicing the Rattling Beach aquaculture site (Figure 47). The layout of on-site equipment is provided in Figures 48-50.

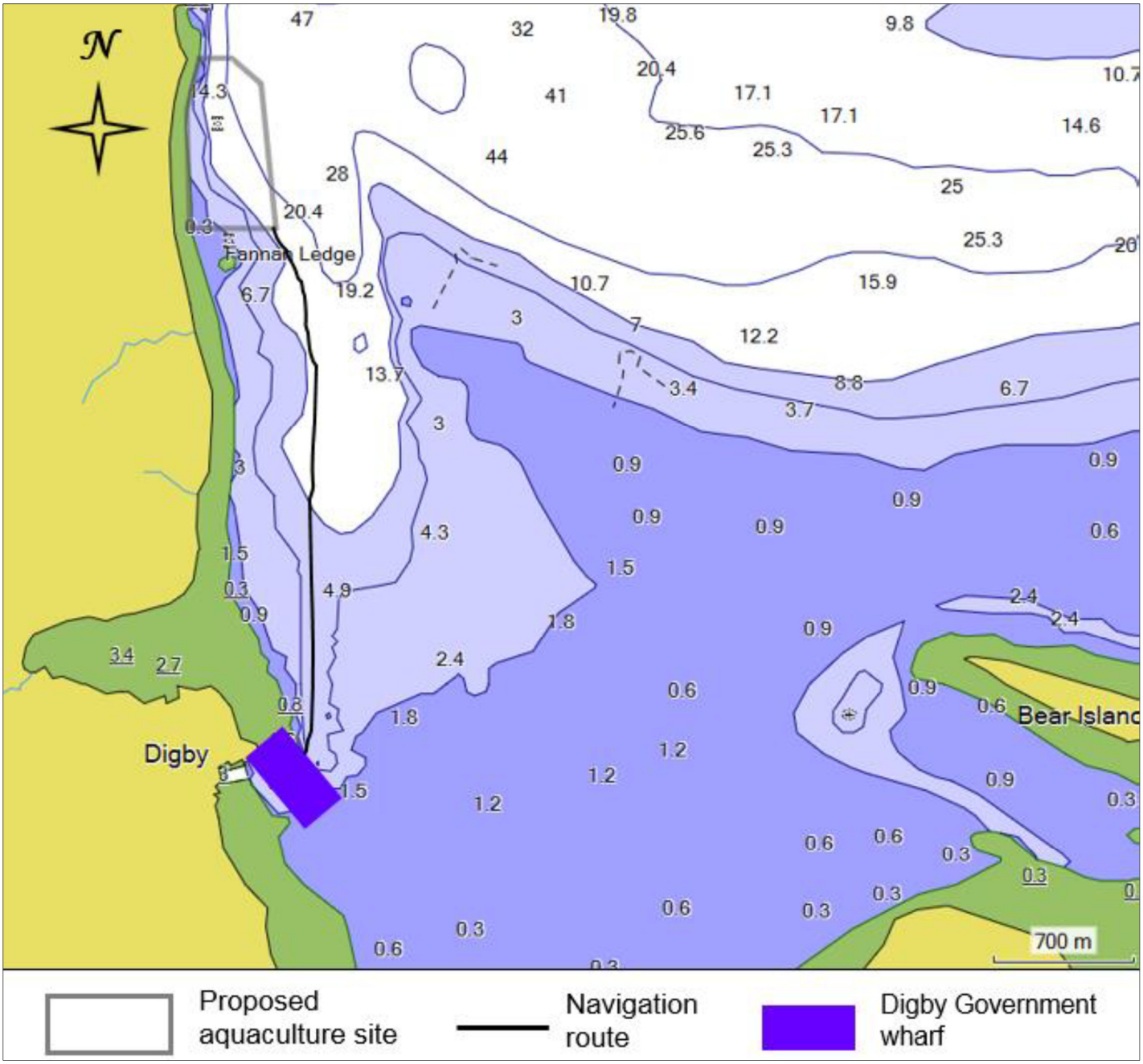

Figure 47. Marine chart showing KCS vessel route from Rattling Beach to the Digby Government Wharf.

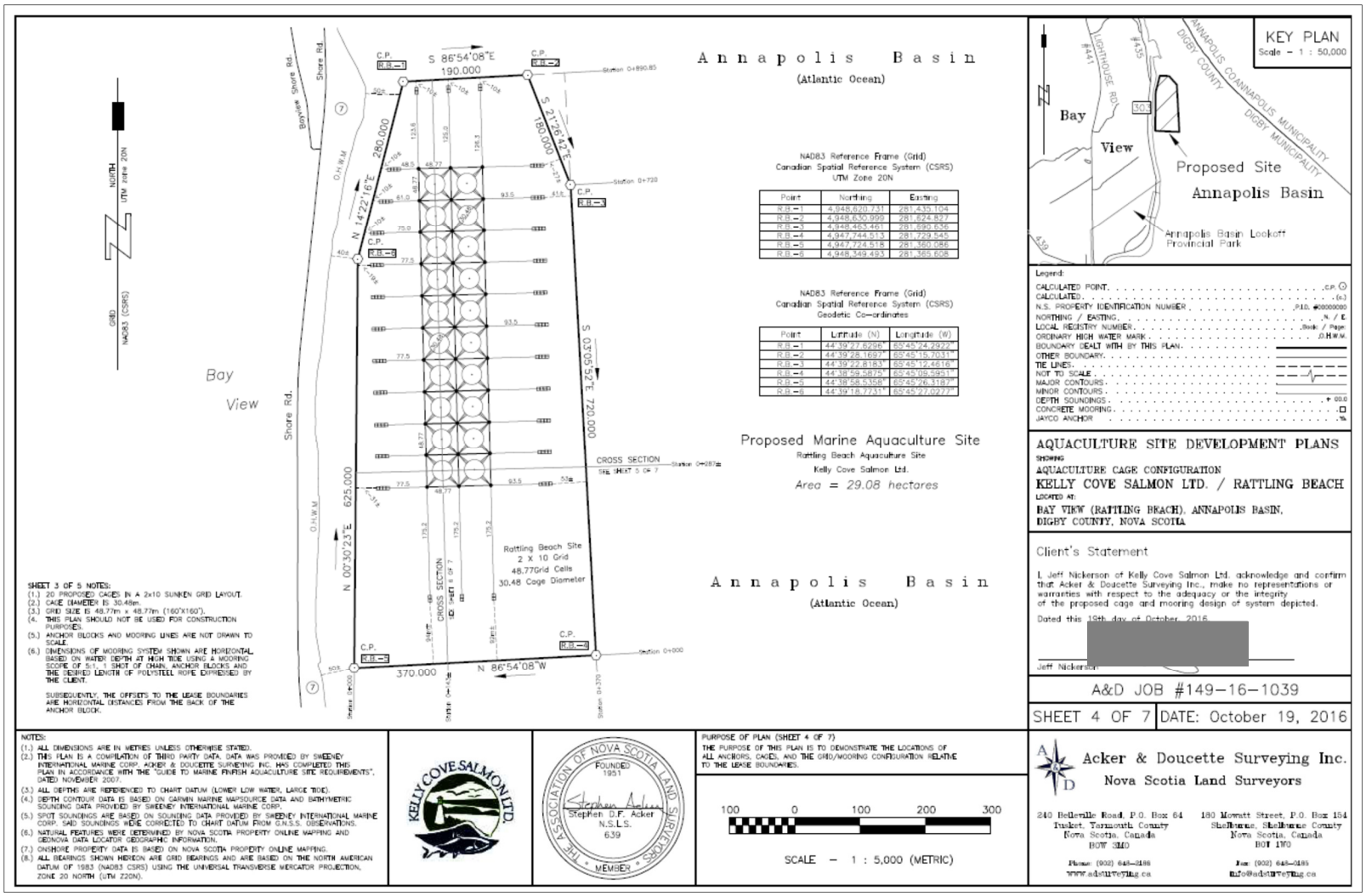

Figure 48. Rattling Beach site development plan showing cage configuration.

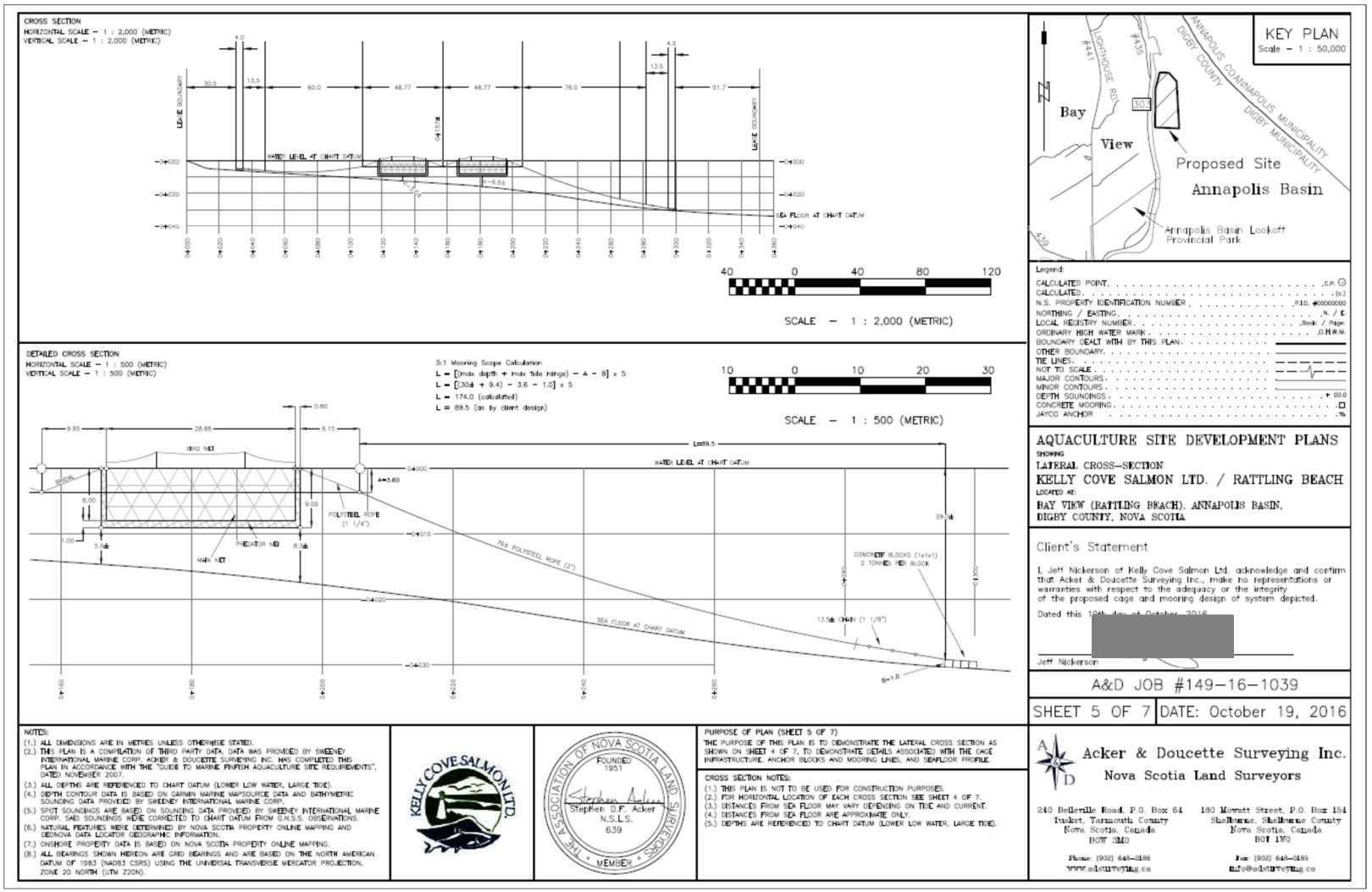

Figure 49. Rattling Beach cross-sectional plan A.

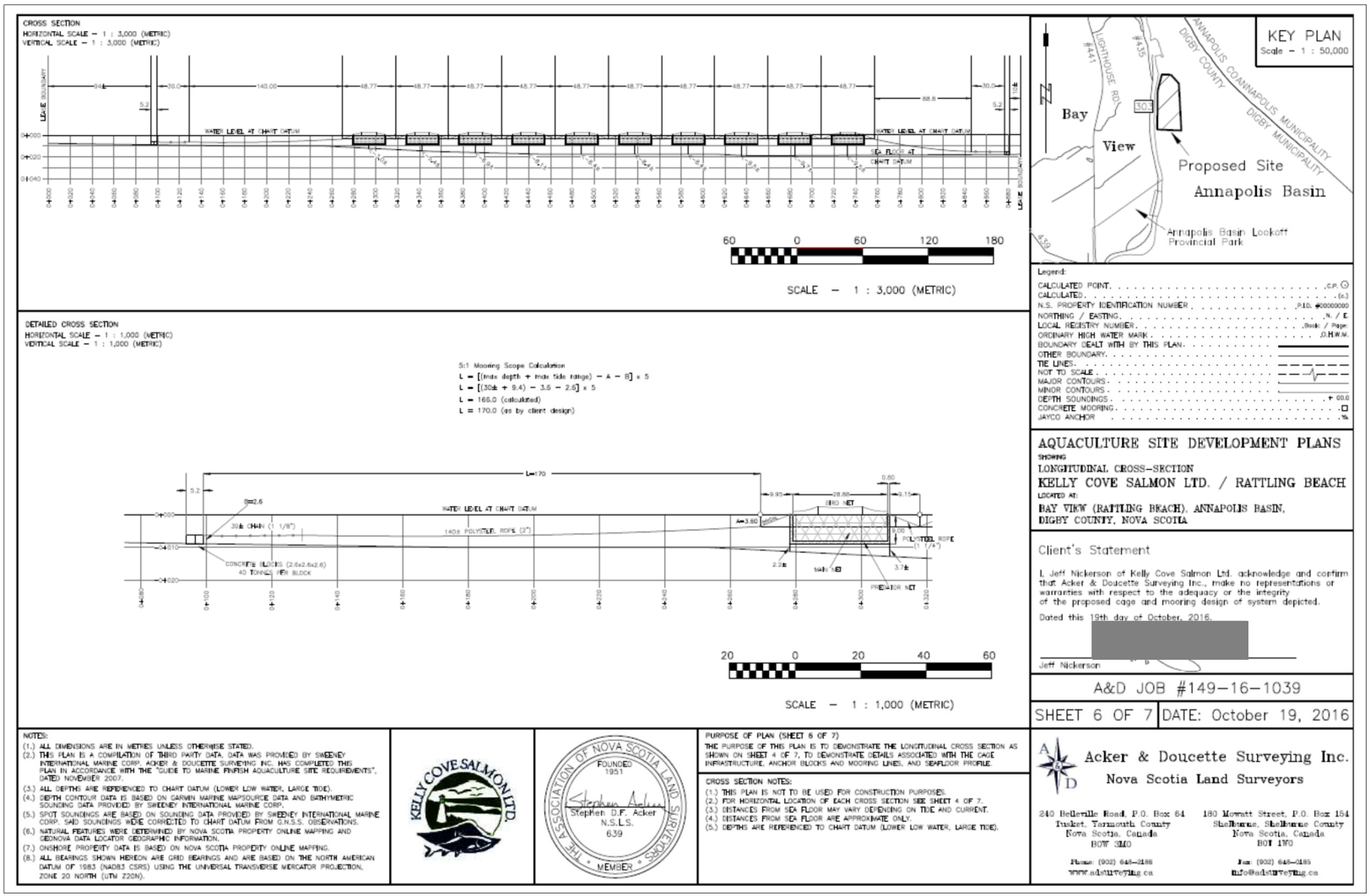

Figure 50. Rattling Beach cross-sectional plan B.

5.3.2.2 Esthetics

Rattling beach site is an existing site. The requested boundary amendment does not affect the visual appearance of the site.

5.3.2.3 Bird Activity

Any activity on the water, which includes fishing and aquaculture, can result in an increased number of opportunistic birds such as seagulls. These birds can become a nuisance for adjacent property owners and tourists travelling in and around the basin. The site will continue to discourage deterring birds by using bird nets over the cages as well as maintaining the feed in closed containers.

5.4 Impacts by Other Users Including Wildlife

5.4.1 Wildlife

Due to the environment in which KCS operates, wildlife interactions will be unavoidable – both positive or neutral and negative (predator). Positive or neutral interactions may require management notification if the species is listed on a Species At Risk list or other similar document.

Negative or predator interactions 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 interaction, whether intentional or accidental, 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 stress the fish, and may pose biosecurity and fish health risks.

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

To deter birds and to mitigate against interactions, each cage containing fish are equipment with a bird stand and net for the duration of the grow-out. These stands and nets remain in place during the production schedule but may be temporarily lifted during activities such as mortality dives, net washing, fish transfers or treatments.

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 the security of the containment, it may be dispatched in accordance with Government Policy and Saltwater Management consent.

The Wild Life Interaction Plan contains prevention and control measures for wildlife (Appendix E.)

5.4.2 People Interaction

Interaction with people outside of KCS for the marine site is inevitable. Use of the Digby Government Wharf and the proximity of the site to Digby contribute to this. Interactions with people and organizations outside of KCS can raise biosecurity concerns, pollution concerns and potential safety concerns for 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 utilized to mitigate risk and to manage activities in such a way to reduce stress of animals and to reduce the potential for pathogen spread. Biosecurity must be considered within all procedures and must be addressed within procedural descriptions. All sites have a wharf usage biosecurity procedure which considers other users of the wharf.

Also, the potential for pollution from other industries within the Annapolis Basin exists. Bay Ferries operate a ferry terminal near the site and a fish processing plant is located nearby.

Water quality is monitored based on the uncertainty of natural cycles and processes such as seasons, thermoclines, weather, haloclines, algal blooms, etc., but also provides information on water quality as it relates to man-made factors. Monitoring specific water parameters will aid the farmer in preparedness for dealing with health issues, assist with feeding regimes, and allow mitigative actions to be taken when conditions are less than optimum. Aquaculture license holders will be responsible for monitoring oxygen and temperature on a daily unless weather conditions do not permit water quality monitoring.

Although environmental parameters such as low oxygen and high or low temperatures and algae levels cannot be controlled in a marine finfish operation, a site must have emergency plans in place to respond to such environmental parameters when they reach levels that may affect fish health and welfare. To better understand oxygen and temperature levels at the site, VEMCO temperature and oxygen sensors will be deployed at the farm - these will provide staff with real-time data 24 hours per day.

Mitigation plans are in place for the possibility of water quality issues related to oxygen, temperature, and algae.

Visitors to the Rattling Beach 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 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. All visitors must sign the log book. Visitors must change their footwear prior to stepping on site, rubber boots will be provided from the office. All visitors must wear a PFD provided by the office to the site and while on site and the use of footbaths and proper hygiene is mandatory. By adhering to strict biosecurity, H&S, 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: The Public Right of Navigation

6.1 Navigation Protection Act Approval

6.1.1 Notice of Works

Transport Canada requires a notice of works form in order to notify the Navigation Protection Program (NPP) regarding a proposed or existing work in navigable water. A completed and signed notice of works form with supporting documentation was submitted to Transport Canada on October 20th, 2016 under NWP File # 8200-94-3045. Acker & Doucette Surveying Inc. produced the aquaculture site development plans submitted with the signed notice of works. The plans include:

a. Proposed navigation aid limits to demonstrate the extent of the marine aquaculture site as well as adjacent parcels of land to the north and south of 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.

Each plan indicates the exact location of the proposed lease, legal lease site number and position of the lease. See Appendix C for the complete Notice of Works Package.

6.1.2 Transport Canada Approval Package

Transport Canada granted Kelly Cove Salmon Ltd. approval for Rattling Beach #1039 under the Navigation Protection Act on January 11th, 2017. The Minister of Transport approved the placement of the aquaculture facility as per the submitted development plans. Within the approval, Transport Canada outlined standard terms and conditions whereby all anchorage systems, gear and associated work must remain within the site boundaries, specific buoy markers are to be installed and maintained, and should any material/equipment drift from the boundaries, it must be immediately marked with a cautionary light and radar reflector and promptly removed or returned to maintain right of navigation.

See Appendix D for complete Transport Canada Approval package.

6.1.3 Project Description

The proposed lease incorporates all aquaculture-related gear, above and below the water line, therefore alterations to the grid are not required. Installation of specific buoy markers outlining the lease area is complete as per Transport Canada's approval package (Section 6.1.2).

Section 7: The Sustainability of Wild Salmon

7.1 Identification of Local Salmon Populations

The Rattling Beach marine aquaculture site is located 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. 51). The marine aquaculture site in Annapolis Basin is located in SFA 22.

The abundance of Atlantic salmon in the Maritimes Region has been in decline for over 20 years leaving populations in many rivers to become extirpated or listed endangered under the Species at Risk Act (SARA). A region-wide electrofishing survey conducted in 2000 found salmon in 28 of 52 rivers surveyed (54%) whereas a similar survey conducted in 2008 and 2009 found salmon in only 21 of 54 rivers surveyed (39%) (Fisheries and Oceans 2011). The pH of water samples collected in the 1980s and 1990s indicated that several rivers in Nova Scotia were partially to heavily acidified (Lacroix and Knox 2005, Gibson et al. 2009, Fisheries and Oceans 2011). River acidification is recognized as a major factor in the survival of Atlantic salmon in Nova Scotia.

All Atlantic salmon index populations within Department of Fisheries and Oceans (DFO) Maritimes Region were assessed to be well below conservation (egg) requirements in 2014. 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 deposits ranging between 2 and 4% of conservation requirements in 2014 (Fisheries and Oceans Canada 2015e). In 2016, assessment of the index population for SFA 21– Lahave River Salmon population above Morgan Falls, indicate that the egg deposition and parr densities were below conservation requirements (DFO 2017c).

In November 2010, COSEWIC designated the Outer Bay of Fundy, Inner Bay of Fundy, Nova Scotia Southern Upland, and Eastern Cape Breton population assemblages as endangered (Fisheries and Oceans Canada 2011). However, the SARA status is “no status, no schedule”. Within SFA 19 to 23, all rivers have been closed to recreational fishing as of 2010 (DFO 2017c). These rivers are all over 100 km away from the proposed aquaculture site (ASF 2016b).

The Salmon Atlas and the Atlantic Salmon Federation (Figs. 52-53) count five salmon rivers feeding into the Annapolis Basin: Annapolis River, Round Hill River, Moose River, Bear River, and Acacia Brook; the Lequille River is considered extirpated (ASF 2016b). Other nearby rivers that flow into Saint Mary’s Bay include the Boudreau and Meteghan rivers, which both also have wild salmon (ASF 2016b). The aquaculture site under boundary amendment application is located approximately 4 and 6 km from the mouths of Acacia Brook and Bear Rivers, respectively, the nearest identified wild salmon rivers.

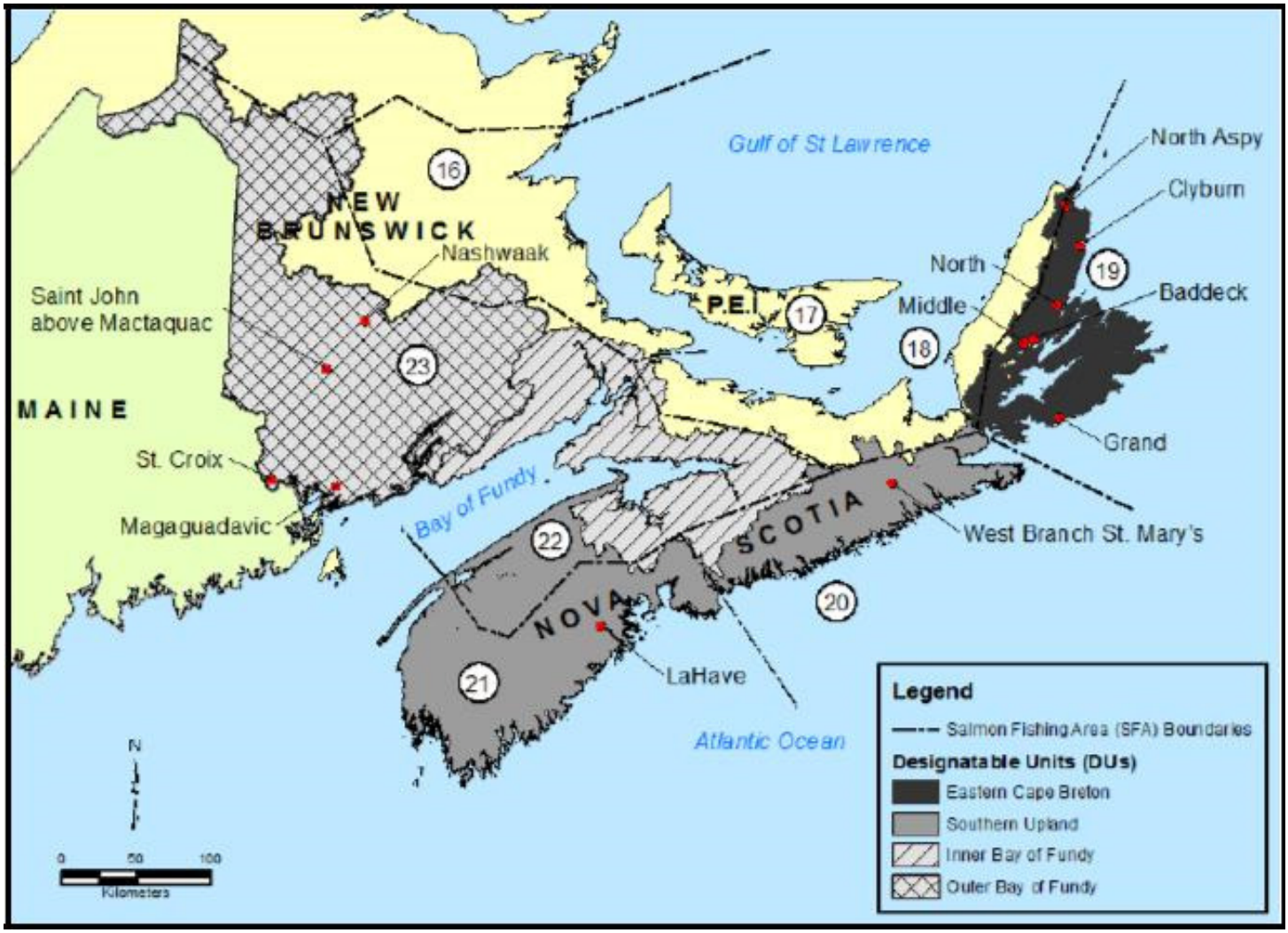

Figure 51. Atlantic Salmon Fishing Areas of Atlantic Canada
Note: Figure was sourced from the Fisheries and Oceans (2015e). White, numbered circles identify designated Salmon Fishing Areas.

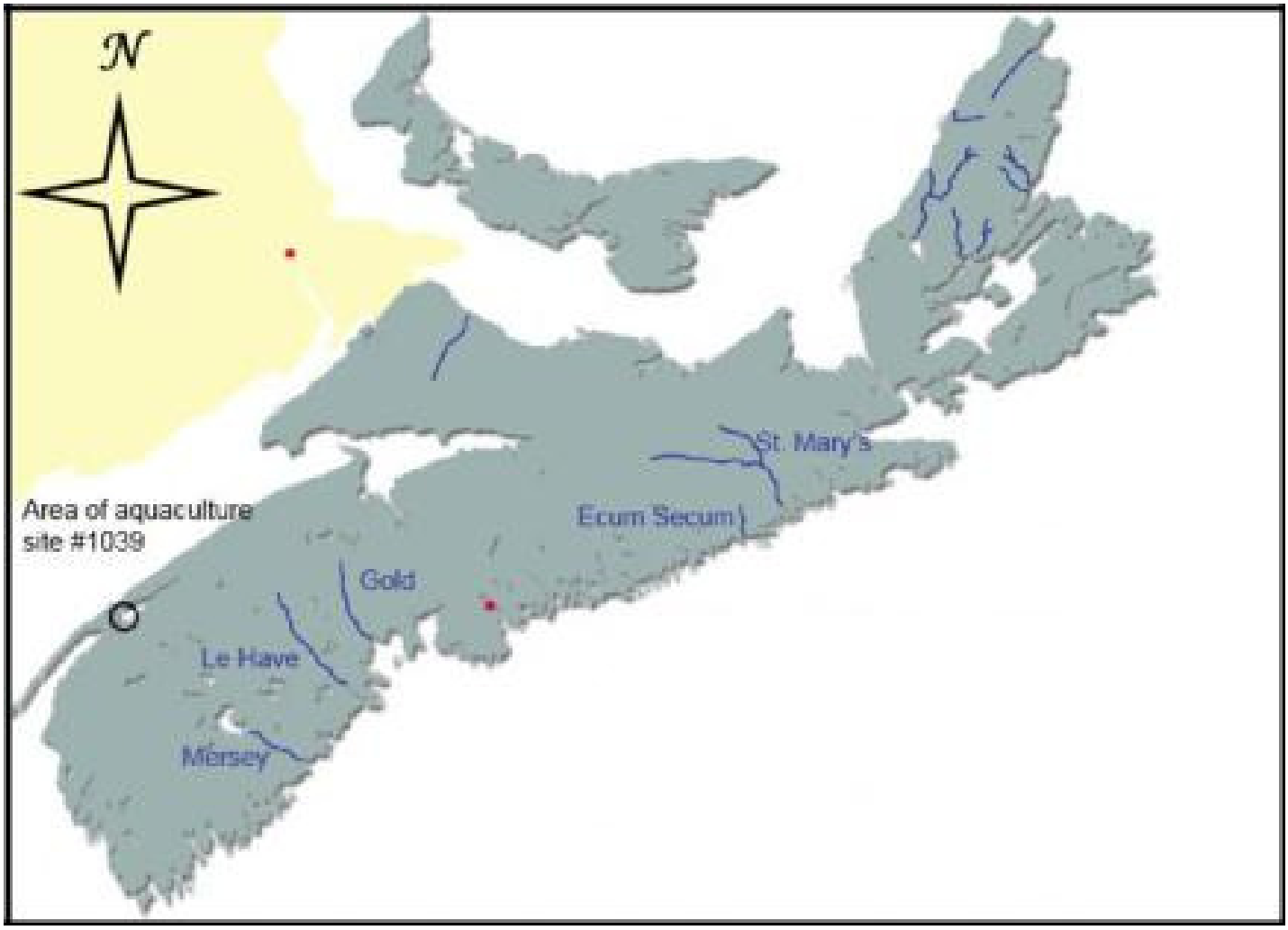

Figure 52. Atlantic Salmon Rivers of Nova Scotia According to The Salmon Atlas
Note: Figure was sourced from The Salmon Atlas (2016).

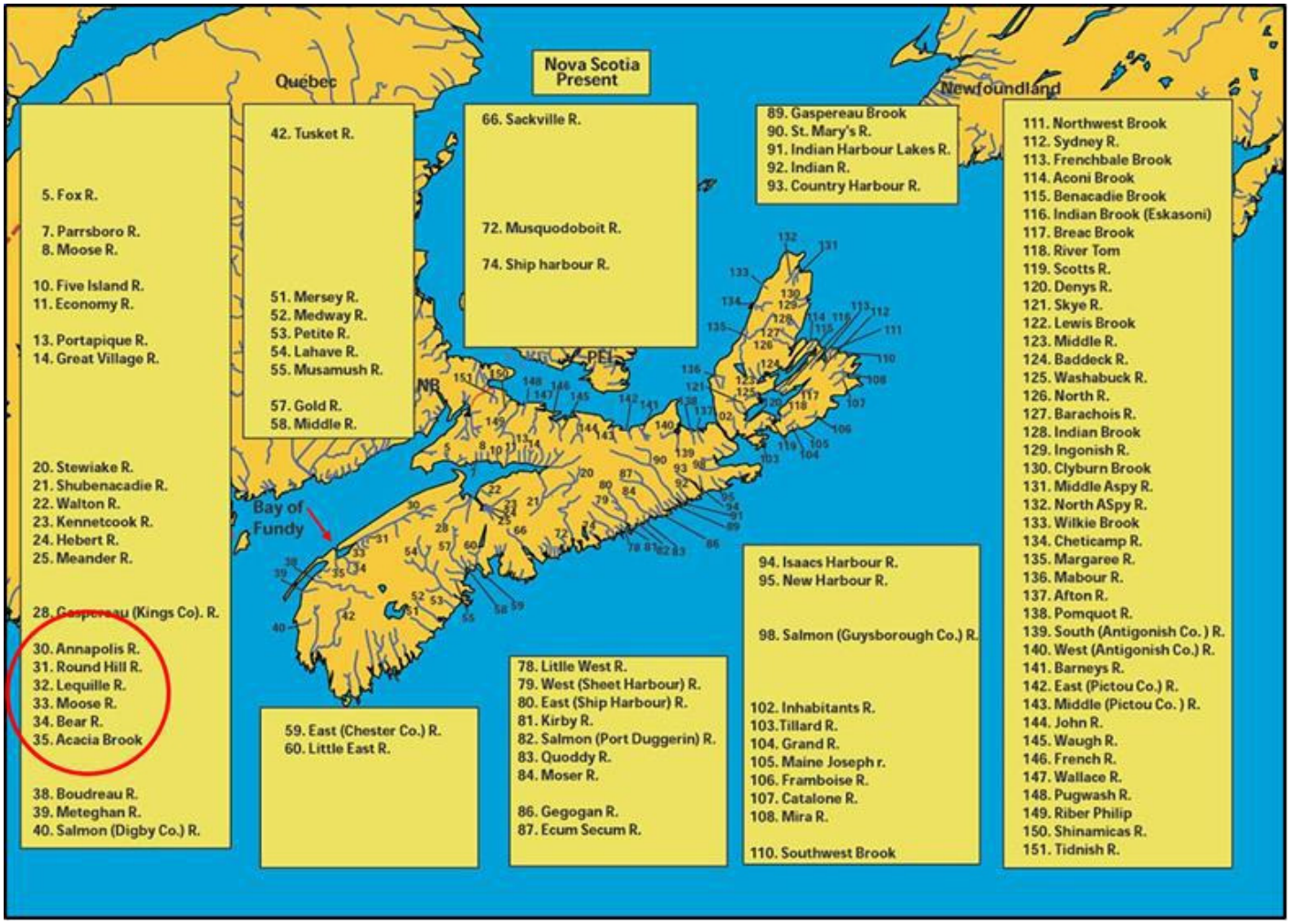

Figure 53. Present Atlantic Salmon Rivers of Nova Scotia
Note: Figure was sourced from the Atlantic Salmon Federation (2016a)

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 Atlantic Salmon Federation (ASF) recommends placement of marine cages away from the mouths of Atlantic salmon rivers, emphasis on sustainable aquaculture with minimal environmental effects and disease transfer, as well as increased containment protocols.

ASF's review on marine cage aquaculture states escapes are inevitable due to "equipment failure due to accidents, predators, storms and high wave action, or vandalism" which has resulted in identification of farmed salmon in rivers within Maine and Newfoundland (ASF 2013). The main concerns regarding escapees include interbreeding with wild stock which can reduce fitness of the wild population as well as competition for freshwater habitat. ASF stresses the need for transparency regarding escapee events. Government and industry should communicate pertinent information immediately to the public and local community groups.

ASF outlines concern for wild salmon migrating in the area of a marine aquaculture facility, due to increased risk of disease transfer to wild populations, specifically Infectious Salmon Anemia (ISA) and sea lice. To reduce the risk of disease transfer, ASF suggests immediate industry response is required to reduce disease transfer. However, the use of chemicals such as SLICE and hydrogen peroxide to treat sea lice outbreaks continues to be a point of contention due to the potential release into the marine waters and impacts on the health of crustaceans (ASF 2013).

Refer to Section 7.2.3 – Mitigation Efforts and Regulatory Requirements for information regarding containment protocols, disease management and environmental monitoring which support the sustainability of wild salmon.

7.2.2 Restoration Efforts

NSLC Adopt a Stream program (2017) has engaged over 35 Nova Scotia community-based groups to participate in restoration of steam habitats. Supports include remediation of culverts, re-establishing fish passage ways and planting streamside trees to prevent erosion. Adopt a Stream program indicates two (2) restoration efforts near the Annapolis Basin. The first is the L'sitkuk watershed (the Bear River) which is scheduled to undergo restoration to support aquatic connectivity and spawning pools through updating digger logs, liming, repair damage to culverts, and collect water quality data. The community group involved with this project is the Bear River First Nation group. The other restoration effort is currently underway within the Annapolis River Watershed. Restoration of fish passageways and habitat enhancement is being guided by the Clean Annapolis River Project (CARP) group in collaboration with members of the Bear River First Nation. This project will install digger logs and deflectors to enhance the habitat quality as well as remove debris, install tailwater control/baffles, barriers and chutes. Restoration efforts will benefit a variety of species including salmon, trout, striped bass and eel.

The aquaculture site, Rattling Beach #1039, will have no foreseeable impact on the restoration efforts in the Annapolis Basin and Digby area.

KCS is actively searching for wild salmon restoration collaborations in Nova Scotia.

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 DFO (1999). They are as follows:

1) Improved containment, including the development and implementation of Code of Practice, contingency plans, and a reporting system for escapees
2) Improved fish health management, including completion and implementation of provincial Codes of Practice, including contingency plans and a reporting system for specified diseases
3) Upgrading policy for introductions and transfers of fishes and improving related enforcement
4) Enhancing education and training of aquaculture workers, particularly relative to containment and farm/hatchery management
5) Ensuring the maintenance of wild stocks at or above their conservation requirements

6) Continuing the use of local stocks as donors, where possible, for currently practiced aquaculture, or using other strains if rendered sterile or properly contained, and
7) Continue incorporating risk analysis into the review process for the location of hatcheries and salmon farms.

Aquaculture license holders of marine finfish must operate to 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 Resources Act). A detailed Farm Management Plan (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 Nova Scotia's Department of Fisheries and Aquaculture to ensure compliance to the Aquaculture Management Regulations. KCS policies outlined in the FMP address priority objectives 1, 2, 4, and 6, as listed above, to reduce the potential impacts of salmon aquaculture on wild salmon populations. Points 3, 5, and 7 are beyond the control of KCS. The FMP, in part or in whole, will be made available upon request by DFA or other parties.

Section 8. 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 nine (9), aquaculture sites less than 15 km from the Rattling Beach site; two are marine finfish (Atlantic salmon), one is licensed for halibut (#1302), one for quahog (#1228), five for soft-shell clam (#1343, 1338, 1342, 1339, 1340) and one is for mixed species of sea/bay scallop, American Oyster, and European Oyster (#1042; Fig. 49, Table 15). The Atlantic salmon farms nearest to the site are both owned by KCS; however, only one (#1040) is operational.

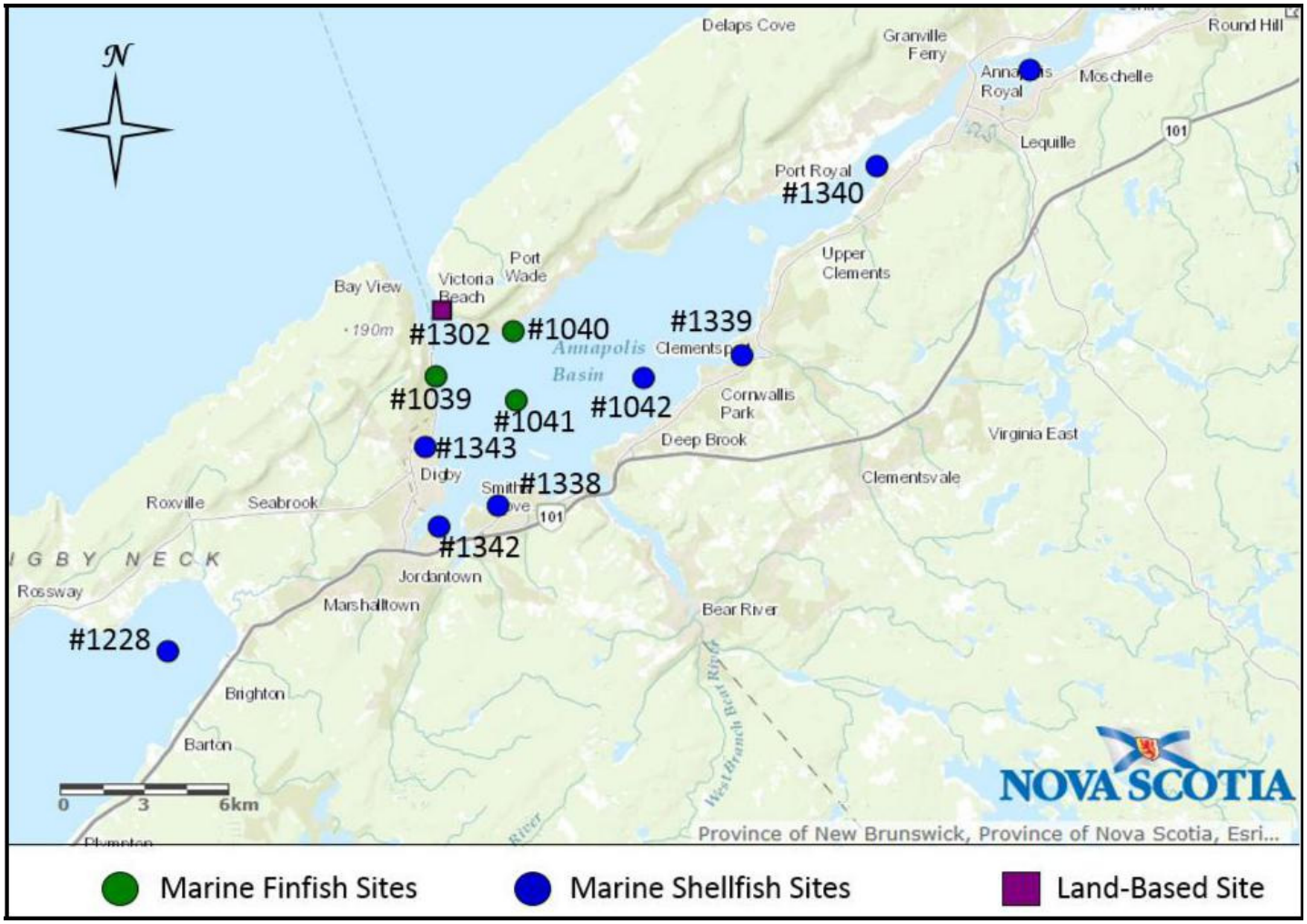

Figure 54. Marine Chart Showing Other Aquaculture Operations
Note: Figure was sourced from the Department of Fisheries and Aquaculture (2016)

Table 17. Distance from Rattling Beach #1039 to nearby finfish and shellfish aquaculture sites

Site #	Distance to Rattling Beach (km)	Species	Owner
1302	2.2	Halibut	Pronet Micro Systems Inc.
1343	2.2	Soft-shelled clam	Innovative Fisheries Products
1041	2.7	Atlantic salmon	Kelly Cove Salmon
1040	2.8	Atlantic salmon	Kelly Cove Salmon
1042	3.9	Sea scallop, bay scallop; American oyster; European oyster	Innovative Fisheries Products
1338	5.9	Soft-shell clam	Innovative Fisheries Products
1342	6.6	Soft-shell clam	Innovative Fisheries Products
1339	7.5	Soft-shell clam	Innovative Fisheries Products
1340	11.1	Soft-shell clam	Innovative Fisheries Products
1228	14.2	Quahog	Innovative Fisheries Products

8.2 Interactions with Other Aquaculture Operations

This site is not part of an Aquaculture Management Area (AMA) for the purpose of managing the health of aquatic animals in the area as we are the sole Atlantic salmon producer in the Production Area.

We do however, operate a company managed stocking/harvesting plan that follows similar principles to an AMA.

8.2.1 Environmental Conditions

The water within Annapolis Basin is continually circulated and flushed as a result of a significant tidal range. Based on Canadian Hydrographic Service Tide Tables (Fisheries and Oceans Canada 2017f) for Digby (Station #325), the predicted highest high tide for 2017 is 9.4 m and the lowest low tide is -0.4 m, giving a maximum tidal range of 9.8 m. Typically, the tidal range is between 6 and 9 m.

Collection of local current speed and direction data throughout the water column was carried out between June 29 and August 4, 2016 using a 600-kHz Acoustic Doppler Current Profiler (ADCP) deployed by NSDFA. Most of the water flowed towards the NNE. Recorded current speeds demonstrated 18 to 24 cm/s near the seafloor, 24 to 36 cm/s mid-water

column and the greatest currents at the surface. With significant currents and flow directed towards the mouth of the basin, a significant interaction with other aquaculture operations as a result of onsite activity, is unlikely.

Annual environmental monitoring of Rattling Beach is conducted in accordance to the Department of Fisheries and Aquaculture's Standard Operating Procedures for Environmental Monitoring of marine Aquaculture Sites in Nova Scotia. Rattling Beach has returned Oxic classifications for the last two production cycles, indicating this site is stocked and managed sustainably.

8.2.2 Boat Traffic and Wharves

Site #1039 is located on the western side of the Annapolis Basin, near the mouth of the Digby Gut channel. All the aquaculture operations in Annapolis Basin, including Rattling Beach, are situated near the shore. Farm gear and structures, when marked in accordance to NPP approval, do not pose a navigation risk or impedance.

The Port of Digby Fishermen's Wharf accommodates community vessels including fishing vessels as well as working vessels Kelly Cove Salmon Ltd. sites, Victoria Beach (#1040) and Rattling Beach (#1039) (Figure 55).

Within the production cycle, disease, including parasites are spread by the movement of live fish, both farmed and wild, the movement of dead fish, human or animal movement between farms, equipment transfers and those naturally occurring in the water column are minimized through the following good management biosecurity practices. Footbaths are to be used upon entering and exiting the site vessel. All equipment will be disinfected prior to being introduced to the Rattling Beach site. Site crew are aware of internal biosecurity protocols regarding staff and equipment movement from site to site and from public locations to the site.

Visitors to the Rattling Beach site are welcomed and are expected to follow basic 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 was not previously informed. If a certain site has a fish health concern, visitors will not be allowed to visit the site – unless granted permission by Saltwater Management or the Fish Health Manager. All visitors must sign the log book. Surprise 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 surprise inspections or 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 to the site and while on site and the use of footbaths and proper hygiene is mandatory.

