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

Public Notice – Adjudicative Application Posted

These documents have been submitted with respect to two (2) New Marine Aquaculture Licence/Lease applications. The applications follow a Scoping period, during which the applicant collected information to support their applications. The information in these documents is provided as part of the routine disclosure of information by the Department of Fisheries and Aquaculture (NSDFA, the "Department"). Some information may be redacted as business confidential information or personal information.

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

<table>
<tr><th colspan="2">Adjudicative Application for a New Aquaculture Licence and Lease</th></tr>
<tr><td>Applicant: Denver Marine Limited</td><td>Species: American oyster (Crassostrea virginica)</td></tr>
<tr><td rowspan="2">Application File Numbers / Location:
AQ#1454 / Walsh's Deep Cove, Richmond County
AQ#1455 / Lazare's Island, Richmond County</td><td>Method of Cultivation: Bottom cultivation with gear, suspended cultivation</td></tr>
<tr><td>Application Received On: April 6, 2022</td></tr>
</table>

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

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

Posting Date of this Notice: March 1, 2023

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

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

NSDFA AQ#	TC Registry #	TC NPP File#
1454 (Walsh's Deep Cove)	5307	2022-206414
1455 (Lazare's Island)	3932	2021-204784

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

Table of Contents (Page 1 starts after this table)

NOVA SCOTIA

Office Use Only
AQ1454

Aquaculture Licence/Lease Application

Applicant Information:

Applicant: Denver Marine Ltd Contact Person: Denny David

Nova Scotia Registry of Joint Stocks Number: 3338929

Revenue Canada Business Number: [redacted]

Telephone No. (Work): _____ (Home): _____ (Cell): [redacted]

Fax No.: _____ E-mail: denvermarineltd@outlook.com

Mailing Address: PO Box 189 Petit de Grat NS

Postal Code: B0E 2L0

Civic Address: 3337 Highway 206 Petit de Grat NS

Postal Code: B0E 2L0

Proposed Site Information:

Location of Site: Walsh's Deep Cove County: Richmond Site Size (Ha): 3.7(approx)

Site Dimensions: 1640' x 255'

Hydrographic Chart No.: 4335

Approximate Center Coordinates: Latitude: 45° 34.137N

Longitude: 61° 12.080N

Type of Licence Application

(Check appropriate boxes):

☒ Commercial licence/lease
☐ Experimental licence/lease

☐ Marine Plants ☐ Finfish ☒ Shellfish ☐ Other

Submit completed applications to: **Nova Scotia Department of Fisheries and Aquaculture, Aquaculture Division**
1575 Lake Road, Shelburne, NS B0T 1W0
E-mail: aquaculture@novascotia.ca

NOVA SCOTIA

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AQ1454

- ☐ Land-based
  - ☐ Freshwater
  - ☐ Saltwater
  - ☐ U-Fish
  - ☐ Hatchery
  - ☐ Nursery Facility
  - ☐ Growout
- ☒ Marine
  - ☐ Cage culture
  - ☒ Suspended shellfish or marine plants
  - ☒ Bottom shellfish with gear
  - ☐ Bottom shellfish without gear

Application Materials

A complete application includes the following:

- Application fee (payable to Minister of Finance) according to Section 77 of the Aquaculture Licence and Lease Regulations for Nova Scotia made under Section 64, Chapter 25 of the Acts of 1996, *the Fisheries and Coastal Resources Act*
- Application Form
- Development Plan according to application
- Report on Public Engagement during Scoping (for all Marine applications and for other applications, as applicable)
- Copy of up-to-date Shareholder's Register which sets out the shareholdings of the company (if applicable, and if not already provided during the Option to Lease application process.

Public Notice and Disclosure

As part of the process for deciding on an aquaculture application, the Nova Scotia Department of Fisheries and Aquaculture ("Fisheries and Aquaculture") will disclose application information to other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture may disclose application information – not including, however, personal or business confidential information – on the departmental website.

Privacy Statement

The personal and business confidential information collected as part of an aquaculture application will only be used or disclosed by Fisheries and Aquaculture for the purpose of deciding on the application.

NOVA SCOTIA

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AQ1454

All application information collected is subject to the Freedom of Information and Protection of Privacy Act ("FOIPOP") and will only be used or disclosed in accordance with FOIPOP.

By signing and submitting this form, I acknowledge that I have read, understand, and accept the above statements regarding the collection, use, and disclosure of the information provided on this form.

Signature of Applicant

[redacted]

Date

April 5th/22

Signature of Nova Scotia Department of Fisheries and Aquaculture Designate

[redacted]

RECEIVED
APR 6 2022

NOVA SCOTIA

Office Use Only

AQ1455

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Applicant: Denver Marine Ltd Contact Person: Denny David

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Fax No.: E-mail: denvermarineltd@outlook.com

Mailing Address: PO Box 189 Petit de Grat NS

Postal Code: B0E 2L0

Civic Address: 3337 Highway 206 Petit de Grat NS

Postal Code: B0E 2L0

Proposed Site Information:

Location of Site: Lazare's Island County: Richmond Site Size (Ha): 4 (approx)

Site Dimensions: 1312' x 328'

Hydrographic Chart No.: 4335

Approximate Center Coordinates: Latitude: 45°35.006N

Longitude: 61°4.465N

Type of Licence Application

(Check appropriate boxes):

☒ Commercial licence/lease
☐ Experimental licence/lease

☐ Marine Plants ☐ Finfish ☒ Shellfish ☐ Other

Submit completed applications to: **Nova Scotia Department of Fisheries and Aquaculture, Aquaculture Division**
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NOVA SCOTIA

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- ☐ Land-based
  - ☐ Freshwater
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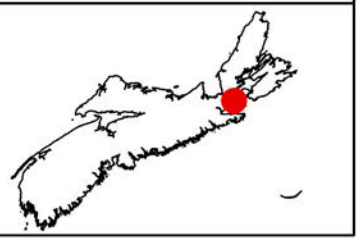
Signature of Applicant [redacted]

Date April 5th/22

Signature of Nova Scotia Department of Fisheries and Aquaculture Designate [redacted]

Date RECEIVED APR 6 2022

SCHEDULE A

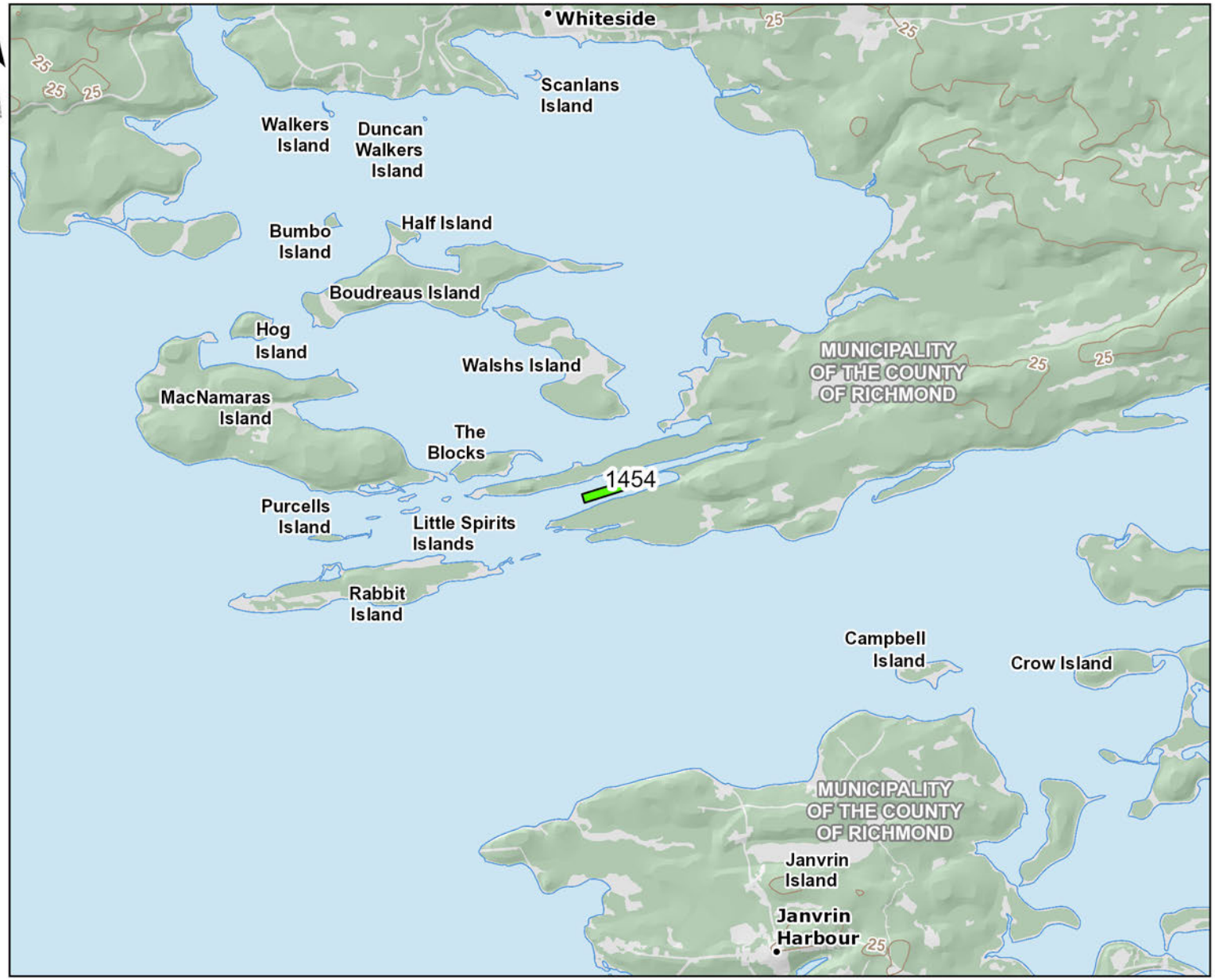


Aquaculture Site

1454

Corner	Latitude	Longitude
1	45° 34' 4.560"	-61° 11' 18.600"
2	45° 34' 8.760"	-61° 10' 58.020"
3	45° 34' 11.040"	-61° 10' 58.920"
4	45° 34' 6.900"	-61° 11' 19.500"
Centre	45° 34' 7.796"	-61° 11' 8.450"

DATUM NAD 83 CSRS UTM Zone 20
The above coordinates are not from a legal survey



License/Lease Holder	County	Waterbody	Hectares	Species Type	Culture Type	Chart
Denver Marine Ltd.	Richmond	Walsh Deep Cove	3.43	Shellfish	Suspended Culture	4308

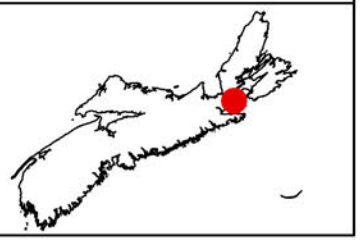
New Commercial Application
Other Proposed Application
Other Issued Lease
Issued Experimental

0 0.5 1 2
Kilometers

NOVA SCOTIA
Fisheries and Aquaculture

Disclaimer
This map should not be used for navigation or legal purposes. It is intended for general reference only.
Date: 2022-07-06 Created By: MK

SCHEDULE A



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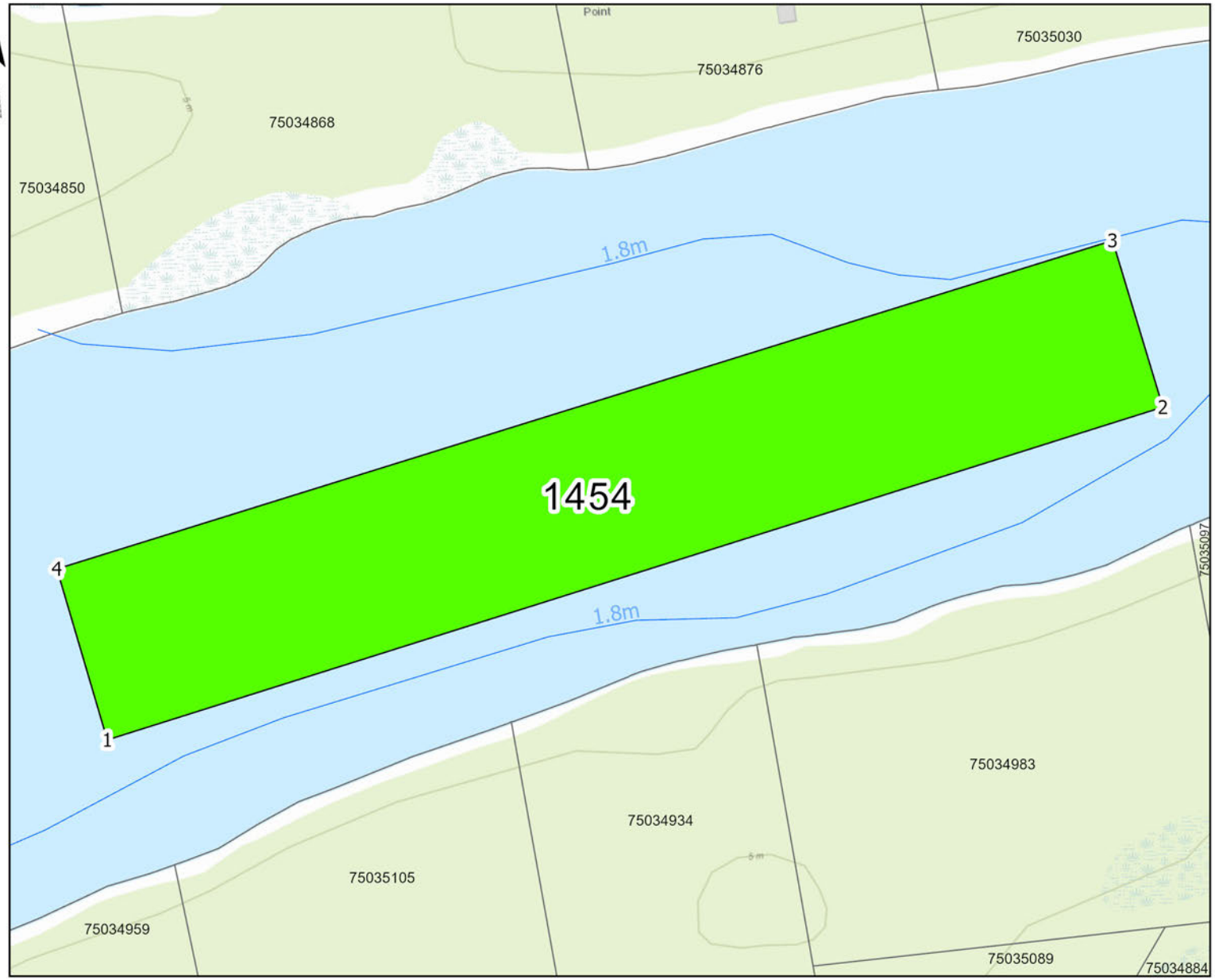

License/Lease Holder	County	Waterbody	Hectares	Species Type	Culture Type	Chart
Denver Marine Ltd.	Richmond	Walsh Deep Cove	3.43	Shellfish	Suspended Culture	4308

New Commercial Application
EC Restricted Area
Other Issued Lease

0 25 50 100 150
Meters

NOVA SCOTIA
Fisheries and Aquaculture

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Date: 2022-07-06 Created By: MK

SCHEDULE A

Aquaculture Site

1455

Corner	Latitude	Longitude
1	45° 34' 55.200"	-61° 4' 36.960"
2	45° 35' 0.480"	-61° 4' 17.700"
3	45° 35' 3.480"	-61° 4' 19.680"
4	45° 34' 58.800"	-61° 4' 38.820"
Centre	45° 34' 59.361"	-61° 4' 28.244"

DATUM NAD 83 CSRS UTM Zone 20
The above coordinates are not from a legal survey

License/Lease Holder	County	Waterbody	Hectares	Species Type	Culture Type	Chart
Denver Marine Ltd.	Richmond	Lennox Passage	4.88	Shellfish	Suspended Culture	4308

New Commercial Application
Other Proposed Application
Other Issued Lease
Issued Experimental

0 0.5 1 2
Kilometers

NOVA SCOTIA
Fisheries and Aquaculture

Disclaimer
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Date: 2022-07-06 Created By: MK

Internal Services Department

SCHEDULE A

Aquaculture Site

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1	45° 34' 55.200"	-61° 4' 36.960"
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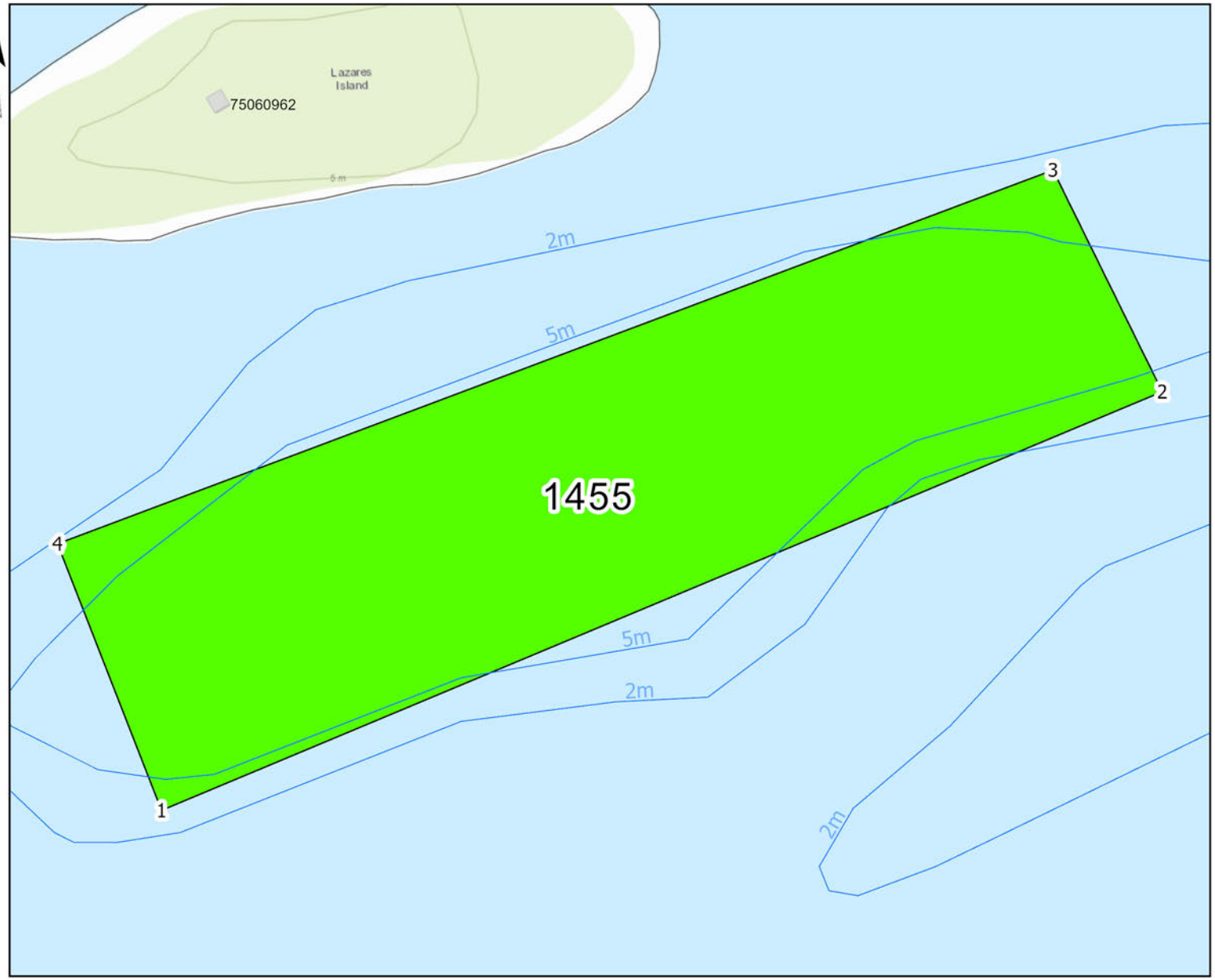

License/Lease Holder	County	Waterbody	Hectares	Species Type	Culture Type	Chart
Denver Marine Ltd.	Richmond	Lennox Passage	4.88	Shellfish	Suspended Culture	4308

New Commercial Application
EC Restricted Area
Other Issued Lease

0 20 40 80 120
Meters

NOVA SCOTIA
Fisheries and Aquaculture

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Date: 2022-07-26 Created By: MK

DENVER MARINE LTD

Shellfish Aquaculture Development Plan

Contents

Section 1: The Optimum Use of Marine Resources

Walshs Deep Cove is a sheltered cove that is an optimal location located in an area that is secluded from community. This area is under utilized commercially and has been surveyed by Denver Marine Ltd and identified as a suitable area to cultivate oysters.

The coordinates of Lennox Passage identified below is an ideal location for cultivating oysters which is also under utilized commercially. This area is sheltered by a roadway which limits its exposure to the wind elements from the open side of Lennox Passage. In addition, it is also sheltered on the Northwest side by an island with the opposite sides sheltered by an inland bay of water which makes it a prime location for such a project.

The first two areas identified are marked by the GPS coordinates below:

Site 1. Walshs Deep Cove

45° 34.115'N	61°11.325'W
45° 34.184'N	61°10.982'W
45° 34.076'N	61°11.310'W
45° 34.146'N	61°10.967'W

Total area encompassed is approximately 3.7 Hectares

Site 2. Lennox Passage

45° 34.980'N	64°4.647'W
45° 35.058'N	61°4.328'W
45° 34.920'N	64°4.616'W
45° 35.008'N	61°4.295'W

Total area encompassed is approximately 4 Hectares

Floating cages will be situated in the two locations protected from winds on all directions and both sites have water depth allow gear to be dropped to the bottom during the winter but also shallow enough to allow the water temperature to warm up adequately during Spring, Summer and Fall to allow for ideal growth.

Walshs Deep Cove is presently uninhabited by the local population with the exception of minimal recreational boating; therefore, the development of this site will prove that the cove is being utilized to it best potential.

The area identified in Lennox Passage is also uninhabited by the local population with the exception of minor recreational boating, and intermittent seasonal commercial vessel traffic; therefore, the development of this site will prove that the cove is being utilized to it best

potential without affecting the vessel traffic. The current goes through Lennox Passage in and out towards St. Peter's and the Strait of Canso which provides an abundance flow of water.

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

2.1 PRODUCTION PLAN

Eastern/American Oyster (Crassostrea Virginica)

Denver Marine's intention is to use the proposed lease sites to cultivate American Oysters (Crassostrea Virginica) using oyster grow cages. The cages are manufactured by BBI in Bouctouche, New Brunswick and have been tested throughout the oyster industry worldwide since approximately 2001.

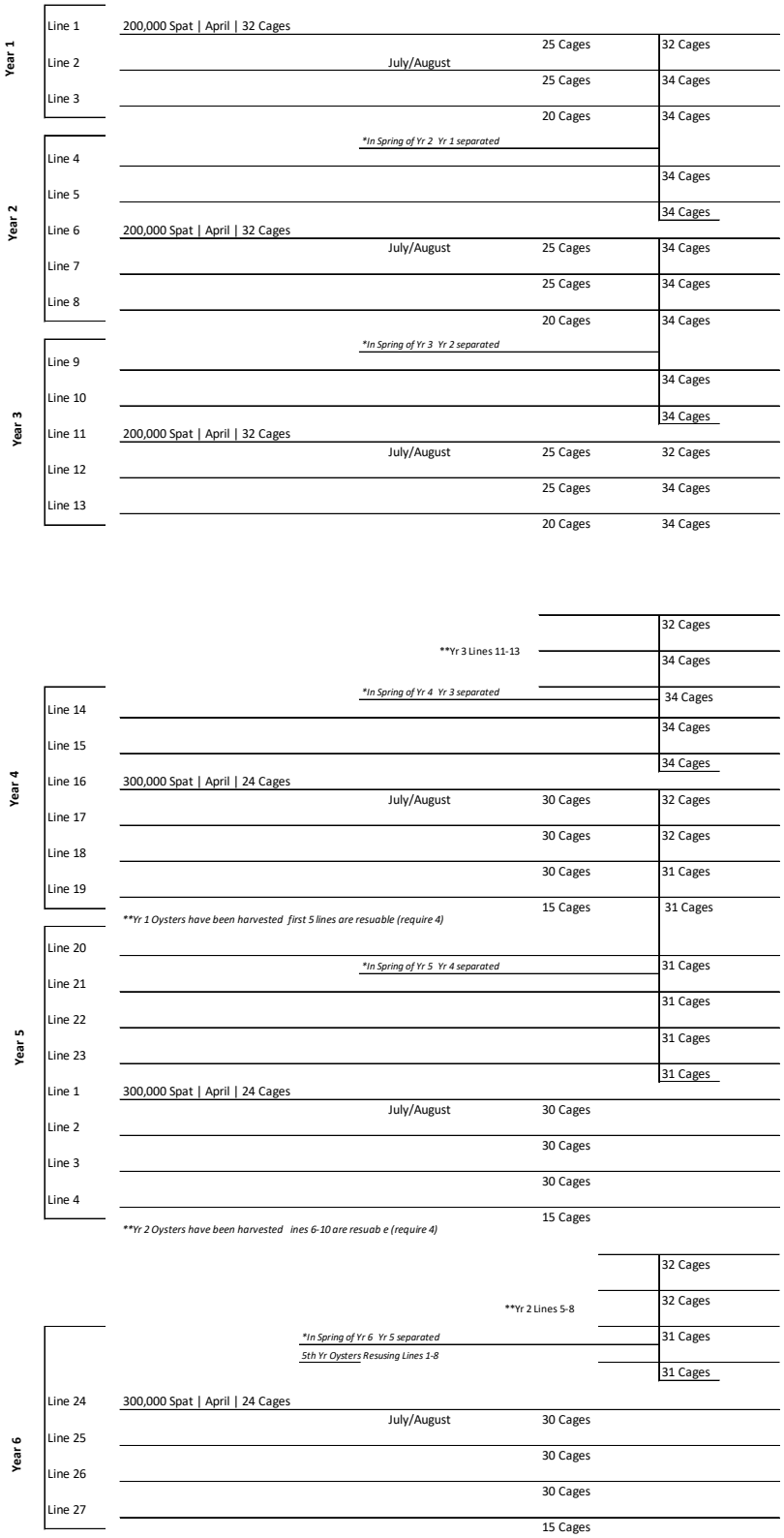
Cage measurements are 60" wide, 36" in length by 20" high and have a tested density of 345 cages per hectare.

Grow bag densities vary depending on life stage of oysters and nutrient availability. Seed density up to 1200/grow bag, intermediate grow stage up to 500/grow bag, grow-out stage up to 225/grow bag, few additional grow bags for slow growers.

The maximum number of oysters per lease will vary as is generally a mix of age classes throughout the lease and density is determined by nutrient supply, water flow, etc.