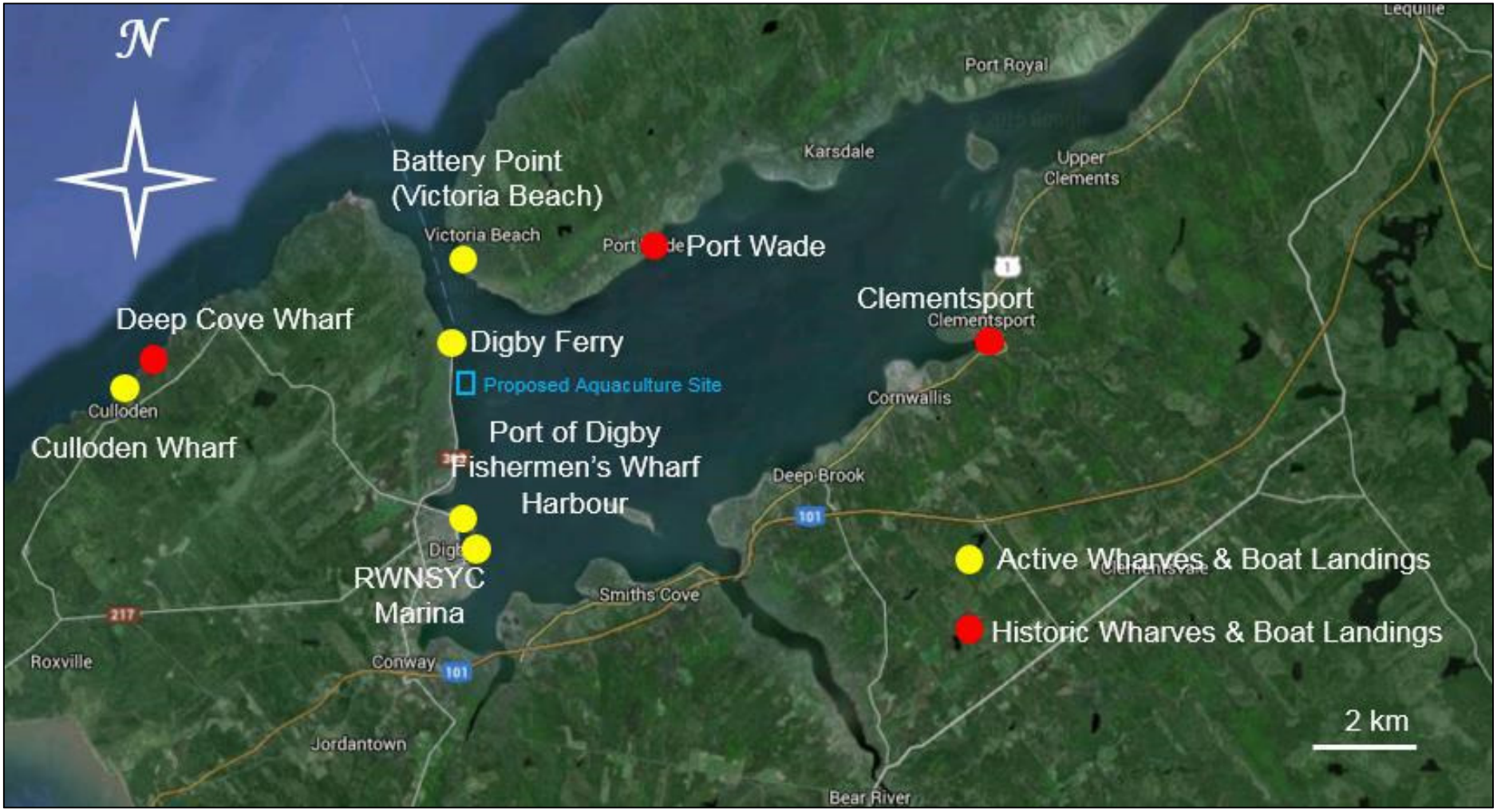

Figure 55. Current and Historic Wharves and Boat Landings Near Rattling Beach Aquaculture Site

8.2.3 Shellfish and Atlantic Salmon Aquaculture

A total of seven (7) shellfish and two (2) active Atlantic salmon net pen aquaculture sites are present in the Annapolis Basin (Figure 1). There are no direct interactions between shellfish and Atlantic salmon aquaculture, specifically related to disease transfer.

List of Contacts

Contact Name	Affiliation	E-mail	Phone	Date of Contact	Reason for Contact
Justin Huston	NSDFA	hustonje@gov.ns.ca	(902) 424-2996	May 11, 2007	Rockweed harvesting
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Carl MacDonald	DFO	Carl.MacDonald@dfo-mpo.gc.ca	(902) 426-1488	Sep 28, 2011	Fisheries
[redacted]	Nova Scotia Federation of Anglers & Hunters	http://www.nsfah.ca/contact/	[redacted]	Oct 11, 2017	Recreational Fisheries
Colin O'Neil	DFO – Policy & Economics	Colin.ONeil@dfo-mpo.gc.ca	(902) 426-6296	Oct 18, 2016	Fisheries
Frank Quinn	DFO – Area Director	Frank.Quinn@dfo-mpo.gc.ca	(867) 393-6719	Oct 10, 2017	Aboriginal Fisheries
Wendy Vissers	NSDFA	Wendy.Vissers@novascotia.ca	(902) 526-3617	Oct 4, 2016	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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Appendices

Appendix A – Baseline Report

Baseline Assessment Report

Site #1039
Rattling Beach

Annapolis Basin
Digby County
Nova Scotia

October 20, 2016

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October 20, 2016

SIMCorp File #SW2016-059

Mr. Jeff Nickerson
Kelly Cove Salmon Ltd.
P.O. Box 1546
Shelburne, NS
B0T 1W0

Dear Mr. Nickerson,

Reference: **Rattling Beach (#1039) Baseline Report**

Please find enclosed the above noted report and attached video footage for the proposed boundary amendment of site #1039 at Annapolis Basin, N.S.

If you have any questions or comments on the above noted report please do not hesitate to contact me at 902-492-7865.

Sincerely,

[redacted]
Marine Environmental Biologist
Sweeney International Marine Corp.

cc: Jessica Feindel (NSDFA)
[redacted] (KCS)
[redacted] (SIMCorp)

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1.0 INTRODUCTION

The following baseline report and attached video have been prepared by SIMCorp for Kelly Cove Salmon Ltd. to summarize the findings of the formal baseline environmental survey required as part of the application for a boundary amendment of Rattling Beach (#1039). Marine aquaculture site #1039 is located on the western shore of the Annapolis Basin, near the mouth of Digby Gut channel in Digby County (Fig. 1). This area is shown on CHS chart #4396. The current lease has dimensions of approximately 160 x 460 x 210 x 460 m with an area of approximately 8.74 ha (Table 1).

Figure 1 – Current Rattling Beach (#1039) location in Annapolis Basin

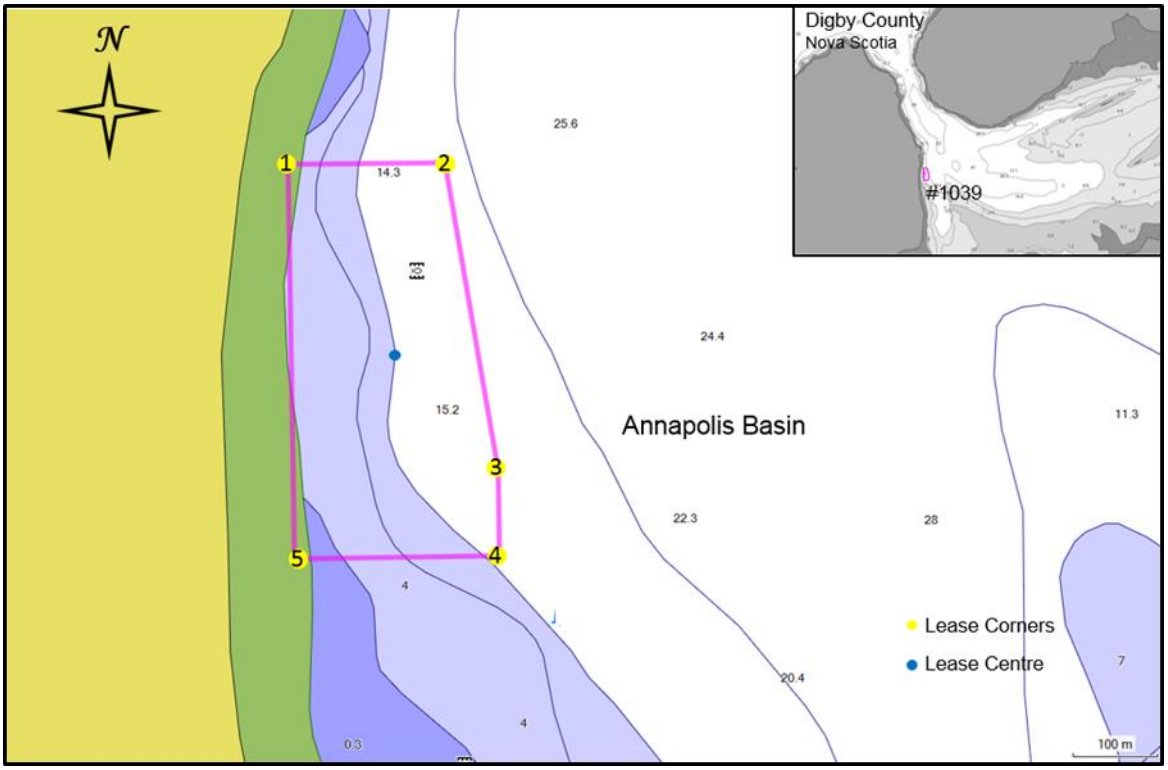

Table 1 – Current boundary and center coordinates of Rattling Beach (#1039)

SITE COORDINATES (NAD 83)		
Corner	**Latitude**	**Longitude**
1	44º 39’ 20.34”	65º 45’ 27.36”
2	44º 39’ 20.40”	65º 45’ 20.10”
3	44º 39’ 08.76”	65º 45’ 17.64”
4	44º 39’ 05.52”	65º 45’ 17.58”
5	44º 39’ 05.40”	65º 45’ 27.06”
Site Centre	44º 39’ 12.68”	65º 45’ 22.68”

The proposed boundary amendment extends the lease boundaries to accommodate all below surface gear. The dimensions of the proposed lease are approximately 140 x 180 x 725 x 590 x 260 m with an area of approximately 24.01 ha (Fig. 2, Table 2).

Figure 2 – Proposed boundary location for Rattling Beach (#1039)

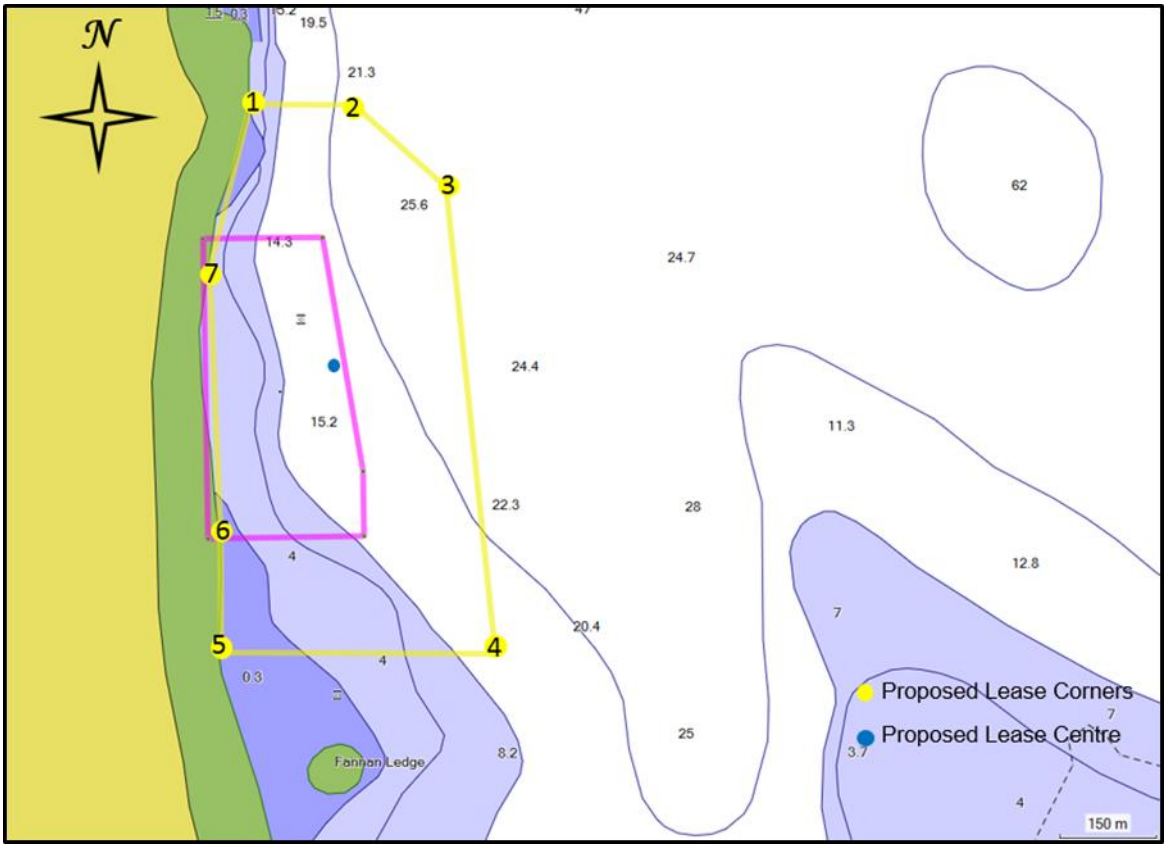

Table 2 – Proposed boundary and center coordinates of Rattling Beach (#1039)

SITE COORDINATES (NAD 83)		
Corner	**Latitude**	**Longitude**
1	44° 39’ 27.0”	65° 45’ 24.5”
2	44° 39’ 27.0”	65° 45’ 18.2”
3	44° 39’ 22.9”	65° 45’ 12.6”
4	44° 38’ 59.6”	65° 45’ 09.7”
5	44° 38’ 59.7”	65° 45’ 26.3”
6	44° 39’ 05.8”	65° 45’ 26.3”
7	44° 39’ 18.8”	65° 45’ 27.0”
Approximate Site Center	44° 39’ 13.8”	65° 45’ 19.2”

Benthic field data contained within this report were collected by SIMCorp Field Supervisor and Marine Environmental Biologist [redacted], B.Sc. and Marine Environmental Biologists [redacted] B.Sc. and [redacted] B.Sc., and Technician [redacted] on July 20, 2016. High tides were at 12:40 (7.7 m), low tides were at 18:49 (1.2 m).

Current speed and direction data presented in this document were collected with the use of an Acoustic Doppler Current Profiler (ADCP), deployed by Nova Scotia Department of Fisheries and Aquaculture (NSDFA) at site #1039 from June 29 to August 4, 2016 (37 days).

2.0 CONTACT INFORMATION

Proponent:

Company Name:	Kelly Cove Salmon Ltd.
Principal Contact:	Mr. Jeff Nickerson
Mailing Address:	P.O. Box 1546 Shelburne, Nova Scotia B0T 1W0
E-mail:	jnickerson@cookeaqua.com

Project Management:

Company Name:	Sweeney International Marine Corp.
Principal Contact:	[redacted]
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Facsimile:	(506) 467-9503
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3.0 METHODOLOGY

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, from a combination of Appendix 2 of the New Brunswick Department of Agriculture, Aquaculture and Fisheries (NB DAAF) *Bay of Fundy Marine Aquaculture Site Allocation Application Guide* (SOPs) and Appendix B of the Nova Scotia Department of Fisheries and Aquaculture draft *Standard Operating Procedures for the Environmental Monitoring of Marine Aquaculture in Nova Scotia* dated June 2016.

3.1 Sampling Locations

A total of nine stations were investigated for the purpose of this baseline survey (Fig. 3). Currently, the site is stocked, therefore only the seven corners of the proposed boundaries and two reference stations were sampled. The sampling station coordinates

are present in Table 3; sampling at the approximate site center was omitted because gear is present on site.

Reference stations previously sampled for the site (ANB-01 and ANB-05) are approximately 374 and 100 m from the current lease boundaries (Table 4). Extending the lease boundaries to incorporate all aquaculture site specific gear, above and below the waterline, will decrease the distance of the reference station ANB-01 to 155 m. ANB-05 will be within the proposed boundary; therefore, a new reference station is required. It is proposed ANB-A be located at N44˚ 38' 56.5" W65 45' 13.5", which is approximately 105 m south of the lease boundary. The recommended locations of the reference stations to accommodate the proposed boundaries are illustrated in Figure 3 and Figure 4.

An ADCP was deployed by Nova Scotia's Department of Fisheries and Aquaculture at the coordinate N44º 39' 03.3" W65º 45' 14.8" in approximately 14 m of water on June 29 to August 4. The current meter could not be deployed at the center of the proposed site due to the presence of gear and fish. Therefore, the location between the current and proposed site boundaries was chosen which is greater than 100 m from the nearest aquaculture site gear to avoid distortion of data (Fig. 4).

Figure 3 – Baseline sampling stations at Rattling Beach (#1039)

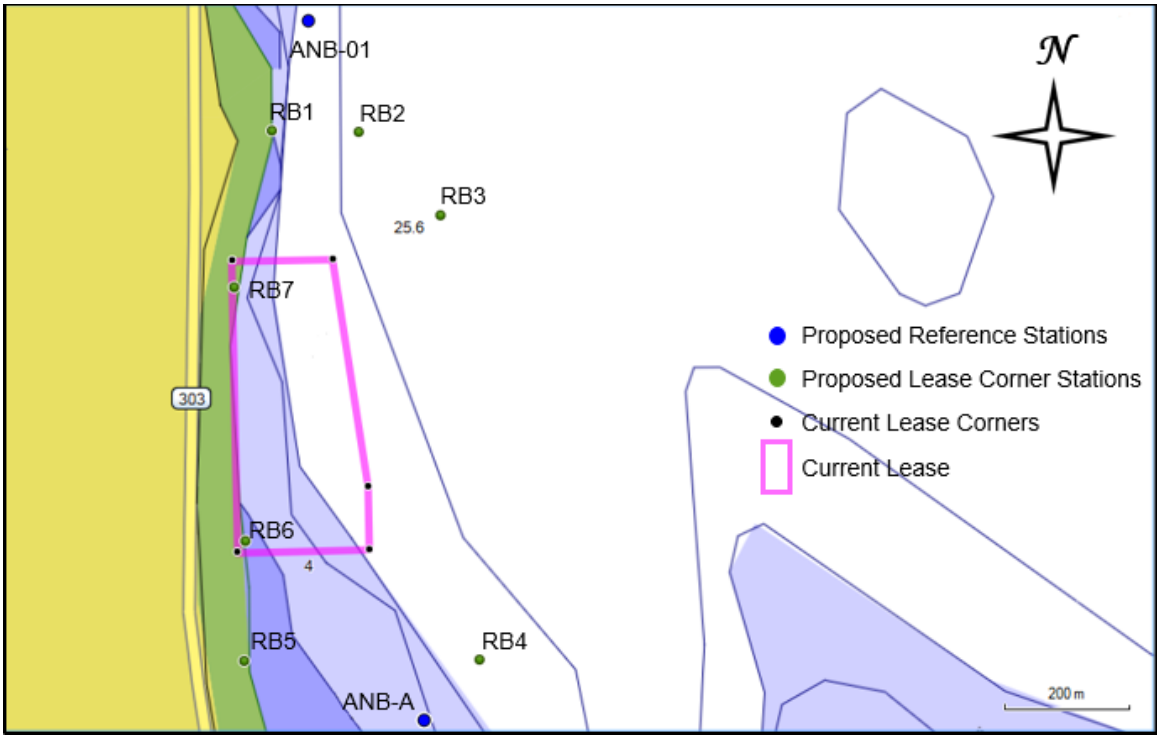


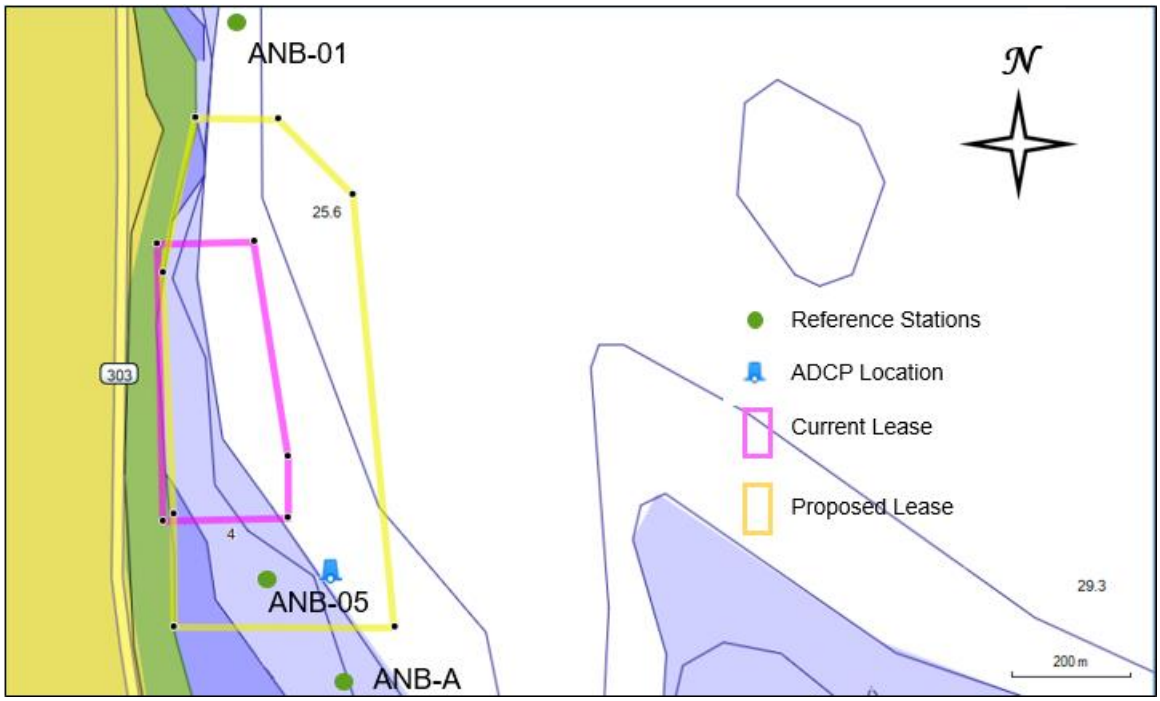
Table 3 - Baseline Sampling Coordinates at Site #1039, Annapolis Basin for Boundary Amendments

SITE COORDINATES (NAD 83)			
Station	**Location**	**Latitude**	**Longitude**
RB1	NW corner	44° 39' 27.0"	65° 45' 24.5"
RB2	NE corner	44° 39' 27.0"	65° 45' 24.5"
RB3	ENE corner	44° 39' 27.0"	65° 45' 18.2"
RB4	SE corner	44° 39' 22.9"	65° 45' 12.6"
RB5	ESE corner	44° 38' 59.6"	65° 45' 09.7"
RB6	SE corner	44° 38' 59.7"	65° 45' 26.3"
RB7	SSE corner	44° 39' 05.8"	65° 45' 26.3"
ANB-01	Upstream Reference	44° 39' 18.8"	65° 45' 27.0"
ANB-A	Downstream Reference	44° 39' 13.8"	65° 45' 19.2"

Table 4 – Reference station coordinates for current and proposed lease boundaries at Rattling Beach (#1039)

REFERENCE STATION COORDINATES (NAD 83)			
Station	**Latitude**	**Longitude**	**Lease Boundary**
ANB-01	44° 39' 32.5"	65° 45' 21.2"	Current and Proposed
ANB-05	44° 39' 02.3"	65° 45' 19.7"	Current
ANB - A	44° 39' 56.5"	65° 45' 13.5"	Proposed

Figure 4 – Proposed reference station locations for new lease boundaries and ADCP deployment location at Rattling Beach (#1039)



3.2 Sample Collection

A standard Ponar grab was used to collect sediment samples from all of the baseline stations; however, many of the samples could not be collected as the stations were located on hard bottom. 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 D). Notes were taken 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 analysed. Syringes were labelled and placed in a plastic cooler with ice. Samples were kept cool until analysed for redox, sulphide, porosity, and percent organic matter. The remaining top 2-cm of sediment was placed in 2-oz Whirl-Paks for use in grain size analysis.

Sample temperatures were recorded using HOBO ProV2 temperature loggers. Temperatures recorded from inside the sample cooler are presented graphically in Appendix F.

All reasonable efforts were made to conform to the SOPs, maintain storage temperature of samples, to collect samples that were as undisturbed as possible and to preserve the

integrity of the samples until analysed. However, site #1039 is characterized by coarse sediments, mainly of cobble stones, pebbles, and moderately packed medium-to-fine sand, gravel, and mud. Retrieving three undisturbed, soft sediment samples with minimal leakage from the grab and at least 5 cm sediment depth was not possible from at any of the stations. Samples were collected from both of the reference stations (ANB -01 and A) as well as three corner stations (Corners #2, 3, & 4) for redox, sulphide, porosity, percent organic matter, and grain size analyses. These samples came from grabs which failed to meet one or more of the criteria; achieving 5 cm of sediment penetration was not always possible and grabs were often leaking due to catching rocks and shells (Appendix G).

3.3 Video Surveillance

Video footage was recorded using a Seaviewer Underwater Camera System, which was mounted perpendicular with the seafloor in an aluminum frame; i-Torches were used for light. A 0.25-m^2 quadrat was visible in the field of view as a size reference. The video camera frame includes a scale bar demarcated with 5-cm segments. 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 "whiteboard" showing collection location information, followed by a 360° pan of the area at the sampling station and then 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 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 E. All on-site visual assessments have been recorded in the field notes and video assessments supplement the field data included in this report. Seafloor characteristics for each station are presented in Tables 6 - 14.

3.4 Bathymetric Profiling

Bathymetric profiling of the existing lease area was carried out on October 5, 2016 using a Hummingbird system Helix 5 SI-GPS to record X, Y, and Z coordinates throughout the lease. The data gathered during the scanning was then compiled and a three dimensional surface map and a two dimensional contour diagram produced by interpolation. Scanning of the Rattling Beach area began at the northern boundary of the proposed lease. Parallel transects were run the length of the 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.

4.0 SEDIMENT SAMPLE ANALYSIS AND DATA COLLECTION

4.1 Sediment Sample Analysis

All sediment samples were analysed within 72 hours of collection for redox potential and sulphide ion concentration (Table 15, Fig. 5). Temperatures were taken for each sample. 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 seen in Table 5. A copy of the laboratory data sheet for the redox and sulphide is presented in Appendix B.

Sediment samples from each station were sent to the SIMCorp Marine Benthic Sediments Laboratory for analysis of porosity, total organic content and grain size. The results of these analyses are presented in Table 16 and Appendix C.

Table 5 – 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 sulphur bacteria present	Patchy sulphur bacteria	Widespread bacterial mats
Macrofaunal Assemblage	Wide array of infauna and epifauna	Mixed group of mostly small infauna	Small infauna only
Sulfide, µM	**< 750 (A) 750 to 1500 (B)**	**1500 to 3000 (A) 3000 to 6000 (B)**	**> 6000**
Redox (Eh), mV	>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

4.2 Equipment and Calibrations

Redox measurements were taken using a combination meter (Fisher Accumet AP125) and probe (Orion Epoxy Sure-Flow Combination Redox/ORP Electrode), which was checked for electrical function just prior to and after use. Readings were taken according to the SOP protocols. Sulphide measurements were taken using a calibrated combination meter (Fisher Accumet AP125) and probe (Orion 96-16 Sure-Flow Combination Silver/Sulphide Electrode). Meter and sulphide probe calibration took place in accordance with SOP protocols at 09:55 on July 21, 2016. One probe was calibrated and used to analyse the samples. The calibration event resulted in a final slope range between -27 and -33 mV (-30.0 mV) the calibration curve was between -25 to -30 mV [500 to 5000 µM read: -25.6 mV, 1000 to 10000 µM read: -25.1 mV]. The results of the five-point, factor-calibration are located in Appendix A. The calibration temperature was 20.8°C.

4.3 ADCP Deployment

Measurements of the current speed and direction were collected at Rattling Beach using a 600 kHz Teledyne RDI Workhorse Sentinel ADCP unit deployed by the Nova Scotia Department of Fisheries and Aquaculture (Fig. 4). The current meter could not be deployed at the center of the proposed site due to the presence of gear and fish. Therefore, a location between the current and proposed site boundaries was chosen, greater than 100 m from the nearest aquaculture site gear to avoid distortion of data. This meter was deployed at site #1039 for a period of approximately 37 days between June 29 and August 4, 2016. The ADCP was configured to record the current speed and direction of the water column in one (1) meter bins, collecting a profile every fifteen (15) minutes. Once the unit was recovered, the data were downloaded and analysed 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 H and raw current speed and direction data is included in the supplementary material attached to this report (*RattlingBeach.xls*).

5.0 RESULTS AND OBSERVATIONS

The following are baseline sampling station benthic characteristics at proposed marine aquaculture lease #1039 in the order they were sampled.

Table 6 – ANB-A Benthic Log

Sampling Date:	July 20th, 2016
Water Body:	Annapolis Basin
Lease Name and Number:	Rattling Beach #1039
Water Temperature (°C)	14.4 °C
Wind Direction and Speed:	NW 15 knots shifting to SW 15-20 knots
Wave Action:	calm
Current Direction & Speed:	Strong SW->NE with the wind
Tide Schedule:	High: 12:40 Low: 18:49
Vessel:	Carolina Skiff

Lease # or Reference Site:	Reference	**Station Comments:**
Video Start Time:	10:36 AM	
Recorder Name(s):		
Sample Collector's Name(s)	**Sediment Sampler:** **Syringe Sampler:**	**Video Notes:**
Sampling Station ID:	ANB-A	Moderately easily disturbed, fine, brown sand & pebbles; scallop shells; rock crabs; macroalgae
Dist. and Dir. from Waypoint:	8 m @ 330°	
Sampling Coordinates:	N44 38.946 W65 45.228	**Benthic Descriptor Key:**
Station Depth (m):	11	[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.* Eelgrass, 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) Standard Ponar Grab	0.28	Y	ANB - A (1)	Brown mud, sand, gravel	None	4	Scallop shell
Benthic Replicate 2 (10 mL) Standard Ponar Grab	0.23	Y	ANB - A (2)	Brown mud, sand, gravel	None	1	Scallop shell
Benthic Replicate 3 (10 mL) Standard Ponar Grab	0.28	Y	ANB - A (3)	Brown mud, sand, gravel	None	1	Whelks, fish bone

Table 7 – Corner #4 Benthic Log

Lease # or Reference Site:	Corner						**Station Comments:**
Video Start Time:	11:28 AM						
Recorder Name(s):	[redacted]						
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]						**Video Notes:**
Sampling Station ID:	Corner #4						Moderately easily disturbed, brown sand, mud, pebbles, boulders & shell hash; rock crabs; scallop shells; macroalgae
Dist. and Dir. from Waypoint:	8 m @ 3.2 °						
Sampling Coordinates:	N44 38. 9977 W65 45.1614						**Benthic Descriptor Key:**
Station Depth (m):	20						[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:	3						[3] *e.g.* Eelgrass, 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) Standard Ponar Grab	0.28	Y	RB4 (1)	Brown mud, sand, pebbles, shell hash	None	2	Shell, whelk, barnacles
Benthic Replicate 2 (10 mL) Standard Ponar Grab	0.28	Y	RB4 (2)	Brown mud, sand, pebbles, shell hash	None	5	Whelks
Benthic Replicate 3 (10 mL) Standard Ponar Grab	0.27	Y	RB4 (3)	Brown mud, sand, pebbles, shell hash	None	3	Whelks, barnacles

Table 8 – Corner #5 Benthic Log

Lease # or Reference Site:	Corner	**Station Comments:** No sediment samples were able to be collected.
Video Start Time:	12:10 PM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:**
Sampling Station ID:	Corner #5	Moderately easily disturbed, brown mud, sand & boulders; kelp; algae;
Dist. and Dir. from Waypoint:	7 m @ 310°	macroalgae; barnacles; rock crabs; other crab species (possibly green crabs)
Sampling Coordinates:	N44 38.9975 W64 45.4425	**Benthic Descriptor Key:**
Station Depth (m):	7.4	[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.* Eelgrass, 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) Standard Ponar Grab		N					
Benthic Replicate 2 (10 mL) Standard Ponar Grab		N					
Benthic Replicate 3 (10 mL) Standard Ponar Grab		N					

Table 9 – Corner #6 Benthic Log

Lease # or Reference Site:	Corner	**Station Comments:** No sediment samples were able to be collected.
Video Start Time:	12:31 PM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:**
Sampling Station ID:	Corner #6	Moderately easily disturbed, light-brown sand, silt & boulders; kelp; red algae; periwinkles; sea star
Dist. and Dir. from Waypoint:	6 m @ 336°	
Sampling Coordinates:	N44 39.0996 W65 45.4401	**Benthic Descriptor Key:**
Station Depth (m):	7	[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.* Eelgrass, 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) Standard Ponar Grab		N					
Benthic Replicate 2 (10 mL) Standard Ponar Grab		N					
Benthic Replicate 3 (10 mL) Standard Ponar Grab		N					

Table 10 – Corner #7 Benthic Log

Lease # or Reference Site:	Corner	**Station Comments:** No sediment samples were able to be collected.
Video Start Time:	12:54 PM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:**
Sampling Station ID:	Corner #7	Mostly boulders covered in barnacles and crustose algae; small
Dist. and Dir. from Waypoint:	5 m @ 335	patches of brown sand and mud; rockweed, green crab
Sampling Coordinates:	N44 39.316 W65 45.452	**Benthic Descriptor Key:**
Station Depth (m):	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.* Eelgrass, 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) Standard Ponar Grab		N					
Benthic Replicate 2 (10 mL) Standard Ponar Grab		N					
Benthic Replicate 3 (10 mL) Standard Ponar Grab		N					

Table 11 – Corner #1 Benthic Log

Lease # or Reference Site:	Corner	**Station Comments:** No sediment samples were able to be collected.
Video Start Time:	1:11 PM	
Recorder Name(s):		
Sample Collector's Name(s)	**Sediment Sampler:** **Syringe Sampler:**	**Video Notes:**
Sampling Station ID:	Corner #1	Mostly boulders covered in barnacles; some light brown mud with sand patches; red algae and kelp
Dist. and Dir. from Waypoint:	4 m @ 128°	
Sampling Coordinates:	N44 39.4502 W65 45.4058	**Benthic Descriptor Key:**
Station Depth (m):	6.7	[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) Standard Ponar Grab		N					
Benthic Replicate 2 (10 mL) Standard Ponar Grab		N					
Benthic Replicate 3 (10 mL) Standard Ponar Grab		N					

Table 12 – ANB-01 Benthic Log

Table 13 – Corner #2 Benthic Log

Lease # or Reference Site:	Corner	**Station Comments:**
Video Start Time:	2:10 PM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:**
Sampling Station ID:	Corner #2	Moderately to easily disturbed brown mud, sand & cobble; lots of
Dist. and Dir. from Waypoint:	4 m @ 153°	shell debris and scallop shells; some *Flustra*
Sampling Coordinates:	N44 39.4480 W65 45.3020	**Benthic Descriptor Key:**
Station Depth (m):	27	[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.* Eelgrass, 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) Standard Ponar Grab	0.3	Y	RB2 (1)	Brown mud, sand, rocks	Moderate	4.5	Rockweed, *Flustra* , quahog, whelk
Benthic Replicate 2 (10 mL) Standard Ponar Grab	0.28	Y	RB2 (2)	Brown mud, sand, pebbles, cobble, gravel	None	3	Quahog, scallop shell, amphipods
Benthic Replicate 3 (10 mL) Standard Ponar Grab	0.29	Y	RB2 (3)	Brown mud, sand, pebbles, rocks	None	1	Shells, whelks, worm tubes, barnacles

Table 14 – Corner #3 Benthic Log

Lease # or Reference Site:	Corner	**Station Comments:** 1st video was scrapped due to the camera shifting in the frame. Lots of strong current affecting this station at the time of sampling.
Video Start Time:	2:59 PM	
Recorder Name(s):	[redacted]	
Sample Collector's Name(s)	**Sediment Sampler:** [redacted] **Syringe Sampler:** [redacted]	**Video Notes:** Moderately easily disturbed mud, sand & cobble; shell debris; scallop shells; *Flustra;* rock crab; hermit crab
Sampling Station ID:	Corner #3	
Dist. and Dir. from Waypoint:	12 m @ 145°	
Sampling Coordinates:	N44 39.3764 W65 45.2049	**Benthic Descriptor Key:**
Station Depth (m):	31	[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:	3	[3] *e.g.* Eelgrass, 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) Standard Ponar Grab	0.27	Y	RB3 (1)	Brown mud, sand	None	1	Shells, whelks
Benthic Replicate 2 (10 mL) Standard Ponar Grab	0.28	Y	RB3 (2)	Brown mud, sand, shell debris, rocks	None	5	Whelks
Benthic Replicate 3 (10 mL) Standard Ponar Grab	0.29	Y	RB3 (3)	Brown mud, sand, gravel, shell debris	None	2	Whelks

Table 15 – Redox potential and sulphide ion concentration for samples collected at proposed marine aquaculture lease #1039

Site #1039 – Rattling Beach

Sample Collection: July 20, 2016 10:20 - 15:30
Sample Analysis: Redox: July 21 2016 10:05 - 10:55
Sulphides: July 21, 2016 10:10 - 10:55

Sample I.D.		Core Sample Temp	Redox	Redox	Sulphide	
Station	ID #	°C	mV	mV$_{NHE}$	µM	mV
ANB-01	1	8.9	11.6	226.7	313	-869.9
	2	10.5	-209.0	4.5	193	-864.2
	3	10.5	-75.8	137.7	467	-875.1
Means		10.0	-91.1	**123.0**	**324**	-869.7
ANB-A	1	8.2	-15.8	200.0	25	-837.1
	2	7.5	70.0	286.5	58	-848.1
	3	10.8	55.0	268.2	55	-847.2
Means		8.8	36.4	**251.6**	**46**	-844.1
Corner #1	1	NS	NS	NS	NS	NS
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		N/A	N/A	N/A	N/A	N/A
Corner #2	1	8.8	-35.8	179.4	343	-871.0
	2	12.0	-36.5	175.5	382	-872.4
	3	10.4	-119.6	94.0	292	-869.2
Means		10.4	-64.0	**149.6**	**339**	-870.9
Corner #3	1	8.2	-109.7	106.1	34	-840.8
	2	8.2	-66.9	148.9	19	-833.2
	3	9.9	-11.2	202.9	51	-846.2
Means		8.8	-62.6	**152.6**	**35**	-840.1
Corner #4	1	10.0	-125.4	88.6	29	-838.9
	2	8.0	-112.1	103.9	117	-857.0
	3	10.2	46.3	260.1	23	-835.5
Means		9.4	-63.7	**150.9**	**56**	-843.8
Corner #5	1	NS	NS	NS	NS	NS
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		N/A	N/A	N/A	N/A	N/A
Corner #6	1	NS	NS	NS	NS	NS
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		N/A	N/A	N/A	N/A	N/A
Corner #7	1	NS	NS	NS	NS	NS
	2	NS	NS	NS	NS	NS
	3	NS	NS	NS	NS	NS
Means		N/A	N/A	N/A	N/A	N/A

Redox Test Solution
Prior to analysis: 220.8 mV @ 25°C
Post analysis: 220.8 mV @ 25°C

Sulphide Probe 1 Calibration:

Standard	mV
100	-855.3
500	-876.3
1000	-884.6
5000	-901.9
10000	-909.7

Sulphide Probe Calibration Temperatures: 20.8°C

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

Figure 5 – Mean redox potential and sulphide ion concentration at proposed marine aquaculture lease #1039

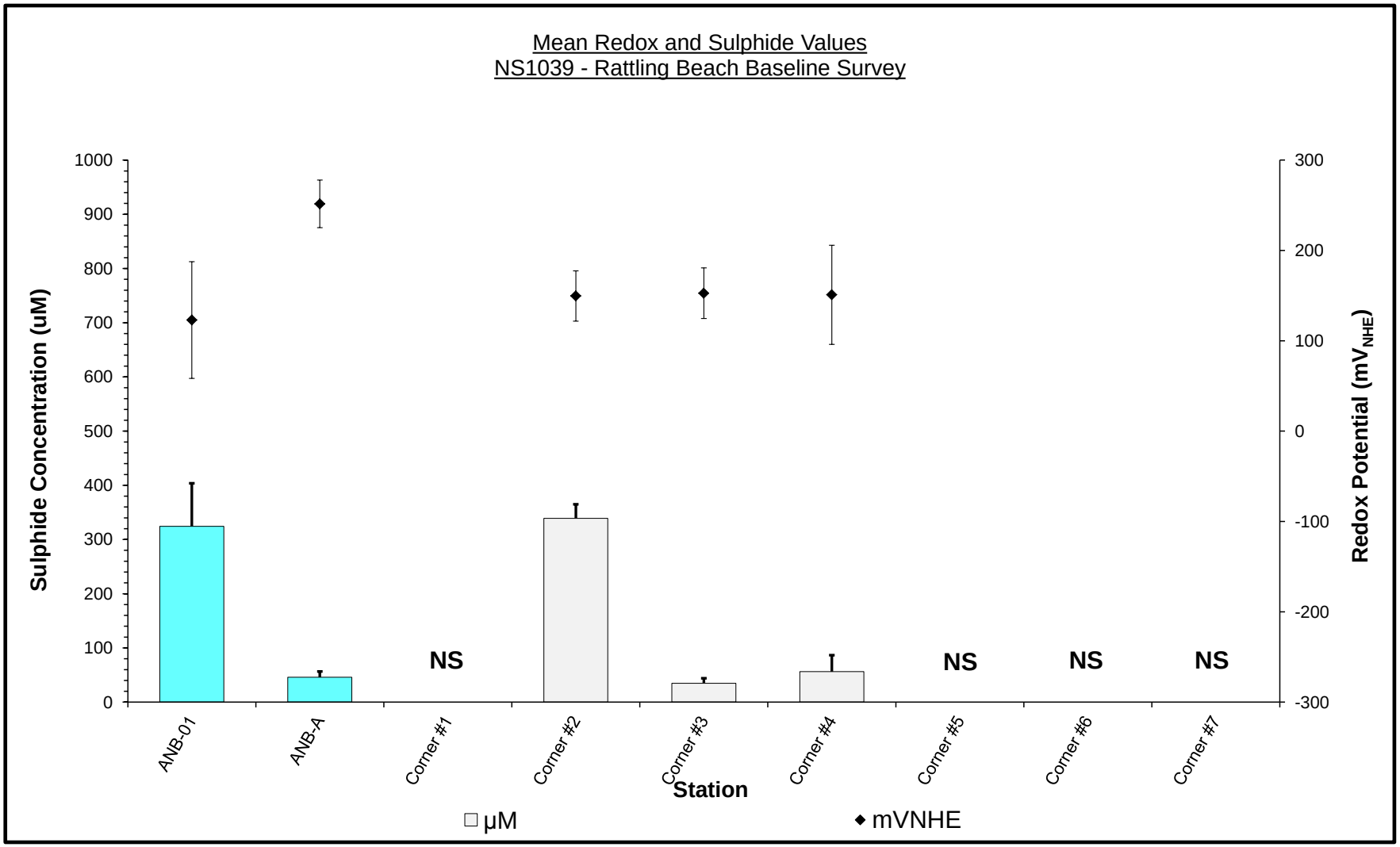


Table 16 – 2016 Baseline porosity and percent organic matter data for site #1039

Station	Sample #	Porosity Value (%)	% Organic Matter
ANB-01	1	30.16	2.29
ANB-01	2	25.83	1.99
ANB-01	3	44.22	4.34
ANB-A	1	21.40	1.65
ANB-A	2	20.01	1.27
ANB-A	3	17.84	1.55
Corner #1	1	NS	NS
Corner #1	2	NS	NS
Corner #1	3	NS	NS
Corner #2	1	17.61	1.39
Corner #2	2	15.59	1.94
Corner #2	3	19.18	1.45
Corner #3	1	12.61	0.77
Corner #3	2	21.22	1.36
Corner #3	3	18.67	1.16
Corner #4	1	18.16	1.31
Corner #4	2	25.01	1.78
Corner #4	3	26.12	1.88
Corner #5	1	NS	NS
Corner #5	2	NS	NS
Corner #5	3	NS	NS
Corner #6	1	NS	NS
Corner #6	2	NS	NS
Corner #6	3	NS	NS
Corner #7	1	NS	NS
Corner #7	2	NS	NS
Corner #7	3	NS	NS

Note: samples in turquoise are from reference stations

6.0 DISCUSSION

6.1 Benthic Observation and Analysis

Review of the video footage and grab observations collected from the proposed lease area in the Annapolis Basin reveal no evidence of waste feed, salmon faeces, or other organic deposits. The substrate beneath site #1039 consisted mainly of cobble stones and pebbles at the western most stations closer to shore where sediment was not retrievable by surface-deployed grab. The remaining stations, where sediment was obtained, consisted mostly of medium to fine sand, gravel, and mud that was moderately packed. Shell hash and scallop shells were also very common due to scallop shucking that occurs in the area. Grain size analysis results are presented in Appendix C and further support these observations.