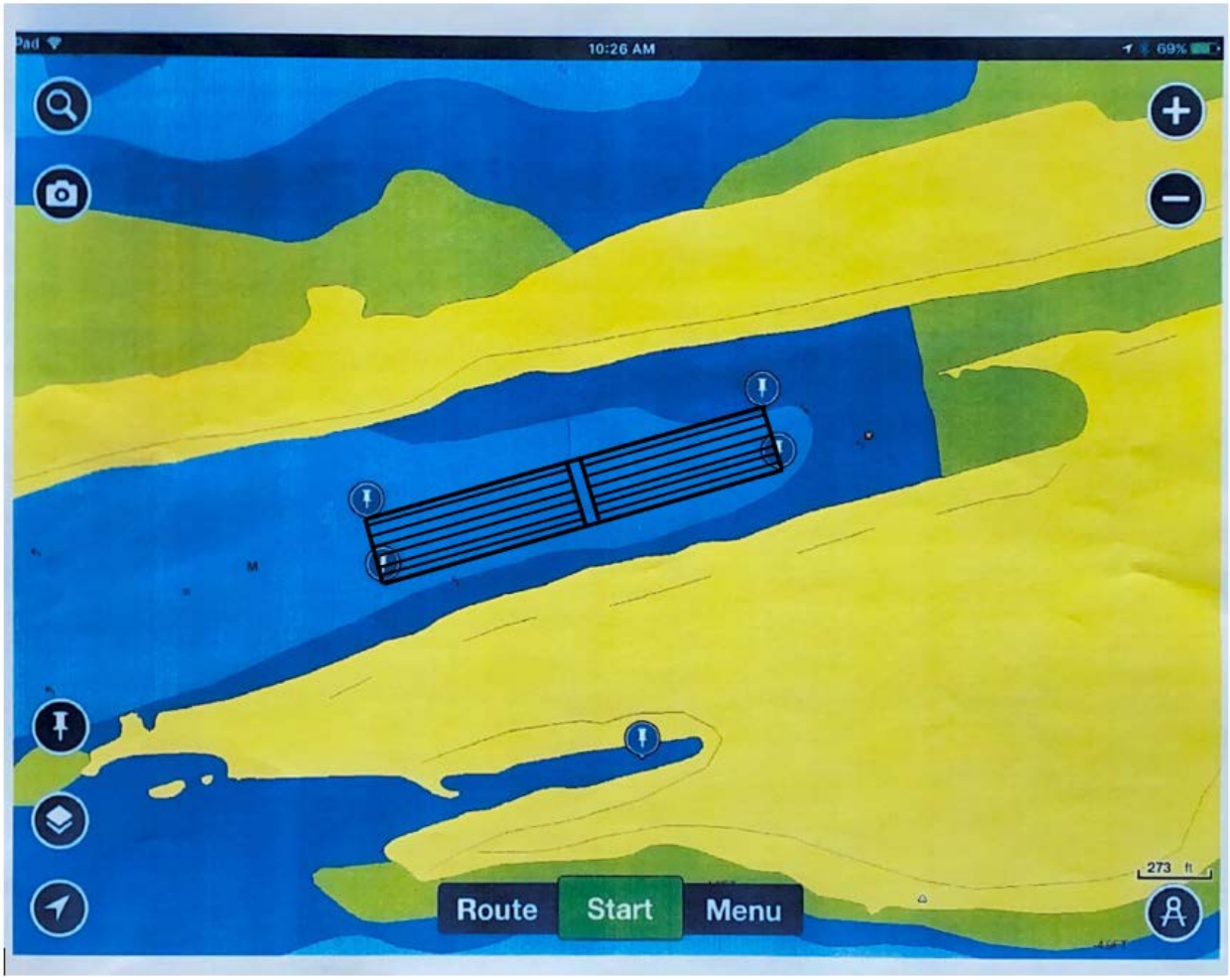
The first year of operation will comprise of collecting wild spat as there is wild population of oysters in the area, followed by acquiring spat from a supplier if necessary.

Harvest Plan 1-6



Site #1 Coordinates

Site #1 Lease Layout



Site #2 Coordinates

Site #2 Lease Layout

2.2 INFRASTRUCTURE

Oyster farming requires the use of special equipment such as tumblers, shakers and an ice machine. A floating dock, as well as a floating work platform is required in addition to a boat, trailer, truck, storage building and outdoor space. Some of the required infrastructure will need to be purchased, some built, and some is already acquired.

Infrastructure Requirements Years 1-6

Year 1

Will introduce 200,000 spat in April which will require 32 cages, 192 bags. During the months of July/August oysters will be divided into 70 cages and 420 bags and will be sunk for the winter months. The following gear will be required to fulfill the above production plan which will consist of three lines (330' long):

- 4 yellow spar buoys
- 2 coils of 1/2" rope (1200'/coil)
- 2 coils of 3/8" rope (1200'/coil)
- 10 screw anchors

***3 lines to date*

Additional equipment required:

- Tumbler (3 screen)
- 25x10 pontoon work platform

Year 2

Year 1 oysters will be separated into 168 cages, 1008 bags and will require two additional lines (330' long).

YEAR 2 OYSTERS:

Will introduce 200,000 spat in April which will require 32 cages, 192 bags. During the months of July/August oysters will be divided into 70 cages and 420 bags and will be sunk for the winter months. The following gear will be required to fulfill the above production plan which will consist of three lines (330' long):

- 2 coils of 1/2" rope (1200'/coil)
- 3 coils of 3/8" rope (1200'/coil)
- 10 screw anchors

***8 lines to date*

Additional equipment required:

- Shaker (3 screen)
- Hopper conveyor

Year 3

Year 2 oysters will be separated into 168 cages, 1008 bags and will require two additional lines (330' long).

YEAR 3 OYSTERS:

Will introduce 200,000 spat in April which will require 32 cages, 192 bags. During the months of July/August oysters will be divided into 70 cages and 420 bags and will be sunk for the winter months. The following gear will be required to fulfill the above production plan which will consist of three lines (330' long):

- 2 coils of 1/2" rope (1200'/coil)
- 3 coils of 3/8" rope (1200'/coil)
- 10 screw anchors

***13 lines to date*

Year 4

Year 3 oysters will be separated into 168 cages, 1008 bags and will require two additional lines (330' long).

YEAR 4 OYSTERS:

Will introduce 300,000 spat in April which will require 48 cages, 288 bags. During the months of July/August oysters will be divided into 105 cages and 630 bags and will be sunk for the winter months. The following gear will be required to fulfill the above production plan which will consist of four lines (330' long):

- 2 yellow spar buoys
- 2 coils of 1/2" rope (1200'/coil)
- 3 coils of 3/8" rope (1200'/coil)
- 14 screw anchors

***19 lines to date (year 1 oysters have been harvested, therefore lines, cages and bags available for reuse)*

Year 5

Year 4 oysters will be separated into 252 cages, 1512 bags and will require four additional lines (330' long).

YEAR 5 OYSTERS:

Will introduce 300,000 spat in April which will require 48 cages, 288 bags. During the months of July/August oysters will be divided into 105 cages and 630 bags and will be sunk for the winter months. The following gear will be required to fulfill the above production plan which will consist of four lines (330' long):

- 2 coils of 1/2" rope (1200'/coil)
- 3 coils of 3/8" rope (1200'/coil)
- 8 screw anchors

***23 lines to date (year 2 oysters have been harvested, therefore lines, cages and bags available for reuse. 5th year oysters will utilize lines 1-4 from year 1 oysters)*

Year 6

Year 5 oysters will be separated into 252 cages, 1512 bags and will be placed in lines 5-8 from 2nd year.

YEAR 6 OYSTERS:

Will introduce 300,000 spat in April which will require 48 cages, 288 bags. During the months of July/August oysters will be divided into 105 cages and 630 bags and will be sunk for the winter months. The following gear will be required to fulfill the above production plan which will consist of four lines (330' long):

- 2 coils of 1/2" rope (1200'/coil)
- 2 coils of 3/8" rope (1200'/coil)
- 8 screw anchors

***27 lines to date (year 3 oysters have been harvested, therefore lines, cages and bags available for reuse.)*

2.3 SERVICES AND SUPPLIERS

Several Nova Scotian companies in the area supply fishing gear (ropes, buoys, anchors, etc). Oyster cages and bags can be sourced from BBI Oyster Grow System in New Brunswick. A local company on Isle Madame specializes in aluminum fabrication and welding.

SPAT SUPPLIERS:

L'Étang Ruisseau Bar Ltée
PO Box 3332
111 Rue Pointe Brulée St
Shippagan, NB E8S 3H9

Paqtnkek First Nation
7 Dillon Street
RR#1
Afton, NS B0H 1A0

2.4 EMPLOYMENT

Technical
Year 1 – One Full Time Seasonal (labourer)
Year 2 – One Full Time Seasonal (labourer), One Part Time Seasonal (labourer)
Year 3 – One Full Time Seasonal (labourer), One Part Time Seasonal (labourer)
Year 4 – One Full Time Seasonal (labourer), Two Part Time Seasonal (labourers)

2.5 OTHER ECONOMIC CONTRIBUTORS TO THE LOCAL COMMUNITY AND PROVINCE

Oysters will be made available to the general public, local and neighbouring restaurants in additional to interested buyers throughout the province, country and potentially internationally. Denver Marine Ltd will promote their oysters through social media and industry contacts. Local quality seafood is an attractive resource sought out by not only the locals but also to tourists who frequent the area. Farm tours is also consideration which will be promoted to locals and tourists alike.

2.6 FINANCIAL VIABILITY

[redacted]

2.7 ADVERSE ECONOMIC IMPACT

Throughout the course of the scoping process there have been no identified impacts on the economic development of the community or province. While scoping Walshs Deep Cove the sole local camp owner that was approached and informed of the intent to develop the site; there was no objection or concerns noted by the landowner. While scoping out the identified location in Lennox Passage 23 individuals (residents, commercial fishers, recreational boaters, etc.) were approached and informed of the intent to develop both site's, there were no objections or concerns noted by these individuals.

Names, addresses, and contact information of those persons contacted throughout the scoping of both sites have been attached. (See *Appendix B*)

In addition, there are no other local oyster or shellfish farmers in the immediate areas, therefore there should be no impact.

Section 3. Fisheries Activities in the Public Waters Surrounding the Proposed Aquaculture Operation

3.1 STATUS OF FISHERIES ACTIVITIES

While speaking to local fishers, it was noted that there is a green crab fishery, a commercial mackerel fishery and lobster fishery. There is recreational fishing for scallops, clams, mussels and mackerel. None of these impacted by site 1 and 2 as there no fishers in the immediate area.

List of fishers included in the above section 2.7 and noted as *Appendix B*.

3.2 IMPACTS OF FISHERIES ACTIVITIES

As noted in the previous section, public activity in the proposed site 1 and 2 is minimal and no concerns have been identified as the fishers involved do not fish in the immediate area of proposed leases.

Section 4. Oceanographic and Biophysical Characteristics of the Public Waters

4.1 OCEANOGRAPHIC ENVIRONMENT

- Annual maximum wind speed (19 km/hr)
- Maximum wave height (0.4 m) – avg provided from buoy #44489
- Direction of maximum wave – Site #1 West/North East | Site#2 South West/North East
- Annual minimum tide (0.3m)
- Annual maximum tide (1.6m)
- Current speed range and averages 2.86 - 3 cm/sec
- Annual minimum salinity (31ppt)
- Annual maximum salinity (34ppt)
- Annual minimum temperature (-8°C)
- Annual maximum temperature (23°C)
- Depth of water at each corner of the site #1
    - (Top Left 7.1m| Top Right 5m | Bottom Left 7.7m | Bottom Right 6.2m)
- Depth of water at each corner of the site #2
    - (Top Left 4.1m| Top Right 5.2m | Bottom Left 8.5m | Bottom Right 5.2m)
- Primary production information (chlorophyll) – See *Appendix C*
- Biotoxin information (if available) – See *Appendix D*
- Current location classification – Site #1 Closed Area | Site #2 Approved Area

- Wind & Wave Condition Chetabucto Bay (CMAR) – See *Appendix E*
- Coastal Monitoring Program Report: Richmond County (CMAR) – See *Appendix E*
- Sea Surface Temperature Chart (CMAR) – See *Appendix E*
- Meteoblue Climate Isle Madame Averages – See *Appendix E*
- Buoy 44489 Chetabucto Bay Data – See *Appendix E*

4.2 BASELINE ENVIRONMENTAL MONITORING

Department of Fisheries deployed current meters on both proposed leases and also completed the baseline monitoring as described in the Standard Operating Procedures for the Environmental Monitoring of Marine Aquaculture of Nova Scotia. The video taken of the proposed leases will show a seafloor bottom of mud and silt which is devoid of seaweed and grass.

Please see included in this submission, videos of the bottom of sites 1 and 2. Current meter findings for each lease is included can be found in this submission, in the Baseline Environmental Monitoring folder. Included in *Appendix F*, you will find the Rose Plot, the Average Current Speed Chart and the Current Speed Frequency Distribution for each proposed lease.

4.3 SITE DESIGN

The Walshs Deep Cove proposed area was chosen because of its sheltered inlet, lack of activity from the general population. Oysters are already growing here in several areas. The only fishery in the cove is green crab but not in the immediate area. Land has been acquired in the area which will be beneficial to the storage and work area required for the project. Site is close to area where spat collection will be done.

The Lennox Passage site was chosen because it is sheltered on three sides, with the 4th side being a smaller channel which will limit the exposure to the elements. This area has limited marine traffic. The throughfare for marine traffic is off to the Northwest and East of the site and will not affect traffic. The area of the proposed site is in a deep pocket of water in which the rest of the surrounding area is shallow which will be sufficient for winter storage on the ocean floor. This area has good flushing action during tidal movement which will aid in the replenishment of food and oxygen water.

Section 5. The other Users of the Public Waters Surrounding the Proposed Aquaculture Operation

5.1 DESCRIPTION OF OTHER USERS

For proposed site in Walshs Deep Cove both sides of the inlet are wooded areas with no development except for one camp. The owner of the camp has no objections or concerns.

For proposed site in Lennox Passage outreach was done to the surrounding residents on both sides of the site with no identified objections or concerns.

Both sites are well clear of marine traffic. Limited use for recreational boaters. One resident was a kayaker, another was a pleasure craft owner; neither had any issues or concerns.

Fishers in the surrounding areas were contacted, non of which had any issues or concerns with proposed sites as they do not fish in the immediate areas of the proposed sites. Consultation with Potlotek First Nation community took place. Spoke with Fishery Manager, [redacted] regarding Denver Marine Ltd proposed Oyster Farm operation as well as the First Nation Oyster Farm operation. [redacted] provided an email confirming the conversation that took place and noting no concerns or issues regarding both proposed leases, see *Appendix G*.

- Adjacent property owners – See *Appendix B*
- Pleasure craft and commercial boat traffic – See *Appendix B*
- Anchorages and moorings – not applicable
- Processing plants within 10kms – not applicable
- Campgrounds – not applicable
- Municipal industrial and agricultural users which may be source of effluent – not applicable
- Tourism or recreations operations – not applicable
- Private and government wharves – not applicable
- Any known or suspected pre contact or historical archaeological resources – not applicable
- Important habitats and conservations areas – refer to section 5.2
- Other known potential (confirmed or proposed and activities) – Premium Seafoods is in the process of acquiring oyster leases approximately 7kms from proposed sites
- Other users who are relevant to the proposed development area if application – See *Appendix B*

5.2 SIGNIFCANCE OF PROPOSED AREA TO WILDLIFE

Contacted Department of Natural Resources (Trevor Wilkie/St. Peter's Office) regarding endangered species and wildlife at risk surrounding both proposed sites. It was noted that there are no concerns for wildlife at both proposed sites.

Contact has been made with Atlantic Canada Conservation Data Centre, which provided a data report, as well as a data dictionary, for Walshs Deep Cove and Lazares Island. See Appendix H

5.3 IMPACTS TO OTHER USERS INCLUDING WILDLIFE

In proposed Site #1 there is only one occupant in the area that has been contacted and documented in *Appendix B*. In proposed Site #2 all occupants on both sides of proposed site have been contacted and documented in *Appendix B*. There have been no objections to an oyster aquaculture site being established in either proposed area.

An ad was placed on Telile TV, a local broadcasting station, to inform the public of an open house that will take place at the Acadiaville Community Centre in West Arichat. This event allowed persons to have their questions, comments and/or concerns addressed regarding Denver Marine establishing an oyster farm at both proposed sites. The following is the ad that was used to advertised the public meeting:

On March 8, 2022, from 2:00pm-4:00pm and 5:00pm-7:00pm a public meeting took place to give an opportunity to the general public to inquire about the proposed lease sites and ask questions. This meeting was advertised on Telile TV's website, Television Scroll and Social Media account from mid-January 2022 until March 9, 2022. [redacted] from the Aquaculture Association of Nova Scotia was present, as well as [redacted] from BBI Oyster Grow. [redacted] was available to respond to questions pertaining to the farming of oysters and Aquaculture in

Nova Scotia as a whole, while [redacted] had oyster equipment on site for people to look at and see how it operates. I had a slideshow for all persons who attended to showcase the two proposed sites as well as cross sectional view of an aquaculture site.

The first session meeting, from 2:00-4:00pm, there was one individual present, [redacted], who was a local green crab and mackerel fisher. This individual asked question pertaining to the location of the proposed sites and potential impacts to his mackerel nets. There were no concerns brought forward regarding Denver Marine Ltd's proposed sites.

The evening session meeting, from 5:00-7:00pm, there were five people present: two local fishers, [redacted], a retired fisheries officer, [redacted], and a community member, [redacted]. [redacted] had concerns about the location of sites as they drag for scallops and set mackerel nets; however, once the locations of the sites were presented, it was determined that they do not fish in those areas and the initial concerns were no longer an issue. [redacted] asked several questions regarding new regulations put in place over the last several years as things have changed since he retired. [redacted] inquired about the locations of each site. The fifth person was [redacted], a local community member who viewed the slideshow and oyster equipment that was presented at the meeting.

Tea, coffee and sweats were provided for the general public. There was also a draw for a $50 Canadian Tire gift card which was drawn by [redacted] and won by [redacted]. All COVID19 regulations were adhered to during the meeting.

5.4 IMPACTS BY OTHER USERS INCLUDING WILDLIFE

Both proposed sites are situated in an area that will not be affected by marine traffic area or recreational boaters. Marine users will still have the ability to access the waterways freely around both proposed sites without interruption to the lease areas. In the event that there should be a conflict with access to either site or interactions with the public, I will work with the individual(s) to come to a resolve that is satisfactory to both parties.

Section 6: the public right of navigation

6.1 NAVIGATION PROTECTION ACT (NPA) Approval

The application notice of work with Transport Canada has been attached, (confirmation of application) see *Appendix I*; also included in *Appendix I* is location a map for each lease, site coordinate drawings for each lease, plan view and profile view drawings. Anticipated start and end dates will be determined by the application approval process.

Location of sites are not in any shipping lane or any other kind access for public navigation. Site #1 is located in Walsh's Deep Cove and Site #2 is located in Lennox Passage beside Lazare's Island. There are no structures that will be constructed, moved, replaced, secured or renovated. Each site will have floating cages anchored to the mud bottom with screw anchors and will be service by a floating work platform/boat. Please note, both proposed sites have their individual notice of works application submitted to Transport Canada. Correspondence required for each application are included in the appendices as one.

Section 7: The Sustainability of Wild Salmon

7.1 IDENTIFICATION OF LOCAL SALMON POPULATION

Contact was made with the Salmon Association of Nova Scotia and they indicated that the main salmon runs, that are monitored, on Cape Breton Island are in Margaree, Baddeck and Grand River. It was suggested that further contact be made with the Department of Fisheries. In speaking with the Department of Fisheries in Lennox Passage, staff stated that there have been sightings of salmon slinks going up River Inhabitants (being caught by local fishers in the past), but they have not witnessed it themselves. In speaking with various organizations, the conversations led me to the BIO (Bedford Institute of Oceanography). BIO provided information on Stock Status Update of Atlantic Salmon in Salmon Fishing Areas (SFAs 19-21) and 23, attached as *Appendix J*. BIO also provide a copy of the Recovery Potential Assessment for Eastern Cape Breton Atlantic Salmon (Salmo salar): Status, Past and Present Abundance, Life History, and Trends reported by A. L. Levy and A.J.F. Gibson. Attached as *Appendix K* are sections of the document that pertain to River Inhabitants.

The information in the studies suggest that there are several rivers and streams that drain out into the Atlantic Ocean along the East Coast of Cape Breton, River Inhabitant being one of them. The studies note that while the salmon are entering these areas, these streams and river are not necessarily being monitored. In speaking with BIO, where the closest proposed lease is approximately 6 kms from River Inhabitants, the impact of the proposed lease interfering with the salmon going up the river should be of no concern because we are using floating cages, along with the distance between the site and the river.

7.2 SUPPORT OF THE SUSTAINABILTY OF WILD SALMON

As noted in section 7.1, there should be no concern with impact to the sustainability of wild salmon. However, we will monitor potential salmon activity in the proposed lease area and ensure minimal impact.

Section 8: The Number and Productivity of other Aquaculture Sites in the Public Waters Surrounding the Proposed Aquacultural Location

8.1: IDENTIFICATION OF OTHER ACQUACULTURAL SITES

The nearest aquaculture sites to the proposed sites are the proposed sites of Premium Seafood which are 7.5kms away in a completely different water area. There are other mussel, scallop and oyster farms in Lennox Passage that are 7kms away in the opposite direction.

#0760	PEI Mussel Farm Inc Lennox Passage Sea Scallop, Blue Mussel	3.2 nms from Lease #2
#0728	PEI Mussel Farm Inc Lennox Passage Sea Scallop, Blue Mussel	
#0726	PEI Mussel Farm Inc Lennox Passage Sea Scallop, Blue Mussel	
#0725	Paul Lewis Birch Island, Lennox Passage Blue Mussel	3.7 nm from Lease #2
#0683	Kevin Pattengale & Jason Pattengale Knife Island, Lennox Passage Bay Quahaug, Sea Scallop, Blue Mussel, American Oyster	
#0921	Bounty Bay Shellfish Inc Indian Island, Lennox Passage Blue Mussel, Sea Scallop, Sugar Kelp	
#0147	Bounty Bay Shellfish Inc West Cascarette Island, Lennox Passage Blue Mussel, Sea Scallop, Sugar Kelp	
#0826	Open Ocean Systems Inc Strait of Canso Atlantic Salmon, Rainbow Trout	4.1 nm from Lease #1
#0716	We'Koqma'g First Nation Arichat Harbour Rainbow Trout, Atlantic Salmon	7.9 nm from Lease #1
#0692	Premium Seafoods Arichat Harbour American Oyster, Blue Mussel, Sea Scallop, Sugar Kelp	
#0667	Ronald Boudreau Cape Auget Bay	

	Blue Mussel, Sea Scallop	

8.2: INTERACTIONS WITH OTHER AQUACULTURE OPERATIONS

There will be no interactions with other sites.

Appendix A

[redacted] Letter re: Financing

Denver Marine Ltd

Oyster Lease Application

April 2022

Appendix B

Contact Information re: Community Outreach

Denver Marine Ltd

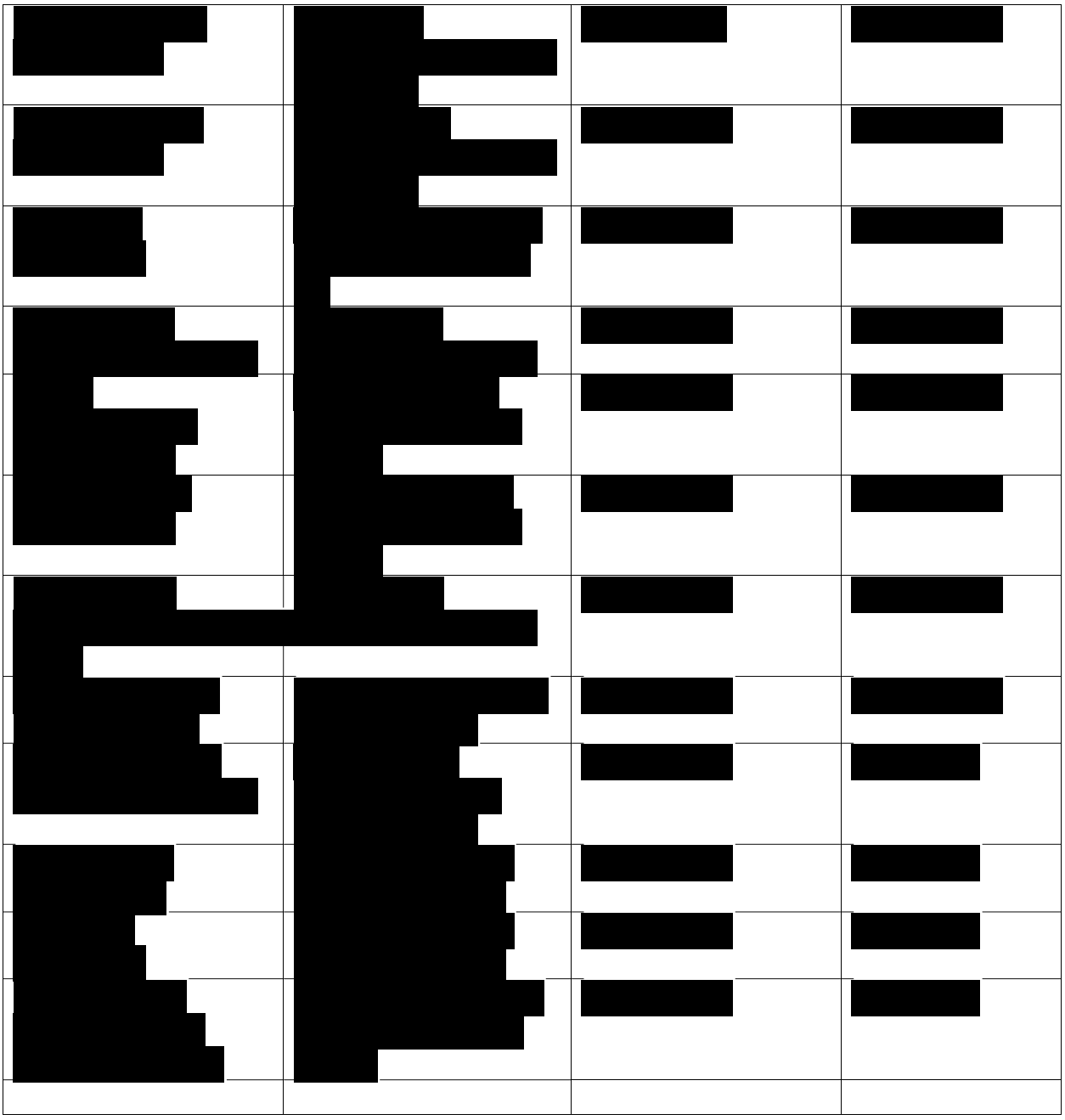
Oyster Lease Application

April 2022

APPENDIX B

Names, addresses, and contact information of those persons contacted throughout the scoping of both sites

Name	Address	Contact Information	Date of Contact
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]



Please note several attempts were made to contact with two households to no avail.

Appendix C

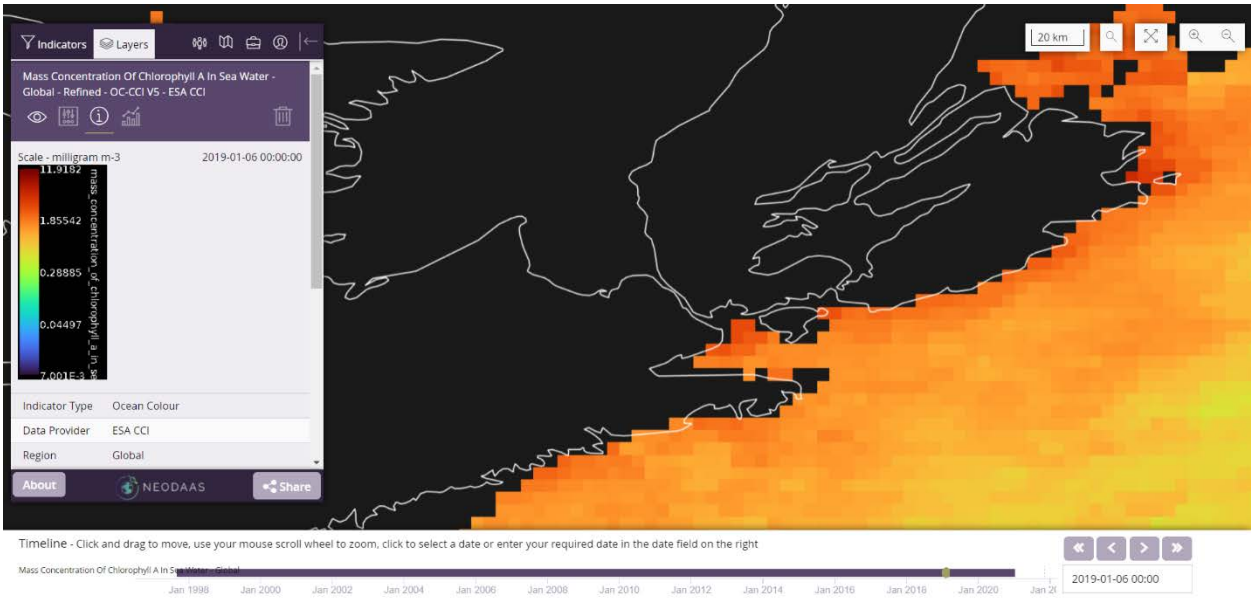
Primary Production Information (Chlorophyll)