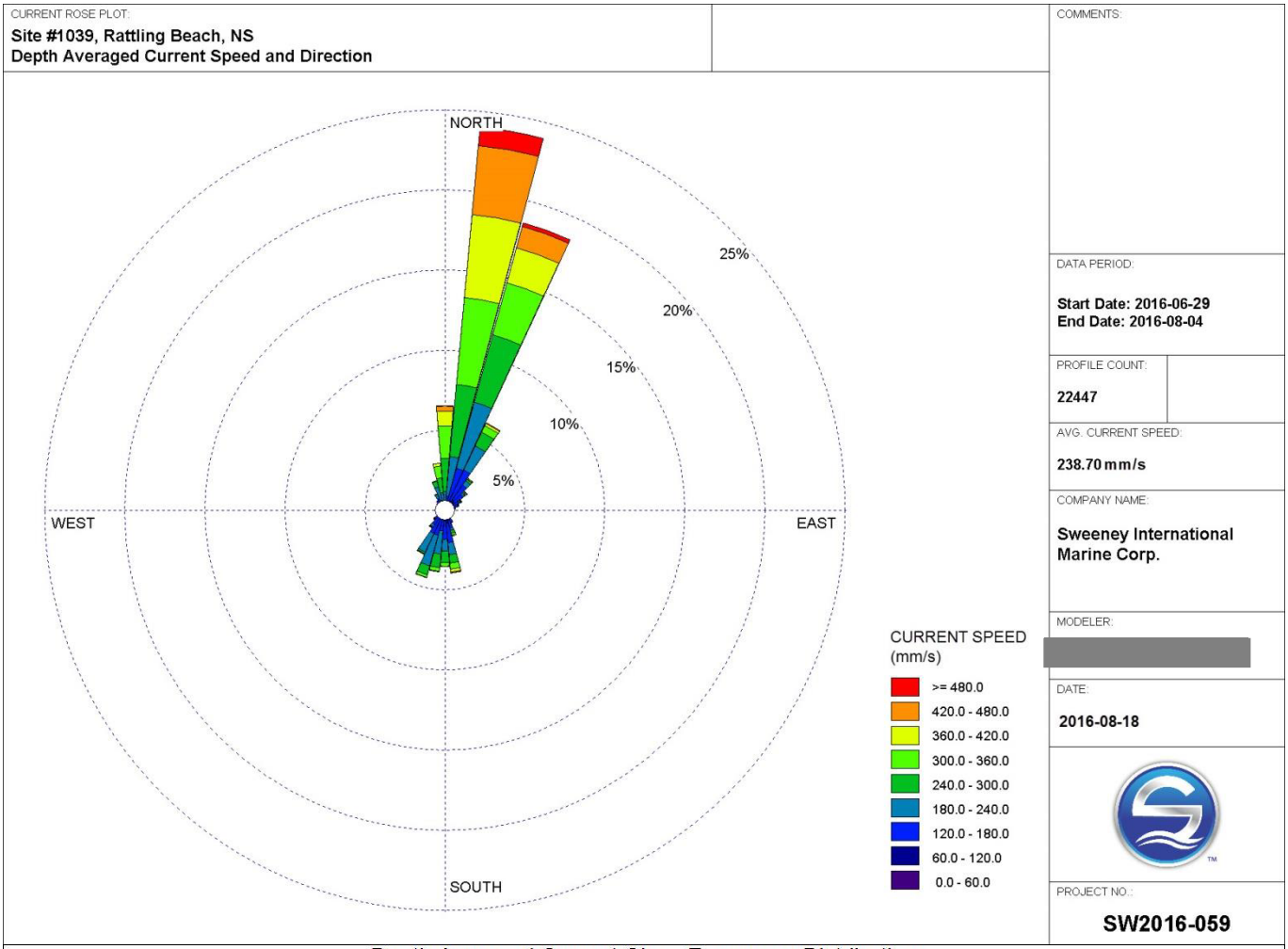
Flora and fauna observed in the video footage and in collected grab samples included rock crabs, green crabs, hermit crabs, whelks, barnacles, kelp, rockweed, sea stars, *Flustra,* periwinkles, and quahogs.

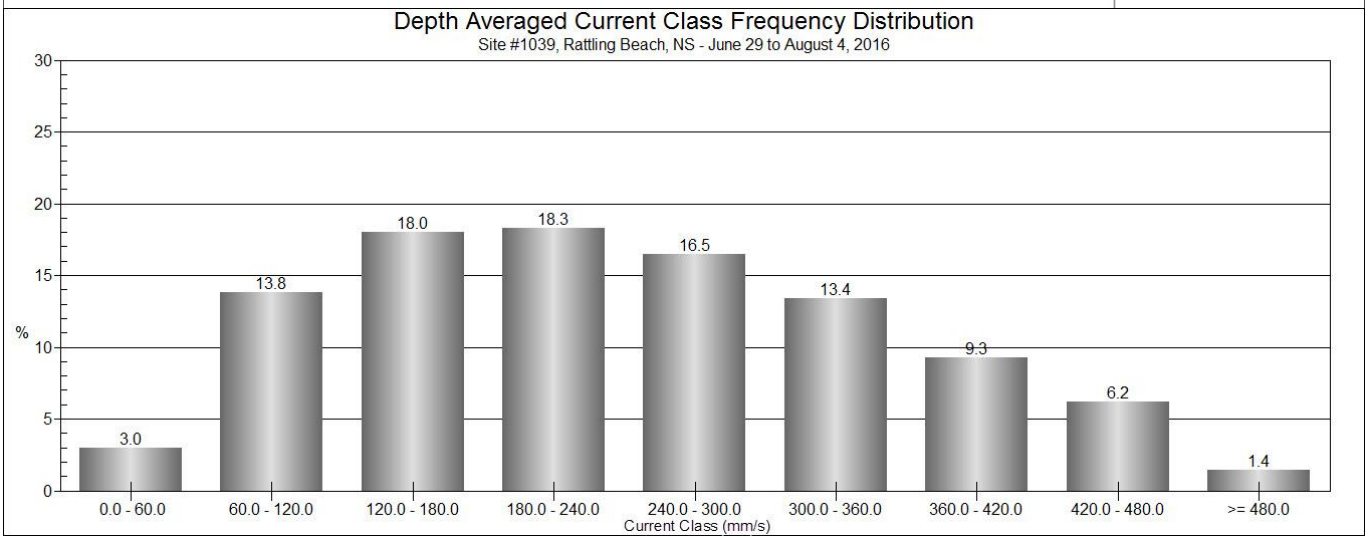
Analysis of the sulphide concentration and redox potential of the collected sediments revealed oxic conditions at every station where sediment could be collected. It should be noted that none of the grabs that yielded sediment met all of the necessary grab criteria; however, samples were collected when possible. The highest mean sulphide concentration obtained during this baseline assessment was 339 µM at the station located at corner #2 of the proposed lease.

6.2 Current Speed and Direction

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 are pointing to the east, then the current was flowing to the east). Analysis of the depth averaged current speed and direction at site #1039 shows that the majority of water flow experienced at this location flowed towards the north northeast, with approximately 42% of all recorded currents travelling between 5 and 25 degrees (NNE). The depth averaged current speed of all recorded profiles at this site was 23.87 cm/s (Fig. 6). In the depth profiles analysed, 3 – 10 m above the ocean bottom, the maximum recorded speed was 81.0 cm/s occurring 10 m from the bottom. The most frequently observed speeds were between 18 and 24 cm/s near the seafloor (25.3% at 3 m) and between 36 and 42 cm/s within the upper water column (22.2% at 10 m). The figures in Appendix H illustrate some of the trends in current flow throughout the water column at Rattling Beach. The direction of current flow remains relatively consistent throughout the water column, but the upper-most cell had a nearly unidirectional flow travelling between about 5 and 25 degrees. Data obtained from cells higher in the water column did not yield reliable data. Less than 75% of the data was present and was omitted from analysis. Average current speeds significantly varied with depth, with the cell nearest to the surface having the highest occurrence of currents greater than 80 cm/s.

Figure 6 – Average current speed and direction recorded at site #1039 within 3 – 10 m above the seafloor





6.3 Bathymetry

Side scan-based, depth profiling of lease #1039 was carried out on October 5, 2016 and the data gathered used to produce both a three-dimensional, surface map and a two-dimensional, contour diagram of the site. Figures 7 - 8 show the water depth within the survey area at the time of scanning, which ranged from approximately 2m at the northwest and southwest corners. The eastern side of site is in deeper water ranging from 20 m in the southeast corner to 36 m in the northeast corner.

It should be noted that the Z axis of the 3D surface map is not displayed at the same scale as that of the X and Y axes. This exaggerates relatively small and gradual depth changes over a large geographical area allowing for a more easily understood bathymetric profile. Depths in both the 2D and 3D contour diagrams have not been corrected for tidal influences, thus the soundings displayed represent the depths at the time of recording and not depth relative to chart datum.

Figure 7 – Interpolated 2D bathymetric profiles of site #1039 at Rattling Beach

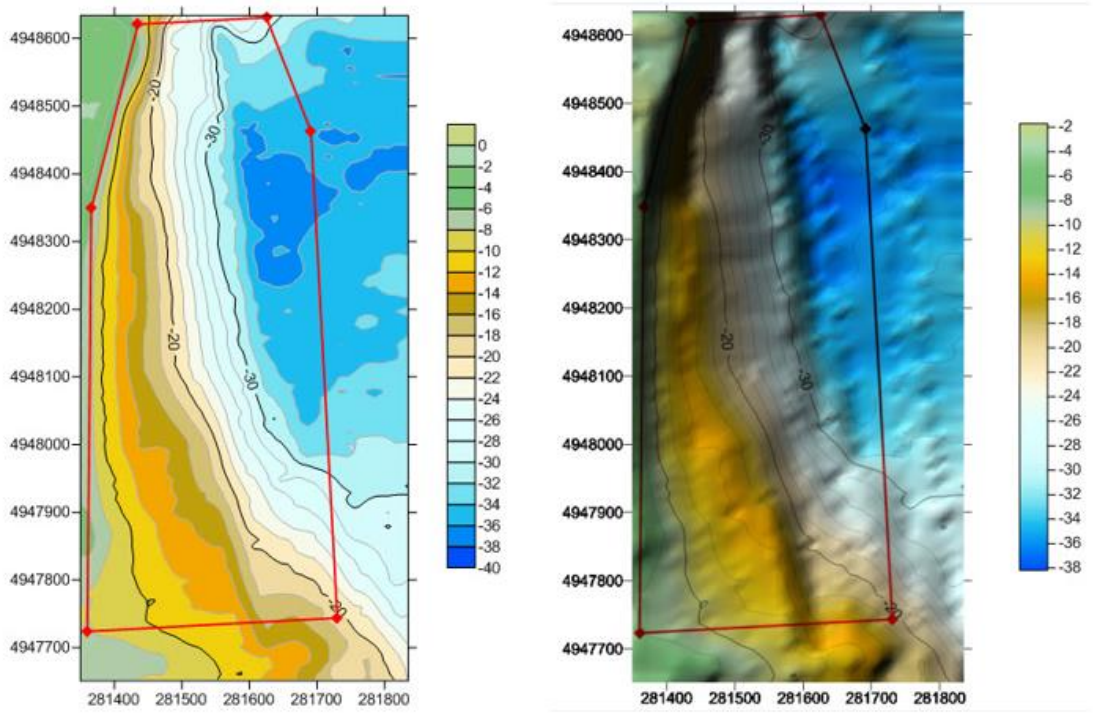
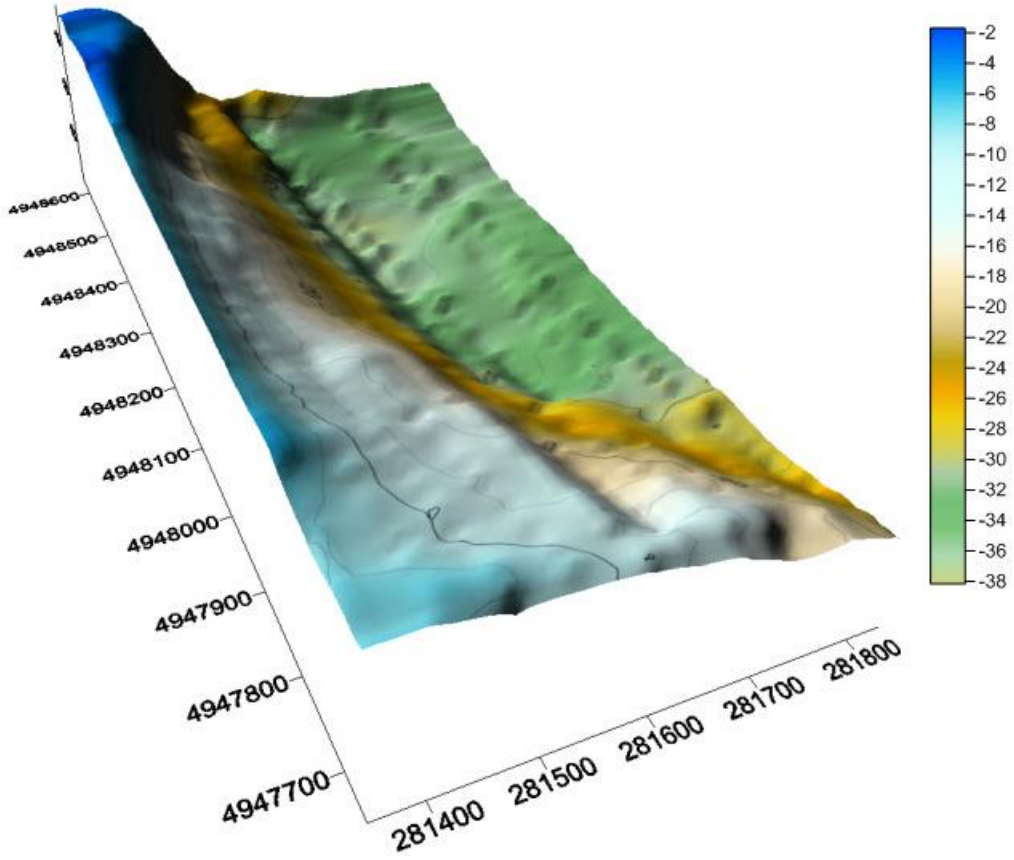


Figure 8 – Interpolated 3D surface map of site #1039 at Rattling Beach site



APPENDIX A
Sulphide Probe Calibration Certificate

NRC-IMB Research Facilities
1411 Oxford Street
Suite 367-368
Halifax, NS
B3H 3Z1
Tel: (902) 492-7865
(902) 492-0359
Fax: (902) 492-7734

Date: 21-Jul-16
Meter: 2007891
Sulfide Probe ID: RS1-12416

Project: SW2016-059 Rattling Beach (#1039)

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

Date calibration performed: 21-Jul-16
Time calibration completed: 9:55am
Calibration performed by: [redacted]

20(1)

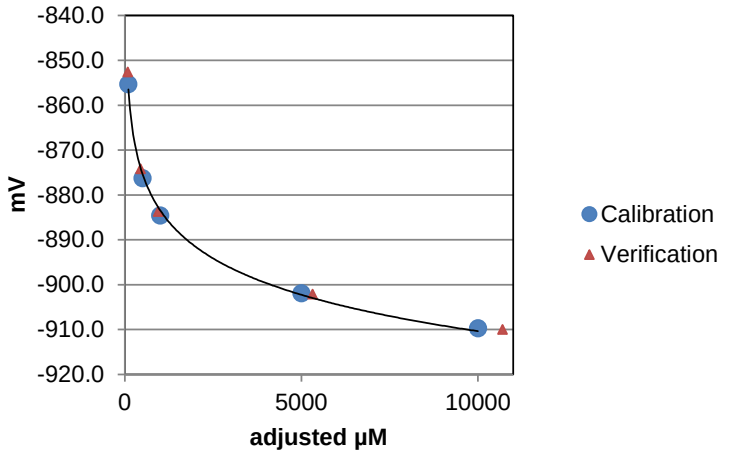
Expiration time: 12:55pm

Temperature calibration performed at: 20.8°C

Calibration -

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

10 µM (really 100 µM)	set at	-855.3 mV	read at	8.19 µM at	-852.6 mV
50 µM (really 500 µM)	set at	-876.3 mV	read at	44.2 µM at	-874.2 mV
100 µM (really 1000 µM)	set at	-884.6 mV	read at	94.3 µM at	-883.7 mV
500 µM (really 5 000 µM)	set at	-901.9 mV	read at	532 µM at	-902.1 mV
1 000 µM (really 10 000 µM)	set at	-909.7 mV	read at	1070 µM at	-910.0 mV



Final slope (meter) = -30.0 mV

10 fold slope (validation)

500 to 5 000 µM: -25.6 mV
1000 to 10 000 µM: -25.1 mV

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

Signed off by:

[redacted], M.Sc.
Senior Laboratory Manager

APPENDIX B
Redox and Sulphide Data Sheet

NRC-IMB Research Facilities
1411 Oxford Street
Suite 367-368
Halifax, NS
B3H 3Z1
Tel: (902) 492-7865
(902) 492-0359
Fax: (902) 492-7734
www.simcorp.ca

Site #: Rattling Beach (#1039)
Sample Collection: 20-Jul-16
Redox Start: 10:05am on 21-Jul-16
Redox Stop: 10:55am on 21-Jul-16
Sulphide Start: 10:10am on 21-Jul-16
Sulphide Stop: 10:55am on 21-Jul-16

Sample I.D.		Temp	Redox	Sulphide		
Station	ID #	°C	mV	unadjusted µM	mV	adjusted µM
ANB-01	1	8.9	11.6	31.3	-869.9	313
	2	10.5	-209.0	19.3	-864.2	193
	3	10.5	-75.8	46.7	-875.1	467
ANB-A	1	8.2	-15.8	2.48	-837.1	24.8
	2	7.5	70.0	5.80	-848.1	58.0
	3	10.8	55.0	5.52	-847.2	55.2
Corner #1	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-
Corner #2	1	8.8	-35.8	34.3	-871.0	343
	2	12.0	-36.5	38.2	-872.4	382
	3	10.4	-199.6	29.2	-869.2	292
Corner #3	1	8.2	-109.7	3.42	-840.8	34.2
	2	8.2	-66.9	1.86	-833.2	18.6
	3	9.9	-11.2	5.13	-846.2	51.3
Corner #4	1	10.0	-125.4	2.89	-838.9	28.9
	2	8.0	-112.1	11.7	-857.0	117
	3	10.2	46.3	2.31	-835.5	23.1
Corner #5	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-
Corner #6	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-
Corner #7	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-

Field Crew: [redacted]

Analysis Crew: [redacted]

Redox Check (mV):
Prior to analysis: 220.8 mV @ 25°C
Post analysis: 220.8 mV @ 25°C

Sulphide Temp: 20.8°C

Redox reading at 2 minutes

Equipment:

Sulphide Analysis
Probe kit: NSLAB004
Sulphide probe: RS1-12416
Temperature probe: T012

Redox Analysis
Meter number: 487142
Redox probe: R002
Temperature probe: T007

SAOB + L-AA mixture

Addition: 10:00am
Expiration: 1:00pm

Signed off by:

[redacted], M.Sc.
Senior Laboratory Manager

APPENDIX C
Sediment Grain Size Analysis

NRC-IMB Research
Facilities
1411 Oxford Street
Suite 367-368
Halifax, NS
B3H 3Z1
Tel: (902) 492-7865
(902) 492-0359
Fax: (902) 492-7734

Date: 02-Aug-16
File No.: SW2016-114
Site Name/#: Rattling Beach (#1039)
Province: Nova Scotia

Grain Size Analysis

			% Fraction								
		mm	**Corner #1**	**Corner #2**	**Corner #3**	**Corner #4**	**Corner #5**	**Corner #6**	**Corner #7**	**ANB-01**	**ANB-A**
Gravel	Pebble	>4	NS	40.745	22.918	22.694	NS	NS	NS	13.406	24.511
	Granule	2-4	NS	6.308	4.643	5.258	NS	NS	NS	2.759	4.891
Sand	Very Coarse	1-2	NS	4.365	2.687	4.147	NS	NS	NS	2.086	7.075
	Coarse	0.5-1	NS	5.592	8.040	6.531	NS	NS	NS	6.765	13.920
	Medium	0.25-0.5	NS	11.257	14.015	10.581	NS	NS	NS	32.562	19.261
	Fine	0.125-0.25	NS	12.377	22.035	17.301	NS	NS	NS	16.193	7.386
	Very Fine	0.063-0.125	NS	15.261	15.278	19.990	NS	NS	NS	13.742	12.561
Mud	Silt	0.004 - 0.063	NS	4.094	10.383	13.497	NS	NS	NS	12.486	10.396
% Gravel			NS	47.054	27.561	27.952	NS	NS	NS	16.165	29.402
% Sand			NS	48.852	62.055	58.551	NS	NS	NS	71.349	60.202
% Mud			NS	4.094	10.383	13.497	NS	NS	NS	12.486	10.396

Note: NS - No Sample Collected

[redacted], M.Sc.
Senior Laboratory Manager

APPENDIX D
Grab Photos

ANB-A

Pre-siphon

Post-siphon

Grab leaked and was not siphoned

Grab leaked and was not siphoned

Grab leaked and was not siphoned

Corner #4

Pre-siphon

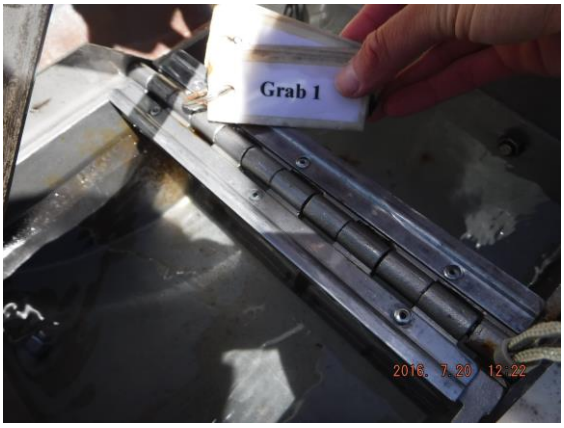
Post-siphon

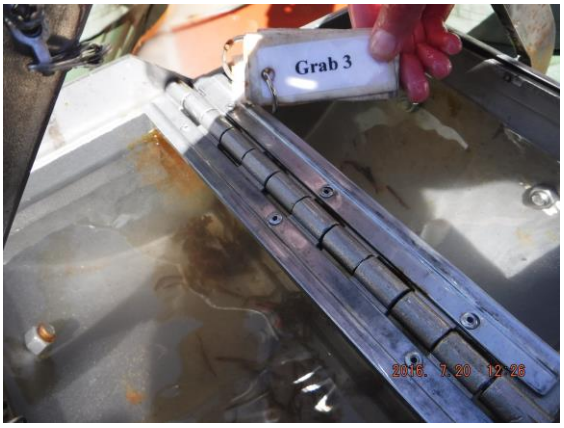
Grab leaked and was not siphoned

Grab leaked and was not siphoned

Corner #5

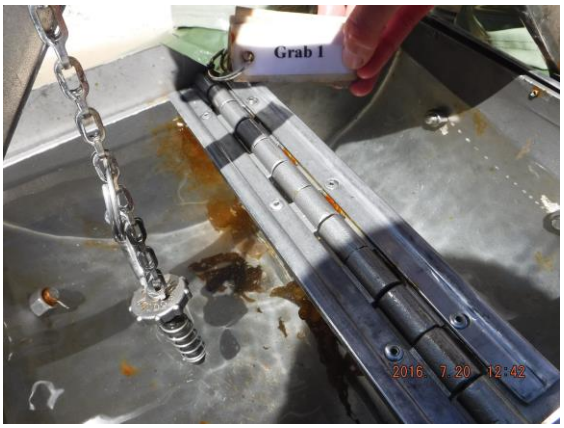
Grabs were not sampled

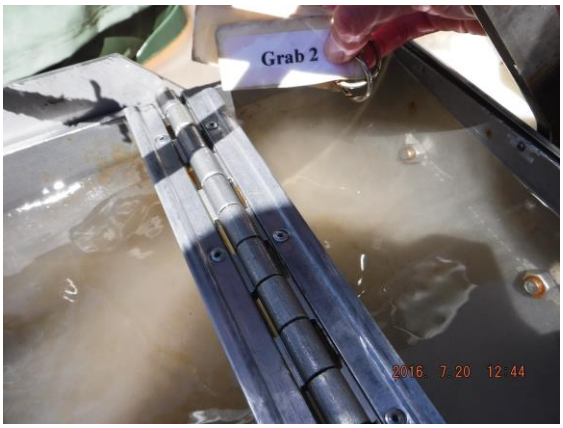




Corner #6

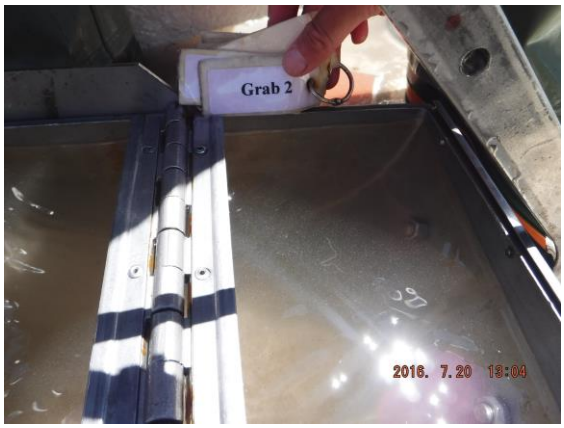
Grabs were not sampled





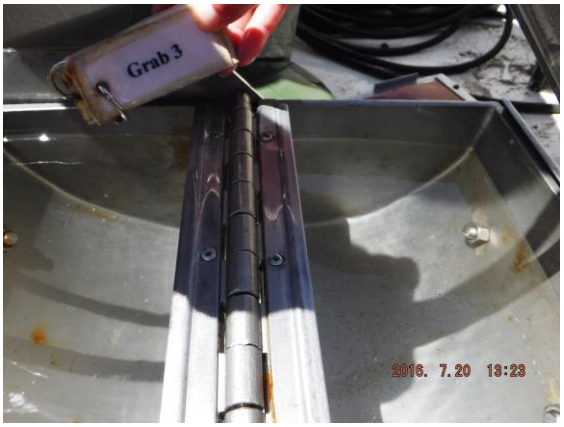
Corner #7

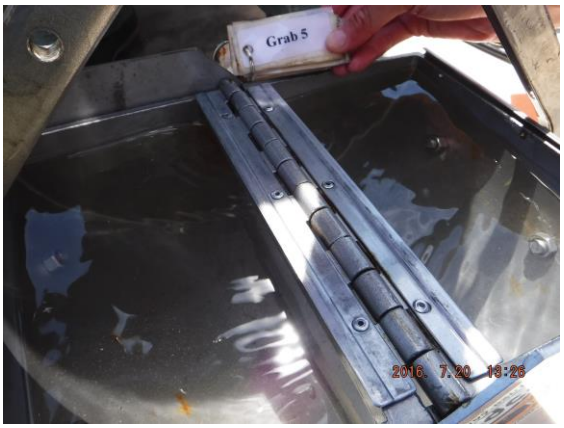
Grabs were not sampled



Corner #1

Grabs were not sampled





ANB-01

Pre-siphon

Post-siphon

Grab leaked and was not siphoned

Grab leaked and was not siphoned

Corner #2

Pre-siphon

Post-siphon

Grab leaked and was not siphoned

Grab leaked and was not siphoned

Grab leaked and was not siphoned

Corner #3

Pre-siphon

Post-siphon

Grab leaked and was not siphoned

.

Grab leaked and was not siphoned

Grab leaked and was not siphoned

APPENDIX E
Screen Captures of the Seafloor


ANB-A
44 38.9476 N
065 45.2351 W
2016/07/20 10:41:49


Corner #4
44 39.0016 N
065 45.1475 W
2016/07/20 11:33:37


Corner #5
44 38.9954 N
065 45.4358 W
2016/07/20 12:12:16


Corner #6
44 39.0980 N
065 45.4412 W
2016/07/20 12:36:28


Corner #7
44 39.3135 N
065 45.4520 W
2016/07/20 12:56:60

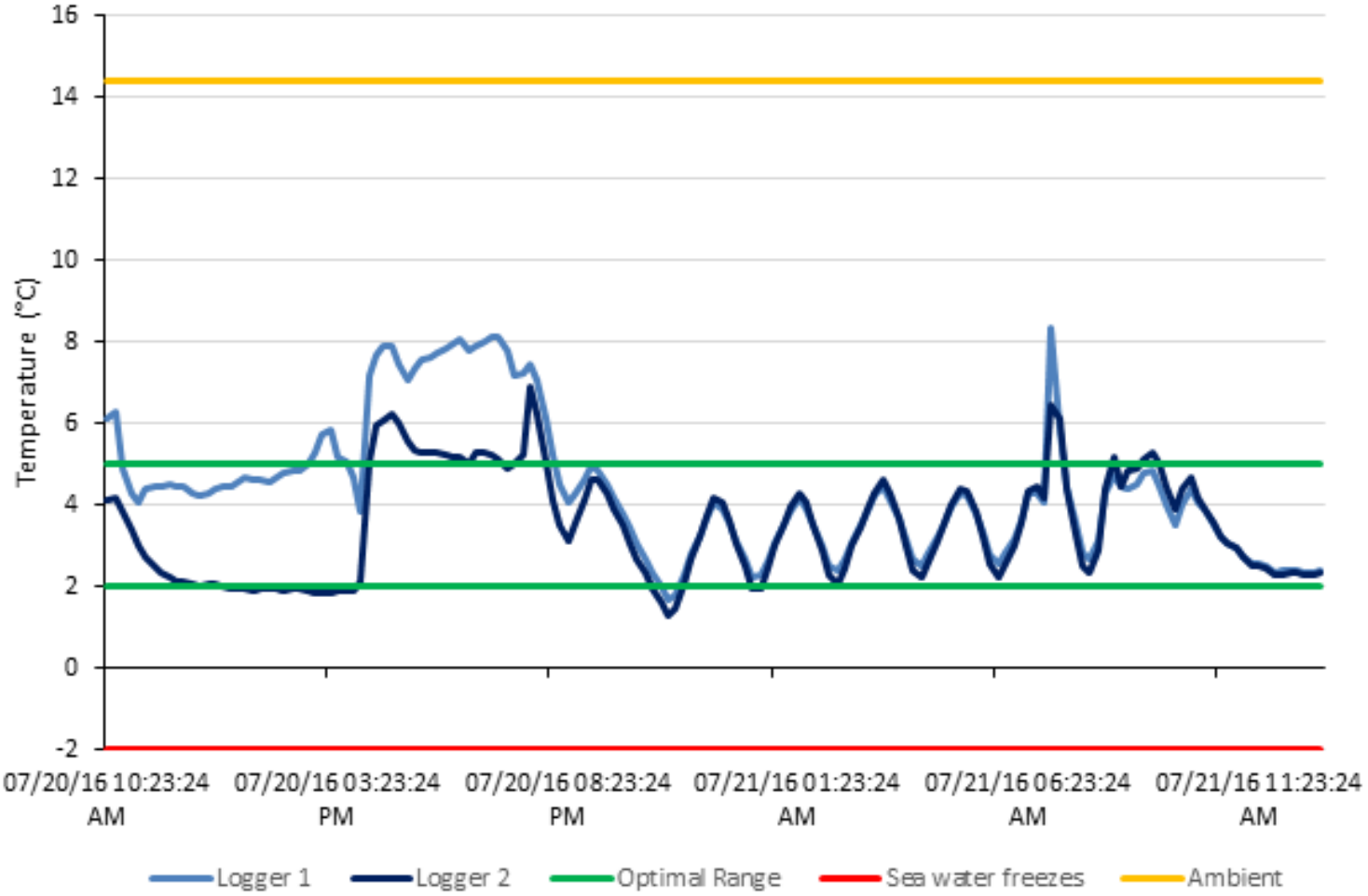

Corner #1
44 39.4482 N
065 45.4057 W
2016/07/20 13:14:29


ANB-01
44 39.5483 N
065 45.3614 W
2016/07/20 13:34:63


Corner #2
44 38.4607 N
065 45.3053 W
2016/07/20 14:12:22


Corner #3
44 39.3845 N
065 45.2038 W
2016/07/20 16:02:22

APPENDIX F
Sample Storage Temperature


16
14
12
10
8
6
4
2
0
-2
Temperature (°C)
07/20/16 10:23:24 AM
07/20/16 03:23:24 PM
07/20/16 08:23:24 PM
07/21/16 01:23:24 AM
07/21/16 06:23:24 AM
07/21/16 11:23:24 AM
Logger 1
Logger 2
Optimal Range
Sea water freezes
Ambient

APPENDIX G
Sediment Sample Quality Criteria

Station	Grab attempts	Grabs that were subsampled	Grab retrieval speeds (cm/s)	Flap position	Sediment depths (cm)	Reason for rejecting grab	Free-falls
ANB-A	6	4, 5, 6	28, 23, 28	Down	4, 1, 1	1 - no sediment 2 - no sediment 3 - no sediment	Yes
Corner #4	3	1, 2, 3	28, 28, 27	Down	2, 5, 3	N/A	No, yes, yes
Corner #5	5	None	N/A	N/A	N/A	1 - no sediment 2 - no sediment 3 - no sediment 4 - no sediment 5 - no sediment	N/A
Corner #6	5	None	N/A	N/A	N/A	1 - no sediment 2 - no sediment 3 - no sediment 4 - no sediment 5 - no sediment	N/A
Corner #7	5	None	N/A	N/A	N/A	1 - no sediment 2 - no sediment 3 - no sediment 4 - no sediment 5 - no sediment	N/A
Corner #1	5	None	N/A	N/A	N/A	1 - no sediment 2 - no sediment 3 - no sediment 4 - no sediment 5 - no sediment	N/A
ANB-01	4	2, 3, 4	26, 27, 25	Down	4, 3, 4	1 - no sediment	Yes
Corner #2	5	3, 4, 5	30, 28, 29	Down	4.5, 3, 1	1 - no sediment 2 - no sediment	Yes
Corner #3	3	1, 2, 3	27, 28, 29	Down	1, 5, 2	N/A	No, yes, yes

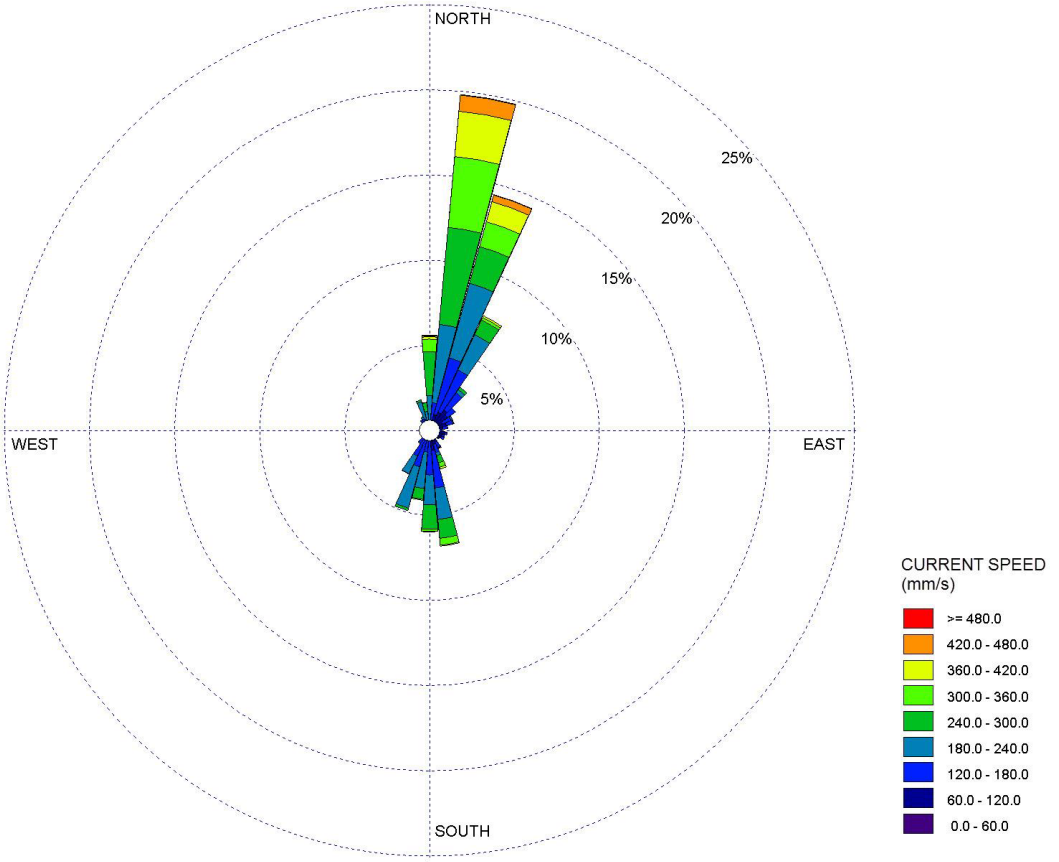
Station	Grab Attempt					
	Grab 1	Grab 2	Grab 3	Grab 4	Grab 5	Grab 6
ANB-A	SP	SP	SP	SP	SP	SP
Corner #4	SP	SP	SP	-	-	-
Corner #5	SP	SP	SP	SP	SP	-
Corner #6	SP	SP	SP	SP	SP	-
Corner #7	SP	SP	SP	SP	SP	-
Corner #1	SP	SP	SP	SP	SP	-
ANB-01	SP	SP	SP	SP	-	-
Corner #2	SP	SP	SP	SP	SP	-
Corner #3	SP	SP	SP	-	-	-

PP = Petite Ponar
SP = Standard Ponar
Grabs there were subsampled are highlighted in green

APPENDIX H
ADCP Data

CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 3m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

3455

AVG. CURRENT SPEED:

198.10 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

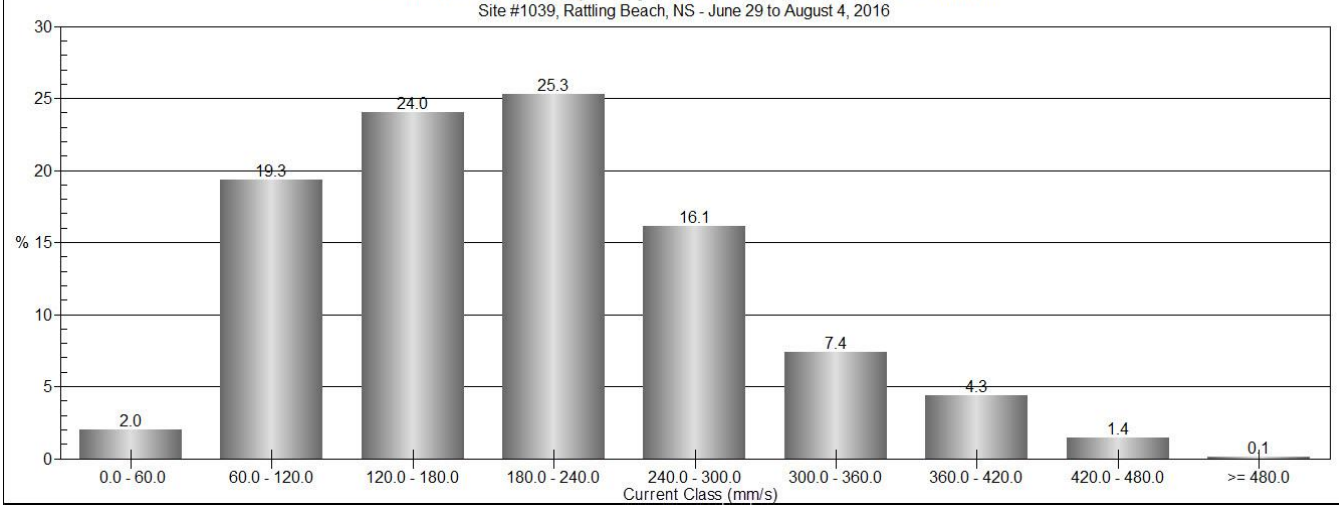
2016-08-18

PROJECT NO.:

SW2016-059

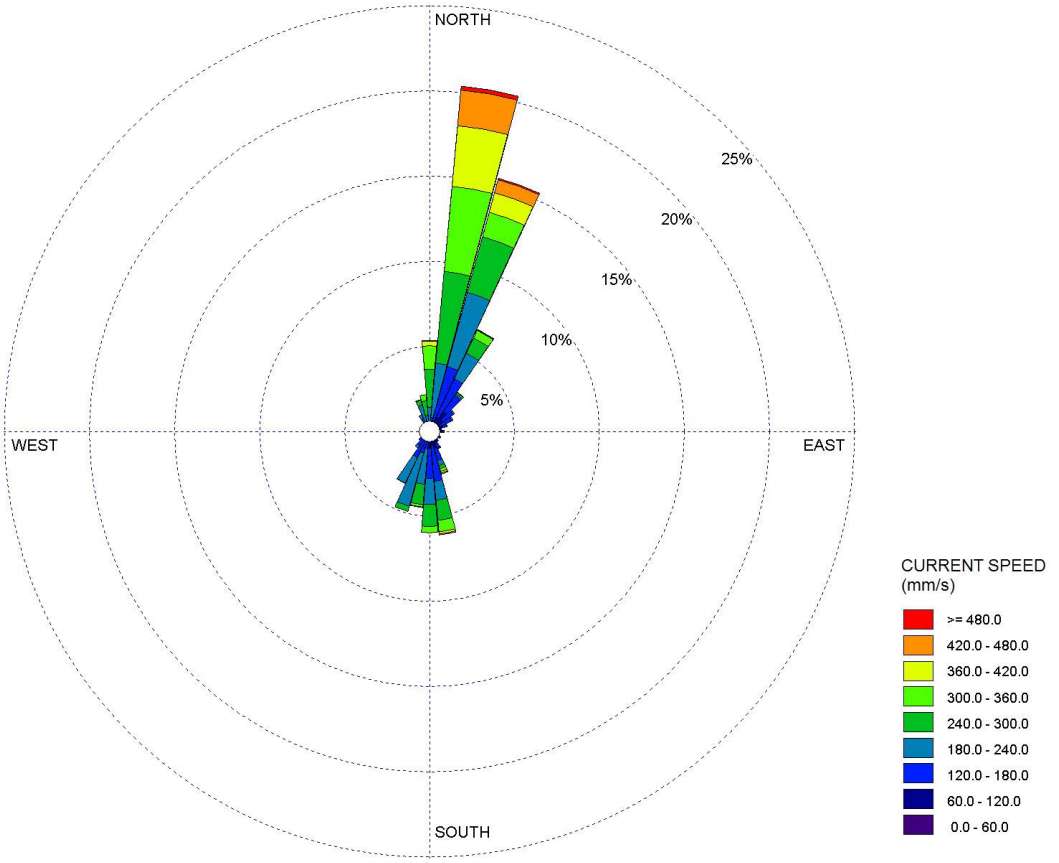
Current Class Frequency Distribution - 3m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 4m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

3440

AVG. CURRENT SPEED:

213.00 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

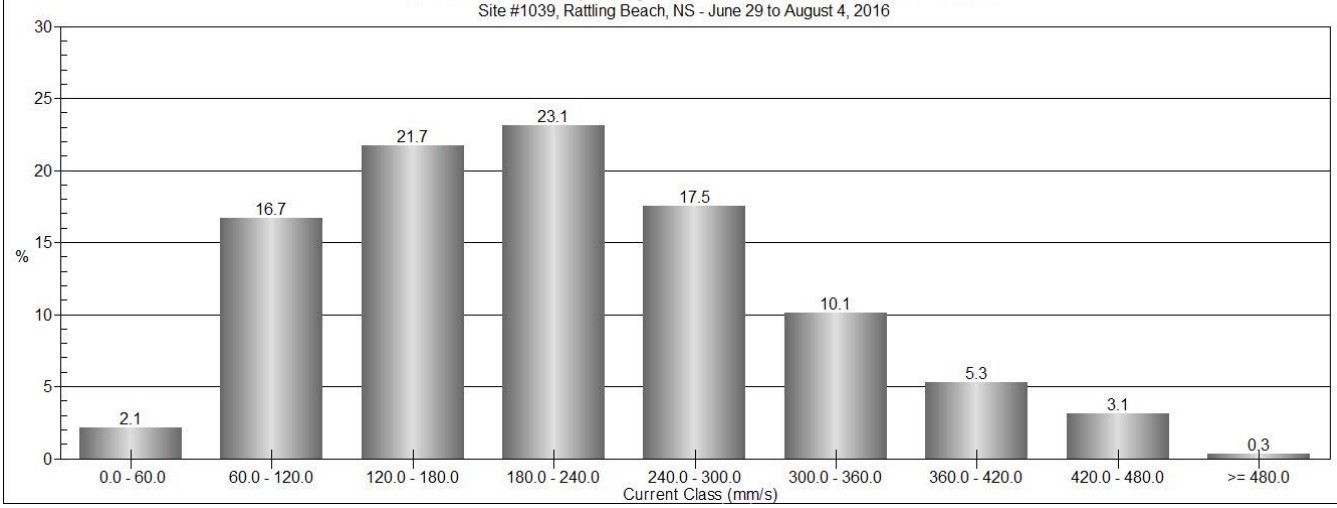
2016-08-18

PROJECT NO.:

SW2016-059

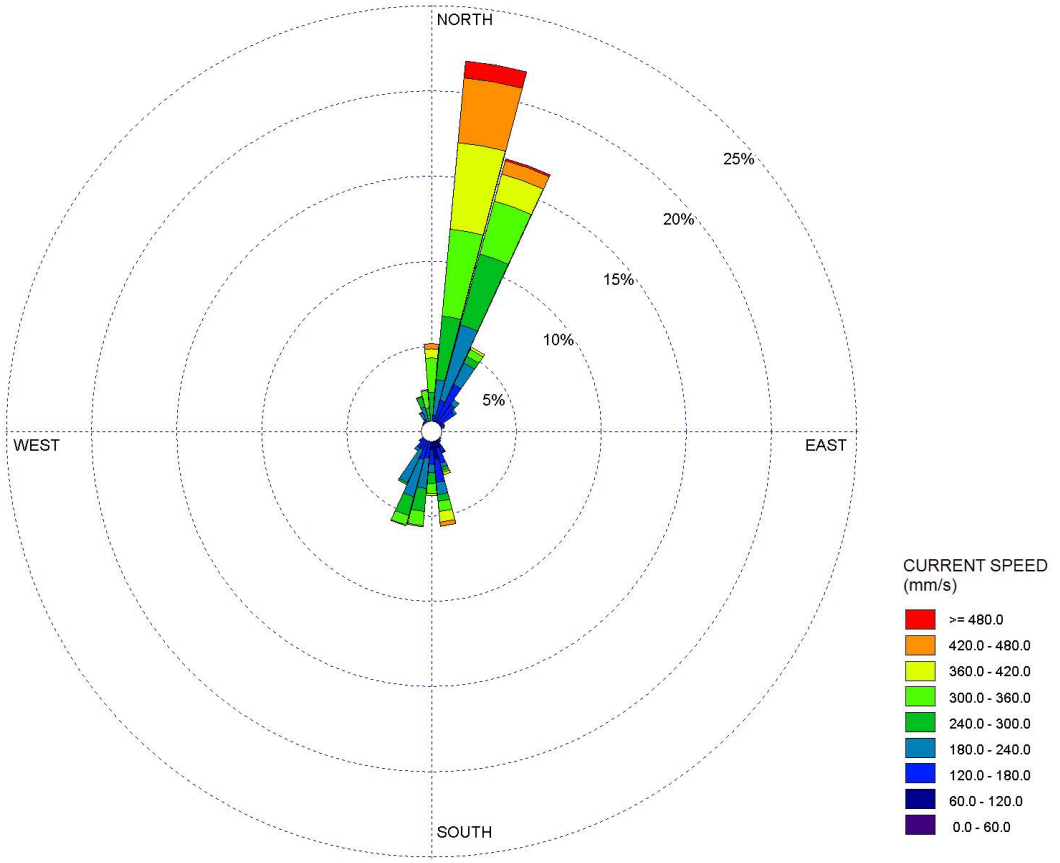
Current Class Frequency Distribution - 4m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 6m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

3337

AVG. CURRENT SPEED:

232.50 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

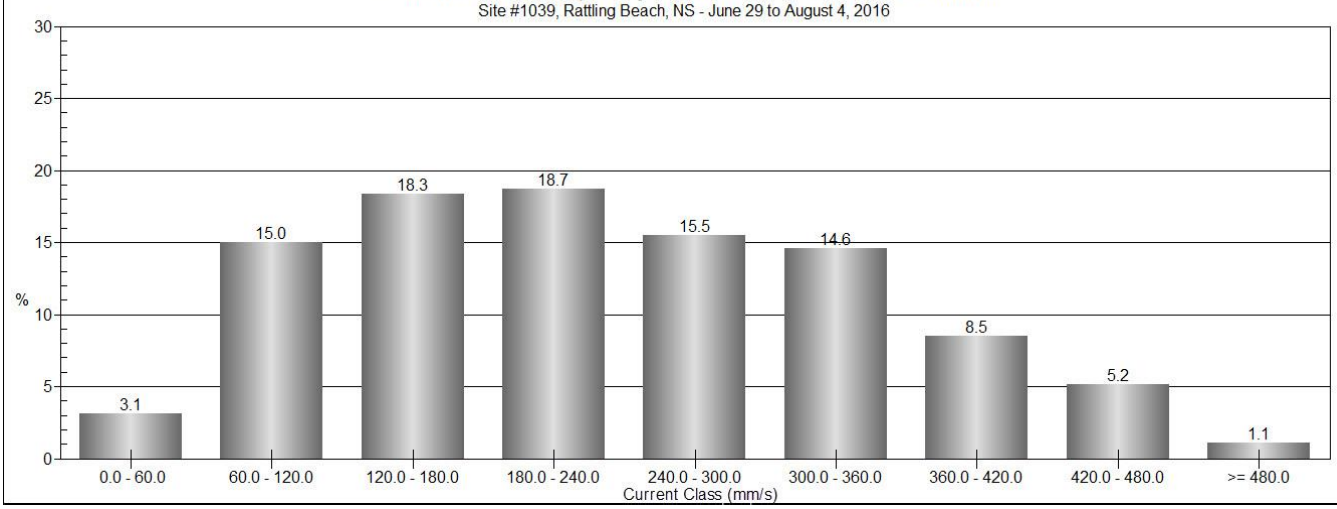
2016-08-18

PROJECT NO.:

SW2016-059

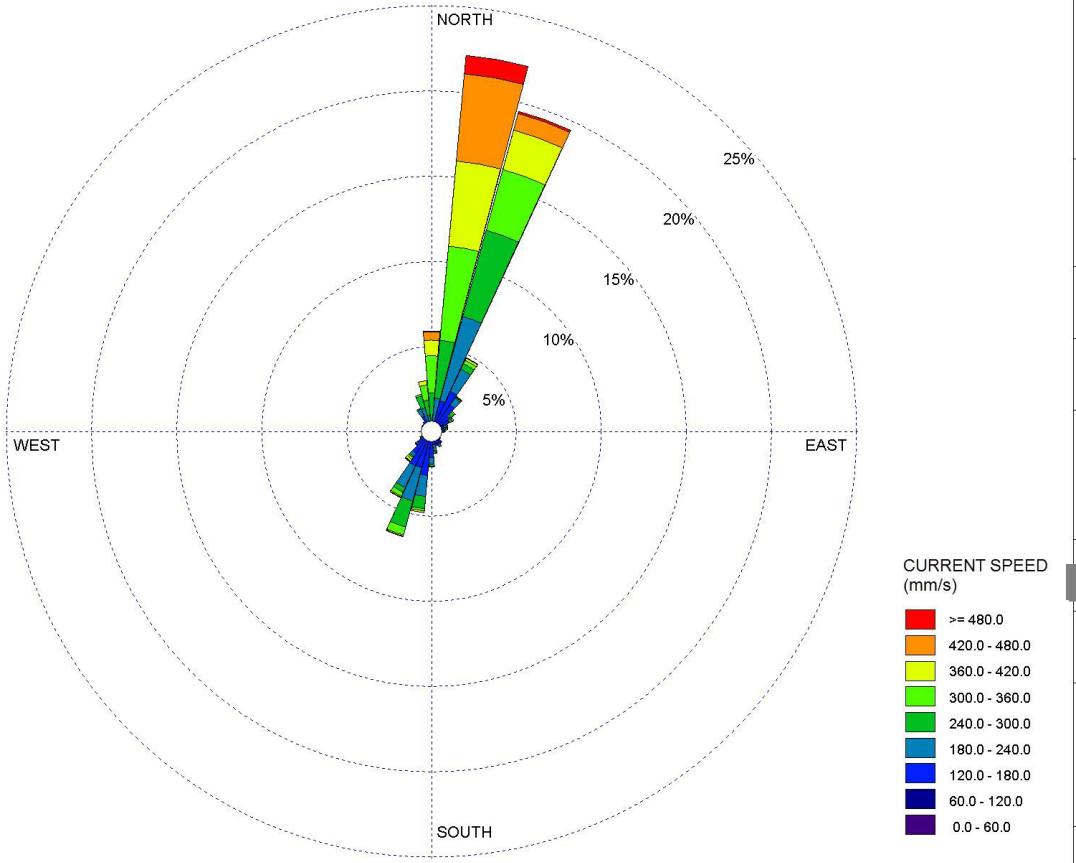
Current Class Frequency Distribution - 6m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 7m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

3060

AVG. CURRENT SPEED:

240.00 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

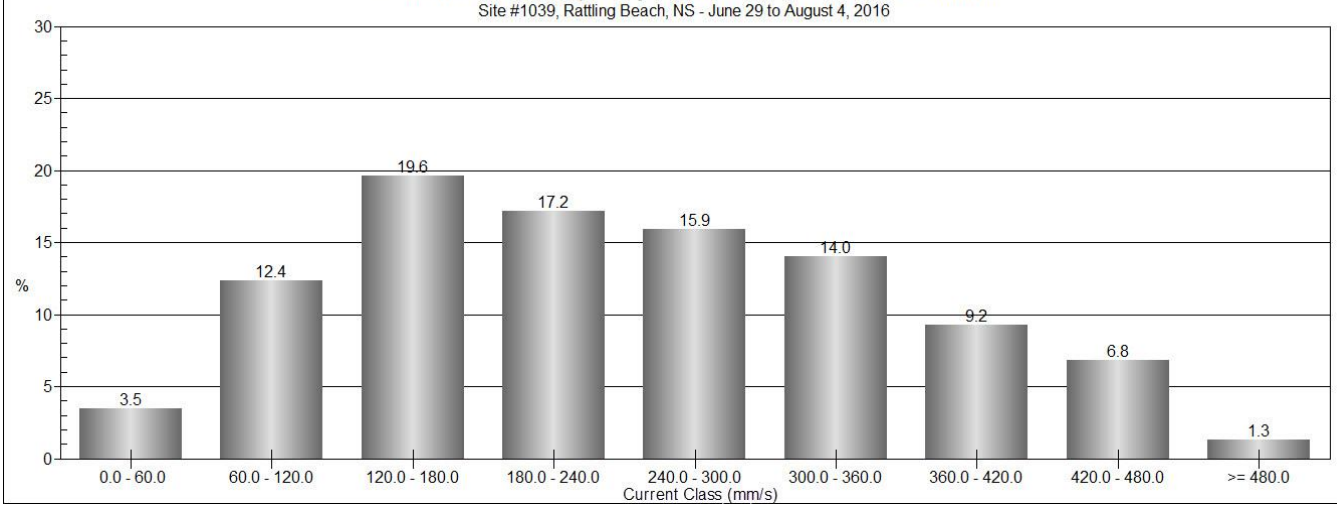
2016-08-18

PROJECT NO.:

SW2016-059

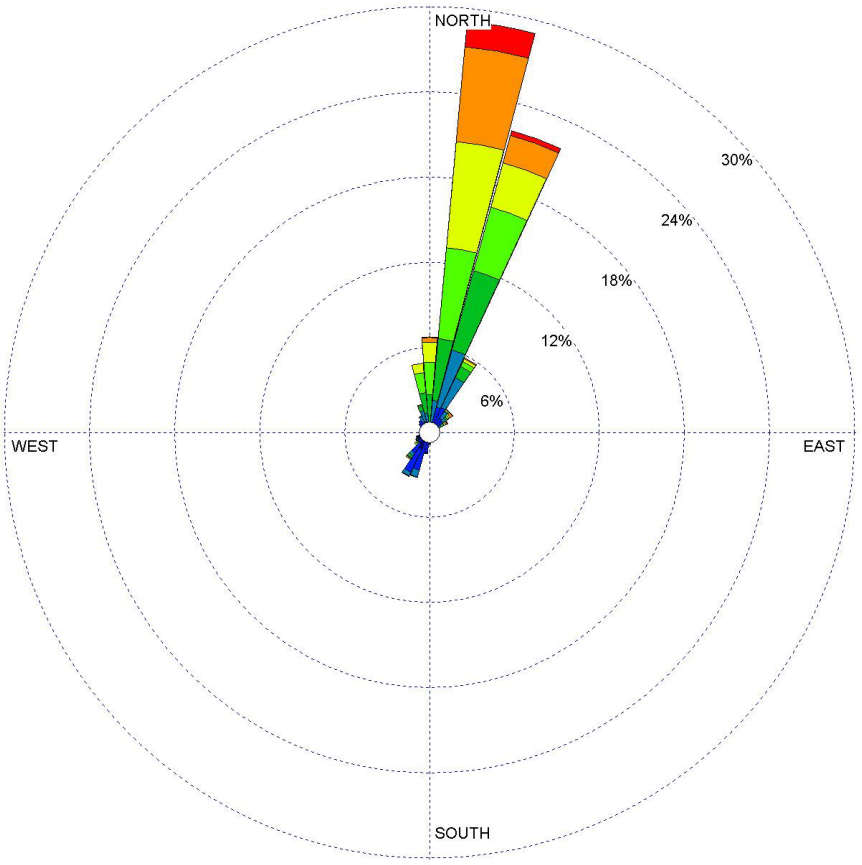
Current Class Frequency Distribution - 7m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 8m Above Bottom



CURRENT SPEED (mm/s)

- >= 480.0
- 420.0 - 480.0
- 360.0 - 420.0
- 300.0 - 360.0
- 240.0 - 300.0
- 180.0 - 240.0
- 120.0 - 180.0
- 60.0 - 120.0
- 0.0 - 60.0

COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

2406

AVG. CURRENT SPEED:

263.30 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

[redacted]

DATE:

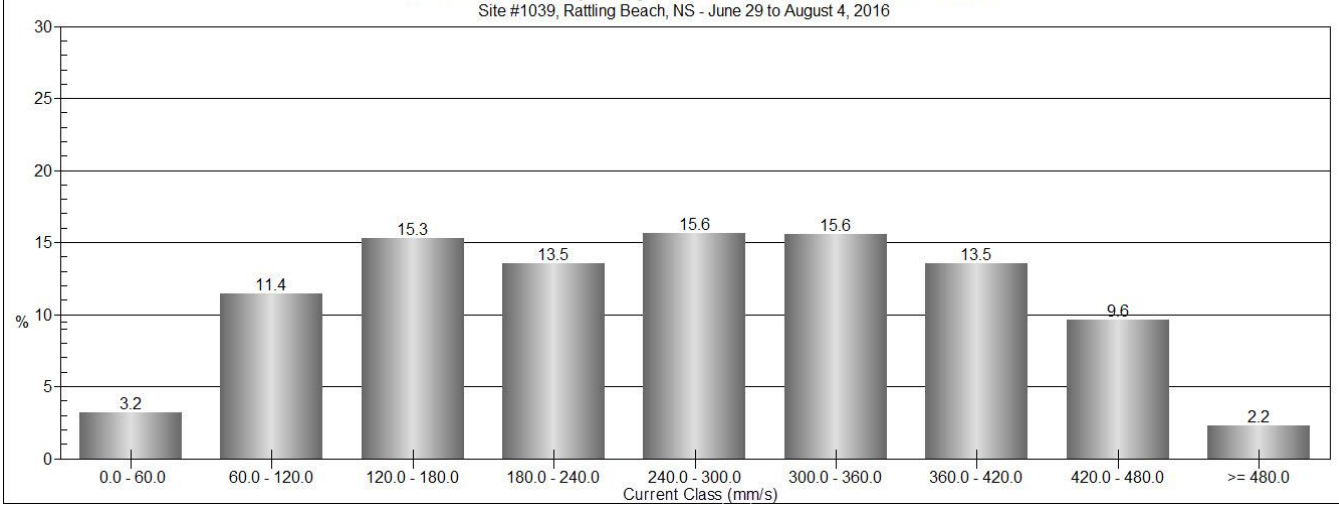
2016-08-18

PROJECT NO.:

SW2016-059

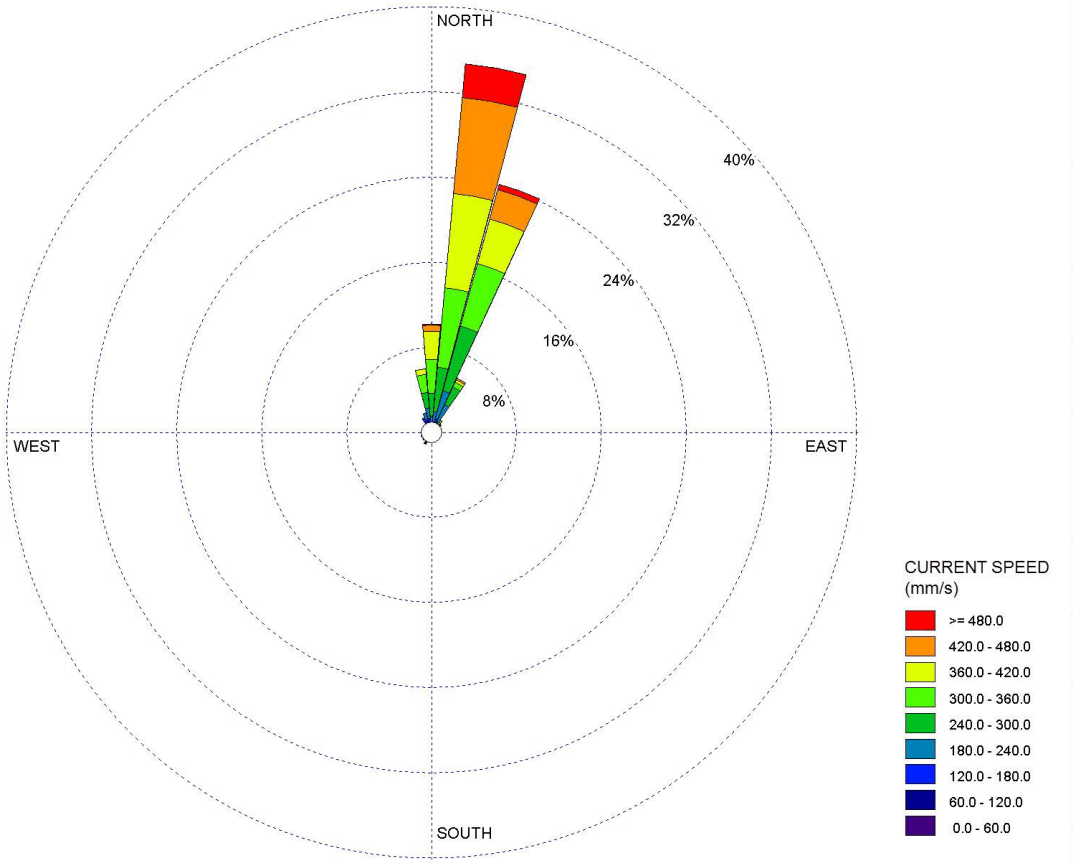
Current Class Frequency Distribution - 8m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 9m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

1894

AVG. CURRENT SPEED:

292.40 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

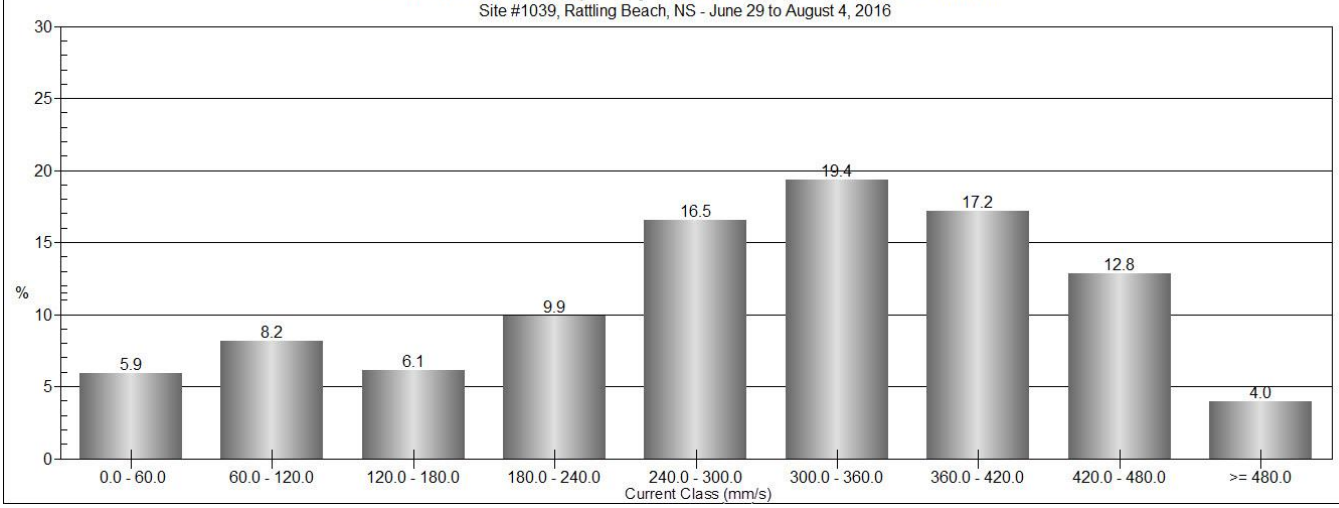
2016-08-18

PROJECT NO.:

SW2016-059

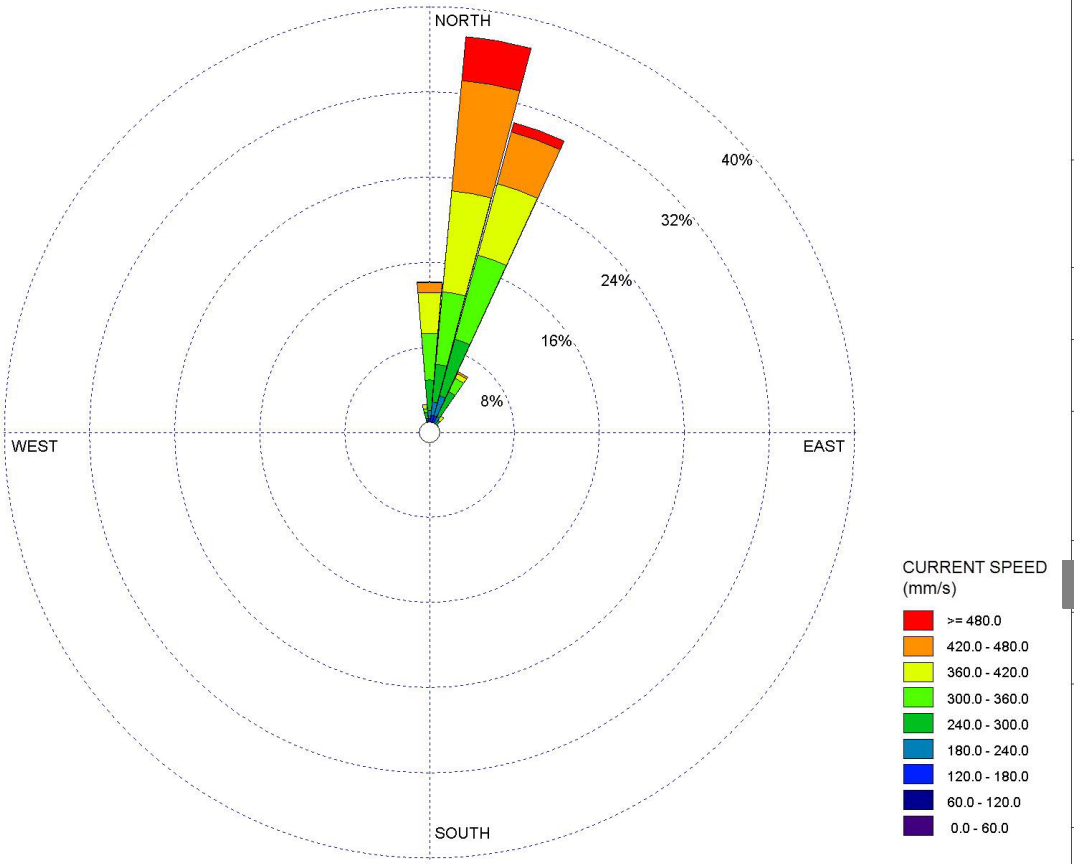
Current Class Frequency Distribution - 9m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



CURRENT ROSE PLOT:

Site #1039, Rattling Beach, NS
Current Speed and Direction - 10m Above Bottom



COMMENTS:

DATA PERIOD:

Start Date: 2016-06-29
End Date: 2016-08-04

PROFILE COUNT:

1455

AVG. CURRENT SPEED:

327.90 mm/s

COMPANY NAME:

Sweeney International Marine Corp.

MODELER:

DATE:

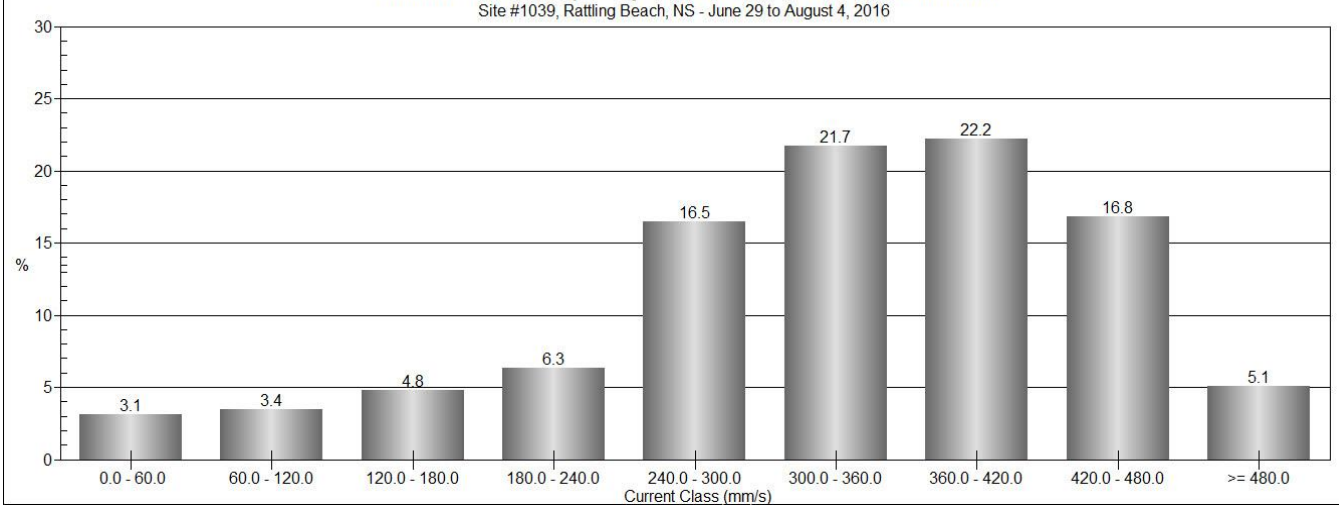
2016-08-18

PROJECT NO.:

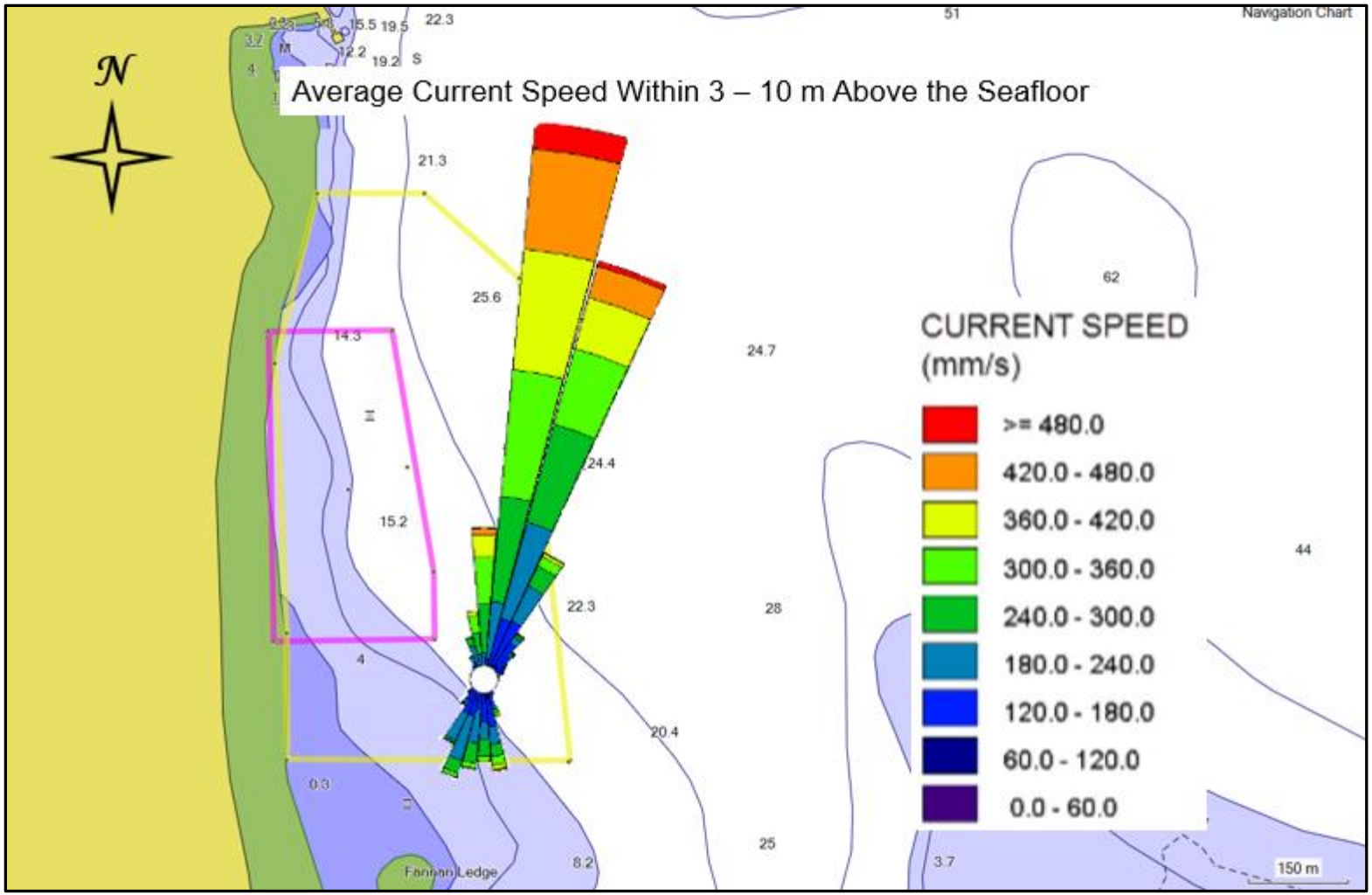
SW2016-059

Current Class Frequency Distribution - 10m Above Bottom

Site #1039, Rattling Beach, NS - June 29 to August 4, 2016



NS1039 Rattling Beach					
	Speed			Direction	
Distance from Bottom (m)	Most Frequent (cm/s)	% Occurrence	Average (cm/s)	Highest Frequency (°)	% Occurrence
3	18-24	25.3	19.8	5-15	19.7
4	18-24	23.1	21.3	5-15	20.2
5	18-12	20.6	22.5	5-15	20
6	18-24	18.7	23.3	5-15	21.0
7	18-12	19.6	24.0	5-15	19.6
8	30-36	15.6	26.3	5-15	20.2
9	30-36	19.4	29.2	5-15	19.0
10	36-42	22.2	32.8	5-15	15.7
Depth Averaged	18-24	18.3	23.9	5-15	19.4


N
Average Current Speed Within 3 – 10 m Above the Seafloor
Navigation Chart
CURRENT SPEED
(mm/s)
>= 480.0
420.0 - 480.0
360.0 - 420.0
300.0 - 360.0
240.0 - 300.0
180.0 - 240.0
120.0 - 180.0
60.0 - 120.0
0.0 - 60.0
150 m
Fanad Ledge

Sweeney International Marine Corp.
46 Milltown Blvd.
St. Stephen, NB
E3L 1G3

NRC-IMB Research Facilities
1411 Oxford Street
Suite 367-368
Halifax, NS
B3H 3Z1

Appendix B – Financial Viability Letter

Appendix C – Notice of Works

46 Milltown Blvd.
St. Stephen, N. B.
Canada, E3L 1G3
Tel: (506) 467-9014
Fax: (506) 467-9503
www.simcorp.ca

October 20. 2016

SIMCorp File #SW2016-059
NWP File # 8200-94-3045

Manager
Transport Canada, Navigation Protection Program
Atlantic Region
95 Foundry Street, 6th Floor
PO Box 42
Moncton, NB E1C 8K6

Dear Manager:

Reference: **Notice of Works Form and Site Development Plans / Rattling Beach #1039 – Kelly Cove Salmon Ltd.**

Please accept this package on behalf of our client Kelly Cove Salmon Ltd. for Approval under the *Navigation Protection Act* for Lease/Licence #1039 at Rattling Beach located in the Annapolis Basin in the Province of Nova Scotia.

Attached is a completed and signed Notice of Works form; as well as, six (6) copies of the site development plans showing the location, a top/plan drawing with dimension and side/profile drawings with dimensions.

We trust that you will find everything to be in order. However, should you require additional information or have questions, please feel free to contact our office at any time.

Yours truly,

[redacted]
Office Manager

Cc. [redacted] SIMCorp.
Jeff Nickerson, Kelly Cove Salmon Ltd.
[redacted] Kelly Cove Salmon Ltd.
Stuart Lane, Transport Canada - NPA

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

Canada

Transport Canada / Transports Canada

PROTECTED A (WHEN COMPLETED)

NAVIGATION PROTECTION ACT
NOTICE OF WORKS FORM

TC file number (if known): 8200-94-3045

Are you the riparian property owner? ◯Yes ◉No

GENERAL INFORMATION

Official and/or local name(s) of the body of water (Required) Rattling Beach, Annapolis Basin	Is the body of water listed on the schedule to the NPA? ◉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*

Individual or company name (Required) Kelly Cove Salmon Ltd.	Contact name (Required) Jeff Nickerson	
Mailing address (Required) P.O. Box 1546		
City/Town (Required) Shelburne	Province/Territory (Required) Nova Scotia	Postal code (Required) B0T 1W0
Primary telephone number (Required) [redacted]	Other telephone number	E-mail jnickerson@cookeaque.com

Owner's agent/mandatary (contractor/consultant/representative/co-proponent, if any)

Company name SIMCorp Marine Environmental Inc.	Contact name [redacted]	
Mailing address 46 Milltown Blvd.		
City/Town St. Stephen	Province/Territory NB	Postal code E3L 1G3
Primary telephone number [redacted]	Other telephone number	E-mail [redacted]simcorp.ca

WORK SITE INFORMATION

Nearest municipality/county/district (Required) Digby	Province/Territory (Required) Nova Scotia

Site location such as lot, concession, section, township, range, meridian, 911 address, property identification, etc. (Required)

Rattling Beach aquaculture site #1039 is located in Annapolis Basin, approximately 3 kilometers north of the town of Digby. Site #1039 is situated on the western side of Annapolis Basin.

Site position Latitude North (Required) Degrees 44 Minutes 39 Seconds 13.8	Site position Longitude West (Required) Degrees 65 Minutes 45 Seconds 19.2
Hydro chart number: 4396	Topo map number:

Canada

Body of water details, such as characteristics, bank/bottom features, biological components, flow/tides, etc.

Site #1039 is located on the western side of Annapolis Basin, occupies a 29.08-ha parcel, and is located over waters ranging from 6 - 31 m in depth. The sediment composition of the seafloor is composed primarily of medium to fine sand, gravel, and mud that is moderately packed. Areas of the lease near the western shore of the basin consist mainly of boulders, cobble stones, and pebbles.

Potential obstructions, such as natural/man-made, other works, navigation aids, etc.

This site consists of plastic circular cages and a feed storage barge. Tag lines and anchor buoys are also located throughout the lease area. The outside corners of the lease are marked with a 0.6 m buoy equipped with a light and radar reflectors. Annapolis Basin also has a marked navigation channel.

Land use/Ownership, such as past/current, private/government, rural/suburban, coastal, environmental, etc.

Aquaculture site #1039 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

Annapolis Basin is used by Bay Ferries Ltd. to dock The Fundy Rose 500m north of site #1039 as it makes its run to and from Digby, Nova Scotia and Saint John, New Brunswick. Fishing vessels also use the basin as passage between the port of Digby and the Bay of Fundy. Lobster vessels and scallop draggers are common in the area. Recreational vessels also frequent the area.

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 10 circular 100 m circumference cages. Cages are present on site all year round.

Method of construction such as temporary works, activities, etc. (Required)

Aquaculture sites consist of anchored cage systems (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)	Expected completion date (dd-mm-yyyy) (Required)
Immediately	Ongoing

Canada

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)
- ☑ Fisheries and Oceans Canada (DFO)
- ☐ Major Projects Management Office (MPMO)
- ☐ Aboriginal Affairs and Northern Development Canada (AANDC)
- ☐ Environment Canada (EC)
- ☐ Natural Resources Canada (NRCan)
- ☐ Northern Projects Management Office (NPMO)
- ☐ 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]

19-10-2016
Date (dd-mm-yyyy) (Required)

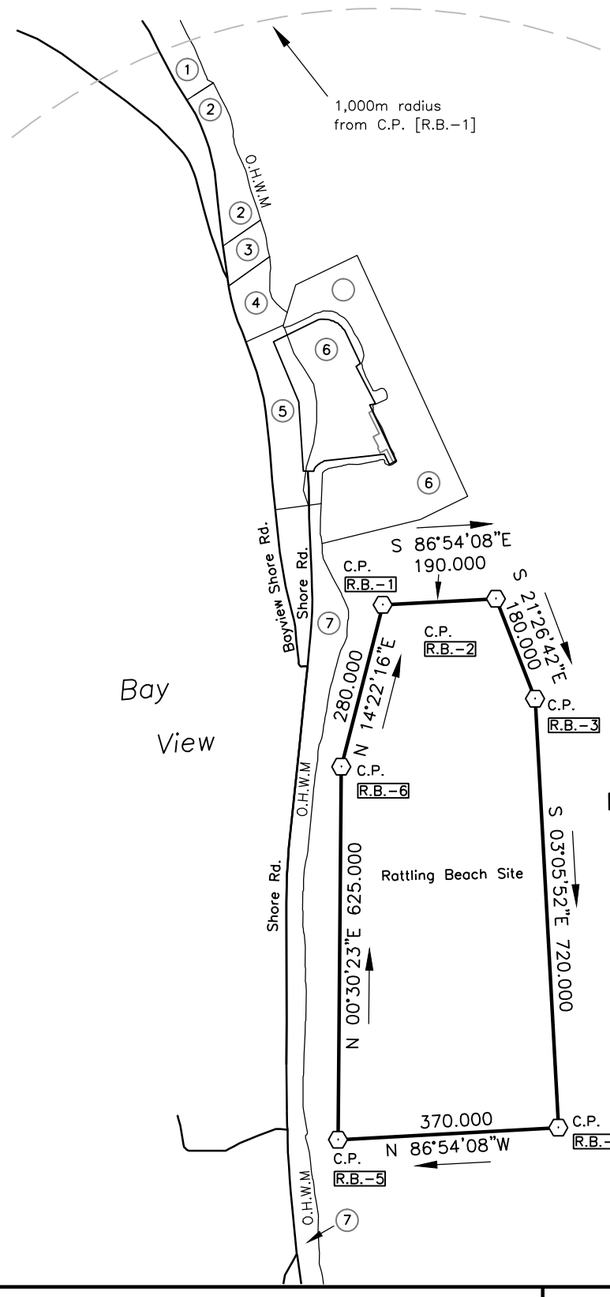
FOR OFFICE USE ONLY

	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

Canada



NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
R.B.–1	4,948,620.731	281,435.104
R.B.–2	4,948,630.999	281,624.827
R.B.–3	4,948,463.461	281,690.636
R.B.–4	4,947,744.513	281,729.545
R.B.–5	4,947,724.518	281,360.086
R.B.–6	4,948,349.493	281,365.608

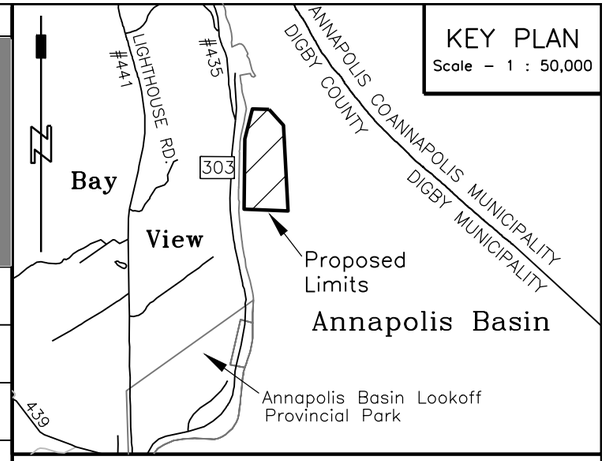
NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co–ordinates

Point	Latitude (N)	Longitude (W)
R.B.–1	44°39'27.6296"	65°45'24.2922"
R.B.–2	44°39'28.1697"	65°45'15.7031"
R.B.–3	44°39'22.8183"	65°45'12.4616"
R.B.–4	44°38'59.5875"	65°45'09.5951"
R.B.–5	44°38'58.5358"	65°45'26.3187"
R.B.–6	44°39'18.7731"	65°45'27.0277"

Proposed Navigational Aids Limits
Rattling Beach Aquaculture Site
Kelly Cove Salmon Ltd.
Area = 29.08 hectares

A n n a p o l i s B a s i n
(Atlantic Ocean)

#	P.I.D. #	OWNER / ADDRESS
1	30194823	[redacted]
2	30194807	
3	30286546	
4	30194781	
5	30194799	Crown Land (N.S.) P.O. Box 634 Stn. Central Charlottetown, PEI, C1A 7L3
6	30357008	Crown Land (P.W.G.S.C.) P.O. Box 634 Stn. Central Charlottetown, PEI, C1A 7L3
7	30294185	Road Parcel Bayview Shore Road
8	30130058	Crown Land (D.N.R.) PO Box 698, Halifax, N.S. B3J 2T9



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 . . . . . □
JAYCO ANCHOR . . . . . ⚓

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
PROPOSED NAVIGATION AIDS LIMITS
KELLY COVE SALMON LTD. / RATTLING BEACH
LOCATED AT:
BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016

[redacted]

Jeff Nickerson

A&D JOB #149–16–1039

SHEET 1 OF 7 | DATE: October 19, 2016

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 20 NORTH (UTM Z20N).

KELLY COVE SALMON LTD.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS
FOUNDED 1951
Stephen Acker
Stephen D.F. Acker
N.S.L.S.
639
MEMBER

PURPOSE OF PLAN (SHEET 1 OF 7)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND TO THE NORTH, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 2 THROUGH 7.

200 0 200 400 600

SCALE – 1 : 10,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

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Nova Scotia, Canada
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www.adsurveying.ca

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Shelburne, Shelburne County
Nova Scotia, Canada
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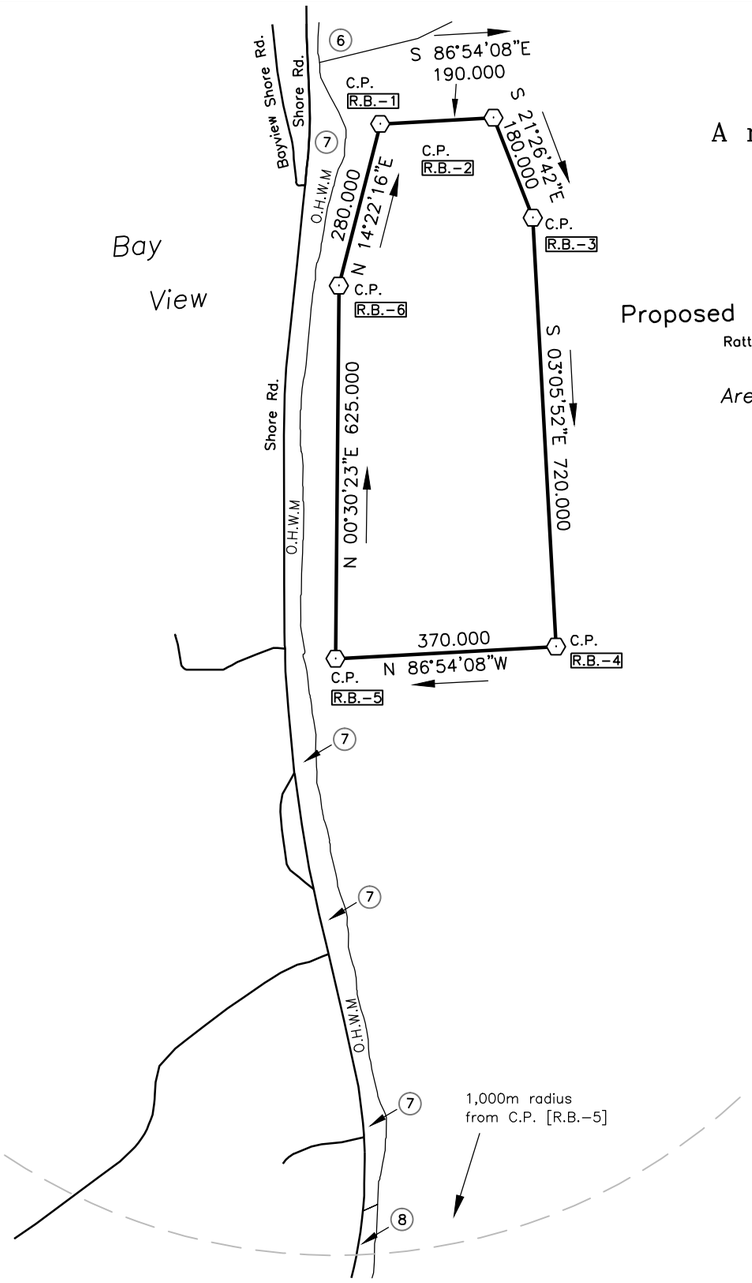

Annapolis Basin

(Atlantic Ocean)

Proposed Navigational Aids Limits

Rattling Beach Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 29.08 hectares

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
R.B.–1	4,948,620.731	281,435.104
R.B.–2	4,948,630.999	281,624.827
R.B.–3	4,948,463.461	281,690.636
R.B.–4	4,947,744.513	281,729.545
R.B.–5	4,947,724.518	281,360.086
R.B.–6	4,948,349.493	281,365.608

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

Point	Latitude (N)	Longitude (W)
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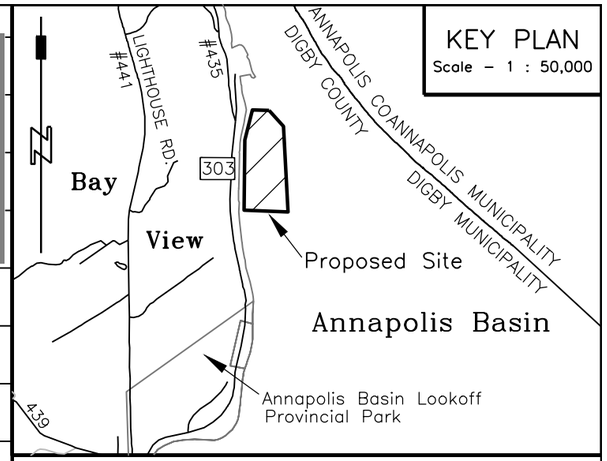
R.B.–3	44°39'22.8183"	65°45'12.4616"
R.B.–4	44°38'59.5875"	65°45'09.5951"
R.B.–5	44°38'58.5358"	65°45'26.3187"
R.B.–6	44°39'18.7731"	65°45'27.0277"

Annapolis Basin

(Atlantic Ocean)

#	P.I.D. #	OWNER / ADDRESS
1	30194823	
2	30194807	
3	30286546	
4	30194781	
5	30194799	Crown Land (N.S.) P.O. Box 634 Stn. Central Charlottetown, PEI, C1A 7L3
6	30357008	Crown Land (P.W.G.S.C.) P.O. Box 634 Stn. Central Charlottetown, PEI, C1A 7L3
7	30294185	Road Parcel Bayview Shore Road
8	30130058	Crown Land (D.N.R.) PO Box 698, Halifax, N.S. B3J 2T9



Legend:

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CALCULATED . . . . . (c.)
N.S. PROPERTY IDENTIFICATION NUMBER . . . . . P.I.D. #00000000
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BOUNDARY DEALT WITH BY THIS PLAN . . . . .
OTHER BOUNDARY . . . . .
TIE LINES . . . . .
NOT TO SCALE . . . . .
MAJOR CONTOURS . . . . .
MINOR CONTOURS . . . . .
DEPTH SOUNDINGS . . . . . + 00.0
CONCRETE MOORING . . . . . □
JAYCO ANCHOR . . . . . ⚓

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED NAVIGATION AIDS LIMITS

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016.

Jeff Nickerson

A&D JOB #149–16–1039

SHEET 2 OF 7 | DATE: October 19, 2016

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 2 OF 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND TO THE SOUTH, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1 AND 3 THROUGH 7.