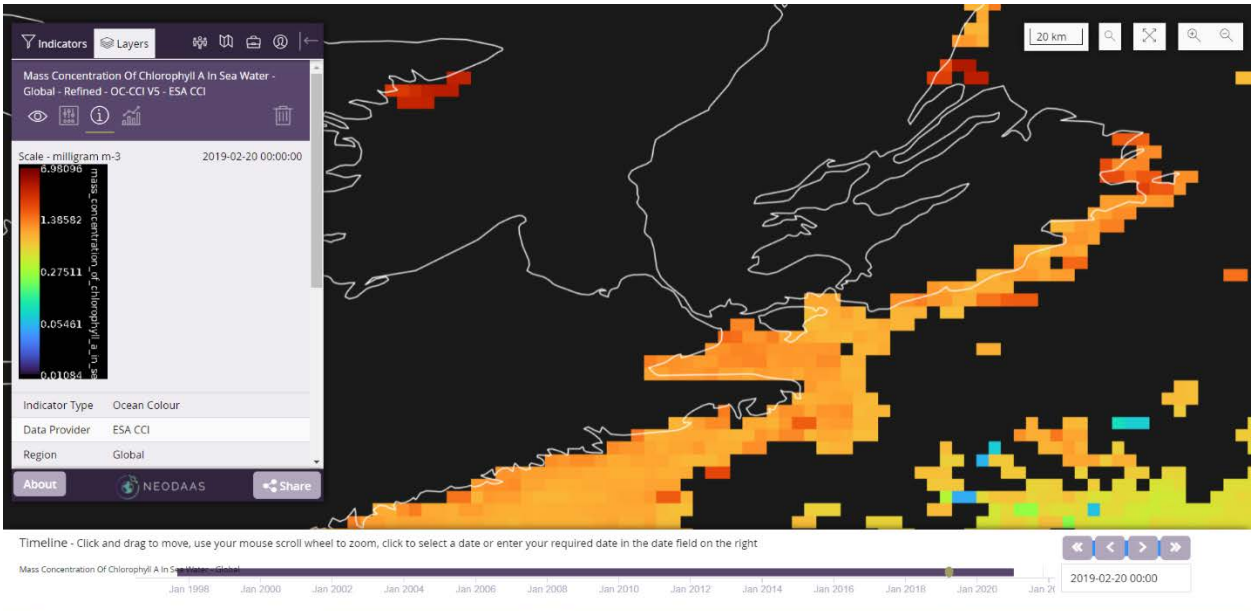
Denver Marine Ltd

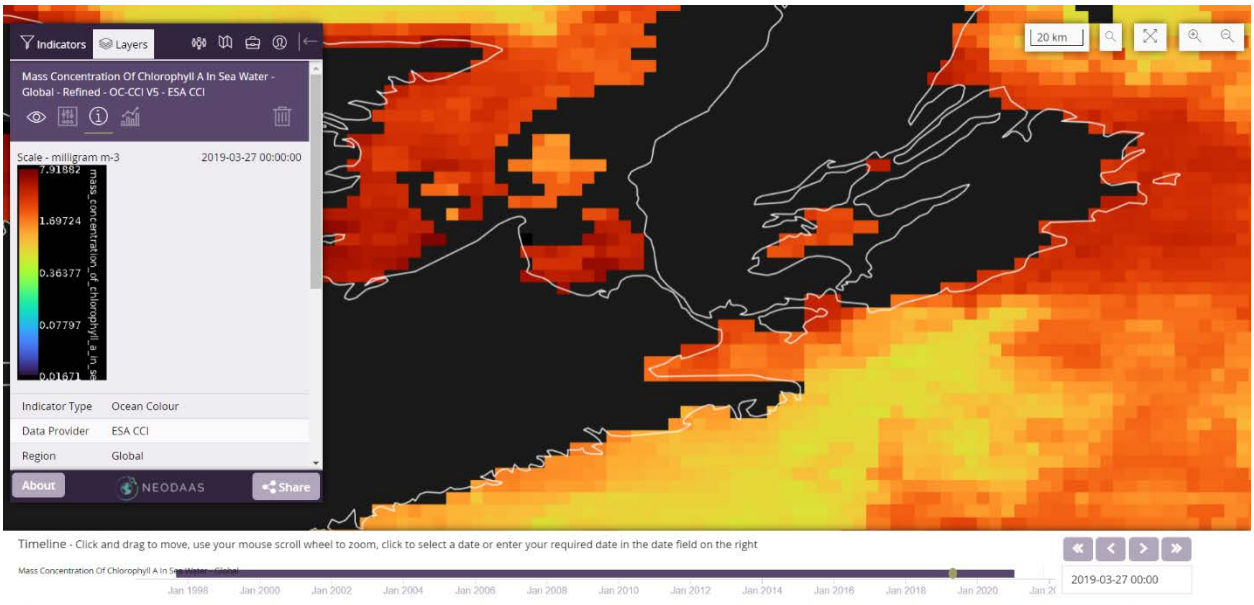
Oyster Lease Application

April 2022

Primary Production Information (Chlorophyll)