200 0 200 400 600

SCALE – 1 : 10,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

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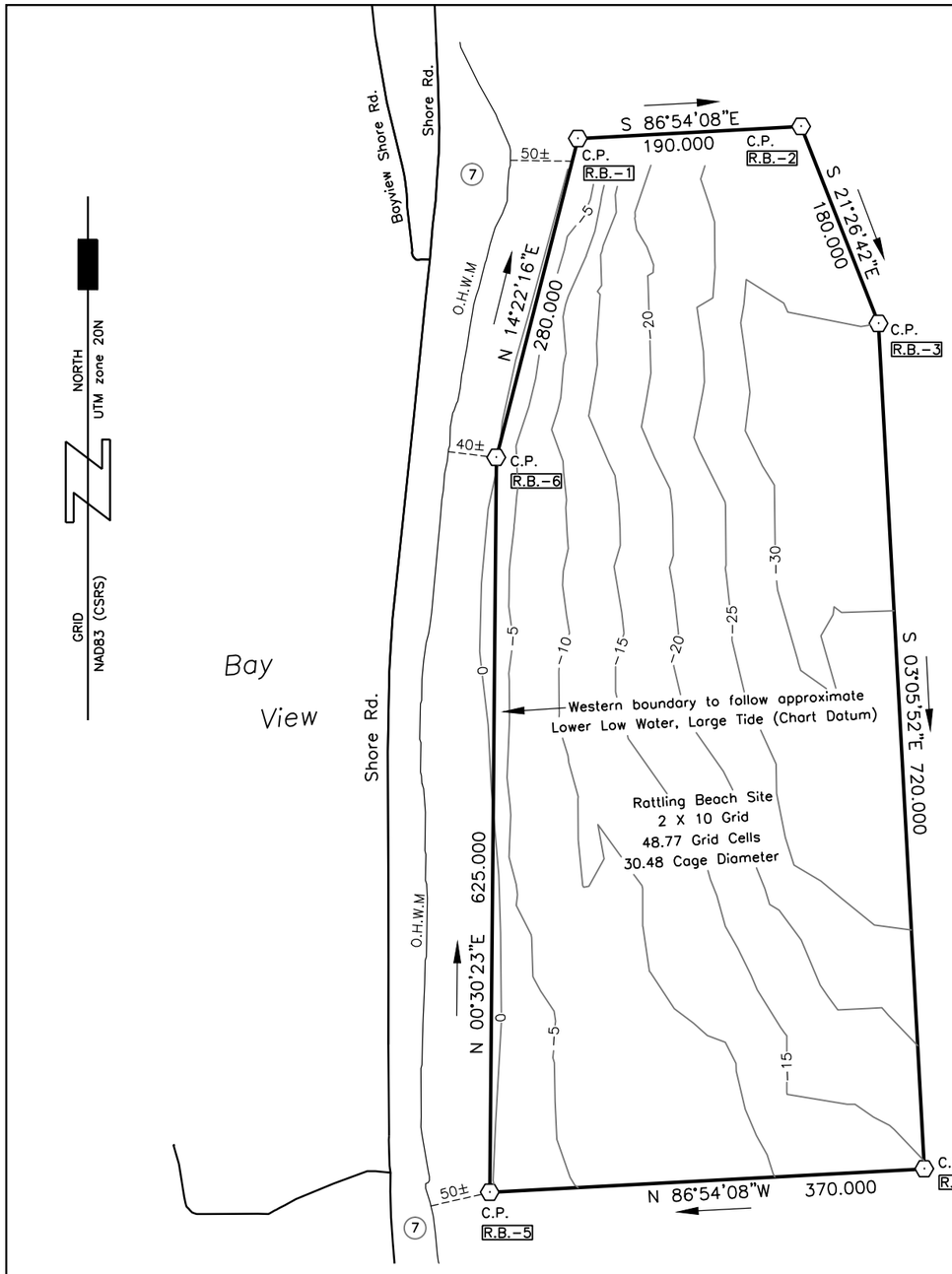

Annapolis Basin

(Atlantic Ocean)

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
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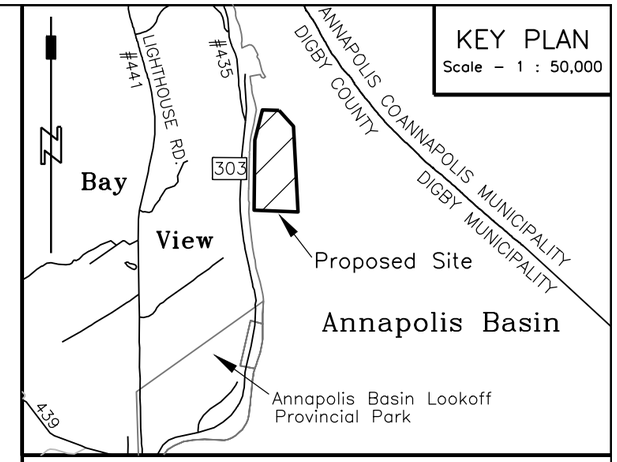
R.B.–6	44°39'18.7731"	65°45'27.0277"

Aquaculture Lease Site
Rattling Beach Aquaculture Site
Kelly Cove Salmon Ltd.
Area = 29.08 hectares

Annapolis Basin

(Atlantic Ocean)



Legend:

CALCULATED POINT . . . . . C.P.
CALCULATED . . . . . (c.)
N.S. PROPERTY IDENTIFICATION NUMBER . . . . . P.I.D. #00000000
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LOCAL REGISTRY NUMBER . . . . . Book: / Page:
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BOUNDARY DEALT WITH BY THIS PLAN . . . . .
OTHER BOUNDARY . . . . .
TIE LINES . . . . .
NOT TO SCALE . . . . .
MAJOR CONTOURS . . . . .
MINOR CONTOURS . . . . .
DEPTH SOUNDINGS . . . . . + 00.0
CONCRETE MOORING . . . . . □
JAYCO ANCHOR . . . . .

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

BASIC SEAFLOOR TOPOGRAPHY

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016.

_____ _____
Jeff Nickerson

A&D JOB #149–16–1039

SHEET 3 OF 7 | DATE: October 19, 2016

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 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE MARINE AQUACULTURE SITE AND BASIC SEAFLOOR TOPOGRAPHY, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1–2 & 4–7.

100 0 100 200 300

SCALE – 1 : 5,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

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Nova Scotia, Canada
BOW 3MO

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Nova Scotia, Canada
BOT 1WO

Fax: (902) 648–0185
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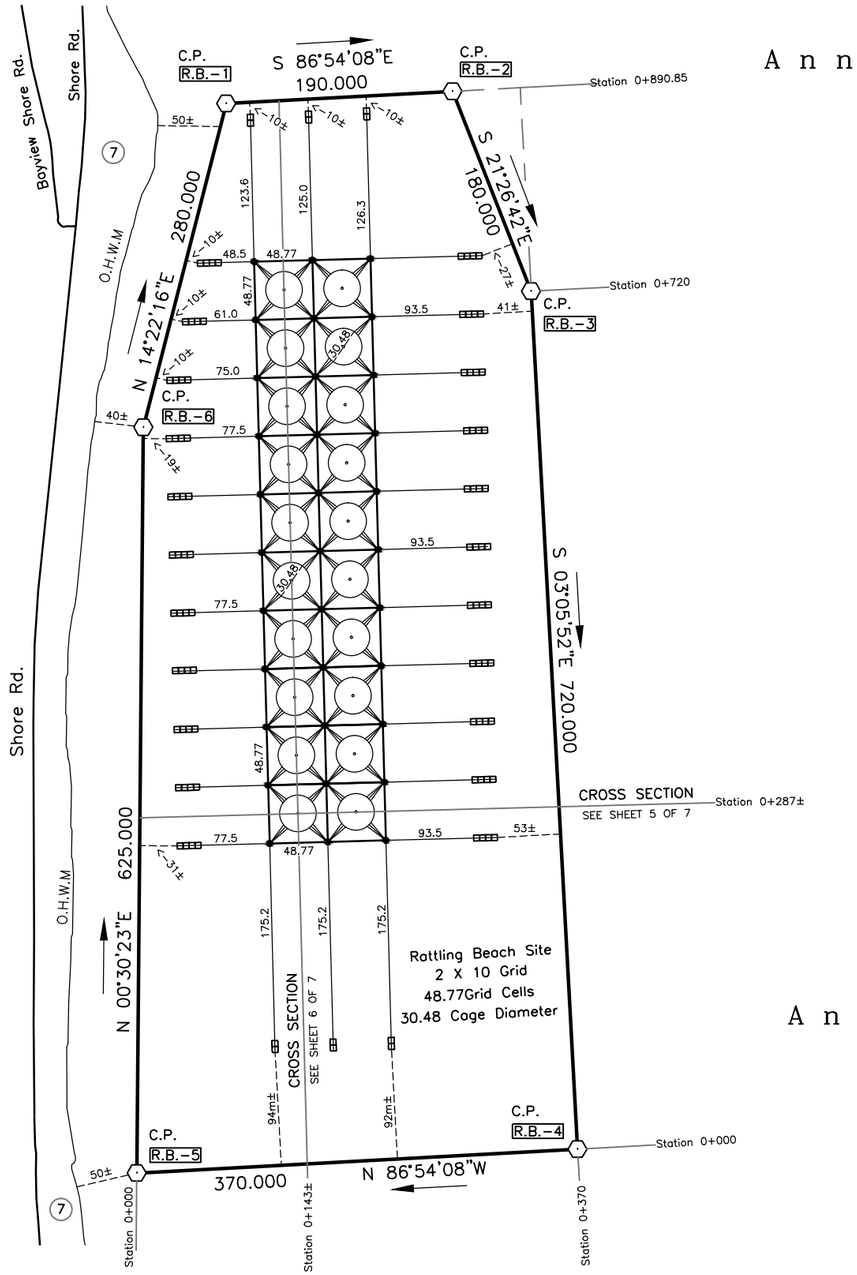
Bay View



SHEET 3 OF 5 NOTES:

(1.) 20 PROPOSED CAGES IN A 2x10 SUNKEN GRID LAYOUT.
(2.) CAGE DIAMETER IS 30.48m.
(3.) GRID SIZE IS 48.77m x 48.77m (160'X160').
(4. THIS PLAN SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
(5.) ANCHOR BLOCKS AND MOORING LINES ARE NOT DRAWN TO SCALE.
(6.) DIMENSIONS OF MOORING SYSTEM SHOWN ARE HORIZONTAL, BASED ON WATER DEPTH AT HIGH TIDE USING A MOORING SCOPE OF 5:1, 1 SHOT OF CHAIN, ANCHOR BLOCKS AND THE DESIRED LENGTH OF POLYSTEEL ROPE EXPRESSED BY THE CLIENT.

SUBSEQUENTLY, THE OFFSETS TO THE LEASE BOUNDARIES ARE HORIZONTAL DISTANCES FROM THE BACK OF THE ANCHOR BLOCK.

A n n a p o l i s B a s i n

(Atlantic Ocean)

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
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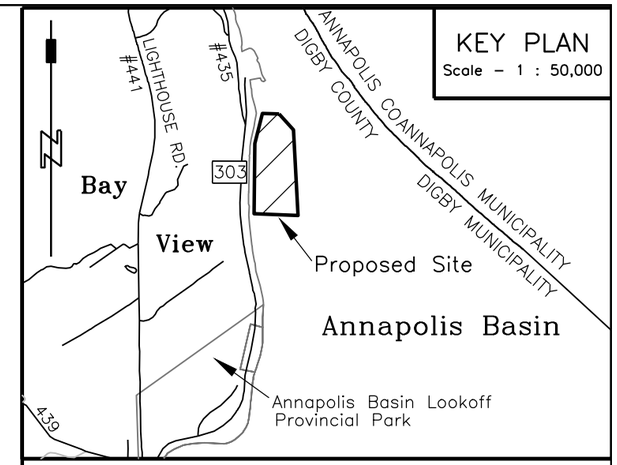
R.B.-6	44°39'18.7731"	65°45'27.0277"

Aquaculture Lease Site
Rattling Beach Aquaculture Site
Kelly Cove Salmon Ltd.
Area = 29.08 hectares

A n n a p o l i s B a s i n

(Atlantic Ocean)



Legend:

CALCULATED POINT . . . . . C.P.
CALCULATED . . . . . (c.)
N.S. PROPERTY IDENTIFICATION NUMBER . . . . . P.I.D. #00000000
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OTHER BOUNDARY
TIE LINES
NOT TO SCALE
MAJOR CONTOURS
MINOR CONTOURS
DEPTH SOUNDINGS . . . . . + 00.0
CONCRETE MOORING . . . . . □
JAYCO ANCHOR

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
EXISTING AQUACULTURE CAGE CONFIGURATION
KELLY COVE SALMON LTD. / RATTLING BEACH
LOCATED AT:
BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
DIGBY COUNTY, NOVA SCOTIA

Client's Statement

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Dated this 19th day of October, 2016.

Jeff Nickerson

A&D JOB #149-16-1039

SHEET 4 OF 7 | DATE: October 19, 2016

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 7)
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

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Nova Scotia, Canada
B0T 1W0
Fax: (902) 648-0185
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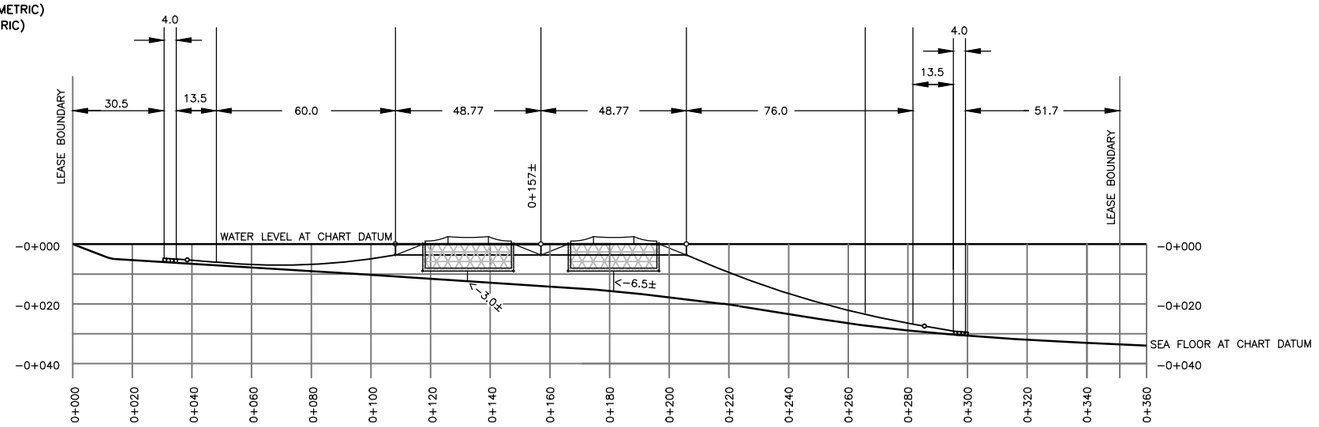
CROSS SECTION

HORIZONTAL SCALE – 1 : 2,000 (METRIC)
VERTICAL SCALE – 1 : 2,000 (METRIC)



40 0 40 80 120

SCALE – 1 : 2,000 (METRIC)

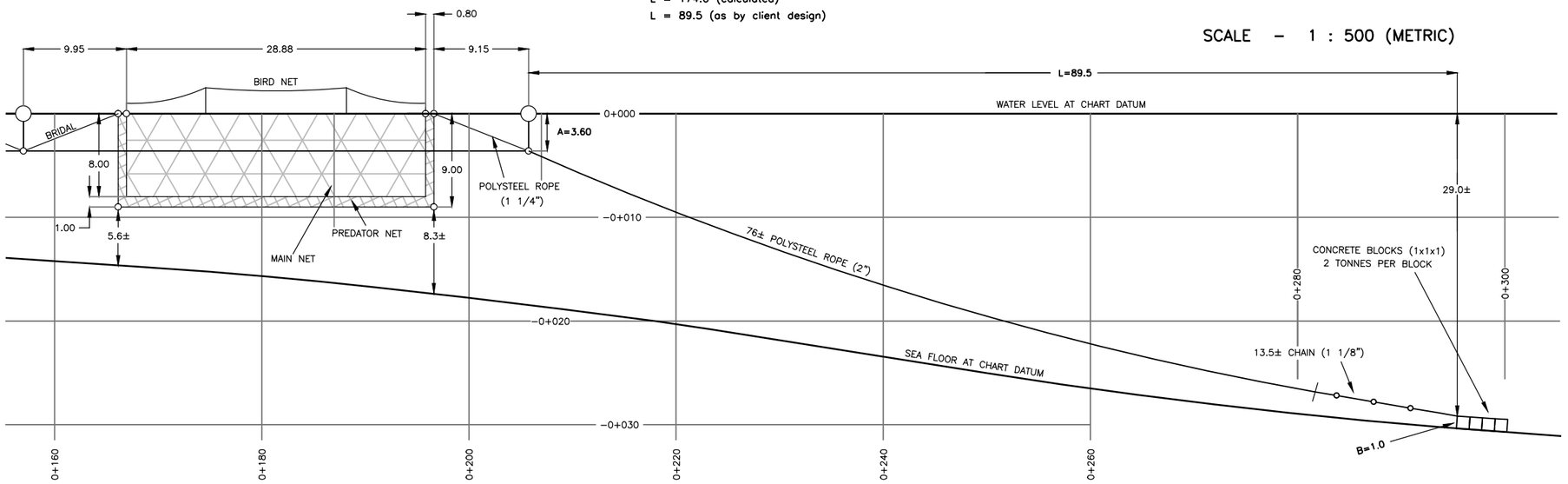
DETAILED CROSS SECTION

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 = [(30± + 9.4) – 3.6 – 1.0] x 5
L = 174.0 (calculated)
L = 89.5 (as by client design)

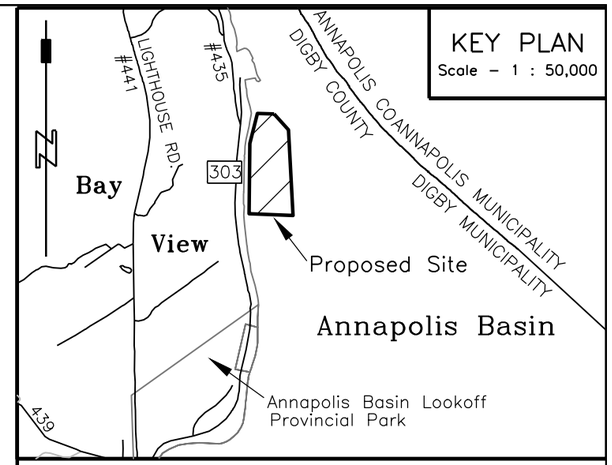
10 0 10 20 30

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
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MAJOR CONTOURS	
MINOR CONTOURS	
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
JAYCO ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

LATERAL CROSS–SECTION

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
DIGBY COUNTY, NOVA SCOTIA

Client's Statement

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Jeff Nickerson

A&D JOB #149–16–1039

SHEET 5 OF 7 | DATE: October 19, 2016

NOTES:

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(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.
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(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 20 NORTH (UTM Z20N).

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 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LATERAL CROSS SECTION AS SHOWN ON SHEET 4 OF 7, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR BLOCKS 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 4 OF 7.
(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

240 Belleville Road, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

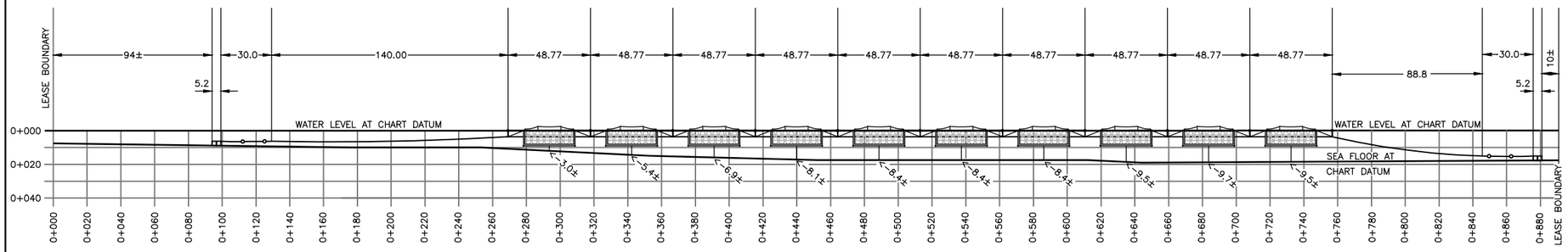
180 Mowatt Street, P.O. Box 154
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Phone: (902) 648–2186
www.adsurveying.ca

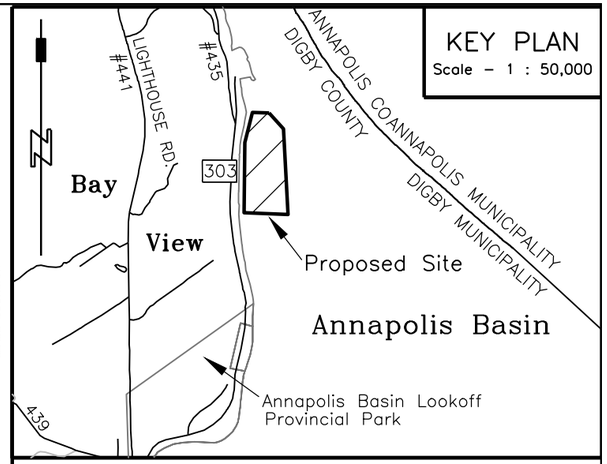
Fax: (902) 648–0185
info@adsurveying.ca

CROSS SECTION

HORIZONTAL SCALE – 1 : 3,000 (METRIC)
VERTICAL SCALE – 1 : 3,000 (METRIC)



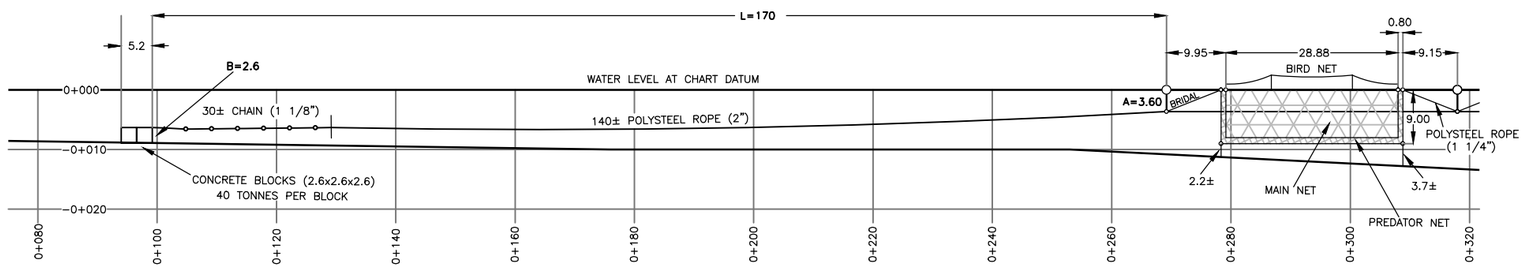
SCALE – 1 : 3,000 (METRIC)

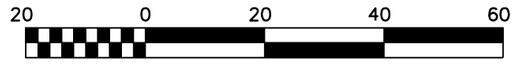


DETAILED CROSS SECTION

HORIZONTAL SCALE – 1 : 1,000 (METRIC)
VERTICAL SCALE – 1 : 1,000 (METRIC)

5:1 Mooring Scope Calculation
L = [(max depth + max tide range) – A – B] x 5
L = [(30± + 9.4) – 3.6 – 2.6] x 5
L = 166.0 (calculated)
L = 170.0 (as by client design)





SCALE – 1 : 1,000 (METRIC)

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

LONGITUDINAL CROSS-SECTION

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
DIGBY COUNTY, NOVA SCOTIA

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	□
JAYCO ANCHOR	

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 19th day of October, 2016

_____
Jeff Nickerson

A&D JOB #149-16-1039

SHEET 6 OF 7 | DATE: October 19, 2016

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 6 OF 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LONGITUDINAL CROSS SECTION AS SHOWN ON SHEET 4 OF 7, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR BLOCKS AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

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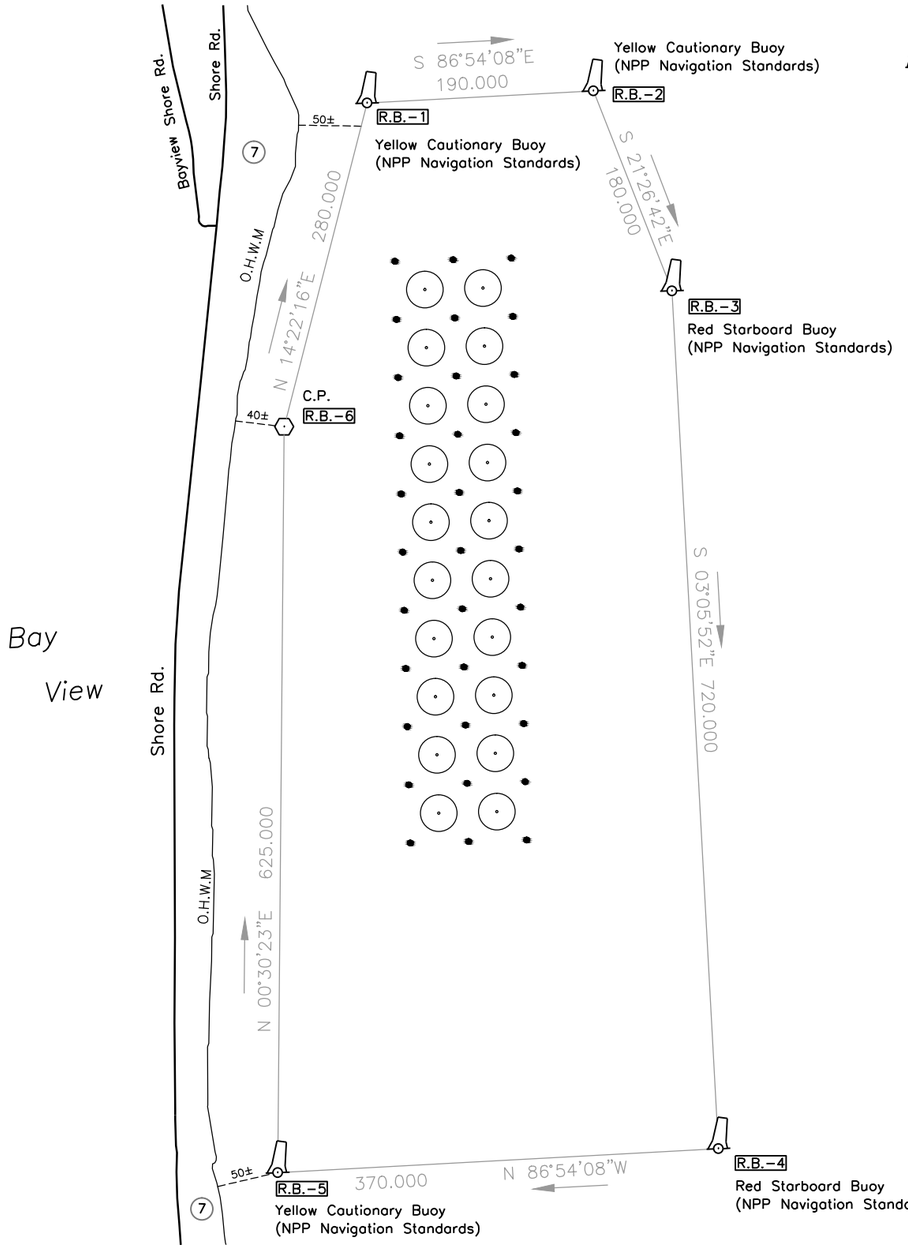


Annapolis Basin

(Atlantic Ocean)

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
R.B.–1	4,948,620.731	281,435.104
R.B.–2	4,948,630.999	281,624.827
R.B.–3	4,948,463.461	281,690.636
R.B.–4	4,947,744.513	281,729.545
R.B.–5	4,947,724.518	281,360.086
R.B.–6	4,948,349.493	281,365.608

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

Point	Latitude (N)	Longitude (W)
R.B.–1	44°39'27.6296"	65°45'24.2922"
R.B.–2	44°39'28.1697"	65°45'15.7031"
R.B.–3	44°39'22.8183"	65°45'12.4616"
R.B.–4	44°38'59.5875"	65°45'09.5951"
R.B.–5	44°38'58.5358"	65°45'26.3187"
R.B.–6	44°39'18.7731"	65°45'27.0277"

Proposed Navigational Aids Marking

Rattling Beach Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 29.08 hectares

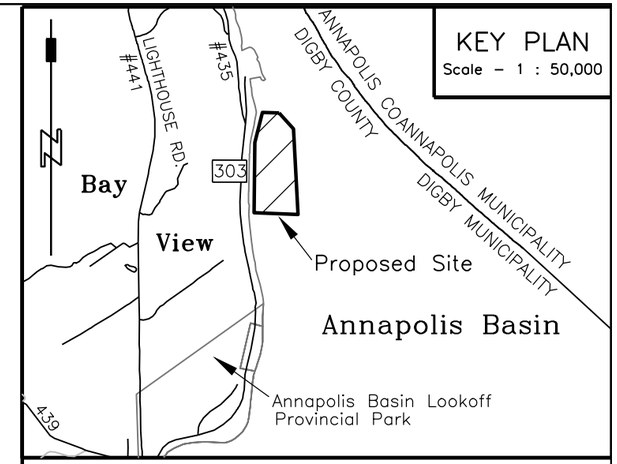
Annapolis Basin

(Atlantic Ocean)

● = compensator buoys (yellow)

⊙ = aquaculture cages (30.48m diameter)

= cautionary buoy (yellow)



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
JAYCO ANCHOR

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED NAVIGATIONAL AIDS MARKING PLAN

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016.

_____ _____

Jeff Nickerso

A&D JOB #149–16–1039

SHEET 7 OF 7 | DATE: October 19, 2016

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 7 OF 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATION AND TYPES OF ALL NAVIGATIONAL AIDS RELATIVE TO THE LEASE BOUNDARIES.

100 0 100 200 300

SCALE – 1 : 5,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

240 Belleville Road, P.O. Box 64
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Appendix D – Transport Canada Approval Package

Transport Canada / Transports Canada

Navigation Protection Program
P.O. Box 42
Moncton, N.B. E1C 8K6

Your file

Our file
8200-94-3045

January 11, 2017

Kelly Cove Salmon Limited
C/O Cooke Aquaculture PO Box 1546
Shelburne, NS B0T 1W0

Attention: Jeff Nickerson

RE: Notice to the Minister under the *Navigation Protection Act* for Approval of an Aquaculture Facility, located at 44° 39' 12.00" N x 065° 45' 22.00" W, Rattling Beach, Annapolis Basin, Annapolis County, in the Province of Nova Scotia

The Minister of Transport has determined under section 5 of the *Navigation Protection Act* (NPA) that your work is likely to substantially interfere with navigation.

Enclosed please find the Approval for the above-noted work issued by the Minister of Transport in accordance with subsection To Be Determined of the NPA.

This permission relates only to the effect of your work on navigation under the NPA and does not grant any rights related to the ownership of the bed of the waterway.

You are reminded that all buoys must conform to the Federal Private Buoy Regulations.

Please note that the NPA, amongst other obligations, requires the owner to immediately notify the Minister if your work causes or is likely to cause serious or imminent danger to navigation and take reasonable measures to remediate the danger to navigation (section 12 of the NPA).

Should you have any questions, please do not hesitate to contact our office in Moncton by phone at (506) 851-3113, by fax at (506) 851-7542 or by e-mail at NPPATL-PPNATL@tc.gc.ca.

Respectfully,

[redacted]

Mélanie LeBlanc
Officer, Navigation Protection Program
Programs Group
Transport Canada
Atlantic Region

Attachments

cc: [redacted] - SIMCorp
[redacted] - SIMCorp
Amanda Spencer – Nova Scotia Department of Fisheries and Aquaculture
Carrie Brayall - CHS

20(1)

Canada

Transport Canada Transports Canada

NAVIGATION PROTECTION ACT
Subsection 6(1) 8200-94-3045

Approval

OWNER: Kelly Cove Salmon Limited
C/O Cooke Aquaculture PO Box 1546
Shelburne, NS B0T 1W0

WORK: **Aquaculture Facility**

SITE LOCATION: Located at Approximately 44° 39' 12.00" N x 065° 45' 22.00" W, Rattling Beach, Annapolis Basin, Annapolis County, Province of Nova Scotia, in the Province of Nova Scotia

Regarding the notice and application to the Minister of Transport, submitted pursuant to the *Navigation Protection Act*, for an approval of a work, the Minister hereby approves the **placement** of the above-described work and the attached plans pursuant to subsection 6(1) in accordance with the following terms and conditions:

1. At all times, all anchorage systems, gear and associated work(s), including anchors, are to be contained within the limits of the marked area and not to extend beyond these boundaries.

2. Buoy markings to be installed and maintained as per Transport Canada conditions outlined on the enclosed Site-specific Marking Plan and Aquaculture Buoy Standard Sheets, at all times aquaculture gear is in the water.

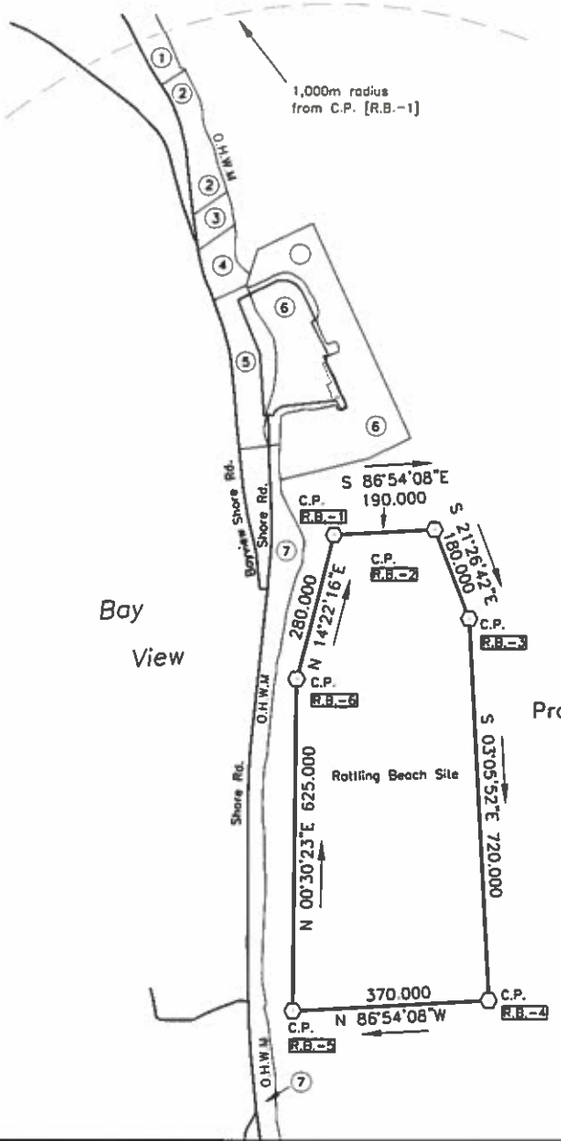
3. In the event that any material or equipment drifts for any reason, it is to be marked immediately with a flashing cautionary light and radar reflector and removed from the waterway or returned to its original location as soon as possible. The Canadian Coast Guard, Marine Communications and Traffic Services (MCTS) Sydney at (902) 564-7751 or toll-free 1-800-686-8676 is to be advised in order to allow for appropriate Notices to Shipping/Mariners action.

SIGNED in two copies on _____ in Moncton, N.B.

[redacted]

Mélanie LeBlanc
Navigation Protection Program Officer
Programs Group
Transport Canada
Atlantic Region
For the Minister of Transport

Canada



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UTM Zone 20N

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R.B.-2	4,948,630.999	281,624.827
R.B.-3	4,948,463.461	281,690.836
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Canadian Spatial Reference System (CSRS)
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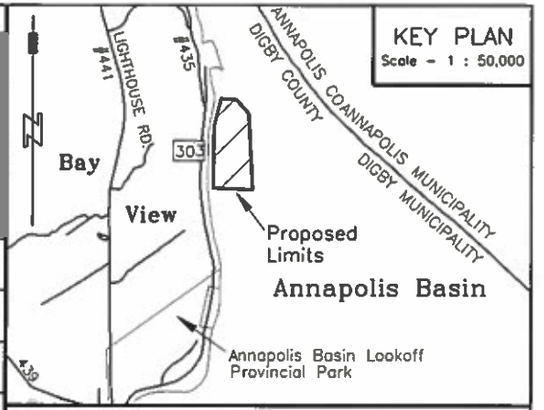
R.B.-6	44°39'18.7731"	65°45'27.0277"

Proposed Navigational Aids Limits
Rattling Beach Aquaculture Site
Kelly Cove Salmon Ltd.
Area = 29.08 hectares

A n n a p o l i s B a s i n
(Atlantic Ocean)

#	P.I.D. #	OWNER / ADDRESS
1	30194823	[redacted]
2	30194807	
3	30286546	
4	30194781	
5	30194799	Crown Land (N.S.) P.O. Box 634 Stn. Central Charlottetown, PEI, C1A 7L3
6	30357008	Crown Land (P.W.G.S.C.) P.O. Box 634 Stn. Central Charlottetown, PEI, C1A 7L3
7	30294185	Road Parcel Bayview Shore Road
8	30130058	Crown Land (D.N.R.) PO Box 698, Halifax, N.S. B3J 2T9



Legend:

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CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
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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	□
JAYCO ANCHOR	⚓

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
PROPOSED NAVIGATION AIDS LIMITS
KELLY COVE SALMON LTD. / RATTLING BEACH
LOCATED AT:
BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016

[redacted]

Jeff Nickerson

Reviewed / Examined
Page 1 of/de 6
11:11 am, Jan 11, 2017
By/par: Mélanie L. LeBlanc
Navigation Protection Program /
Programme de protection de la navigation

A&D JOB #149-16-1039

SHEET 1 OF 7 | DATE: October 19, 2016

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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 1 OF 7)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND TO THE NORTH, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 2 THROUGH 7.

200 0 200 400 600
SCALE - 1 : 10,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

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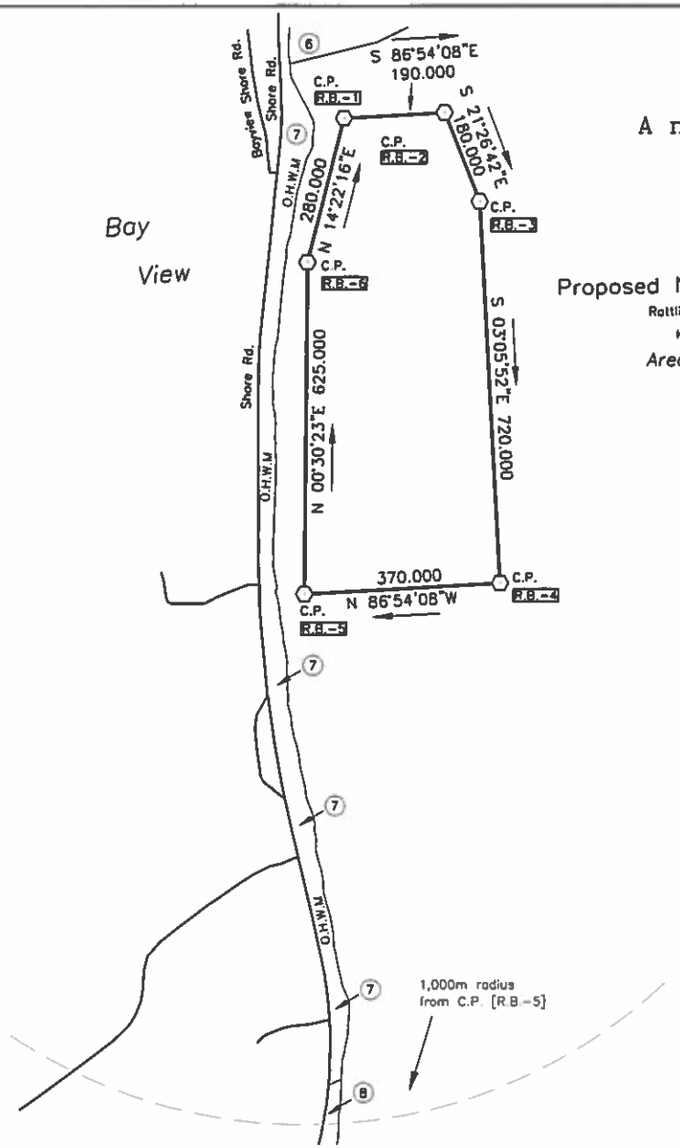

Annapolis Basin

(Atlantic Ocean)

Proposed Navigational Aids Limits

Rattling Beach Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 29.08 hectares

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UTM Zone 20N

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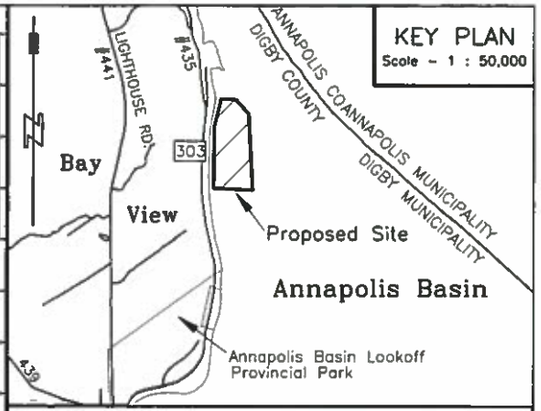
R.B.-3	44°39'22.8183"	65°45'12.4616"
R.B.-4	44°38'59.5875"	65°45'09.5951"
R.B.-5	44°38'58.5358"	65°45'26.3187"
R.B.-6	44°39'18.7731"	65°45'27.0277"

Annapolis Basin

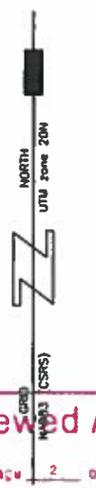
(Atlantic Ocean)

#	P.I.D. #	OWNER / ADDRESS
1	30194823	[redacted]
2	30194807	[redacted]
3	30286546	[redacted]
4	30194781	[redacted]
5	30194799	Crown Land (N.S.) P.O. Box 634 Stn. Central Charlottetown, PEI, C1A 7L3
6	30357008	Crown Land (P.W.G.S.C.) P.O. Box 634 Stn. Central Charlottetown, PEI, C1A 7L3
7	30294185	Road Parcel Bayview Shore Road
8	30130058	Crown Land (D.N.R.) PO Box 698, Halifax, N.S. B3J 2T9



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
- JAYCO ANCHOR



AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

PROPOSED NAVIGATION AIDS LIMITS

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN, 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 19th day of October, 2016

[redacted]

Jeff Nickerson

A&D JOB #149-16-1039

SHEET 2 OF 7 | DATE: October 19, 2016

Reviewed / Examiné

Page 2 of/de 6

11:11 am, Jan 11, 2017

By/par: Mélanie L. LeBlanc

Mélanie L. LeBlanc

Navigation Protection Program

Programme de protection de la navigation

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 20 NORTH (UTM Z20N).

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 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND TO THE SOUTH, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1 AND 3 THROUGH 7.

200 0 200 400 600

SCALE - 1 : 10,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

240 Belleville Road, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

180 Mowatt Street, P.O. Box 154
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Phone: (902) 648-2186
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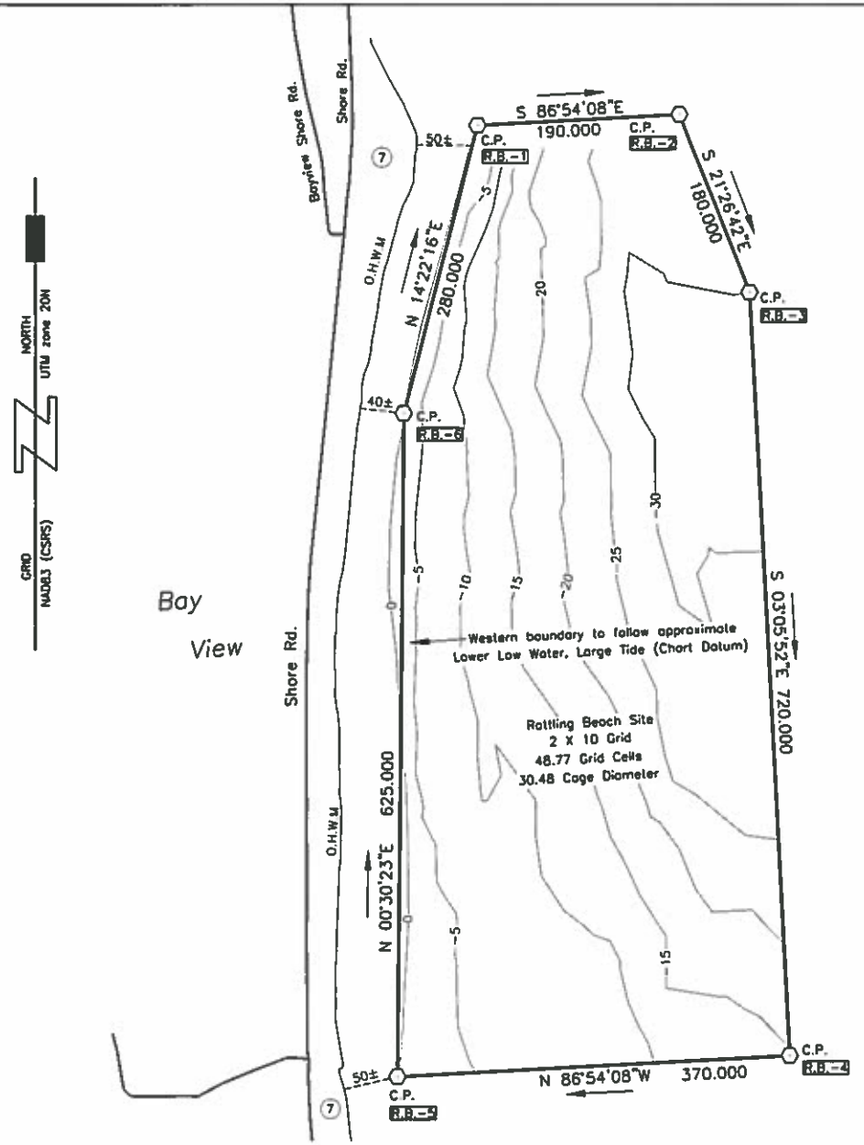
info@adsurveying.ca



Annapolis Basin

(Atlantic Ocean)

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
R.B.-1	4,948,620.731	281,435.104
R.B.-2	4,948,630.999	281,624.827
R.B.-3	4,948,463.461	281,690.636
R.B.-4	4,947,744.513	281,729.545
R.B.-5	4,947,724.518	281,360.086
R.B.-6	4,948,349.493	281,365.608

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

Point	Latitude (N)	Longitude (W)
R.B.-1	44°39'27.6296"	65°45'24.2922"
R.B.-2	44°39'28.1697"	65°45'15.7031"
R.B.-3	44°39'22.8183"	65°45'12.4616"
R.B.-4	44°38'59.5875"	65°45'09.5951"
R.B.-5	44°38'58.5358"	65°45'26.3187"
R.B.-6	44°39'18.7731"	65°45'27.0277"

Aquaculture Lease Site

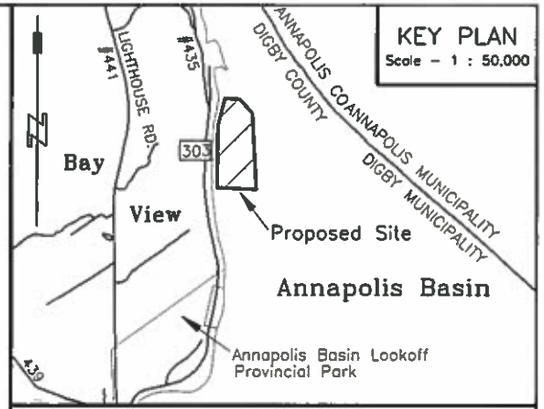
Rattling Beach Aquaculture Site

Kelly Cove Salmon Ltd.