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Data Provider
ESA CCI
Region
Global
About
NEODAAS
Share
20 km
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Mass Concentration Of Chlorophyll A In Sea Water - Global
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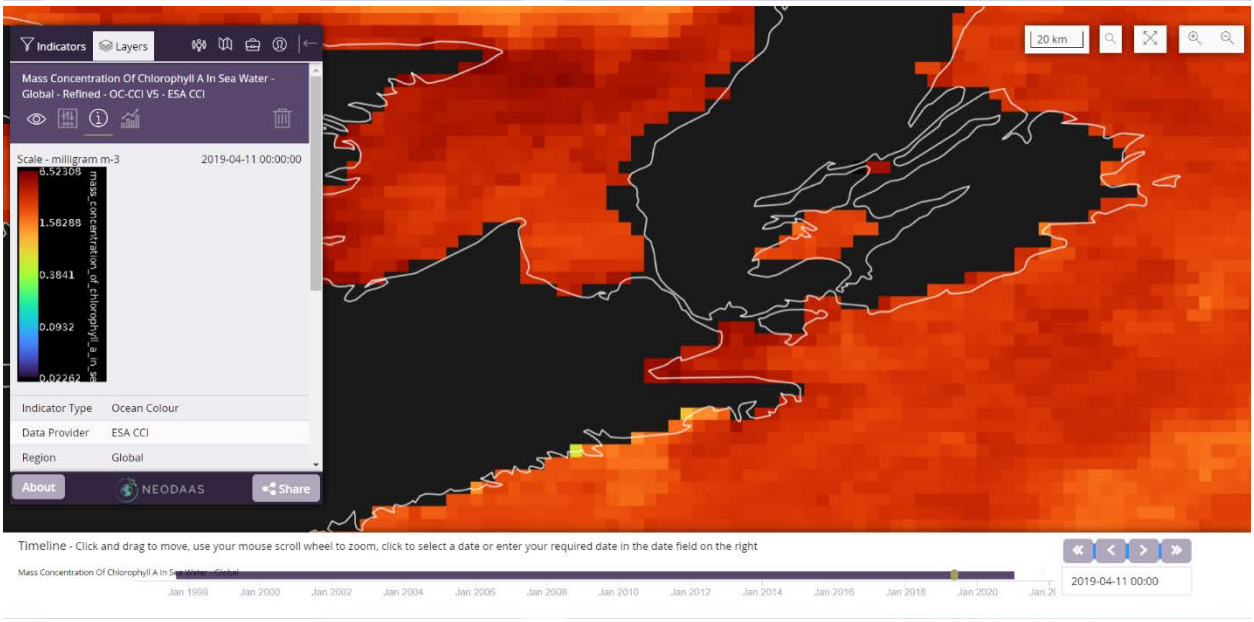
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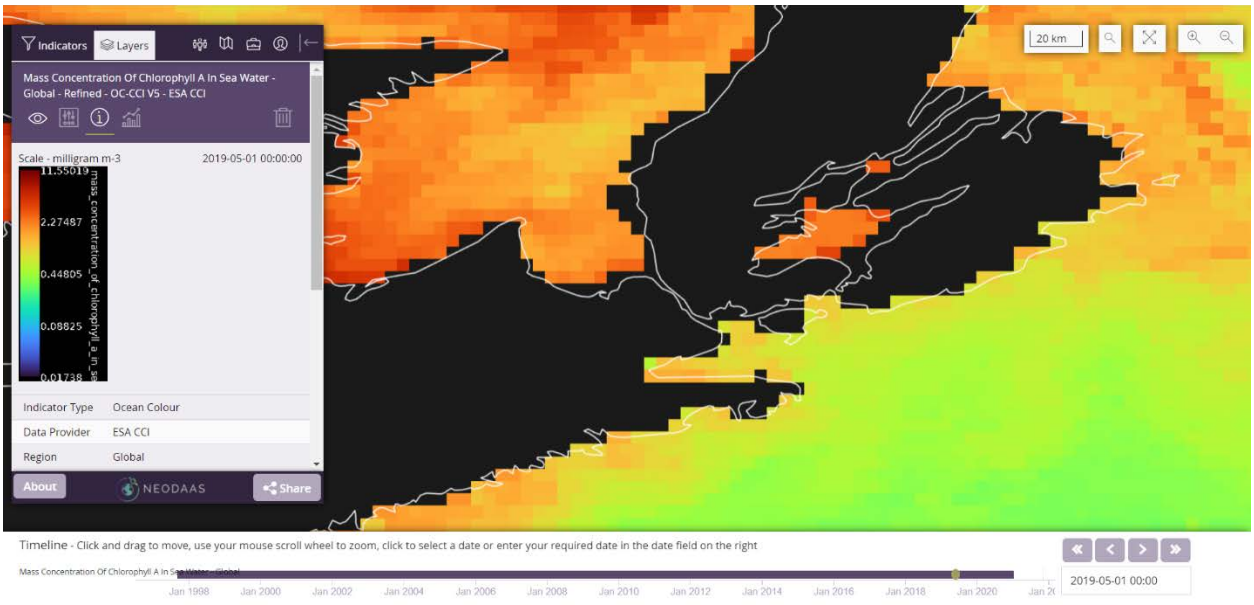
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Data Provider
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Region
Global
About
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Share
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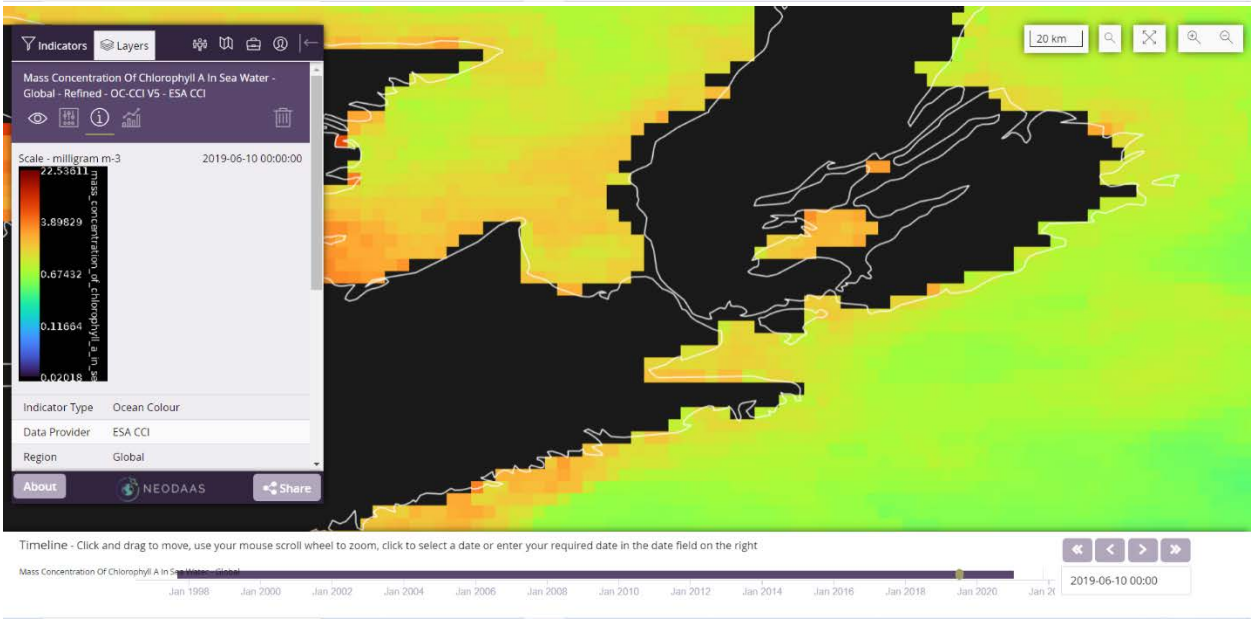
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Region
Global
About
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Share
20 km
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Mass Concentration Of Chlorophyll A In Sea Water - Global
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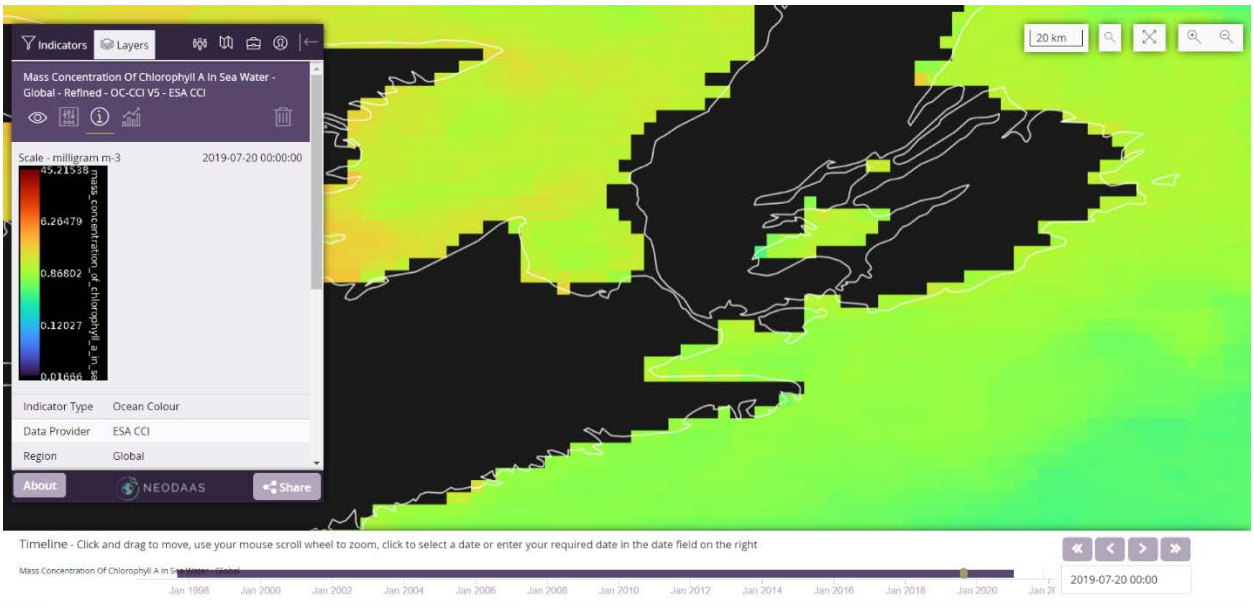
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Data Provider
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Global
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Share
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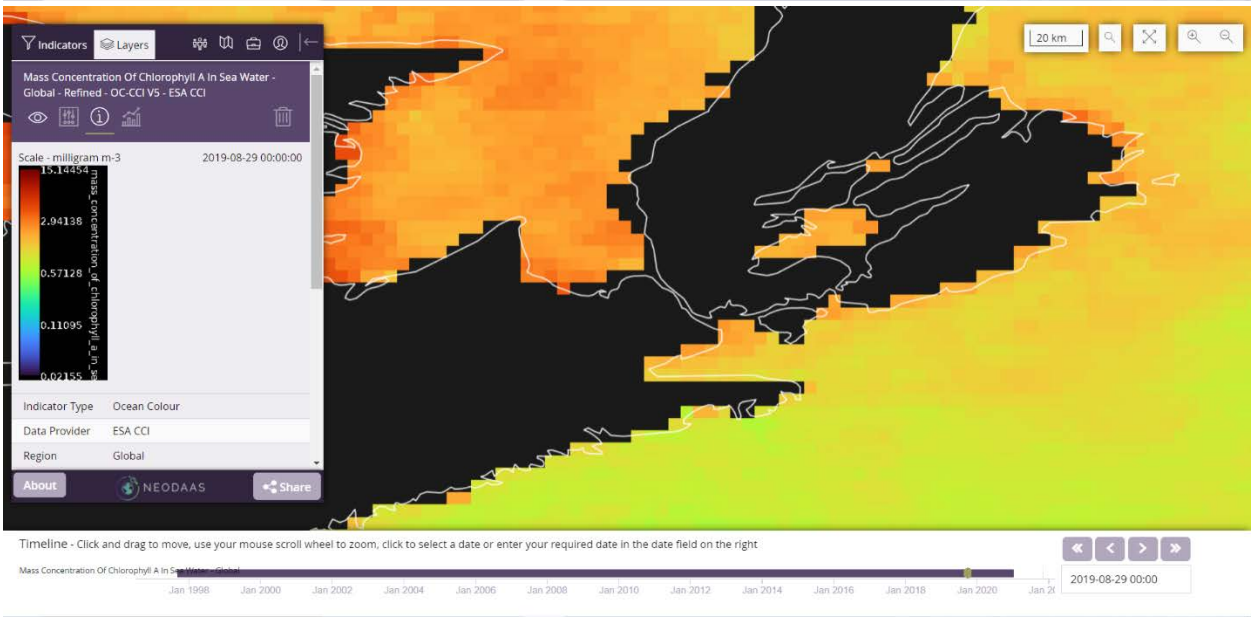
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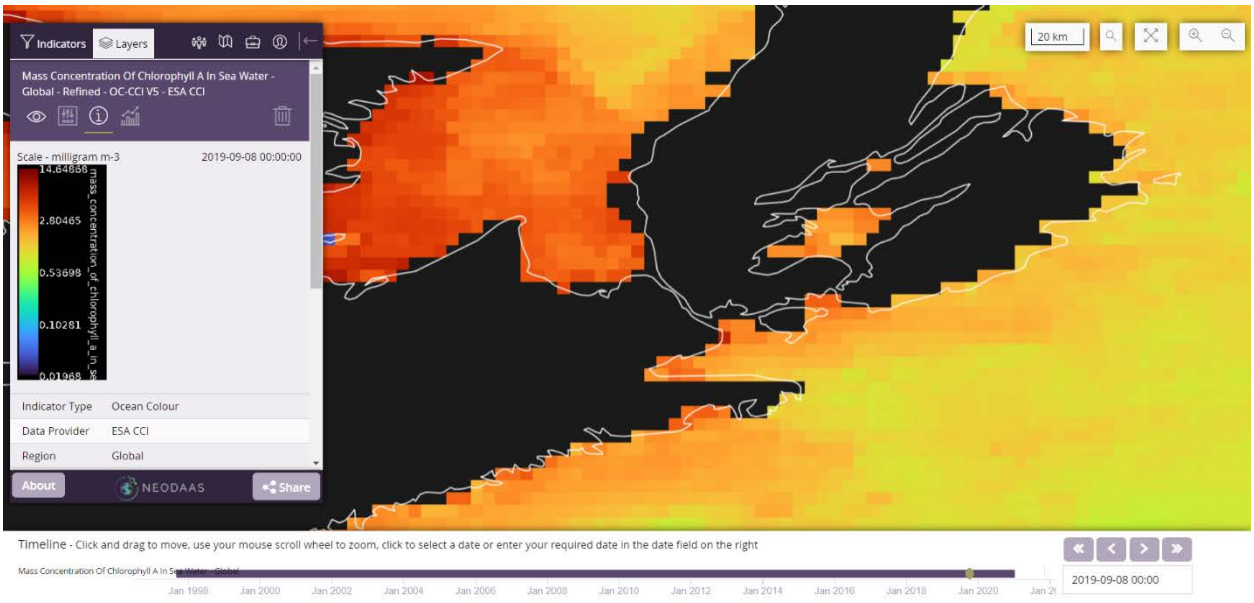
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About