Area = 29.08 hectares

Annapolis Basin

(Atlantic Ocean)



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	□
JAYCO ANCHOR	⚓

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

BASIC SEAFLOOR TOPOGRAPHY

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016.

[redacted]

Jeff Nickerson

Reviewed / Examiné
Page 3 of/de 6
11:11 am, Jan 11, 2017
By/par: Mélanie L. LeBlanc
Navigation Protection Program
Programme de protection de la navigation

A&D JOB #149-16-1039

SHEET 3 OF 7 | DATE: October 19, 2016

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).
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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 C.H.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 20 NORTH (UTM Z20N).

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 7)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE MARINE AQUACULTURE SITE AND BASIC SEAFLOOR TOPOGRAPHY. FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1-2 & 4-7.

100 0 100 200 300

SCALE - 1 : 5,000 (METRIC)

Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

240 Belleville Road, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
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180 Mowatt Street, P.O. Box 154
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B0T 1W0

Phone: (902) 648-2186
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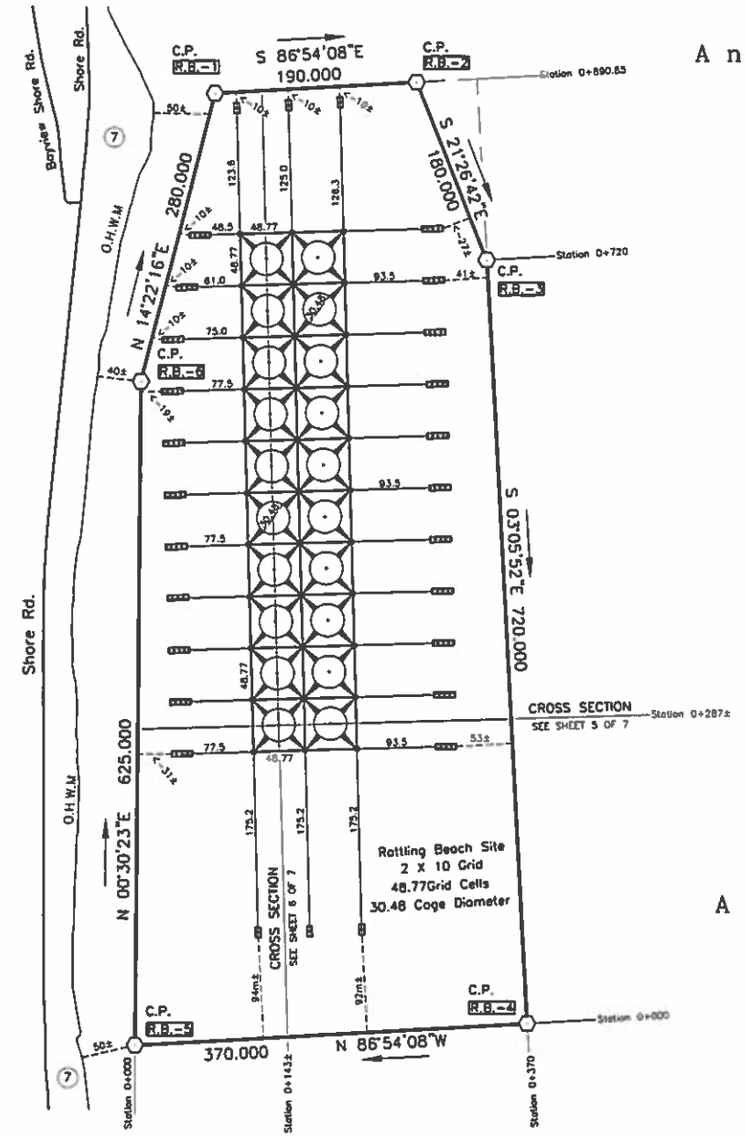
Fax: (902) 648-0185
info@adsurveying.ca



SHEET 3 OF 5 NOTES:

(1.) 20 PROPOSED CAGES IN A 2x10 SUNKEN GRID LAYOUT.
(2.) CAGE DIAMETER IS 30.48m.
(3.) GRID SIZE IS 48.77m x 48.77m (160'X160').
(4.) THIS PLAN SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
(5.) ANCHOR BLOCKS AND MOORING LINES ARE NOT DRAWN TO SCALE.
(6.) DIMENSIONS OF MOORING SYSTEM SHOWN ARE HORIZONTAL, BASED ON WATER DEPTH AT HIGH TIDE USING A MOORING SCOPE OF 5:1, 1 SHOT OF CHAIN, ANCHOR BLOCKS AND THE DESIRED LENGTH OF POLYSTEEL ROPE EXPRESSED BY THE CLIENT.

SUBSEQUENTLY, THE OFFSETS TO THE LEASE BOUNDARIES ARE HORIZONTAL DISTANCES FROM THE BACK OF THE ANCHOR BLOCK.

Annapolis Basin
(Atlantic Ocean)

NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
R.B.-1	4,948,620.731	281,435.104
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R.B.-3	4,948,463.461	281,690.636
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NAD83 Reference Frame (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
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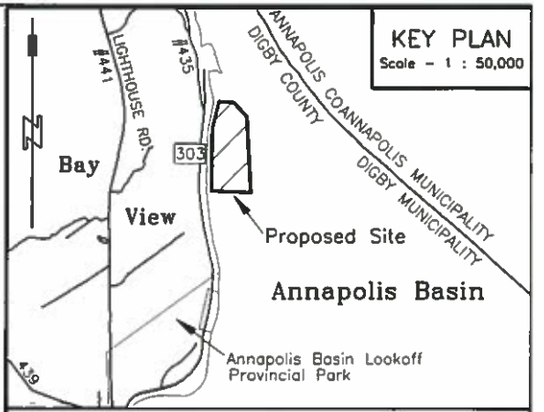
R.B.-4	44°38'59.5875"	65°45'09.5951"
R.B.-5	44°38'58.5358"	65°45'26.3187"
R.B.-6	44°39'18.7731"	65°45'27.0277"

Aquaculture Lease Site
Rattling Beach Aquaculture Site
Kelly Cove Salmon Ltd.
Area = 29.08 hectares

Annapolis Basin
(Atlantic Ocean)

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	□
JAYCO ANCHOR	

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

EXISTING AQUACULTURE CAGE CONFIGURATION

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN, 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 19th day of October, 2016

[redacted]
Jeff Nickerson

A&D JOB #149-16-1039

SHEET 4 OF 7 | DATE: October 19, 2016

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 20 NORTH (UTM Z20N).

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 7)

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

240 Belleville Road, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

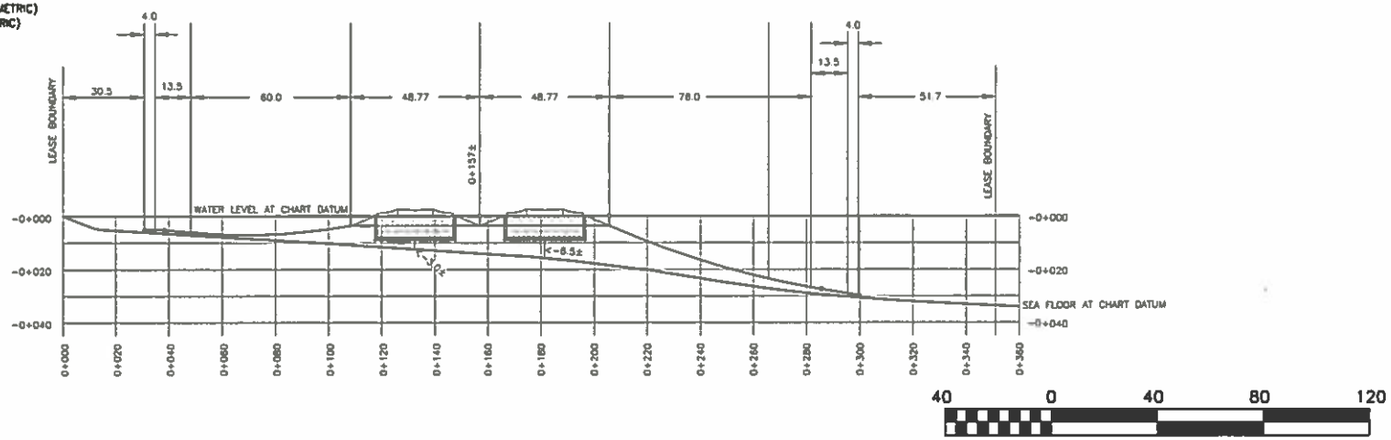
180 Mowatt Street, P.O. Box 154
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Phone: (902) 648-2156
www.adsurveying.ca

Fax: (902) 648-2155
info@adsurveying.ca

CROSS SECTION

HORIZONTAL SCALE = 1 : 2,000 (METRIC)
VERTICAL SCALE = 1 : 2,000 (METRIC)



40 0 40 80 120

SCALE – 1 : 2,000 (METRIC)

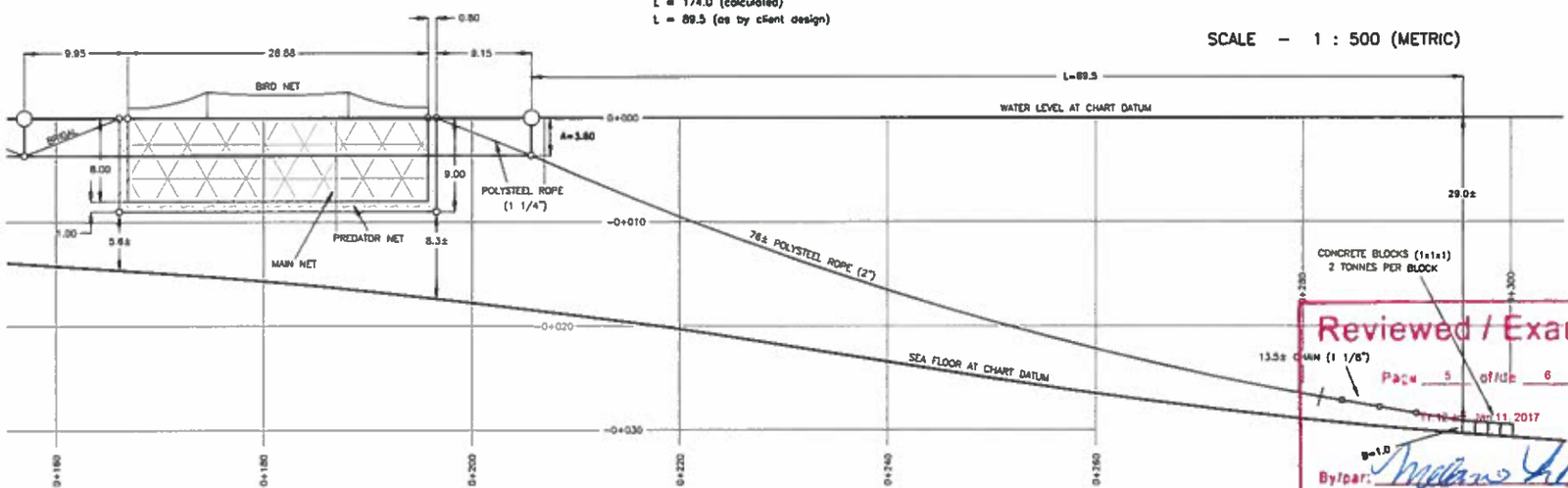
DETAILED CROSS SECTION

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 = [(30± + 9.4) – 3.6 – 1.0] x 5
L = 174.0 (calculated)
L = 89.5 (as by client design)

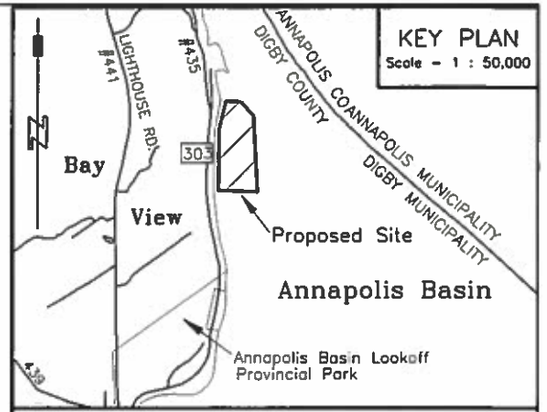
10 0 10 20 30

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	□
JAYCO ANCHOR	⅄

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING

LATERAL CROSS-SECTION

KELLY COVE SALMON LTD. / RATTLING BEACH

LOCATED AT:

BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN, 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 19th day of October, 2016

[redacted]

Jeff Nickerson

A&D JOB #149-16-1039

SHEET 5 OF 7 | DATE: October 19, 2016

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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(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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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 7)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LATERAL CROSS SECTION AS SHOWN ON SHEET 4 OF 7, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR BLOCKS 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 4 OF 7.
(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

240 Belleville Road, P.O. Box 64
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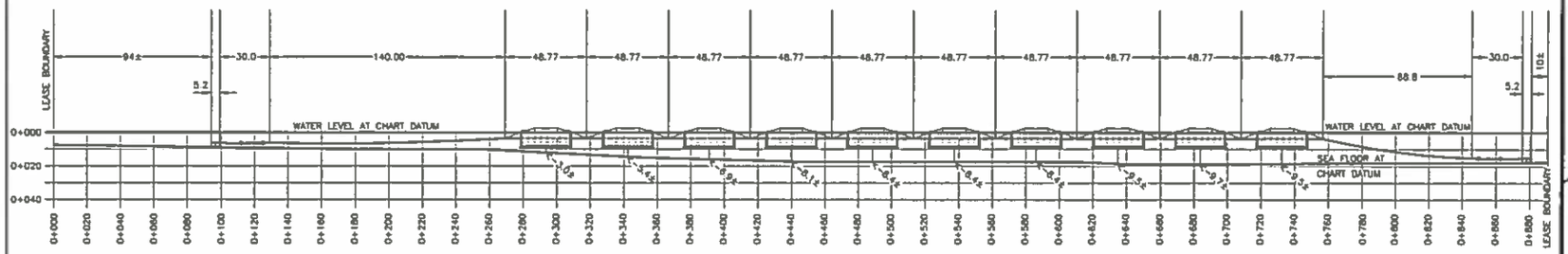
B0W 3M0

180 Mowatt Street, P.O. Box 154
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Phone: (902) 648-2186
www.adsurveying.ca

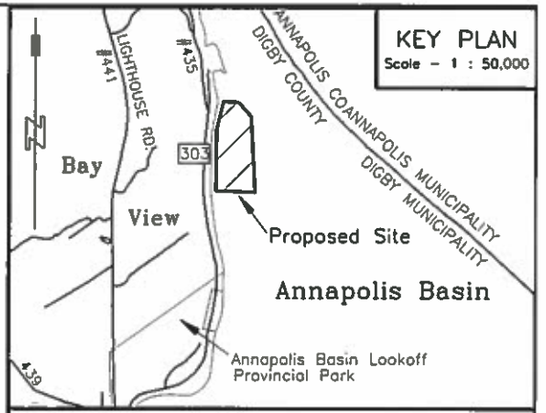
Fax: (902) 648-0165
info@adsurveying.ca

CROSS SECTION
HORIZONTAL SCALE – 1 : 3,000 (METRIC)
VERTICAL SCALE – 1 : 3,000 (METRIC)



60 0 60 120 180

SCALE – 1 : 3,000 (METRIC)

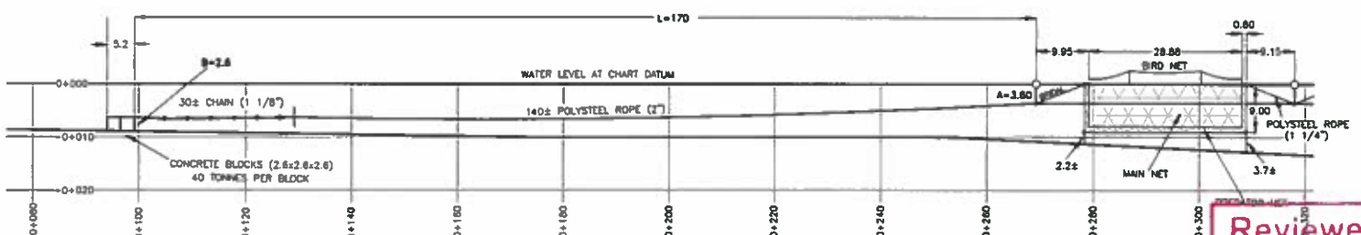


Legend:

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	□
JAYCO ANCHOR	⁂

DETAILED CROSS SECTION
HORIZONTAL SCALE – 1 : 1,000 (METRIC)
VERTICAL SCALE – 1 : 1,000 (METRIC)

5:1 Mooring Scope Calculation
L = [(max depth + max tide range) – A – B] x 5
L = [(30± + 9.4) – 3.6 – 2.6] x 5
L = 168.0 (calculated)
L = 170.0 (as by client design)



20 0 20 40 60

SCALE – 1 : 1,000 (METRIC)

Reviewed / Examiné
Page 6 of/de 6
11:12 am, Jan 30, 2017
By/par: Mélanie L. LeBlanc
Navigation Protection Program
Programme de protection de la navigation

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
LONGITUDINAL CROSS-SECTION
KELLY COVE SALMON LTD. / RATTLING BEACH
LOCATED AT:
BAY VIEW (RATTLING BEACH), ANNAPOLIS BASIN,
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 19th day of October, 2016.

[redacted]
Jeff Nickerson

A&D JOB #149-16-1039

SHEET 6 OF 7 | DATE: October 19, 2016

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 20 NORTH (UTM Z20N).

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 7)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LONGITUDINAL CROSS SECTION AS SHOWN ON SHEET 4 OF 7, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR BLOCKS 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 4 OF 7.
(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).

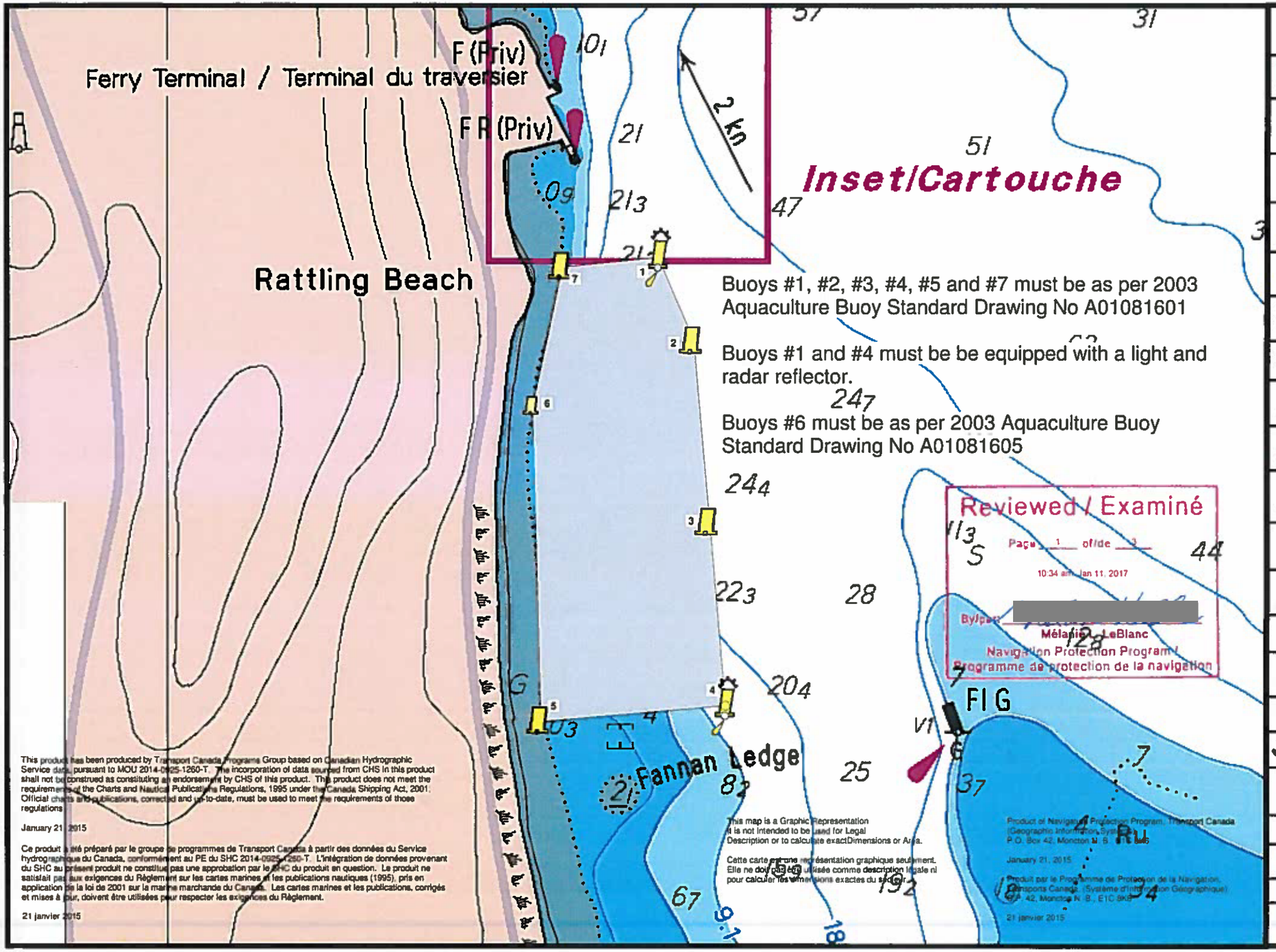
Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors

240 Belleville Road, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

180 Mowatt Street, P.O. Box 154
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Phone: (902) 648-2186
www.adsurveying.ca

Fax: (902) 545-0185
info@adsurveying.ca



Aquaculture Gear and Buoy Types
Types de bouées et de matériel d'aquaculture

Aquaculture Gear / Matériel d'aquaculture	No Gear / Sans matériel

Buoy/Bouée	see drawing/ voir dessin
Lighted Yellow Cautionary Spar/ Espar d'avertissement jaune lumineux	
Yellow Cautionary Spar/ Espar d'avertissement jaune	
Yellow Cautionary Intermediate/ Bouée intermédaire d'advertissement	
Port Hand Intermediate/ Bouée de bâbord intermédaire	
Starboard Hand Intermediate/ Bouée de tribord intermédaire	
Lighted Port Hand Spar/ Bouée de bâbord lumineuse	
Port Hand Spar/ Bouée de bâbord	
Lighted Port Bifurcation/ Bouée de bifurcation de bâbord lumineuse	
Port Bifurcation/ Bouée de bifurcation de bâbord	
Lighted Starboard Hand Spar/ Espar de tribord lumineux	
Starboard Hand Spar/ Espar de tribord	
Lighted Starboard Bifurcation/ Bouée de bifurcation de tribord lumineuse	
Starboard Bifurcation/ Bouée de bifurcation de tribord	
Radar Reflector/ Réflecteur radar (when indicated/ ou indicatif)	

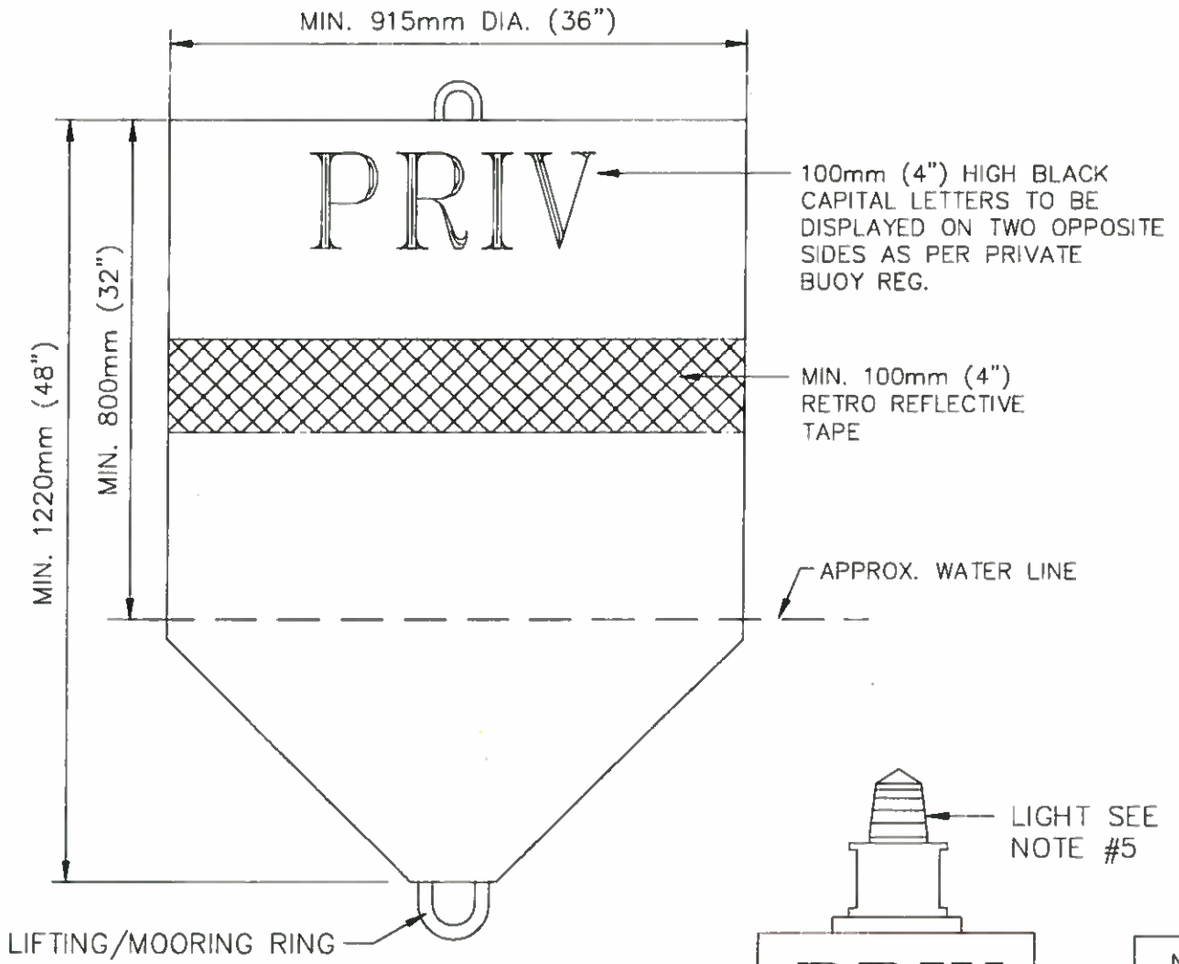
Navigation Protection/Protection de la Navigation
Site Specific Marking Plan/ Plan de Marque Spécifique du Site 1039

NPP/PPN #: 8200-94-3045

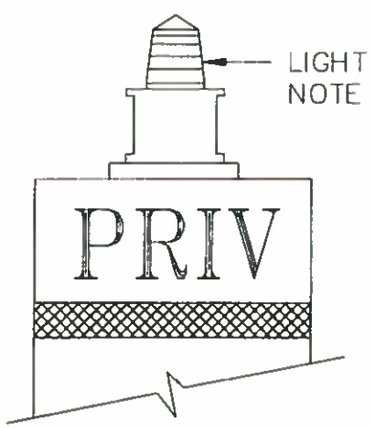
Annapolis Basin, Nova Scotia

If you have any questions contact your nearest NP Officer
Si vous avez des questions, contactez l'Agent de PN pour votre région

Transport Canada **Transports Canada**



TYPICAL AQUACULTURE BUOY



LIGHT DETAIL

- [x] YELLOW BUOYS #CGSB 505-108
- [x] WITH LIGHT (SEE NOTES/DETAILS)
  - ( ) 1 N.M.
  - ( ) 2 N.M.

x buoy # land #4

- [x] RADAR REFLECTOR

- [ ] RED BUOY WITH CONICAL TOP MARK #CGSB 509-102
- [ ] WITH LIGHT (SEE NOTES/DETAILS)
  - ( ) 1 N.M.
  - ( ) 2 N.M.
- [ ] RADAR REFLECTOR

- [ ] GREEN BUOY #CGSB-503-107
- [ ] WITH LIGHT (SEE NOTES/DETAILS)
  - ( ) 1 N.M.
  - ( ) 2 N.M.
- [ ] RADAR REFLECTOR

NOTES:

THE BUOY CAN BE MADE OF ANY MATERIAL. ei STYROFOAM, PLASTIC ETC. THE DIMENSIONS OF THE BUOY ARE THE MINIMUM SIZE REQUIRED THERE IS NO MAXIMUM SIZE.

THE SPACING BETWEEN THE BUOYS IS THE MAXIMUM. THEY CAN BE SPACED AT CLOSER INTERVALS IF REQUIRED BY THE PROPONENT.

Reviewed / Examiné
Page 2 of/de 3
11:40 am, Jan 11, 2017
By/par: [redacted]
Mélanie L. LeBlanc
Navigation Protection Program / Programme de protection de la navigation

NOTE:

AS PER THE FEDERAL PRIVATE BUOY REGULATIONS THE BUOY & ITS MOORING SHALL BE CONSTRUCTED & MAINTAINED IN SUCH A MANNER & WITH SUCH MATERIALS AS WILL REASONABLY ENSURE THAT IT WILL RELIABLY REMAIN IN POSITION & DISPLAY ITS INTENDED COLOR.

- REFER TO SITE SPECIFIC MARKING PLAN

NOTES:

AQUACULTURE BUOY

1. BUOY COLOR TO BE AS PER CGSB SPECIFICATIONS INDICATED.
2. RETROREFLECTIVE MATERIAL TO CGSB-62-GP-11M (3M SCOTCHLITE SERIES #5800 OR EQUIVALENT PRODUCT)
   STRIPES TO BE AROUND THE ENTIRE DIAMETER AND SAME COLOR AS BUOY.
3. BUOYS TO BE SPACED A MAX. OF 400m (1300') APART. NAME, ADDRESS, TELEPHONE# AND LEASE# OF OWNER IN A CONSPICUOUS PLACE AND IN CONTRASTING COLOUR ON THE BUOY.
4. BUOYS MUST FLOAT IN UPRIGHT POSITION SHOWN UNDER NORMAL CONDITIONS.
5. IT WILL BE THE OWNERS RESPONSIBILITY TO ENSURE THE LIGHT IS MAINTAINED AND OPERATING AS REQUIRED.
   CONICAL TOP MARK NOT REQUIRED IF LIGHT INSTALLED.
   WHERE REQUIRED, ALL LIGHTS SHALL BE THE SAME COLOUR AS THE BUOYS
   -FL 0.5S Ec 3.5S, OR_____
   -NOMINAL RANGE AS INDICATED.
   -DISPLAYED CONTINUOUS FROM DUSK TO DAWN.

NAVIGABLE WATERS PROTECTION

TRANSPORT CANADA

2003 AQUACULTURE BUOY STANDARD

36" LEASE CORNER AQUACULTURE BUOY

DATE	DRAWN	CHECKED	APPR.
28/01/02	DAN MacNEIL		
SCALE	REFERENCE	DRAWING NO.	SHT.
N.T.S.		A1081601	___of___

NOTES:

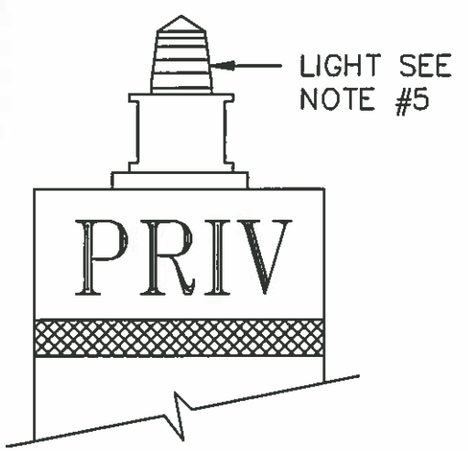
THE BUOY CAN BE MADE OF ANY MATERIAL. ei STYROFOAM, PLASTIC ETC. THE DIMENSIONS OF THE BUOY ARE THE MINIMUM SIZE REQUIRED THERE IS NO MAXIMUM SIZE.

THE SPACING BETWEEN THE BUOYS IS THE MAXIMUM. THEY CAN BE SPACED AT CLOSER INTERVALS IF REQUIRED BY THE PROPONENT.

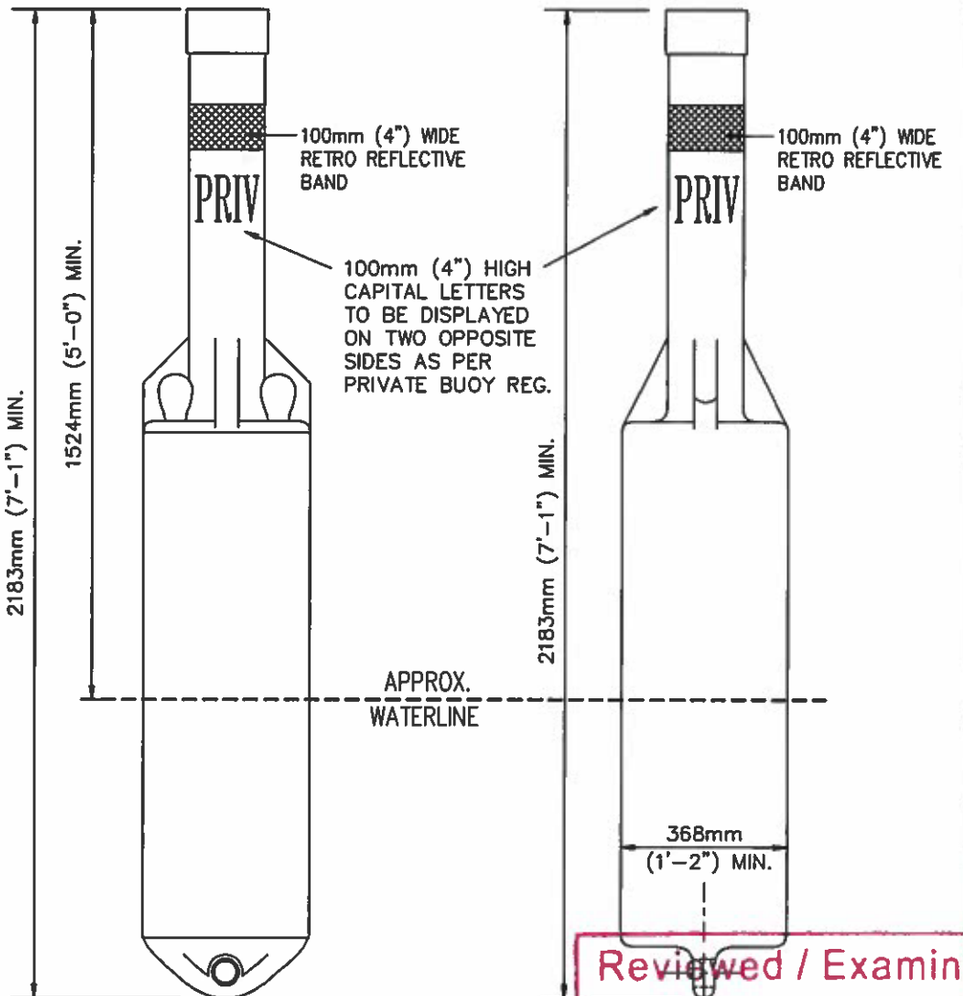
☐ YELLOW BUOY

☐ WITH LIGHT (SEE NOTES/DETAILS)
( ) 1 N.M.
( ) 2 N.M.

☐ RADAR REFLECTOR



LIGHT DETAIL



NOTE:
AS PER THE FEDERAL PRIVATE BUOY REGULATIONS THE BUOY & ITS MOORING SHALL BE CONSTRUCTED & MAINTAINED IN SUCH A MANNER & WITH SUCH MATERIALS AS WILL REASONABLY ENSURE THAT IT WILL RELIABLY REMAIN IN POSITION & DISPLAY ITS INTENDED COLOR.

- REFER TO SITE SPECIFIC MARKING PLAN

NOTES:

SPAR AQUACULTURE BUOY

1. BUOY COLOR TO BE AS PER CGSB SPECIFICATIONS INDICATED.
2. RETROREFLECTIVE MATERIAL TO CGSB-62-GP-11M (3M SCOTCHLITE SERIES #5800 OR EQUIVALENT PRODUCT)
   STRIPES TO BE AROUND THE ENTIRE DIAMETER AND SAME COLOR AS BUOY.
3. SPAR BUOYS TO BE SPACED A MAX. OF 400m (1300') APART. NAME, ADDRESS, TELEPHONE# AND LEASE# OF OWNER IN A CONSPICUOUS PLACE AND IN CONTRASTING COLOUR ON THE BUOY.
4. BUOYS MUST FLOAT IN UPRIGHT POSITION SHOWN UNDER NORMAL CONDITIONS.
5. IT WILL BE THE OWNERS RESPONSIBILITY TO ENSURE THE LIGHT IS MAINTAINED AND OPERATING AS REQUIRED.
   WHERE REQUIRED, ALL LIGHTS SHALL BE THE SAME COLOUR AS THE BUOYS.
   -FL 0.5S Ec 3.5S, OR _____
   -NOMINAL RANGE AS INDICATED.
   -DISPLAYED CONTINUOUS FROM DUSK TO DAWN.

NAVIGABLE WATERS PROTECTION

TRANSPORT CANADA

2003 AQUACULTURE BUOY STANDARD

YELLOW NAVIGATION AQUACULTURE BUOYS

DATE	DRAWN	CHECKED	APPR.
05/09/03	DAN MacNEIL		
SCALE N.T.S.	REFERENCE	DRAWING NO. A1081605	SHT. ___of___

Appendix E – Wildlife Interaction Plan

Wildlife Interaction Plan

for Salmon Farms in North America

Cooke Aquaculture Inc.

This Wildlife Interaction Plan (WIP) has been created to meet the requirements for Section 7 Environment – Predator and Wildlife Interactions of the Best Aquaculture Practices (BAP) Salmon Farms Standard. The guidance and practice herein have and will continue to be followed by all North American employees of Cooke Aquaculture who are employed in the Saltwater Division and those who directly interact with the salmon farms. This plan merely acts as an overall summary of the current requirements that each salmon farm must follow and in the effect of any conflict of information or direction between this document and the requirements, the requirements will prevail.

Table of Contents

List of Appendices

Section 1; Local Laws and Regulations for Wildlife Management and Protection

1.1 Canadian Federal Legislation

1.1.1 **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 as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened.*[1]

1.1.2 **Fisheries Act, 2012** - *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.*[2] *Subsection 35(1) is a general prohibition of harmful alteration, disruption or destruction (HADD) of fish habitat.*[3]

1.1.3 **Aquaculture Activities Regulations, 2015 –** *Fisheries and Oceans Canada has developed the Aquaculture Activities Regulations (AAR), 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. The Regulations are designed to align with policies and regulatory regimes that already exist in provincial and other federal jurisdictions through codification of these measures, while providing further clarification with the addition of AAR-specific conditions. Reconciling and clarifying aquaculture-related regulations will improve coherence, simplicity and accountability. The Regulations will also increase operational certainty across Canada, improve environmental protection, and increase reporting with the intention of strengthening public confidence.*[4]

1.1.4 ***Health of Animals Act, 2015 –*** *The Canadian Food Inspection Agency may, for the purposes of fish pathogen or pest control and the Health of Animals Act, deposit a deleterious substance as defined in the AAR.*[5]

1.1.5 **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.* [6]

1.1.6 **Oceans Act, 1997** - *Canada made a legal commitment to conserve, protect and develop the oceans in a sustainable manner.*[7]

1.1.7 **Migratory Birds Convention Act, 1994** - *Protecting and conserving Migratory Birds*

1.1.8 **Canadian Environmental Protection Act, 1999** - *An Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development.*[8]

1.1.9 **Marine Mammal Regulations, 2010 -** *These Regulations apply in respect of the management and control of (a) fishing for marine mammals and related activities in Canada or in Canadian fisheries waters; and (b) fishing for marine mammals from Canadian fishing vessels in the Antarctic.*[9]

1 Species at Risk Act (S.C. 2002, c. 29), Section 6 – "Purposes"

2 http://www.dfo-mpo.gc.ca/habitat/role/141/1415/14151-eng.htm

3 http://www.dfo-mpo.gc.ca/habitat/role/141/1415/14151-eng.htm

4 http://www.dfo-mpo.gc.ca/acts-lois/rules-reglements/rule-reglement06-eng.htm

5 Aquaculture Activities Regulations, SOR/2015-177, Section 17 (2) – "Canadian Food Inspection Agency"

6 Canadian Environmental Assessment, 2012 Section 37 – "Exemption"

7 http://www.dfo-mpo.gc.ca/oceans/management-gestion/governmentsrole-roledesgouvernements/index-eng.htm

8 Canadian Environmental Protection Act, 1999, c. 33, Section "Introduction"

9 Marine Mammal Regulations, Current to April 28, 2010, Section 3 – "Application"

1.2 Canadian Provincial Legislation

1.2.1 New Brunswick

1.2.1.1 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]

1.2.1.2 NB Fish and Wildlife Act, 1980 - *"This Act applies to all hunting and angling and rights of hunting and angling, and all matters relating thereto, except that this Act, and any lease, licence, permit or regulation issued or made hereunder, shall not authorize or be deemed to authorize any interference with the navigation of any navigable water."*[2]

1.2.1.3 NB Crown Lands and Forests Act, 1980 - *"The Minister is responsible for the development, utilization, protection and integrated management of the resources of Crown Lands, including habitat for the maintenance of fish and wildlife populations."*[3]

1.2.1.4 NB Clean Environment Act, 1973 - *"The Clean Environment Act contains many regulations that are centred on dealing with materials and actions that can contaminate the physical environment. It includes above and below surface level."*[4]

1.2.1.5 NB Clean Water Act, 1989 - *Governs water quality in the Province of New Brunswick*

1.2.1.6 NB Clean Air Act, 1997 - *"The purpose of this Act and the regulations is to support and promote the protection, restoration, enhancement and wise use of the environment…"*[5]

1 Species at Risk Act (S.N.B. 2012, c. 6), Section "Purposes"

2 Fish and Wildlife Act (S.N.B. 1980, c. F-14.1), Section 2

3 *Crown Lands and Forests Act, SNB 1980, c C-38., Section "General Administration"*

4 http://en.wikipedia.org/wiki/New_Brunswick_environmental_legislation

5 *Clean Air Act, SNB 1997, c C-5.2, Section "Purpose of Act and Regulations"*

1.2.2 Nova Scotia

1.2.2.1 Wildlife Act, 1989 - *Develop and implement policies and programs for wildlife designed to maintain diversity of species at levels of abundance to meet management objectives*[1]

1.2.2.2 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*[2]

1.2.2.3 Special Places Protection Act, 1989 - *Provide for the preservation, protection, regulation, acquisition and study of ecological sites which are considered important parts of the natural heritage of the Province.*[3]

1.2.2.4 Fisheries and Coastal Resource Act, 1996 - *This act is the primary piece of legislation for the Department of Fisheries and Aquaculture. It gives authority for most of the Department's functions and activities. These include: recreational fishing, sea plant harvesting, training and development, licensing of buyers and processors, aquaculture, the Fisheries and Aquaculture Loan Board, and enforcement.*[4]

1.2.2.5 Aquaculture Regulations, 2015 – *Regulations under the Fisheries and Coastal Resource Act for the management and development of the aquaculture industry – specifically regarding aquaculture management and licensing.*

1 *Wildlife Act*. R.S., c. 504, s. 2., Section 2 – "Object and Purpose"

2 *NS Endangered Species Act, Section 2*

3 Special Places Protection Act. R.S., c. 438, s. 1, Section 2

4 http://novascotia.ca/fish/aquaculture/laws-regs/

1.2.3 Newfoundland

1.2.3.1 NL Endangered Species Act, 2001 - *"Provides special protection for plant and animal species considered to be endangered, threatened, or vulnerable in the province…"*[1]

1.2.3.2 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."*[2]

1 http://www.env.gov.nl.ca/env/wildlife/endangeredspecies/

2 Wilderness and Ecological Reserves Act, "subtitle"

1.3 United States Federal Legislation

1.3.1 The Migratory Bird Treaty Act of 1918 (Title 16 U.S. Code Sections 703 to 711) - *Wildlife Protection*

1.3.2 Endangered Species Act (Title 16 U.S. Code Sections 1531 to 1544) - *Wildlife Protection*

1.3.3 Clean Water Act (Title 33 U.S. Code Sections 1251 to 1376) - *Indirectly protects wildlife, protects habitat*

1.3.4 Coastal Zone Management Act (Title 16 U.S. Code Sections 1451 to 1464) - Indirectly protects wildlife, protects habitat

1.3.5 Nonindigenous Aquatic Nuisance Prevention and Control Act (Title 16 U.S. Code Sections 4701 to 4751) - *Indirectly protects wildlife, protects habitat*

1.3.6 Federal Agricultural Improvement and Reform Act of 1996 (Public Law No. 104-127) - *Indirectly protects wildlife, protects habitat*

1.4 State of Maine Legislation

1.4.1 Maine Endangered Species Act (Title 12 M.R.S.A Sections 7751 to 7759) - *Wildlife protection*

1.4.2 Natural Resources Protection Act (Title 38 M.R.S.A Section 480) - *Indirectly protects wildlife, protects habitat*

1.4.3 Coastal Management Policy (Title 38 M.R.S.A Sections 1801 to 1803) - *Indirectly protects wildlife, protects habitat*

1.4.4 Shoreland Zoning Ordinance (Title 38 M.R.S.A. Sections 435 to 447) - *Indirectly protects wildlife, protects habitat*

1.4.5 Maine's Rivers Law (Title 12 M.R.S.A. Sections 401 to 407) - *Indirectly protects wildlife, protects habitat*

1.4.6 Water Pollution Control Law (Title 38 M.R.S.A. Sections 411 to 424) - *Indirectly protects wildlife, protect habitat*

1.4.7 Interstate Water Pollution Control (Title 38 M.R.S.A. Sections 491 to 501)

Section 2; Specific Conditions of Operating Permits for Wildlife Management and Protection

2.1 New Brunswick

2.1.1 **License:** Schedule A – Operating Terms and Conditions; this license may be suspended or revoked should the licensee fail to comply with the *Clean Water Act,* the *Clean Environment Act*, the *Crown Lands and Forests Act*, *the Public Health Act,* the *Seafood Processing Act*, the *Fish and Wildlife Act,* the Federal *Fisheries Act,* the Federal *Navigable Waters Protection Act*, or any other applicable law.