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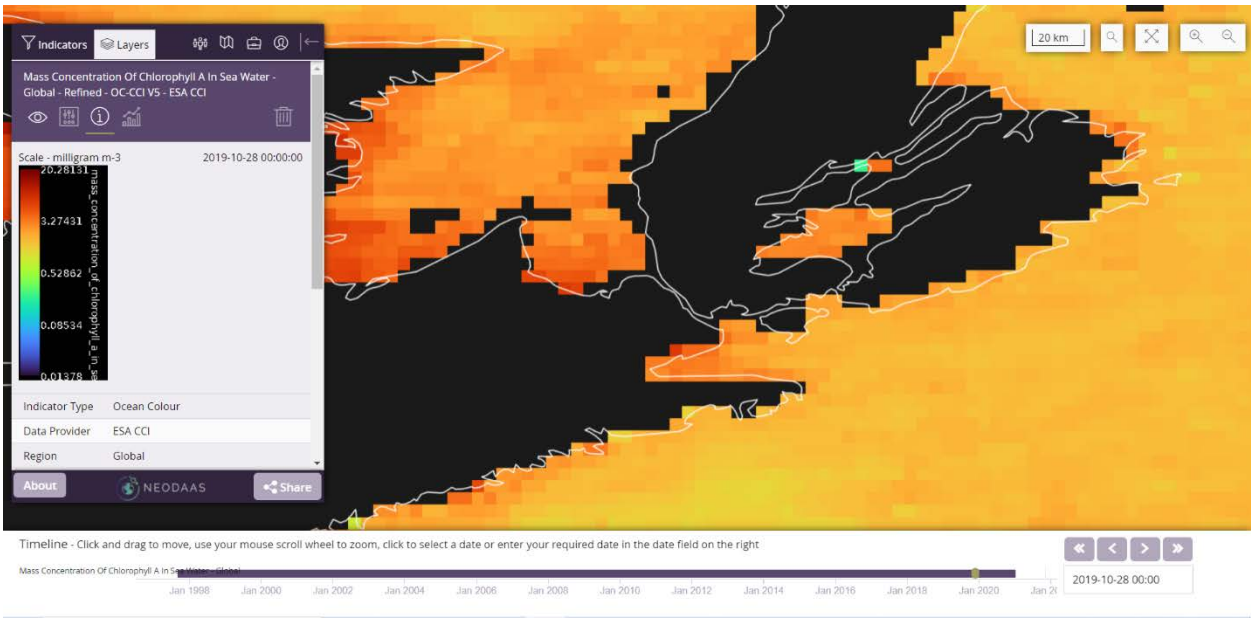
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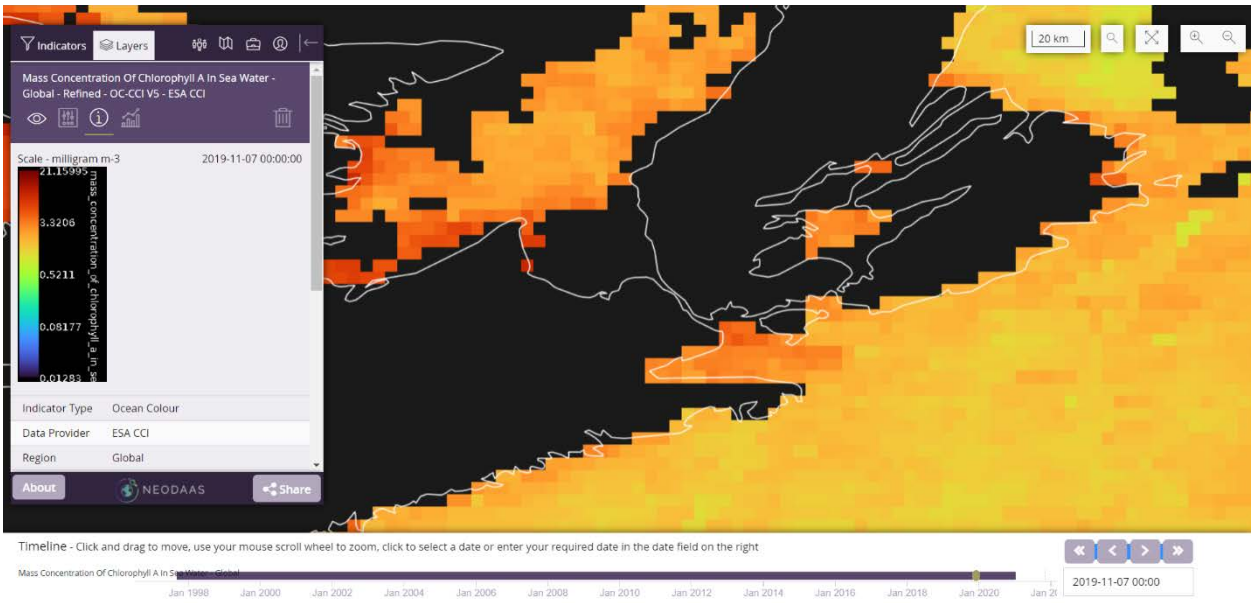
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Region
Global
About
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Share
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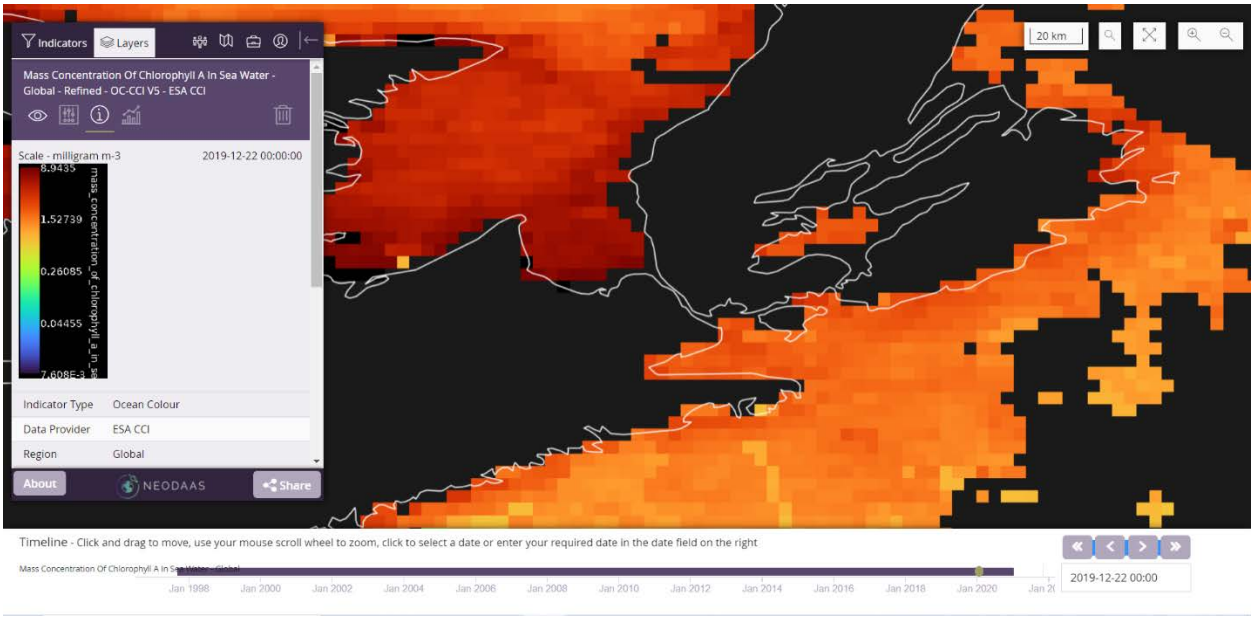
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Data Provider
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Region
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About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
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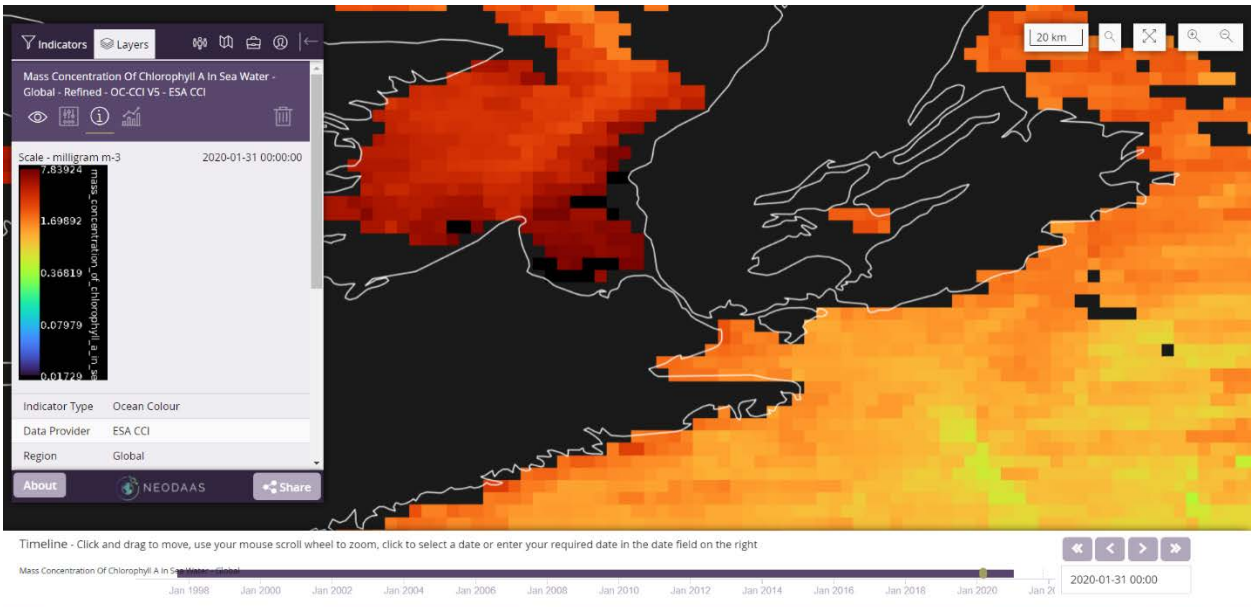
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Data Provider
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Share
20 km
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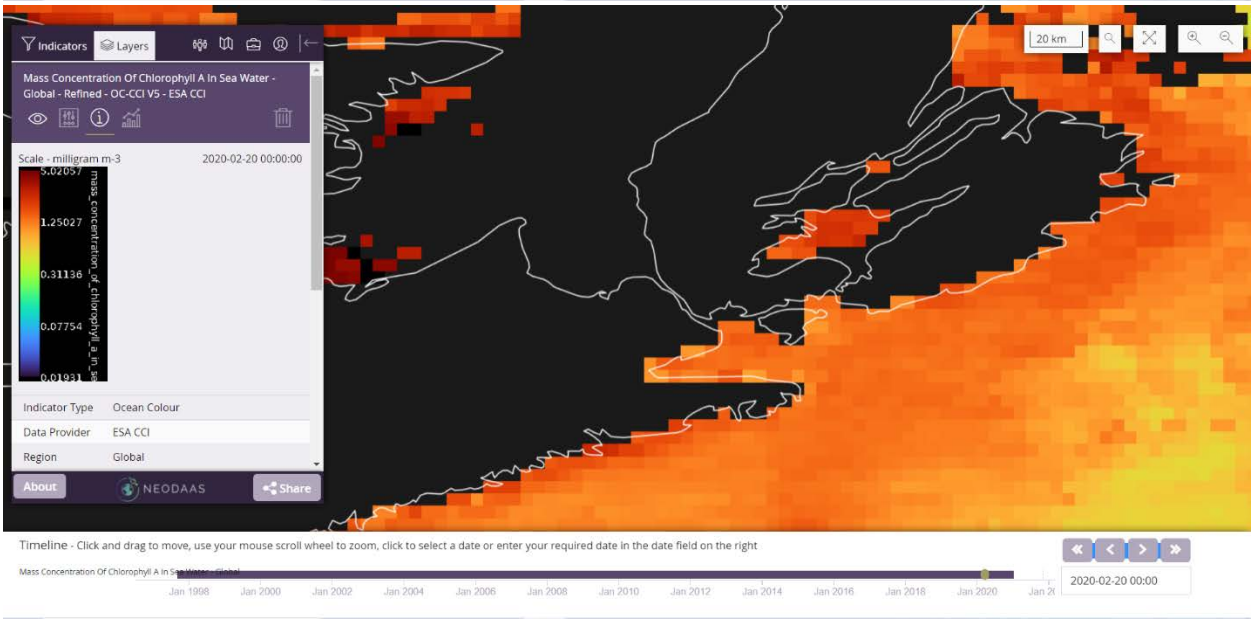
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Data Provider
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Region
Global
About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
Jan 1998
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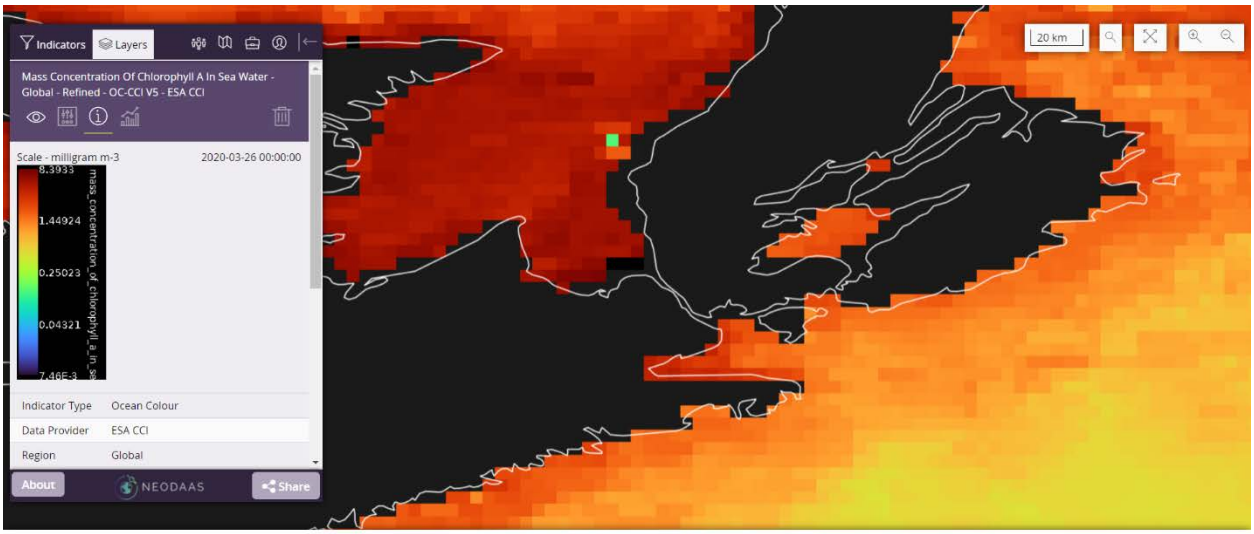
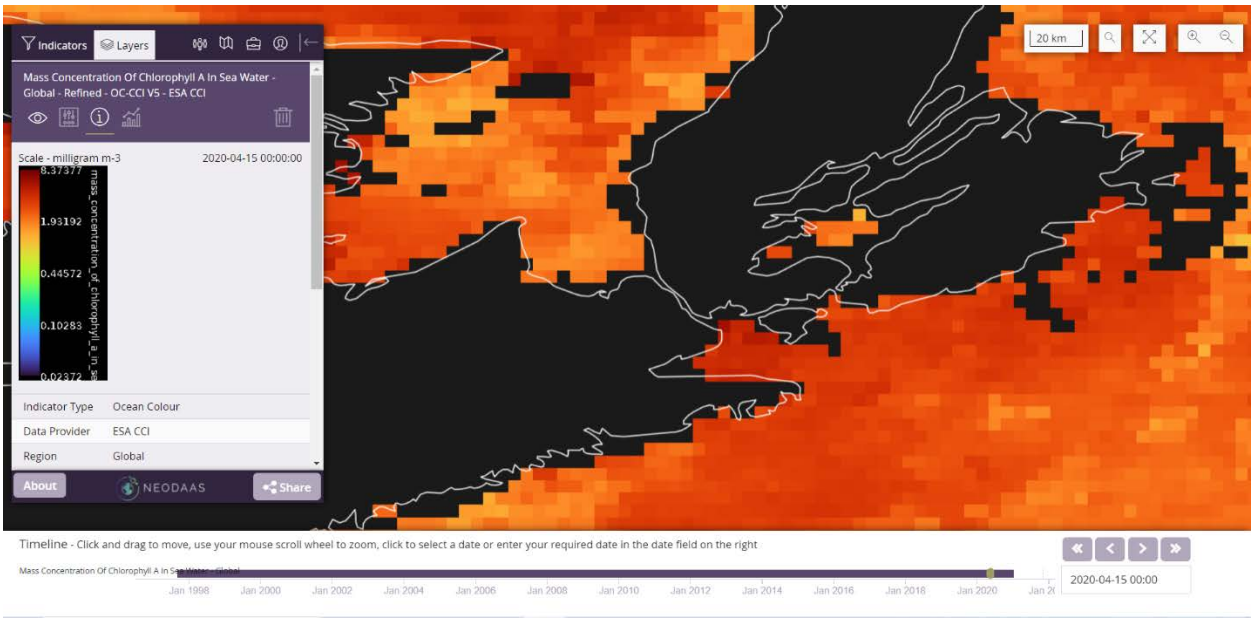
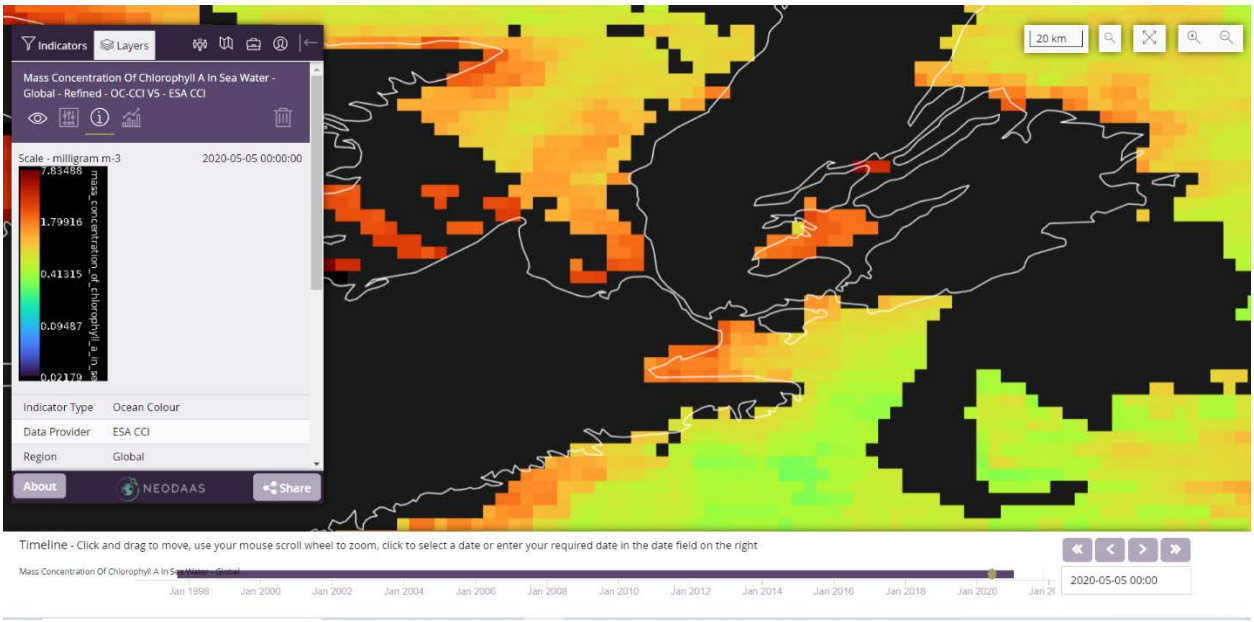
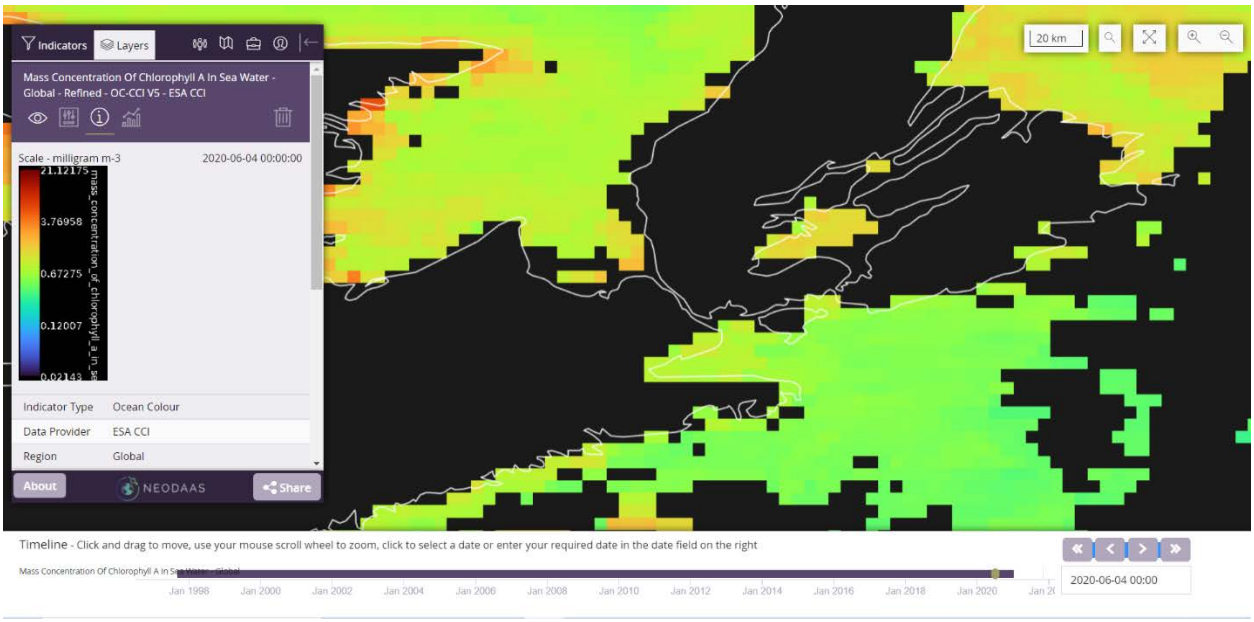
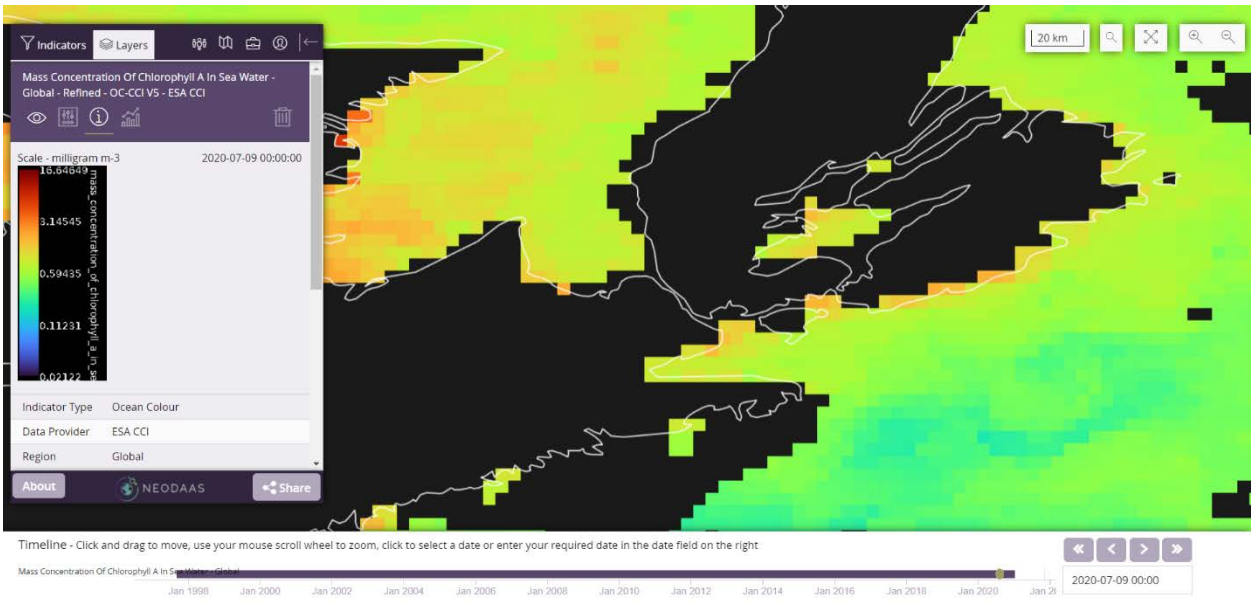
Jan 2020
2020-02-20 00:00