2.1.2 **Approval to Operate:** Schedule A; the Approval Holder, operator or any person in charge of the Facility shall **immediately** report to the New Brunswick Department of the Environment where: (a) There has been, or is likely to be, an unauthorized release of solid, liquid or gaseous material including wastewater, petroleum or hazardous materials, to the environment; (b) There has been a violation of the *Air Quality Regulation,* the *Water Quality Regulation* or any Approval issued thereunder; or (c) A release of a contaminant or contaminants is of such magnitude or period that there is concern for the health or safety of the general public, or there could be significant harm to the environment. The Approval Holder shall operate the facility in compliance with the *Water Quality Regulation – Clean Environment Act. #11.* This Certificate of Approval does not relieve the Approval Holder from complying with municipal bylaws, other provincial acts and regulations, or any federal acts and regulations. An Inspector, at any reasonable time, has the authority to inspect the Facility and carry out such duties as defined in the *Clean Air Act,* the *Clean Environment Act* or the *Clean Water Act.*

2.2 Nova Scotia

2.2.1 **Lease & License:** Any undertakings required by Schedule "B" to this license, and any permits, protocols, approvals, licenses or permissions which may be required under the laws of the Province or Canada form part of this Agreement, and the Licensee hereby agrees to comply with any conditions or limitations contained in these requirements unless compliance for licensing purposes is expressly waived by the Minister.

2.3 Newfoundland

2.3.1 **Lease:** 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.

2.3.2 **License:** The proponent is required to complete, on an annual basis, a DFO Finfish Aquaculture Farm Monitoring Report for Fish Habitat.

2.3.3 **Water Use Permit:** The Licensee/Holder shall not impair, pollute or cause to be polluted the quality of water.

2.4 Maine

2.4.1 **DMR Lease:** 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 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 MDIF&W and preliminary review will grant approval for the MDMR 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 such a fashion as to be detrimental to public health, personal property or marine resources, or as to create a serious threat to the marine environment.

2.4.2 **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.

2.4.3 **DEP Permit:** PART II.I.1-8 (Protection of Atlantic Salmon)

Section 3; Local Endangered or Threatened Species

3.1 Canada

Prior to 2012 there were two parallel environmental assessment processes for new aquaculture sites and for sites applying for boundary amendments: one federally referred to as CEAA (Canadian Environmental Assessment Act); and, a second provincial process. The provincial environmental assessments are required by the following acts: New Brunswick - NB Aquaculture Act and the Clean Environment Act; Nova Scotia - NS Marine and Coastal Resources Act; and, Newfoundland - NL Aquaculture Act. In June 2012 the federal government passed Bill C-38 that essentially ended the requirement for aquaculture sites to go through the Federal CEAA process.

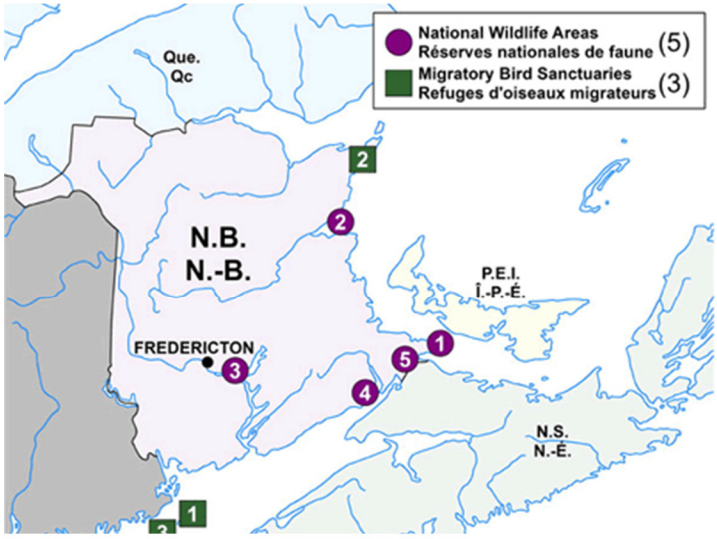
Nonetheless, each Provincial government continues to require an environmental assessment or review. The purpose of Environmental Assessments (EA) is to decide whether or not the aquaculture site will cause adverse significant environmental effects. Items that are assessed include the following: site location and infrastructure; local resources; physical environment; biological environment; description of benthos; fish health; production; public consultation; ancillary information; and socio-economic environment. Critical and sensitive habitats are assessed within the biological environment section. If the aquaculture site is approved, the EA may also set out mitigation measures that must be implemented in order to avoid or minimize impact on the environment.

3.2 Maine

Refer to section 2.4.

Section 4; Map of Sensitive Areas

4.1 National Wildlife Areas and Migratory Bird Sanctuaries in New Brunswick



National Wildlife Areas

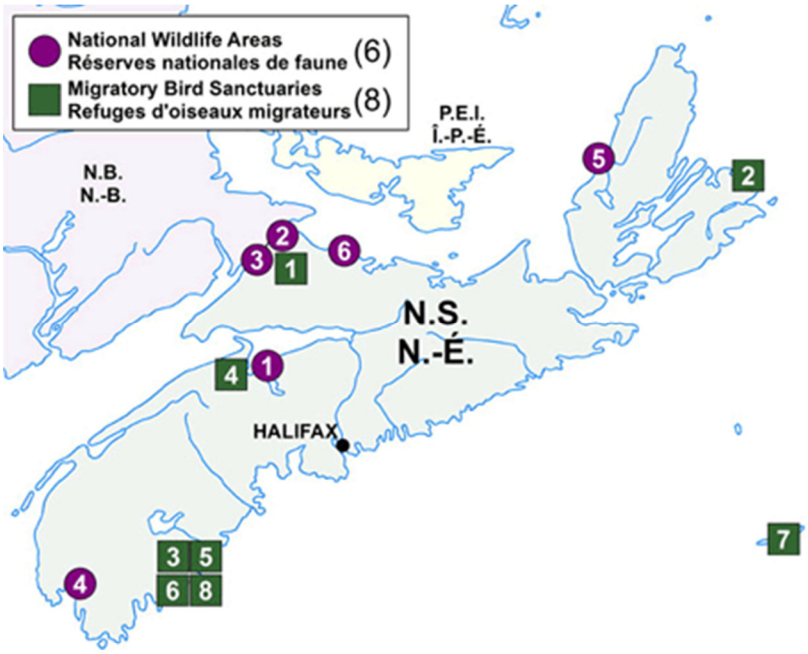
No.	Name	Year established	Size in hectares	Notes
1	Cape Jourimain NWA	1980	662	-
2	Portage Island NWA	1979	349	-
3	Portobello Creek NWA	1995	2,154	• part of Lower St. John River (Sheffield/Jemseg) IBA
4	Shepody NWA	1980	1,069	• part of Mary's Point Ramsar Site • part of Shepody Bay West IBA • part of Bay of Fundy WHSRN
5	Tintamarre NWA	1977	1,941	-
-	**Total:**	-	**6,175**	-

This table provides information on migratory bird sanctuaries such as the name of sanctuary, the year it was established, the size in hectares and notes.

Migratory Bird Sanctuaries

No.	Name	Year established	Size in hectares	Notes
1	Grand Manan MBS	1931	433	• part of Grand Manan Archipelago IBA
2	Inkerman MBS	1998	16	• part of Pointe aux Rats MusquesHeronry IBA
3	Machias Seal Island MBS	1944	1,046	• part of Machias Seal Island IBA
-	**Total:**	-	**1,495**	-

4.2 National Wildlife Areas and Migratory Bird Sanctuaries in Nova Scotia



National Wildlife Areas

Photo: A. MacPherson © Environment Canada
Boot Island NWA.

Nova Scotia

NWA Name	Year established	Size in hectares
Boot Island NWA	1979	107
John Lusby Marsh NWA	1982	552
Chignecto NWA	1978	432
Sand Pond NWA	1977	531
Sea Wolf Island NWA	1982	76
Wallace Bay NWA	1980	702

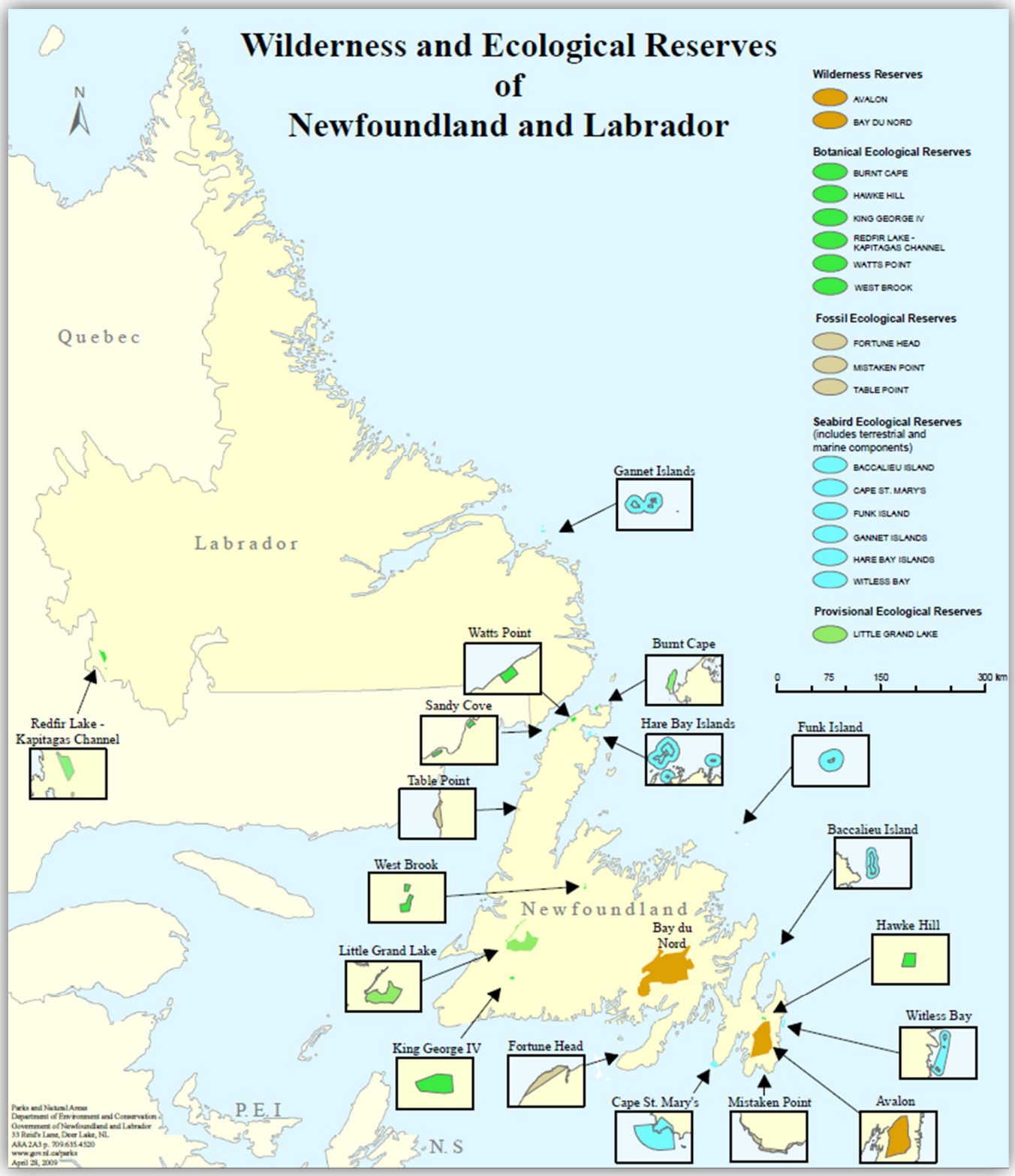
Migratory Birds Sanctuary

Photo: Julie Paquet © Environment Canada
Amherst Point MBS.

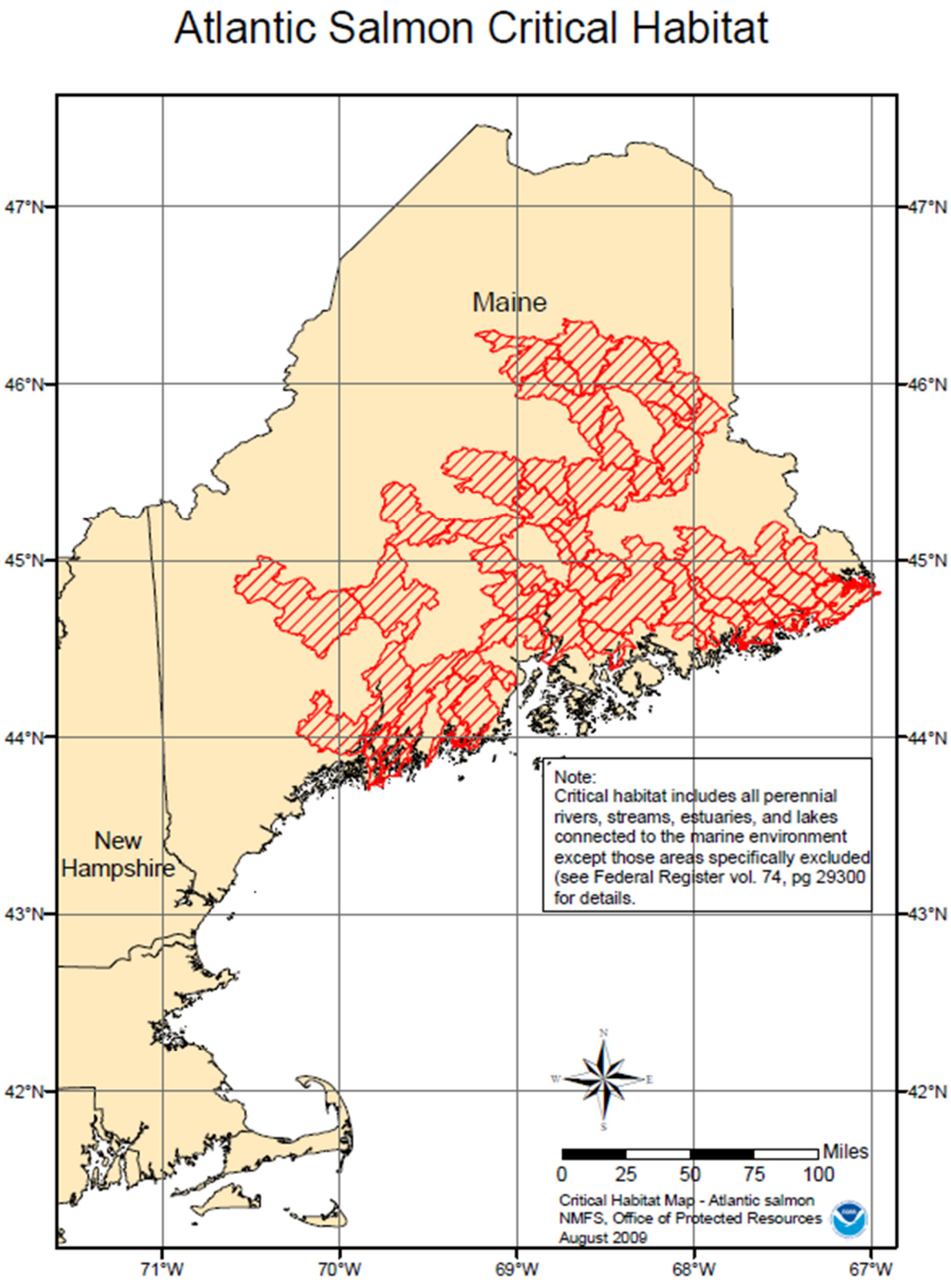
Nova Scotia

MBS Name	Year established	Size in hectares
Amherst Point MBS	1947	432
Big Glace Bay Lake MBS	1939	393
Port Hebert MBS	1980	346
Kentville MBS	1939	506
Port Joli MBS	1941	397
Sable River MBS	1941	313
Sable Island MBS	1977	3,100
Haley Lake MBS	1941	95

4.3 Wilderness and Ecological Reserves of Newfoundland and Labrador



4.4 Critical Atlantic Salmon Habitat in Maine



Section 5; Risk Assessment

5.1 Canadian Aquaculture Sites and the Species At Risk Act (SARA)

The Species At Risk Act 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."*[1] SARA provides for the legal protection of wildlife species and the conservation of their biological diversity.

When creating New Site and Boundary Amendment Applications, endangered, at risk and threatened species that have been or may be found in the area of the site have to be identified. For some species it is easy to determine whether or not they would be found in the area, for others it has to be assumed they could be found there as the limited available data does not state otherwise. Species listed under the Federal SARA (Species At Risk Act) designation must be protected.

1. Species at Risk Act (S.C. 2002, c. 29), Section 6 - "Purposes"

5.1.1 Endangered Species - Canada

- New Brunswick SARA list – Appendix 1 A
- Nova Scotia SARA list – Appendix 1 B
- Newfoundland SARA list – Appendix 1 C

5.2 United States Aquaculture Sites and the Maine Endangered Species Act

The Maine Endangered Species Act provides the Maine Department of Inland Fisheries and Wildlife (MDIFW) with a mandate to conserve all of the species of fish and wildlife found in the State, as well as the ecosystems upon which they depend.

Under the Maine Endangered Species Act, as stated in Maine aquaculture site DMR Leases, 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 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 of the boundary of a designated Essential Habitat.

5.2.1 Endangered Species - Maine

The following species are listed as endangered or threatened in Maine:

- **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

Beetles

1 American Burying Beetle (*Nicrophorus americanus*) **F**

Birds

2 American Pipit (*Anthus rubescens*) (Breeding population only) **S**
3 Arctic Tern (*Sterna paradisaea*) **s**
4 Atlantic Puffin (*Fratercula arctica*) **s**
5 Barrow's Goldeneye (*Buchephala islandica*) **s**
6 Black-crowned Night Heron (*Nycticorax nycticorax*) **s**
7 Black Tern (*Chlidonias niger*) **S**
8 Common Moorhen (*Gallinula chloropus*) **s**
9 Eskimo Curlew (*Numenius borealis*) **F**
10 Golden Eagle (*Aquila chrysaetos*) **S**
11 Grasshopper Sparrow (*Ammodramus savannarum*) **S**
12 Great Cormorant (*Phalacrocorax carbo*) (Breeding population only) **s**
13 Harlequin Duck (*Histrionicus histrionicus*) **s**
14 Least Bittern (*Lxobrychus exilis*) **S**
15 Least Tern (*Sterna antillarum)* **S**
16 Peregrine Falcon (*Falco peregrinus*) (Breeding population only) **S**
17 Piping Plover (*Charadrius melodus*) **S f**
18 Razorbill (*Alca torda*) **s**
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 Redfin Pickerel (*Esox americanus americanus*) **S**
25 Shortnose Sturgeon (*Acipenser brevirostrum*) **F**
26 Swamp Darter (*Etheostoma fusiforme*) **s**

Invertebrates

Butterflies and Skippers

27 Clayton's Copper (*Lycaena dorcas claytoni*) **S**
28 Edwards' Hairstreak (*Satyrium edwardsii*) **S**
29 Hessel's Hairstreak (*Callophrys hesseli*) **S**
30 Juniper Hairstreak (*Callophrys gryneus*) **S**
31 Karner Blue (*Lycaeides melissa samuelis*) **F**
32 Katahdin Arctic (*Oeneis polixenes katahdin*) **S**
33 Purple Lesser Fritillary (*Boloria chariclea grandis*) **s**
34 Sleepy Duskywing (*Erynnis brizo*) **s**

Dragonflies and Damselflies

35 Boreal Snaketail (*Ophiogomphus colubrinus*) **s**
36 Rapids Clubtail (*Gomphus quadricolor*) **S**
37 Ringed Boghaunter (*Williamsonia lintneri*) **s**

Freshwater Mussels

38 Brook Floater (*Alasmidonta varicosa*) **s**
39 Tidewater Mucket (*Leptodea ochracea*) **s**
40 Yellow Lampmussel (*Lampsilis cariosa*) **s**

Mayflies

41 Flat-headed Mayfly (Roaring Brook Mayfly) (*Epeorus frisoni*) **S**
42 Tomah Mayfly (*Siphlonisca aerodromia*) **s**

Moths

43 Pine Barrens Zanclognatha (*Zanclognatha martha*) **s**
44 Twilight Moth (*Lycia rachelae*) **s**

Mammals

45 Canada Lynx (*Lynx canadensis*) **f**
46 Eastern Cougar (*Felis concolor couguar*) **F**
47 Finback Whale (*Balaenoptera physalus*) **F**
48 Gray Wolf (*Canis lupus*) **F**
49 Humpback Whale (*Megaptera novaeangliae*) **F**
50 New England Cottontail (*Sylvilagus transitionalis*) **S**
51 Northern Bog Lemming (*Synaptomys borealis*) **s**
52 Northern Right Whale (*Eubalaena glacialis*) **F**
53 Sei Whale (*Balaenoptera borealis*) **F**
54 Sperm Whale (*Physeter catodon*) **F**

Reptiles

Snakes

55 Black Racer (*Coluber constrictor*) **S**

Turtles

56 Atlantic Ridley (*Lepidochelys kempi*) **F**
57 Blanding's Turtle (*Emys blandingii*) **S**
58 Box Turtle (*Terrapene carolina*) **S**
59 Leatherback (*Dermochelys coriacea*) **F**
60 Loggerhead (*Caretta caretta*) **f**
61 Spotted Turtle (*Clemmys guttata*) **s**

Also refer to APPENDIX 1 D

USFWS Nationally Significant Seabird, Wading Bird and Eagle Nesting Islands in Coastal Maine

Section 6; Reporting and Training

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.

6.1 *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.

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 the animals are observed around the aquaculture sites, care should be exercised to avoid causing them any harm.

6.2 *Nuisance Seal Reporting*

A Nuisance Seal license may be obtained from the Department of Fisheries and Oceans under the Marine Mammal Regulations. It authorizes producers to harvest those seals that have been observed to be causing damage to aquaculture gear, or fish entrapped in aquaculture gear.

The license holder shall submit a catch report annually which identifies:

a. The day, month, year on which any seals were taken
b. The location where any seals were taken
c. The number of seals recovered
d. The number of seals struck but not recovered

The catch report shall be mailed to the Department of Fisheries and Oceans (see permit for address).

6.3 *General Predator Interactions*

Due to the environment in which we operate, wildlife interactions will be unavoidable – both positive or neutral and negative (predator).

Positive or neutral interactions may require management notification if the species is listed on a Species at Risk list or other similar document.

Negative or predator interactions 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 interaction, whether intentional or accidental, must be reported.

An EMS Incident Report Form must be completed and submitted to the Area Manager in the event of a negative predator interaction – hard copy or via Pronto Forms on an iPad.

Also refer to APPENDIX 2

EMS Incident Report Form

6.4 ***Canadian Wildlife Service Permit***

Marine birds may become entangled, trapped or oiled from gear or chemicals on an aquaculture site. The first step to preventing such emergencies is prevention. Continually checking nets for integrity and avoiding oil, gas and chemical spills is important.

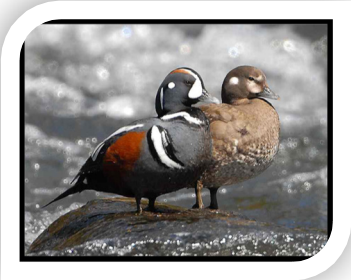
If a large spill does occur, immediately contact Coast Guard (CG) at 1-800-565-1633 and activate the Spill Prevention and Response Plan (SPRP) or Spill Prevention, Control and Countermeasure (SPCC) Plan. If wildlife is not initially affected, it should be kept out of the spill area, if possible.

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 in an attempt 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. Workers should not touch birds, regardless of the situation. If a bird must be handled, clean work gloves must be worn and the bird handled with care. If an incident cannot be resolved, Canadian Wildlife Services should be contacted (506-364-5068) for further direction. A permit may become necessary to handle and transport the bird to a rehabilitation facility.

Any instances of wildlife interaction shall be recorded on the EMS Incident Report Form.

The following three marine birds are protected by SARA and may be found in Atlantic Canada. Site workers should familiarize themselves with these birds. If any of these species are found around the sites in distress, the Canadian Coast Guard should be contacted immediately at 1-800-565-5068. The Coast Guard can help confirm the identity of the bird(s) in question. Workers must describe the scenario (entanglement, chemical spill, etc.) which caused the distress, if known, as well as the location of the species. Proper directions and/or coordinates are essential to help experts arrive in time.

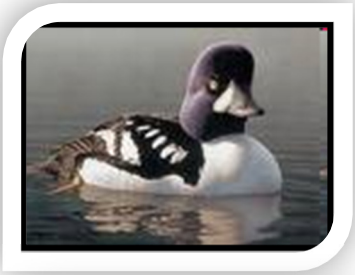


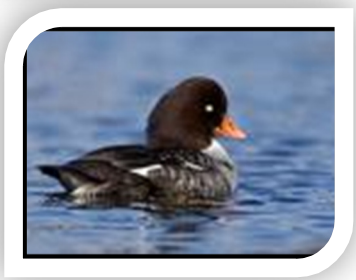
Harlequin Duck

During the mating season, 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 around the eye.

They usually build their nests on the ground next to banks of fast-flowing streams.





Barrow's Goldeneye

Males (left) are black and white with a purplish-black head and a white crescent-shaped patch at the base of the bill.

Females (below) are grayish-brown and whitish on the sides and belly with a chocolate brown head. In the winter and spring, females have a bright orange bill.

Nests are usually built 1-2 km from freshwater and 2-15 m off of the ground.

Ivory Gull

Adults have black legs and pure white plumage. Bill is slate blue at the base, yellow in the middle with a red tip.

Nests are usually built on flat terrain or on sheer cliffs above ice sheets.

Roseate Tern

These terns would be found locally during breeding season when adults appear mostly white with a black cap, long white tail streamers and a white breast with pale pink.

The bill of the Roseate Tern is black with red appearing at the base later in the breeding season.

Their breeding grounds are found on rocky offshore islands, barrier beaches and salt marsh islands.

Section 7; Control Measures

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 the security of the containment, it may be dispatched in accordance with Government Policy and Saltwater Management consent.

7.1 Passive Control Measures

The primary containment net will be protected from damage by predators by the use of a predator control net as needed.

The predator net mesh size will be consistent with that utilized in the area for controlling access by predators.

Provision will be made to avoid bird predation with the use of a top bird net.

7.2 Active Control Measures

Non-Lethal, acoustic deterrent devices may be used on sites to discourage birds from landing on the cages. Usage of underwater acoustic devices must be administered under Regulatory approval and following the Acoustic Deterrent Policy.

7.3 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.

7.4 Daily Inspections

Daily inspections are required on each cage with fish. Any debris should be removed from around or in the cages including garbage, large sticks, and excessive amounts of kelp or rockweed. Waterlines or handrail ties that are missing, broken or chaffed should be replaced. Any lines that are untied must be retied.

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.

Also refer to APPENDIX 3

Acoustic Deterrent Policy

Section 8; Special Requirements

9.1 Newfoundland

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 you do encounter entangled birds, other wildlife and marine mammals on your site, whether alive or dead, you must contact the following authorities for their information and action;

- Birds and other wildlife: notify the local Conservation Officer, Department of Environment and Conservation (in the Bay D'Espoir area the phone number is 882-2200). If the animal in question is an eagle, you should also contact the Conne River Band Council.
- 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 bald eagles, the Conservations Officer will make properly permitted arrangements to turn them over to the Conne River Band Council for respectful burial at Conne River.

APPENDICES

Appendix 1 A – New Brunswick SARA List
Appendix 1 B – Nova Scotia SARA List
Appendix 1 C – Newfoundland SARA List
Appendix 1 D – USFWS Nationally Significant Seabird, Wading Bird and Eagle Nesting Islands in Coastal Maine
Appendix 2 – EMS Incident Report Form
Appendix 3 – Acoustic Deterrent Policy

New Brunswick's Protected Wildlife

The following species 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 southwestern NB's aquaculture sites. 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 the animals are observed around the aquaculture sites, care should be exercised to avoid causing them any harm.

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 barbell.
3 dorsal fins and 2 anal fins.
Max. size: 2 m, 96 kg

Atlantic Salmon (*Salmo salar*)
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

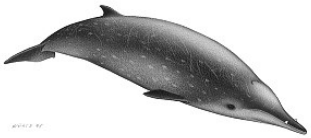
Atlantic Wolffish *(Anarhichas lupus)*
Habitat: Inhabits cold, deep water, bottom dwellers, prefer rock or hard-clay sediment
Description: Rounded profile, heavy head, blunt snout, lacking pelvic fins. Body color ranges from slate blue to dull green to purplish brown with vertical, dark brown bars along the sides. Extensive teeth structure
Max. size: 150 cm, 20 kg

Fin Whale *(Balaenoptera physalus)*
"Grey hound of the deep"
Habitat: Temperate, deep, cool waters
Description: Baleen whale with a long and slender, streamlined body, dark greybody, white underneath. Narrow, V-shaped head, pointed snout, paired blowholes.
Adult Size: 20-27 m, 70,000 kg

Harbour Porpoise *(Phocoena phocoena)*
Habitat: Close to cooler (<16 °C), coastal areas or river estuaries
Description: Black back, grayish-white sides fading to white underneath
Max. size: 1.7 m , 65 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. Broad back, lacks a dorsal fin.
Adult Size: 16-17 m, 63,500 kg
Season of Concern: Congregate in summer and fall in the lower Bay of Fundy, mainly east of Grand Manan

Porbeagle *(Lamna nasus)*
Habitat: Coastal and oceanic
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. Distinguished by its 3-cusped teeth.
Max. size: 3 m in length, 135 kg



Sowerby's Beaked Whale *(Mesoplodons bidens)*
Habitat: Generally found in deep waters, continental shelf/slope
Description: Medium sized dark gray, beaked whale. Streamlined body with a small head with a long, narrow beak. Tails have no central notch. Small, triangular dorsal fin.
Max. size: 4.5 -5.5 m in length, 1000-1300 kg

Leatherback Sea Turtle (*Dermochelys coriacea*)
Habitat: Prefer open ocean, deep water. Nest on ocean beaches.
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: June to October

Barrow's Goldeneye *(Buscephala islandica)*
Habitat: Wooded lakes, beaver ponds, overwinter in protected coastal waters or open inland water
Description: Medium sized sea duck. Males are black and white. Females are grayish brown and white on the sides and belly with a chocolate brown head
Adult Size: 53 cm, 1 kg

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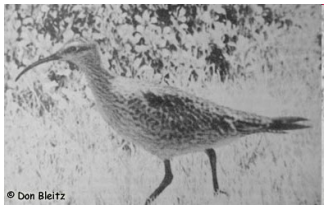
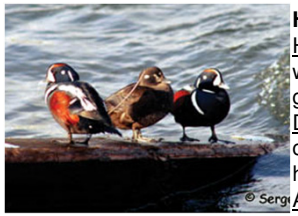
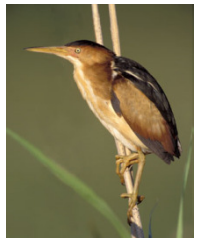


Eskimo curlew *(Numenius borealis)*
*May have gone extinct
Habitat: Pass through Maritimes during migration, no specific habitat known
Description: Mottled brown shorebird, brown back, buff underside, long legs, long, thin down-curving bill
Adult size: 337 cm in length, 270-454 g, 19-23 cm wing span
Season of Concern: July – October (fall migration)



Harlequin Duck *(Histrionicus histrionicus)*
Habitat: Turbulent mountain streams in summer, rocky coastal waters in winter. Nest in a well-concealed location on the ground, near a stream
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

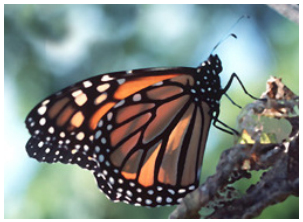


Least Bittern *(Ixobrynchus exilis)*
Habitat: Nest in freshwater marches and swamps, often with cattails
Description: Member of the heron family. Mainly brown and buff colored body, white underside, black head and back
Adult Size: 30 cm in length, 80 g
Season of Concern: Summer (overwinter in southern US states)

Piping Plover *(Charadrius melodus melodus)*
Habitat: Nests along coastal sand, gravel beaches, sand flats
Description: Small, sand coloredshorebird. Black ring around neck. Bill yellow with a black tip, yellow legs (In winter, bill is black, legs are pale)
Adult size: 15-19 cm, 43-48 g
Season of Concern: Late April /May to August

Ivory Gull *(Pagophila eburnea)*
Habitat: Live near the edges of pack or drift ice
Description: Small white seabird with black legs. Juveniles have a dusky face and chin and black spots on the breast and along the flanks and tail.
Adult size: 38-43 cm
Season of Concern: Late May/early June (breeding season)

Yellow Rail *(Coturnicops noveboracensis)*
Habitat: Found in marshes through summer, coastal wetlands and rice fields in winter
Description: Tiny bird with black and white markings on plumage, short tail, small bill. Almost never flies unless disturbed.
Adult size: 15-19 cm in length, 60 g



Monarch *(Danaus plexippus)*
Habitat: Wherever milkweed and wildflowers are found- fields, meadows, gardens, *etc.*
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

Roseate Tern (*Sterna dougalli*)
Habitat: Nests are usually built on flat terrain or on sheer cliffs above ice sheets.
Description: Adults have black legs and pure white plumage. Bill is slate blue at the base, yellow in the middle with a red tip.
Season of Concern: Spring to late August/September

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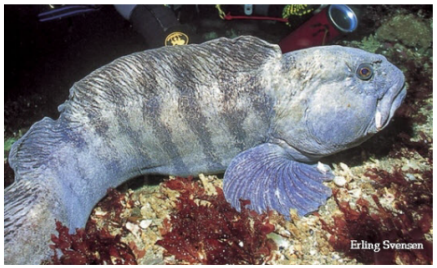
SWEENEY INTERNATIONAL Management Corp.

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) and have been or could be found in areas of NS where aquaculture is taking place. 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 the animals are observed around the aquaculture sites, care should be exercised to avoid causing them any harm.

Atlantic Whitefish (Coregonus huntsmani)
Habitat: Petite Riviere watershed and surrounding waters. Found at sea during spring and summer. Returns to freshwater to spawn during winter.
Description: Black, dark green or blue back, silver sides, white underbelly, large scales,
Classification: Endangered (COSEWIC & SARA)
Max Size: Up to 40 cm

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 barbs. 3 dorsal fins and 2 anal fins.
Classification: Endangered (COSEWIC)
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. Body color ranges from slate blue to dull green to purplish brown with vertical, dark brown bars along the sides. Extensive teeth structure.
Classification: Threatened (COSEWIC & SARA)
Max Size: 150 cm, 20 kg

Atlantic Salmon (*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.
Classification: Endangered (COSEWIC & SARA)
Max Size: 60 cm, 3 kg

Barrow's Goldeneye (*Buscephala islandica*)
Habitat: Coastal waters throughout Atlantic Canada
Description: Medium sized sea duck. High, rounded head is black with white patch under eye. Males are black and white, femaes are greyishh brown and white.
Classification: Threatened (COSEWIC & SARA)
Max Size: 53 cm, 1 kg

Piping Plover (*Charadrius 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.
Classification: Endangered (COSEWIC & SARA)
Max Size: 19 cm, 48 g

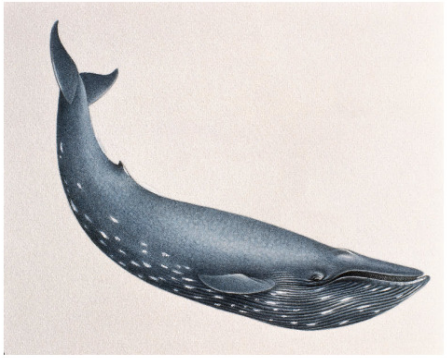
Roseate Tern (*Sterna dougallii*)
Habitat: Occurs in large colonies on coasts and islands all along the Atlantic shore of Nova Scotia
Description: Medium sized seabird with long forked tail. White with black head cap and bill.
Classification: Endangered (COSEWIC & SARA)
Max Size: 40cm, 130 g

Peregrine Falcon (*Falco peregrinus*)
Habitat: Along the Bay of Fundy coast of Nova Scotia. Nests on cliff ledges near water and large open spaces.
Description: Medium sized, grey/blue upper body and wings, white to light brown speckled underparts, black bars on legs.
Classification: Threatened (SARA)
Max Size: 59 cm, 910 g

NOVA SCOTIA

Cooke AQUACULTURE Inc.

SWEENEY INTERNATIONAL Management Corp.



Blue Whale (*Balaenoptera musculus*)
Habitat: North shore of the Gulf of St. Lawrrence 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.
Classification: Endangered (COSEWIC & SARA)
Max Size: 30 m, 181 MT

Red Knot (*Calidris canustus*)
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.
Classification: Endangered (COSEWIC)
Max Size: 26 cm

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.
Classification: Endangered (COSEWIC & SARA)
Max Size: 17 m, 64 MT

Leatherback Sea Turtle
(*Dermochelys coriacea*)
Habitat: Often found in deep, temperate waters throughout the Atlantic where they feed. Often sighted between June and October.
Description: Blue-black carapace composed of skin and small bones. Seven ridges running entire length of carapace.
Classification: Endangered (COSEWIC & SARA)
Max Size: 2.4 m, 725 kg

Northern Bottlenose Whale
(*Hyperoodon ampullatus*)
Habitat: Scotian Shelf, areas surrounding 'The Gully', a submarine canyon off the Southeast coast of Nova Scotia
Description: Beaked whale with bulbous 'forehead'. Variable in colour, ranging from chocolate brown in young animals, to light brown in older animals, to yellowish brown (with whitish beaks and heads) in very old males.
Classification: Endangered (COSEWIC & SARA)
Max Size: 10 m, 7.5 MT

Least Bittern (*Ixobrychus exilis*)
Habitat: Prefer large marshes with stable water levels during spring and summer. Winter habitat can be any wetland, including brackish and saline swamps.
Description: Small member of the heron family. Brown plumage with broad buff streaks on its white underside. Back and crown are glossy black.
Classification: Threatened (COSEWIC & SARA)
Max Size: 30 cm, 80 g

Harbour Porpoise (*Phocoena phocoena*)
Habitat: Three distinct Canadian Atlantic populations: Newfoundland-Labrador, St. Lawrence and Bay of Fundy.
Description: Rounded head with no obvious beak, small triangular dorsal fin. White underside, mottled grey/white sides to dark grey back.
Classification: Threatened (SARA)
Max Size: 1.7 m, 65 kg

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; noteably in several rivers which drain into the Bay of Fundy.
Description: Dark olive green back with pale silver striped sides and white belly.
Classification: Threatened (COSEWIC)
Max Size: 1.8 m

NOVA SCOTIA

Cooke AQUACULTURE Inc.

SWEENEY INTERNATIONAL Management Corp.

Newfoundland and Labrador Protected Wildlife

The following species 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 near aquaculture sites on the south coast of Newfoundland island. 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 the animals are observed around the aquaculture sites, care should be exercised to avoid causing them any harm.

American Eel (*Anguilla rostrata*)
Habitat: Uses all salinities during life stage, found in all freshwater that are accessible to the to Atlantic Ocean.
Description: Elongated body, grey with white or cream color belly, one dorsal/caudal/anal fin.
Max. size: Adults - male: 0.4 m, female: 1.0 m

Leatherback Sea Turtle (*Dermochelys coriacea*)
Habitat: Prefer open ocean, deep water. Nest on ocean beaches.
Description: Largest living sea turtle. Lacks a bony shell, its carapace is covered by bluish black skin.
Max.size: 2.4 m in length, 3.6 m wide, 725 kg
Season of Concern: June to October

Atlantic Cod – Laurentain North (*Gadus morhua*)
Habitat: Northern Gulf of St. Lawrence and waters off the south coast of Newfoundland. Migrate 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.
Max. size: 2 m, 96 kg

Blue Whale (*Balaenoptera musculus*)
Habitat: Along the north shore of the Gulf of St. Lawrence; off eastern Nova Scotia; off the south coast of the island of Newfoundland.
Description: Largest animal on earth, colored dark and light grey, smallish dorsal fin and pointed pectoral flippers.
Max. size: 30 m, 181 MT

Fin Whale (Balaenoptera physalus)
Habitat: Temperate, deep, cool waters.
Description: Baleen whale with a long and slender, streamlined body, dark grey body, white underneath. Narrow, V-shaped head, pointed snout, paired blowholes.
Adult Size: 20 - 27 m, 70 MT

Harbour Porpoise (Phocoena phocoena)
Habitat: Close to cooler (<16 °C), coastal areas or river estuaries.
Description: Black back, grayish-white sides fading to white underneath.
Max. size: 1.7 m , 65 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. Broad back, lacks a dorsal fin.
Adult Size: 16 - 17 m, 64 MT

Atlantic Wolffish (Anarhichas lupus)
Habitat: Inhabits cold, deep water, bottom dwellers, prefer 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

Northern Wolffish (*Anarhichas denticulatus*)
Habitat: Open continental-shelf water that is cold—usually between 2°C to 5°C—and mainly at depths between 400 and 1000 metres. Prefer a rocky or muddy sea floor.
Description: Thick and heavy set, with a large head, small sharp teeth with grey to dark chocolate color appearance.
Max. size: 1.4 m , 20 kg

Spotted Wolffish (*Anarhichas minor*)
Habitat:Found offshore in cold, deep water, usually below 5°C and between 50 – 800 m in depth but as shallow as 25 m, prefer a coarse sand bottom with rocky areas.
Description: Canine teeth, round blunt head long body, olive to deep brown with blackish-brown spots.
Max. size: 1.8 m, 23 kg

Harlequin Duck (*Histrionicus histrionicus*)
Habitat: Turbulent mountain streams in summer, rocky coastal waters in winter. Nest in a well-concealed location on the ground.
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: 45 cm

Short-eared owl (*Asio flammeus*)
Habitat: Tundra, coastal barrens, sand dunes, field and bog areas. All coastal areas and near shore islands are suitable.
Description: Medium-sized, puffy white and brown owl with shirt ear tufts and yellow eyes.
Max. size: 34 - 43 cm , 206 - 475 g

Red Crossbill
(*Loxia curvirostra percna*)
Habitat: Restricted to the island of NL. Found in mature conifer forests.
Description: Medium-sized finch with a crossed beak. Males are dull red color with brown shading . Females are grayish-olive with yellow rumps.
Max size: 14 - 16 cm

Olive-sided Flycatcher
(*Contopus cooperi*)
Habitat: Coniferous, mixed wood or boreal forests where suitable habitat is more likely to be in or near wetland areas.
Description: Dark olive on the face, upperparts and flanks. They have light under parts, a large dark bill and a short tail.
Max. size: 18 - 20 cm

Monarch (*Danaus plexippus*)
Habitat: Wherever milkweed and wildflowers are found- fields, meadows, gardens, *etc.*
Description: Bright orange butterfly with heavy black veins and a wide black border containing two rows of white spots.
Adult size: Wingspan of 8.9 - 10.2 cm

Boreal Felt Lichen
(*Erioderma pedicellatum*)
Habitat: It grows on trees in damp boreal forests along the Atlantic coast.
Description: Medium-sized foliose lichen, fuzzy upper surface that is greyish-brown when dry and slate-blue when moist. The underside is white with edges usually curled upward
Max. size: 2 - 5 cm across, sometimes reaching 12 cm in diameter

Cooke AQUACULTURE Inc.

SIMCorp MARINE ENVIRONMENTAL INC.

Nationally Significant Seabird, Wading Bird and Eagle Nesting Islands in Coastal Maine

For many years, seabird biologists from U.S. Fish and Wildlife Service and Maine Dept. of Inland Fisheries and Wildlife have conducted surveys to identity coastal islands that support nesting pairs of seabirds, wading birds, and bald eagles. The table below is based on information last updated in 2002.

KEY TO THE TABLE on the following 8 pages):

CIR# Coastal Island Registry Number (every island has a unique CIR#)

OWNER (May indicate fee and/or easement ownership)

- **IFW** Maine Dept. of Inland Fisheries and Wildlife
- **FWS** U.S. Fish and Wildlife Service, Maine Coastal Nesting Islands NWR
- **ANP** Acadia National Park
- **BPL** Maine Bureau of Parks and Lands
- **MDOT** Maine Dept. of Transportation
- **NGO** Non-government conservation organization
- **PRI** towns and private owners
- **(E)** Privately owned, protected with conservation easement
- ***** nesting site -- usually for bald eagles -- on a relatively large island with multiple owners

VALUES

- **S** Island where 1% or more of the state's seabird population nests
- **W** Island where 1% or more of the state's wading bird population nests
- **R** Island where any number of federally endangered roseate terns nests
- **E** Island where bald eagles nest
- **D** Island that may not meet the 1% population criteria for any one species, but support three or more species of nesting seabirds

MCINWR

- **✔** Island identified in the Comprehensive Conservation Management Plan for potential acquisition by Maine Coastal Islands National Wildlife Refuge — if current owners are willing sellers and federal funds are available for acquisition.

This list of nationally significant islands is intended to provide a helpful reference to inform recreational users and to catalyze protection of high value nesting islands through effective stewardship, management agreements, easements and/or fee acquisition with willing landowners. This list alone should not be used for making final management decisions or for regulatory purposes. Rather, the list should be considered as a helpful first reference, to be checked for updates and accuracy on an as-needed, island-specific basis.

In order to minimize disturbance and maximize nesting success, please respect island closures for recreational uses during the nesting season (April 1 - August 31).

7/06

CIR #	Island name	OWNER	TOWN	Acres	Values	MCINWR
55-012	FREYEE ISLAND (EAST)	IFW	Brooklin	9.6	E	
55-088	UPPER COOMBS ISLAND	PRI	Brunswick	8.6	E	✔
55-105	DOUGHTY ISLAND	NGO	Harpswell	1.4	E	
55-156	DUCK ROCK	IFW	Harpswell	1.0	D	
55-159	JENNY ISLAND	IFW	Harpswell	3.5	S, R, D	
55-175	LONG LEDGE	IFW	Harpswell	1.3	D	
55-176	LONG LEDGE (SOUTH)	IFW	Harpswell	2.0	S, D	
55-177	FLAG ISLAND ISLAND	IFW	Harpswell	26.2	S, D	
55-178	TWO BUSH ISLAND	IFW	Harpswell	2.0	D	
55-179	CEDAR LEDGE	IFW	Harpswell	2.4	D	
55-200	LANES ISLAND	PRI	Yarmouth	28.2	E	✔
55-223	THE NUBBIN	IFW	Yarmouth	0.2	R	
55-245	SOW AND PIGS	PRI	Freeport	2.9	E	
55-275	UPPER GREEN (SOUTH)	IFW	Cumberland	1.2	S, D	
55-282	LITTLE WHALEBOAT ISLAND	PRI	Harpswell	18.0	W	✔
55-283	LITTLE WHALEBOAT ISLAND (SE)	PRI	Harpswell	4.3	D	✔
55-295	WILLIAMS ISLAND	PRI,PRI/NGO	Freeport	21.4	E	
55-297	UPPER GREEN ISLAND (N)	IFW	Cumberland	0.6	D	
55-330	SCREECHING GULL	IFW	Falmouth	0.1	R	
55-381	HOUSE ISLAND	PRI	Portland	31.1	D	✔
55-383	RAM ISLAND	IFW	Portland	14.1	S, W, D	
55-386	OUTER GREEN ISLAND	IFW	Portland	5.4	S, D	
55-406	LITTLE BIRCH ISLAND	IFW	Harpswell	9.2	S, D	
55-415	UPPER FLAG ISLAND	FWS	Harpswell	34.1	D	
55-427	TURNIP ISLAND	PRI	Harpswell	1.9	D	✔
55-437	LITTLE MARK ISLAND	IFW	Harpswell	1.7	S, D	
55-439	EAGLE ISLAND	BPR	Harpswell	13.3	D	
55-458	WEST BROWN COW ISLAND	IFW	Cumberland	1.3	D	
55-499	INNER GREEN ISLAND	IFW	Portland	3.0	D	
55-521	RAM ISLAND	PRI	Cape Elizabeth	2.8	S, D	✔
55-605	RAM ISLAND	FWS	Harpswell	6.3	D	
55-615	POND ISLAND	IFW	Harpswell	22.7	S, R, D	
55-626	RAGGED ISLAND	PRI	Harpswell	74.9	S, D	✔
55-628	WHITE BULL ISLAND	IFW	Harpswell	5.5	D	
55-630	MARK ISLAND	IFW	Harpswell	10.5	W, D	
55-632	EAST BROWN COW	IFW	Harpswell	2.4	D	
59-010	HOG ISLAND	PRI/ANP	Gouldsboro	52.3	E	
59-012	JORDAN ISLAND	PRI/ANP	Winter Harbor	261.5	E	
59-036	BALD ROCK	PRI	Steuben	1.3	D	✔
59-037	SALLY ISLAND	PRI	Gouldsboro	5.3	D	✔
59-039	SHEEP ISLAND	PRI	Gouldsboro	9.4	E	✔
59-060	ROLLING ISLAND	ANP	Winter Harbor	5.1	E	
59-062	SCHOODIC ISLAND	ANP	Winter Harbor	67.2	S, D, E	
59-065	TURTLE ISLAND	TNC	Winter Harbor	128.7	W, E	
59-084	BURYING ISLAND	PRI/IFW	Franklin	37.8	W, E	
59-087	HILLS COVE ISLAND	PRI/NGO	Hancock	9.9	E	
59-089	KILKENNY COVE ISLAND	PRI	Hancock	3.1	E	
59-110	BUCKSKIN ISLAND	PRI	Franklin	5.6	E	✔
59-119	MT DESERT ISLAND*	PRI	Bar Harbor	69,049.0	E	
59-127	INDIAN PT LEDGE	IFW	Bar Harbor	0.4	S	

CIR #	Island name	OWNER	TOWN	Acres	Values	MCINWR
59-132	BLACK ISLAND	NGO	Bar Harbor	13.8	E	✔
59-136	JED ISLAND	PRI	Bar Harbor	11.8	E	
59-137	CONARY NUB	PRI	Blue Hill	0.2	S	✔
59-160	THE TWINNIES (NORTH)	PRI	Bar Harbor	3.6	E	✔
59-161	THE TWINNIES (SOUTH)	FWS	Bar Harbor	3.3	E	
59-170	TREASURE ISLAND	PRI	Sorrento	18.7	E	
59-177	CALF ISLAND	PRI	Sorrento	98.2	E	
59-180	STAVE ISLAND	PRI	Gouldsboro	499.4	E	
59-182	IRONBOUND ISLAND	PRI/ANP	Winter Harbor	830.8	E	
59-183	PREBLE ISLAND	NGO	Sorrento	78.8	E	
59-189	INGALLS ISLAND	PRI/ANP	Sorrento	23.5	E	
59-190	BEAN ISLAND	PRI/ANP	Sorrento	30.1	W, E	✔
59-195	SHEEP PORCUPINE ISLAND	NPS	Gouldsboro	22.2	E	
59-197	BALD PORCUPINE ISLAND	NPS	Gouldsboro	31.9	E	
59-198	BURNT PORCUPINE ISLAND	PRI	Gouldsboro	37.6	E	
59-201	LONG PORCUPINE ISLAND	NGO	Gouldsboro	130.1	E	
59-236	HARDWOOD ISLAND	PRI/ANP	Tremont	196.1	E	
59-240	BARTLETT ISLAND*	PRI/TOWN	Mount Desert	2,158.6	E	
59-242	TINKER ISLAND	NGO,PRI/NGO	Tremont	446.9	E	
59-265	BAR ISLAND	NPS	Mount Desert	6.7	E	
59-270	GREAT CRANBERRY ISLAND*	PRI	Cranberry Isles	1,064.9	E	
59-300	THE THRUMCAP	IFW	Bar Harbor	2.6	S, D	
59-301	EGG ROCK	FWS	Winter Harbor	12.5	R, D	
59-313	LT CRANBERRY ISLAND	PRI	Cranberry Isles	491.3	E	
59-340	TRUMPET ISLAND	FWS	Tremont	6.4	D	
59-341	SHIP ISLAND	FWS	Tremont	13.1	S	
59-343	WEST BARGE ISLAND	FWS	Tremont	0.5	D	
59-347	POND ISLAND	PRI	Frenchboro	241.0	E	✔
59-351	JOHNS ISLAND	PRI	Swans Island	21.8	E	✔
59-398	GOOSEBERRY ISLAND	PRI	Swans Island	5.4	D	✔
59-409	BAKER ISLAND (N)	NGO	Swans Island	8.1	E	
59-413	SWANS ISLAND*	PRI	Swans Island	6,853.3	E	
59-438	PLACENTIA ISLAND	NGO	Frenchboro	553.0	E	
59-439	LT DUCK ISLAND	NGO	Frenchboro	89.8	S, D, E	
59-440	GREAT DUCK ISLAND	PRI/NGO's/IFW	Frenchboro	212.0	S, D, E	
59-443	LT BLACK ISLAND	PRI(NGO)	Frenchboro	2.9	E	
59-445	GREEN I LEDGE	IFW	Frenchboro	1.9	D	
59-446	GREEN ISLAND	IFW	Frenchboro	5.6	S, D	
59-447	SISTER ISLAND	PRI	Swans Island	30.3	E	✔
59-448	CROW ISLAND	PRI	Frenchboro	10.6	E	✔
59-449	DRY MONEY LEDGE	IFW	Frenchboro	0.6	S	
59-450	HARBOR ISLAND	PRI	Frenchboro	19.9	E	✔
59-451	LONG ISLAND*	PRI,PRI/NGO	Frenchboro	1,468.5	E	
59-470	RINGTOWN(LT MARSHALL) ISLAND	FWS	Swans Island	13.9	E	
59-479	BRIMSTONE ISLAND	IFW	Swans Island	1.2	D	
59-480	HERON ISLAND	NPS	Swans Island	51.8	S, D	
59-481	MASON LEDGE	IFW	Swans Island	4.5	S, D	
59-483	JOHN'S ISLAND	FWS	Swans Island	43.1	S, D	
59-570	VERONA ISLAND*	PRI	Verona	3,977.1	E	
59-587	YOUNGS ISLAND (MID) (SAMS?)	PRI	Pembroke	2.9	E	

CIR #	Island name	OWNER	TOWN	Acres	Values	MCINWR
59-596	NN I S BEAR HEAD(RAM?)	PRI	Brooksville	0.4	E	
59-650	HOLBROOK ISLAND	BPL	Castine	110.9	E	
59-651	RAM ISLAND	NGO	Castine	7.3	E	
59-669	THRUMCAP ISLAND	IFW	Brooksville	1.2	D	
59-672	BUCK ISLAND	IFW	Brooksville	0.9	D	
59-673	SPECTACLE ISLAND	PRI	Brooksville	8.7	S, D	✔
59-674	GREEN LEDGE	IFW	Deer Isle	0.8	D	
59-675	WESTERN ISLAND	PRI/NGO	Deer Isle	22.0	S, E	✔
59-685	COLT HEAD	IFW	Deer Isle	4.3	D	
59-687	BEACH ISLAND	PRI	Deer Isle	73.4	E	
59-709	SCOTT I (W)	PRI/NGO	Deer Isle	6.2	E	
59-742	NN I S CARLETON I(SALT POND IS.?)	IFW	Blue Hill	0.2	E	
59-771	BRADBURY ISLAND	NGO	Deer Isle	160.7	E	
59-772	LITTLE SPRUCEHEAD	PRI	Deer Isle	44.1	S	✔
59-782	HARDHEAD ISLAND	IFW	Deer Isle	5.2	S, D	
59-789	GRASS LEDGE (W)	IFW	Deer Isle	1.1	S, D	
59-790	COMPASS ISLAND	PRI	Deer Isle	7.0	D	✔
59-799	INNER PORCUPINE ISLAND	PRI	Deer Isle	10.2	E	✔
59-800	OUTER PORCUPINE ISLAND	PRI	Deer Isle	6.3	E	✔
59-802	GRASS LEDGE	IFW	Deer Isle	1.3	D	
59-810	CROW ISLAND	IFW	Deer Isle	5.3	E	
59-825	BARRED ISLAND	NGO	Deer Isle	3.4	E	
59-836	SCRAGGY ISLAND	PRI/NGO	Stonington	8.5	W	✔
59-849	CURRENT ISLAND	PRI?	Deer Isle	2.3	E	
59-923	CAMPBELL ISLAND	NGO	Deer Isle	92.0	E	
59-925	BEAR ISLAND	PRI	Deer Isle	20.1	E	✔
59-931	SMUTTYNOSE ISLAND	IFW	Brooklin	0.7	R	
59-933	MAHONEY ISLAND	PRI	Brooklin	7.0	S, D	✔
59-956	EASTERN MARK ISLAND	PRI/ANP	Stonington	9.9	E	✔
59-959	SHINGLE ISLAND	PRI/ANP	Stonington	9.2	E	✔
59-966	RAM ISLAND	BPL	Stonington	2.8	E	
59-977	NO MANS ISLAND	BPL	Stonington	4.7	E	
59-980	THREE BUSH ISLAND	PRI	Swans Island	1.6	S	✔
59-991	HALIBUT ROCKS (EAST)	IFW	Swans Island	2.7	D	
59-996	SHABBY ISLAND	IFW/ANP	Deer Isle	3.6	S, D	
59-998	SPIRIT LEDGE	IFW	Swans Island	1.7	D	
61-002	NEHUMKEAG ISLAND	PRI?	Gardiner	2.3	E	
63-011	SPOON LEDGE	IFW	North Haven	0.8	S, D	
63-013	BURNT ISLAND	IFW	North Haven	17.2	E	
63-018	SHEEP Island	IFW	North Haven	22.5	E	
63-034	STIMPSONS ISLAND	PRI/NGO	North Haven	194.0	E	
63-079	BLUFF HEAD	PRI/NGO	Vinalhaven	7.8	E	
63-081	NECK ISLAND	PRI/NGO	Vinalhaven	21.7	E	
63-093	PENOBSCOT ISLAND	PRI/NGO	Vinalhaven	257.0	E	
63-135	GREEN LEDGE	PRI	Vinalhaven	0.7	D	✔
63-157	GREENS ISLAND	PRI	Vinalhaven	432.5	E	
63-160	VINALHAVEN*	PRI	Vinalhaven	11,397.8	E	
63-166	CARVERS ISLAND	BPL (IFW)	Vinalhaven	8.4	S, D	
63-169	HAY ISLAND	NGO	Vinalhaven	3.6	D	
63-174	ROBERTS ISLAND	FWS	Vinalhaven	10.8	S, D	

CIR #	Island name	OWNER	TOWN	Acres	Values	MCINWR
63-175	ROBERTS ISLAND (WEST)	FWS	Vinalhaven	2.4	S, D	
63-176	BRIMSTONE ISLAND	NGO	Vinalhaven	32.3	S, D	
63-179	LITTLE BRIMSTON	NGO	Vinalhaven	3.3	D	
63-183	OTTER ISLAND	IFW/NGO	Vinalhaven	44.4	S, D	
63-200	SPARROW ISLAND	IFW	Isle au Haut	5.3	S, D	
63-204	HARDWOOD ISLAND	IFW	Isle au Haut	13.6	E	
63-211	RAM ISLAND	IFW	Isle au Haut	3.4	E	
63-230	ISLE AU HAUT*	PRI/ANP	Isle au Haut	6,808.7	E	
63-260	SOUTHERN MARK ISLAND	IFW	Isle au Haut	5.3	S, D	
63-264	FOG ISLAND	PRI/NGO	Isle au Haut	56.7	E	✔
63-266	GREEN LEDGE	IFW	Isle au Haut	4.2	S, D	
63-283	COW PEN (WEST)	IFW	Isle au Haut	3.8	S	
63-284	COW PEN (EAST)	IFW	Isle au Haut	2.6	S	
63-287	GREAT SPOON ISLAND	IFW/ANP	Isle au Haut	50.4	S, D	
63-289	LITTLE SPOON ISLAND	NGO/ANP	Isle au Haut	23.1	S, D	
63-313	CURTIS ISLAND	PRI?	Camden	7.8	E	
63-314	GOOSE ROCK	IFW	Rockport	0.5	D	
63-323	RAM ISLAND	PRI	Rockport	1.1	S, D	✔
63-330	MOUSE ISLAND	PRI	North Haven	2.7	D	✔
63-335	EAST GOOSE ROCK	IFW	North Haven	0.7	D	
63-336	GOOSE ISLAND	IFW	North Haven	1.6	D	
63-339	MARK ISLAND	NGO	North Haven	31.1	E	
63-341	ROBINSON ROCK	IFW	North Haven	1.9	D	
63-393	SHEEP ISLAND	PRI	Owls Head	62.3	E	
63-402	FISHERMAN ISLAND	IFW	Matinicus Isle Pl.	8.9	D	
63-403	MARBLEHEAD ISLAND	IFW	Matinicus Isle Pl.	1.0	D	
63-418	LT GREEN ISLAND	PRI	Matinicus Isle Pl.	2.9	S, D	✔
63-420	GARDEN ISLAND	IFW	Thomaston	1.5	D	
63-421	OAK ISLAND	PRI	Matinicus Isle Pl.	1.8	D	✔
63-485	GREEN ISLAND	IFW	Vinalhaven	1.7	D	
63-493	GREEN LEDGES	IFW	Vinalhaven	2.3	S, D	
63-501	CRANE ISLAND (NORTH)	PRI	Vinalhaven	35.9	E	
63-503	SPECTACLE ISLAND (WHITE IS.?)	PRI	Vinalhaven	3.7	E	
63-505	CRANE ISLAND (SOUTH)	PRI	Vinalhaven	1.6	E	✔
63-526	HURRICANE ISLAND LEDGE	IFW	Vinalhaven	1.4	D	
63-578	GUNNING ROCK (EAST)	IFW	Saint George	2.7	D	
63-579	THE BROTHERS (NORTH)	NGO	Saint George	3.8	D	✔
63-580	THE BROTHERS (C)	NGO	Saint George	0.6	R, D	✔
63-581	THE BROTHERS (SOUTH)	NGO	Saint George	7.4	D	✔
63-582	HAY LEDGE	NGO	Saint George	5.0	D	
63-584	METINIC ISLAND	FWS/PRI	Matinicus Isle Pl.	346.0	S, R, D	
63-585	METINIC GREEN ISLAND	PRI	Matinicus Isle Pl.	8.7	S, D	
63-588	HOG ISLAND	PRI	Matinicus Isle Pl.	9.4	D	
63-626	HURRICANE ISLAND	PRI	Matinicus Isle Pl.	1.8	D	✔
63-634	GRAFFAM ISLAND	PRI	Muscle Ridge S.	65.1	W	✔
63-651	CROW ISLAND	PRI	Matinicus Isle Pl.	11.8	E	✔
63-653	TWO BUSH ISLAND	FWS	Matinicus Isle Pl.	8.1	D	
63-654	LT GREEN ISLAND	PRI	Matinicus Isle Pl.	36.0	S, D	✔
63-655	LARGE GREEN ISLAND	PRI	Matinicus Isle Pl.	85.3	S, R, D	✔
63-701	HARBOR ISLAND	NGO/PRI	Friendship	96.7	S	✔

CIR #	Island name	OWNER	TOWN	Acres	Values	MCINWR
63-705	CRANE ISLAND	PRI/FWS	Friendship	11.9	S, D	
63-707	FRANKLIN ISLAND	FWS	Friendship	10.9	S, W, D	
63-730	SAND ISLAND	PRI	Friendship	4.2	E	✔
63-731	RAM ISLAND	PRI	Friendship	1.3	E	✔
63-802	BAR ISLAND	PRI	Saint George	8.1	S, D	✔
63-820	SHAG LEDGES (EAST)	IFW	Saint George	1.7	D	
63-821	SHAG LEDGDES (WEST)	IFW	Saint George	1.4	D	
63-833	HART ISLAND	FWS	Saint George	13.2	S, D	
63-836	GUNNING RK (WEST)	IFW	Saint George	2.1	S, D	
63-839	OLD HUMP LEDGES (SOUTH)	IFW	Saint George	1.7	D	
63-860	EASTERN EGG ROCK	IFW	Saint George	9.6	S, R, D	
63-873	LITTLE EGG ROCK	IFW	Saint George	3.2	D	
63-875	SHARK ISLAND	IFW	Saint George	2.5	S, D	
63-900	NO MAN'S LAND	IFW	Matinicus Isle Pl.	23.5	S, D	
63-901	TWO BUSH ISLAND	PRI	Matinicus Isle Pl.	5.9	S, D	✔
63-917	WOODEN BALL ISLAND	PRI	Matinicus Isle Pl.	38.2	S, D	✔
63-920	TENPOUND ISLAND	NGO	Matinicus Isle Pl.	28.3	S, D	
63-923	SEAL ISLAND	FWS	Vinalhaven	95.8	S, R, D	
63-924	PUDDING ISLANDI	IFW	Matinicus Isle Pl.	2.9	S, D	
63-929	GREEN LEDGE	IFW	Matinicus Isle Pl.	4.4	D	
63-930	RAGGED ISLAND	PRI	Matinicus Isle Pl.	332.3	D	
63-940	MATINICUS ROCK	FWS	Matinicus Isle Pl.	25.7	S, R, D	
65-019	HOG ISLAND	PRI	Damariscotta	4.7	E	✔
65-123	HODGSONS ISLAND	NGO	South Bristol	23.2	E	
65-165	HOG ISLAND	NGO	Bremen	302.2	E	
65-173	CROTCH ISLAND (SOUTH)	IFW	Bremen	0.7	E	
65-189	KILLICK STONE	IFW	Bristol	5.5	R, D	
65-194	WRECK ISLAND	IFW	Bristol	14.1	S, W, D, E	
65-198	ROSS ISLAND	NGO	Bristol	26.7	S, D	
65-200	HADDOCK ISLAND	PRI	Bristol	12.1	D	✔
65-201	WESTERN EGG ROCK	NGO	Bristol	7.9	S, D	
65-244	CHRISTMAS COVE	IFW	South Bristol	0.3	R, D	
65-258	THREAD OF LIFE	PRI	South Bristol	1.4	S, D	✔
65-267	THRUMCAP ISLAND (SOUTH)	FWS	South Bristol	9.0	R	
65-274	FISHERMAN ISLAND	PRI	Boothbay	70.7	W, D	✔
65-276	WHITE ISLAND (INNER)	NGO/FWS	Boothbay	10.6	S, D	
65-278	WHITE ISLAND (OUTER)	FWS	Boothbay	13.4	W, D	
65-279	OUTER HERON ISLAND	FWS	Boothbay	66.2	W, E	
65-280	DAMARISCOVE ISLAND	NGO	Boothbay	242.3	S, D	✔
65-287	PUMPKIN ISLAND	State of Maine	Boothbay	5.7	D	
65-313	EASTERN DUCK ROCK	IFW	Monhegan Island	2.2	D	
65-408	ISLE OF SPRINGS	PRI	Boothbay Harbor	104.9	E	
65-423	GREEN ISLAND	PRI	Southport	19.6	E	
65-461	LOWER MARK ISLAND	NGO/FWS	Southport	9.5	S, W	
73-010	SWAN ISLAND	IFW	Perkins Twp	1,434.7	E	
73-012	LT SWAN ISLAND	IFW	Perkins Twp	46.3	E	
73-030	FREYEE ISLAND (WEST)	PRI	Topsham	5.3	E	✔
73-065	NN I (STONEY ?)	PRI?	Bath	1.5	E	
73-067	THORNE ISLAND	PRI	Woolwich	11.5	E	
73-072	CRAWFORD ISLAND	PRI	Bath	7.6	E	

CIR #	Island name	OWNER	TOWN	Acres	Values	MCINWR
73-090	LITTLE LINES ISLAND	PRI?	Woolwich	0.9	E	
73-168	LEE ISLAND	IFW	Phippsburg	105.6	E	
73-213	NORTH SUGARLOAF	IFW	Phippsburg	0.8	R	
73-262	OUTER HEAD	BPL	Georgetown	3.4	R	
73-280	SOUTH SUGARLOAF	IFW	Phippsburg	1.3	S, R, D	
73-282	POND ISLAND	FWS	Phippsburg	10.5	S	
73-308	FULLER ROCK	PRI	Phippsburg	2.4	D	✔
73-313	HERON ISLAND (NORTH)	NGO	Phippsburg	2.0	S, D	
73-315	HERON ISLAND (C)	NGO	Phippsburg	2.7	D	
73-316	HERON ISLAND (SOUTH)	NGO	Phippsburg	3.3	S, D	
73-320	SEGUIN ISLAND	NGO	Georgetown	63.1	S, D	✔
77-011	SEARS ISLAND	MDOT	Searsport	977.1	E	
77-012	ISLESBORO*	PRI	Islesboro	7,750.6	E	
77-045	RAM ISLAND	PRI	Islesboro	7.0	E	✔
77-047	FLAT ISLAND	IFW	Islesboro	11.5	S, D	
79-012	ST. CROIX ISLAND	ANP	Calais	7.4	E	
79-061	FALLS ISLAND	NGO,PRI/NGO	Trescott Twp	143.1	E	
79-072	WILBUR NECK (SOUTH)	IFW	Pembroke	6.1	E	
79-081	WILBUR NECK (NORHT)	PRI	Pembroke	69.4	E	
79-085	NN I REYNOLDS POINT	IFW	Edmunds Twp	0.3	E	
79-126	GOOSE ISLAND	IFW	Eastport	3.7	S, D	
79-128	MATTHEWS ISLAND	PRI?	Eastport	18.1	E	
79-132	SPECTACLE ISLAND	PRI	Eastport	4.8	S, D	✔
79-172	BIRCH ISLAND (SOUTH)	FWS	Edmunds Twp	2.1	E	
79-193	FREDS ISLAND	PRI	Trescott Twp	3.4		
79-219	GOOSEBERRY ISLAND	PRI	Lubec	4.5	E	
79-222	TALBOT COVE ISLAND (WEST)	IFW	Trescott Twp	4.5	E	
79-228	CARLOS COVE ISLAND	IFW	Trescott Twp	3.8	E	
79-241	HOG ISLAND	NGO	Lubec	12.6	E	
79-279	HOG ISLAND	IFW	Machiasport	30.7	D, E	
79-285	SALT ISLAND	IFW/PRI	Machiasport	73.0	E	
79-290	YELLOW HEAD ISLAND	PRI?	Machias	15.8	E	
79-291	BAR ISLAND	??	Machiasport	49.7	E	
79-297	CAPE WASH ISLAND	PRI	Cutler	21.1	E	✔
79-304	LT RIVER ISLAND	US Coast Guard	Cutler	16.9	E	
79-313	OLD MAN ISLAND	FWS	Cutler	5.3	S, D	
79-345	MINK ISLAND	FWS	Cutler	11.2	E	
79-347	CROSS ISLAND	FWS	Cutler	1,474.8	E	
79-351	DBL HEADSHOT (INNER)	FWS	Cutler	8.0	E	
79-352	DBL HEADSHOT (OUTER)	FWS	Cutler	14.5	S, D	
79-356	STONE ISLAND	NGO	Machiasport	57.7	W, E	
79-359	BIG LIBBY ISLAND	IFW	Machiasport	95.6	S, D	
79-360	LITTLE LIBBY	FWS	Machiasport	39.7	D	
79-370	TREAT ISLAND	PRI	Eastport	73.2	E	
79-371	POPES FOLLY	IFW	Lubec	1.7	E	
79-393	HOPE ISLAND	PRI	Roque Bluffs	5.5	E	✔
79-410	HARDWOOD ISLAND	PRI	Addison	20.2	E	
79-412	DUCK LEDGE ISLAND	PRI	Addison	1.1	D	✔
79-422	INNER GOOSE ISLAND	IFW	Addison	2.9	E	
79-462	LT RAM ISLAND	PRI	Roque Bluffs	2.0	E	✔

CIR #	Island name	OWNER	TOWN	Acres	Values	MCINWR
79-464	FELLOWS ISLAND	PRI	Roque Bluffs	33.0	E	✔
79-475	ROQUE ISLAND	PRI	Jonesport	1,306.7	E	
79-481	LT SPRUCE ISLAND	PRI	Jonesport	84.3	E	
79-488	BALLAST	IFW	Jonesport	3.5	S, D	
79-493	MARK ISLAND	NGO	Jonesport	39.2	E	
79-499	NIPPLE ISLAND	NGO	Jonesport	0.3	D	
79-512	GREAT WASS ISLAND*	PRI/NGO	Beals	2,653.5	E	
79-514	SHEEP ISLAND	PRI	Jonesport	4.2	E	✔
79-520	PIG ISLAND	PRI	Beals	54.1	E	
79-523	FRENCH HOUSE ISLAND	PRI	Beals	8.1	E	
79-570	HALIFAX ISLAND	FWS	Jonesport	60.0	D	
79-572	GREEN ISLAND	IFW	Jonesport	2.0	D	
79-573	EAST BROTHERS	FWS	Jonesport	16.8	S, D	
79-574	ANGUILLA ISLAND	PRI	Jonesport	12.9	E	
79-576	PULPIT ROCK	IFW	Jonesport	1.7	S, D	
79-580	DOUBLE SHOT ISLAND	PRI	Jonesport	7.5	E	
79-586	WEST BROTHERS	IFW	Jonesport	12.9	D	
79-600	LITTLE RAM ISLAND	IFW	Beals	13.1	E	
79-601	BIG RAM ISLAND	PRI	Beals	29.3	E	✔
79-602	OUTER RAM ISLAND	PRI	Beals	8.6	E	✔
79-605	EGG ROCK	IFW	Beals	1.9	D	
79-610	TOMS ISLAND (NORHT)	PRI	Addison	1.6	E	
79-614	INNER SAND ISLAND	FWS	Addison	17.8	D	
79-619	PLUMMER ISLAND (EAST)	NGO	Addison	8.0	E	
79-621	FLAT ISLAND	PRI	Addison	19.6	S, D	✔
79-623	RAM ISLAND	PRI?	Addison	5.7	E	
79-626	BIG NASH ISLAND/CONE	PRI	Addison	75.3	S, R, D	✔
79-627	NASH ISLAND	PRI/FWS	Addison	16.7	S, D	✔
79-632	THE LADLE	PRI	Addison	2.3	D	✔
79-635	PLUMMER ISLAND (WEST)	PRI	Addison	13.0	E	
79-638	LITTLE DRISKO	IFW	Addison	10.9	S	
79-662	LT HARDWOOD ISLAND	NGO	Jonesport	5.2	E	
79-676	FREEMAN ROCK	IFW	Jonesport	1.5	S, D	
79-679	MINK ISLAND	PRI	Beals	2.6	E	
79-693	BROWNEY ISLAND	NGO	Beals	39.8	S, D, E	
79-694	FISHERMAN ISLAND	PRI	Beals	48.1	S, D	✔
79-740	UPPER BIRCH ISLAND	NGO	Addison	27.5	E	
79-742	LOWER BIRCH ISLAND	PRI	Addison	23.9	E	
79-748	NIGHTCAP ISLAND	PRI/IFW	Addison	2.7	S, D	
79-751	EAGLE ISLAND	PRI/NGO	Addison	3.5	E	
79-757	BOWLINE HEAD	NGO	Harrington	7.2	E	
79-763	STROUT ISLAND	PRI	Harrington	20.8	E	✔
79-765	OTTER ISLAND	BPL	Harrington	1.0	E	
79-778	RIPLEY ISLAND	PRI	Harrington	0.9	E	
79-787	PINKHAM ISLAND	PRI	Milbridge	79.6	E	✔
79-789	FOSTER ISLAND	PRI	Harrington	322.5	E	
79-820	BAR ISLAND	PRI?	Milbridge	82.2	E	
79-824	BOIS BUBERT ISLAND	FWS/PRI	Milbridge	1,059.3	E	
79-832	POP ISLAND	PRI?	Steuben	2.8	E	
79-835	SHEEP ISLAND	PRI	Steuben	7.9	E	✔

CIR #	Island name	OWNER	TOWN	Acres	Values	MCINWR
79-836	SALLY ISLAND	FWS	Steuben	1.3	E	
79-843	EASTERN ISLAND	PRI	Steuben	4.7	S, D	✔
79-903	FLINT ISLAND	NGO	Harrington	136.0	E	
79-906	SHIPSTERN ISLAND	NGO	Harrington	8.0	E	
79-909	TRAFTON ISLAND	PRI/IFW	Harrington	113.2	W	✔
79-917	DOUGLAS ISLAND (WEST)	PRI	Milbridge	10.5	E	
79-918	DOUGLAS ISLAND (MID)	PRI	Milbridge	19.4	E	
79-919	DOUGLAS ISLAND (EAST)	PRI	Milbridge	3.9	E	
79-922	JORDANS DELIGHT	FWS/PRI	Harrington	27.0	S, D	
79-929	GREEN ISLAND	IFW	Steuben	14.2	S, D	
79-933	PETIT MANAN	FWS	Steuben	15.7	S, R, D	
79-935	EGG ROCK	IFW	Milbridge	1.8	D	
81-001	BLUFF ISLAND	NGO	Saco	14.5	S, D	
81-002	STRATTON ISLAND	NGO	Saco	30.0	S, W, R, D	
81-010	EAGLE ISLAND	PRI	Saco	3.1	S, D	✔
81-015	WOOD ISLAND	NGO/US Coast Guard	Biddeford	43.5	S, D	✔
81-016	STAGE ISLAND	NGO	Biddeford	10.1	D	
81-018	BEACH ISLAND	IFW	Biddeford	3.1	R	
81-025	GOOSEBERRY ISLAND	IFW	Biddeford	1.7	D	
81-040	W GOOSE ROCKS	IFW	Kennebunkport	2.1	R	
81-041	W GOOSE ROCKS	IFW	Kennebunkport	0.4	R	
81-098	GREEN ISLAND	NGO	Kennebunkport	5.8	S, D	
81-101	FOLLY ISLAND	PRI	Kennebunkport	5.4	S, D	✔
81-102	BUMPKIN ISLAND	NGO	Kennebunkport	1.7	S, D	
81-181	DUCK ISLAND	FWS	Kittery	8.8	S, D	
81-182	SMUTTYNOSE ISLAND	PRI/FWS	Kittery	40.5	S, D	
81-191	APPLEDORE ISLAND	PRI	Kittery	99.1	S, W, D	✔

Record	EMS	Incident Report	
Created by:	**Revision:**	**Replaces Revision :**	**Reason for Revision:**
Jennifer Wiper	November 2014	New	New

All incidents that affect our Environmental Management System (EMS) need to be documented in detail to determine if changes are needed to our Operational Controls (procedures, equipment, reporting or staff training).

INCIDENT TYPE

- ☐ **Blood Water Spill**
- ☐ **Chemical / Fuel Spill**
- ☐ **Vessel / Barge Sinking**
- ☐ **Potential Fish Escape**
- ☐ **Wildlife Interaction**
- ☐ **Other:**

TO BE COMPLETED BY INCIDENT RECORDER

Name of Incident Recorder:	Date of Incident:
Location of Incident:	
Personnel Involved:	
Description of Incident:	
Immediate Corrective Action:	
Preventative Action:	
Management Representative Contacted:	Position:

TO BE COMPLETED BY MANAGEMENT REPRESENTATIVE

Management Representative Remarks:	
Revisions Required to Operational Controls:	
Signature of Management Representative:	Date Signed:

The Referred Individual must submit this record to the Cooke Aquaculture Certification Supervisor upon completion

FOR OFFICE USE ONLY

Reviewed and Documented (CAI CS signature)	

Acoustic Deterrent Policy

Version 15.05-01

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. To make certain that we live up to the commitment of protecting and maintaining the sustainability of the environment in which we operate, we need to establish Best Management Practices and Policies and as such we have developed this Acoustic Deterrent Policy regarding their use.

Acoustic Deterrent Devices (ADDs), also referred to as Acoustic Harassment Devices (AHDs) are equipment used underneath the surface of the water to deter predators away from our cages. While we continue to advance our predator exclusion systems, such as the use of the steel-core nets, redesign of our grid systems and other technologies, including ADDs, predator interactions are unavoidable given the environment in which we operate.

- Any use of an ADD must be 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 schemes need to be referred to prior to deployment and your Area and/or Production Manager are your best resources to answer these questions.
- To ensure that non-target species are not negatively impacted, we will limit the use of any ADDs during periods of high population densities. As such, the use of ADDs will NOT BE PERMITTED during the months of June through September.
    - It is imperative that the devices are removed from the water during this time.

This policy supports our commitments to our Environmental Management System.

Michael Szemerda
VP Saltwater Operations
Kelly Cove Salmon Ltd.

NS1039 Rattling Beach– Boundary Amendment

Report on Public Engagement during Scoping

Kelly Cove Salmon
134 North Street. Bridgewater. NS. B4V2V6

Introduction

On March 30, 2017, Kelly Cove Salmon (KCS) hosted a public meeting in Digby, Nova Scotia, at the Digby Fire Hall. The meeting ran from 3:30 – 7:00pm. The purpose of the meeting was to provide information about the boundary amendment application for the Rattling Beach site and to answer questions from the public and neighbours about the Rattling Beach site, the proposed boundary amendment, and the company in general.

KCS is seeking a boundary amendment the enable the lease to include the moorings as well as the footprint of the cages as per regulatory requirements. Operationally, the site will continue operating as it has for the last 16 years. Transport Canada has already issued an approval.

Community Engagement

On Monday, March 6, Jeff Nickerson and [redacted] made a presentation to the Town of Digby to update the Mayor and Council about KCS NS operations and to explain the background of the Boundary Amendment for Rattling Beach. Advice was sought about setting up a Community Liaison Committee for the Digby area and notified them of the Open House scheduled for March 30, 2017. A similar presentation was made to the Municipal Council on March 13.

The following ad was posted in the regional newspapers for two consecutive weekends prior to the open house.

Figure 1. Open house ad that was posted in regional newspapers.

A greeting station was set-up near the entrance of the fire hall. Visitors were greeted by the Communications team and were asked if they would like to register. Those who registered, were given a ballot for a $100 gift certificate/draw for the Fundy Restaurant in Digby. Visitors were also asked to fill out an exit survey. A summary of the exit survey is provided near the end of the scoping report.

Company Representatives

Certification and Compliance: [redacted], Corporate Sustainability Manager, answered questions about certification and compliance and had brochures and information on hand.

Feed Manufacturing: [redacted], GM of Northeast Nutrition and Charlotte Feeds, brought jars with samples of feed and feed ingredients and showed a loop of images from the feed mill. He answered questions about feed and feeding practices.

Feed Systems: Kelly Cove staff set up monitors to show live video from the Rattling Beach site's dome camera and underwater cameras.

SimCorp: Two staff from SimCorp had a display showing Environmental Monitoring Program (EMP) related equipment and diagrams showing the boundary amendment.

GMG: [redacted], VP Marine Services, and [redacted] brought a model cage set up along with some net and hardware samples. They explained our farming technology and discussed innovations in moorings, rope and netting.

Human Resources: [redacted] Human Resources Manager, responded to questions about career opportunities and provided application forms and Cooke materials.

NSERC Industrial Research Chair in Sustainable Aquaculture: [redacted] and [redacted] provided a poster illustrating the NSERC Industrial Research Chair project. They answered questions relating to Research & Development and modeling work.

Fish Health/Farm Operations: [redacted], VP Saltwater Operations, Jeff Nickerson, NS Production Manager, and [redacted] NS Area Manager, were on hand to respond to questions about farm operations and fish health.

A food station was set-up at back of the room: Samples of smoked salmon, fruit, sweets, coffee, tea were available for visitors.

Attendees

9 visitors, besides presenters and members of the Kelly Cove Salmon staff, attended the open house. Three people filled out application forms for employment. Three people were neighbours from the Rattling Beach site area who were interested in learning more about the farm.

Only one person refused to register or offer his name. He came with his mother and would only say that he was from the Annapolis area and that he was a boat builder and former urchin diver. He came with pre-conceived perceptions about the sector, of our fish health practices and of the environmental monitoring program. He did spend time with the experts in the room but questioned their science, experience and expertise and left with the general comment that we don't do enough testing. He did not fill out an exit survey.

Exit Survey Summary

The following is a summary of questions and responses to the exit survey.

1. What was your primary reason for attending the Open House?
   - Employment, Looking for work, Employment Opportunities, Education, Just wondering about the site, Just interested in the site, Live near the site.
2. Did you find the information provided helpful?
   - Very helpful, Yes, very much, It was very informative, Yes, Very interesting.
3. Was there a particular area that interested you?
   - The feed station, Feeding system, The career section, Food ingredients. The feeding, Feeding and how it works.
4. What outstanding questions or suggestions might you have about our farms in the Digby area or about our operations in Nova Scotia?
   - None.
5. Would you be interested in serving on a Community Liaison Committee?
   - No.
6. Any further comments?
   - Candied salmon sure is good! You should offer it to your neighbours sometimes.

Photos from the Open House

Figure 2. KCS staff and presenters at the open house.

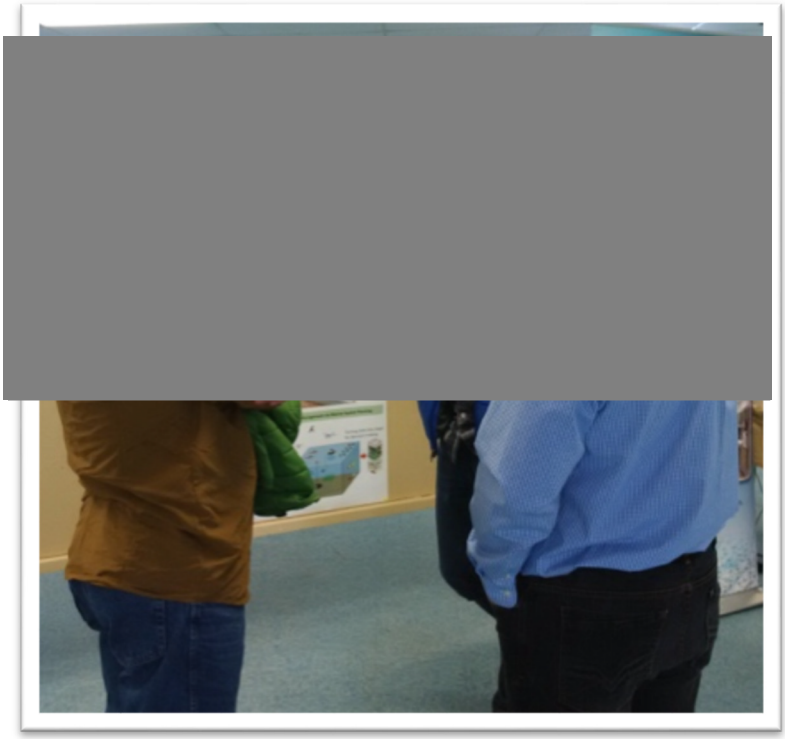


Figure 3. [redacted] and [redacted] at the open house.

Figure 4. [redacted] and [redacted] at the open house.

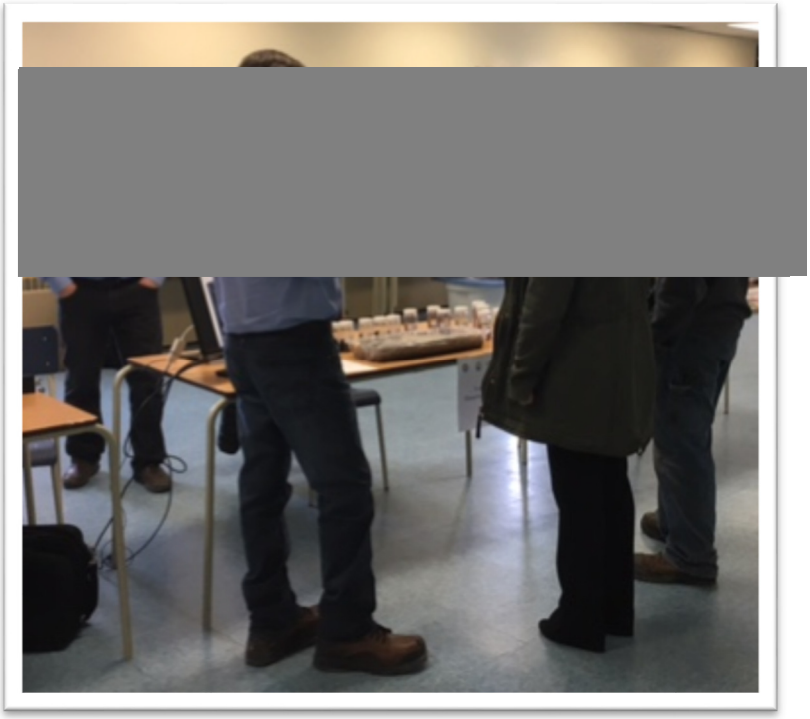


Figure 5. [redacted] speaking to meeting attendees.

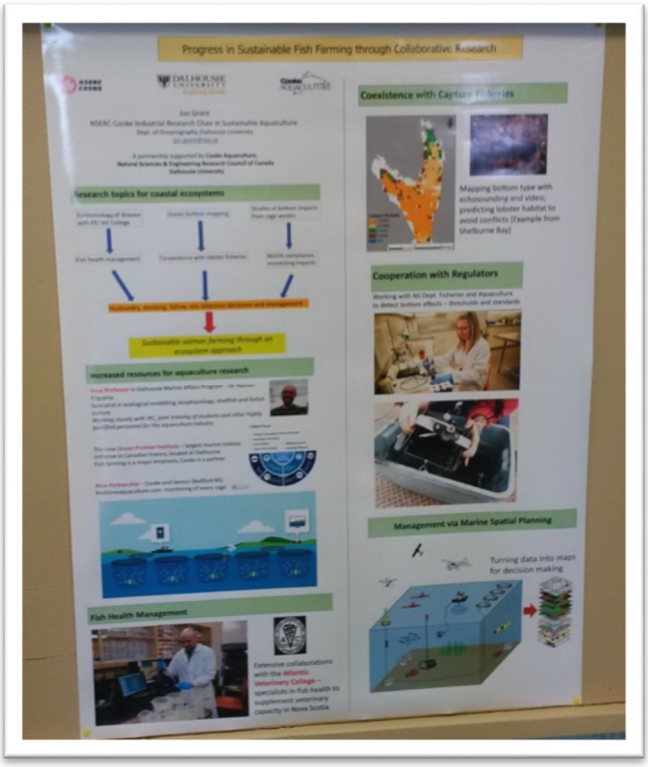


Figure 6. Information on research being conducted through NSERC,

Figure 7. Feed samples from NNI and Charlotte Feeds.

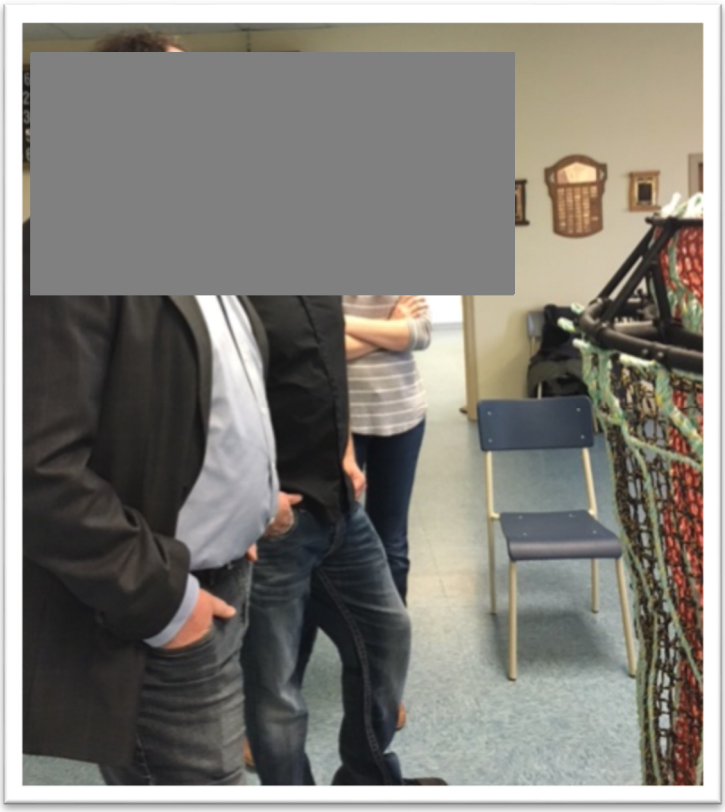


Figure 8. [redacted] of KCS.

Figure 9. Underwater video from Rattling Beach site.