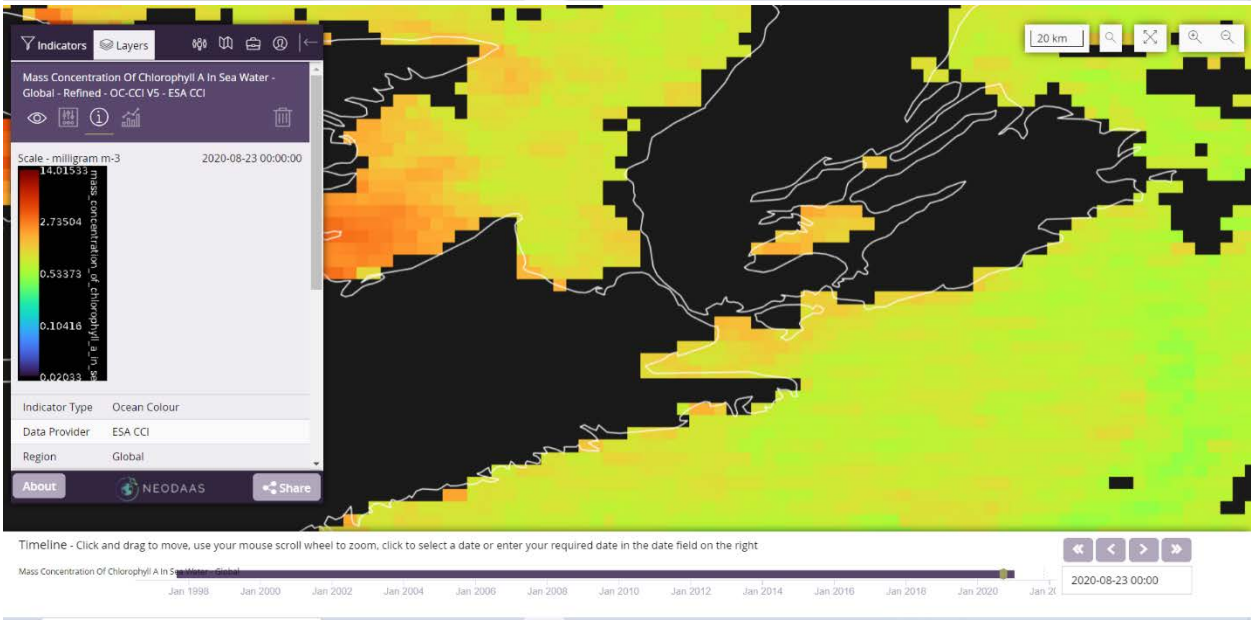

Indicators
Layers
Mass Concentration Of Chlorophyll A In Sea Water - Global - Refined - OC-CCI V5 - ESA CCI
Scale - milligram m-3
2020-03-26 00:00:00
8.3933
1.44924
0.25023
0.04321
7.46E-3
mass_concentration_of_chlorophyll_a_in_sea
Indicator Type
Ocean Colour
Data Provider
ESA CCI
Region
Global
About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
Mass Concentration Of Chlorophyll A In Sea Water - Global
Jan 1998
Jan 2000
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 2012
Jan 2014
Jan 2016
Jan 2018
Jan 2020
2020-03-26 00:00

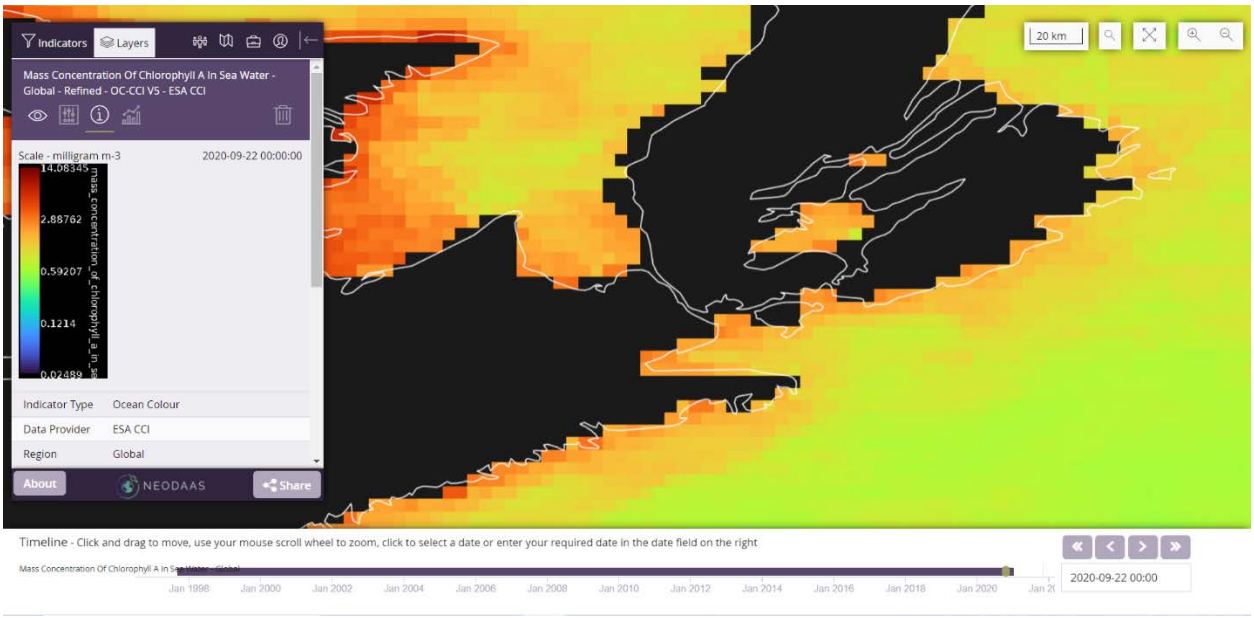

Indicators
Layers
Mass Concentration Of Chlorophyll A In Sea Water - Global - Refined - OC-CCI V5 - ESA CCI
Scale - milligram m-3
2020-04-15 00:00:00
8.37377
1.93192
0.44572
0.10283
0.02372
mass_concentration_of_chlorophyll_a_in_sea
Indicator Type
Ocean Colour
Data Provider
ESA CCI
Region
Global
About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
Mass Concentration Of Chlorophyll A In Sea Water - Global
Jan 1998
Jan 2000
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 2012
Jan 2014
Jan 2016
Jan 2018
Jan 2020
2020-04-15 00:00

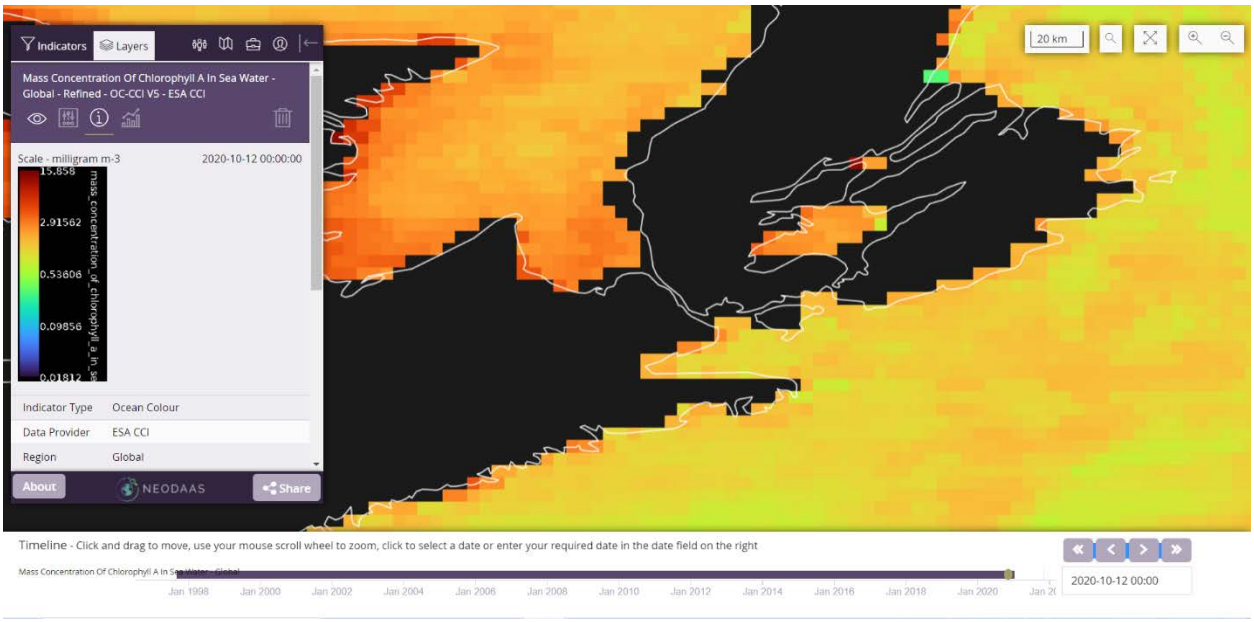

Indicators
Layers
Mass Concentration Of Chlorophyll A In Sea Water - Global - Refined - OC-CCI V5 - ESA CCI
Scale - milligram m-3
2020-05-05 00:00:00
7.83488
1.79916
0.41315
0.09487
0.02179
mass_concentration_of_chlorophyll_a_in_sea
Indicator Type
Ocean Colour
Data Provider
ESA CCI
Region
Global
About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
Mass Concentration Of Chlorophyll A In Sea Water - Global
Jan 1998
Jan 2000
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 2012
Jan 2014
Jan 2016
Jan 2018
Jan 2020
2020-05-05 00:00

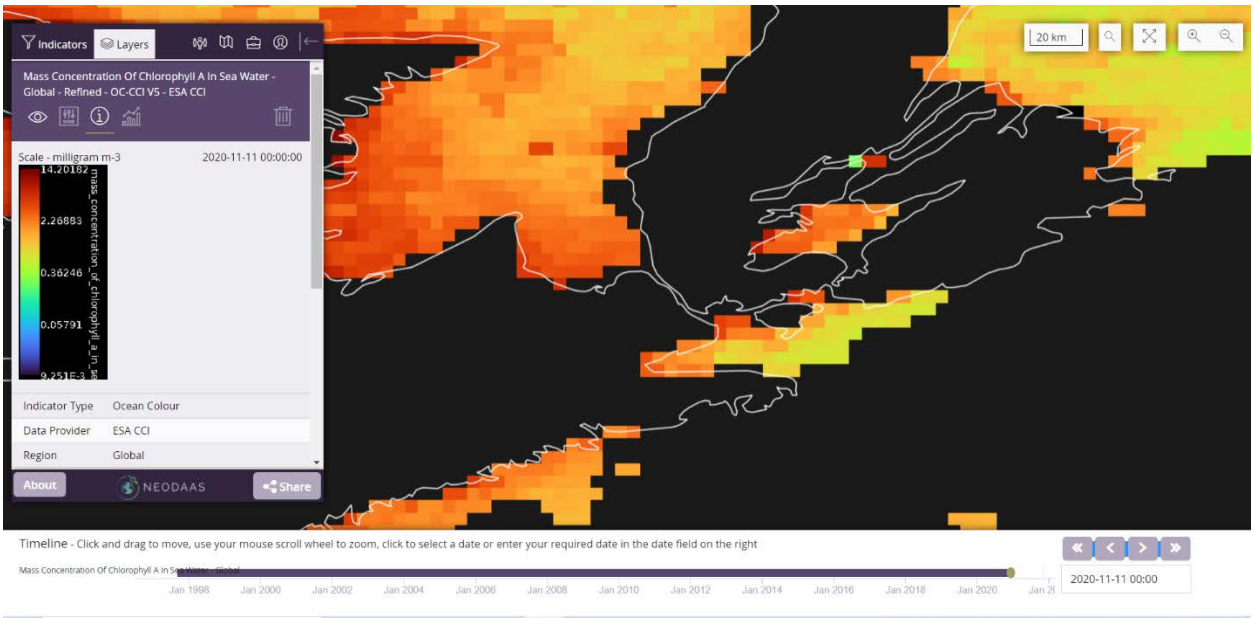

Indicators
Layers
Mass Concentration Of Chlorophyll A In Sea Water - Global - Refined - OC-CCI V5 - ESA CCI
Scale - milligram m-3
2020-06-04 00:00:00
21.12175
3.76958
0.67275
0.12007
0.02143
mass_concentration_of_chlorophyll_a_in_sea
Indicator Type
Ocean Colour
Data Provider
ESA CCI
Region
Global
About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
Mass Concentration Of Chlorophyll A In Sea Water - Global
Jan 1998
Jan 2000
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 2012
Jan 2014
Jan 2016
Jan 2018
Jan 2020
2020-06-04 00:00

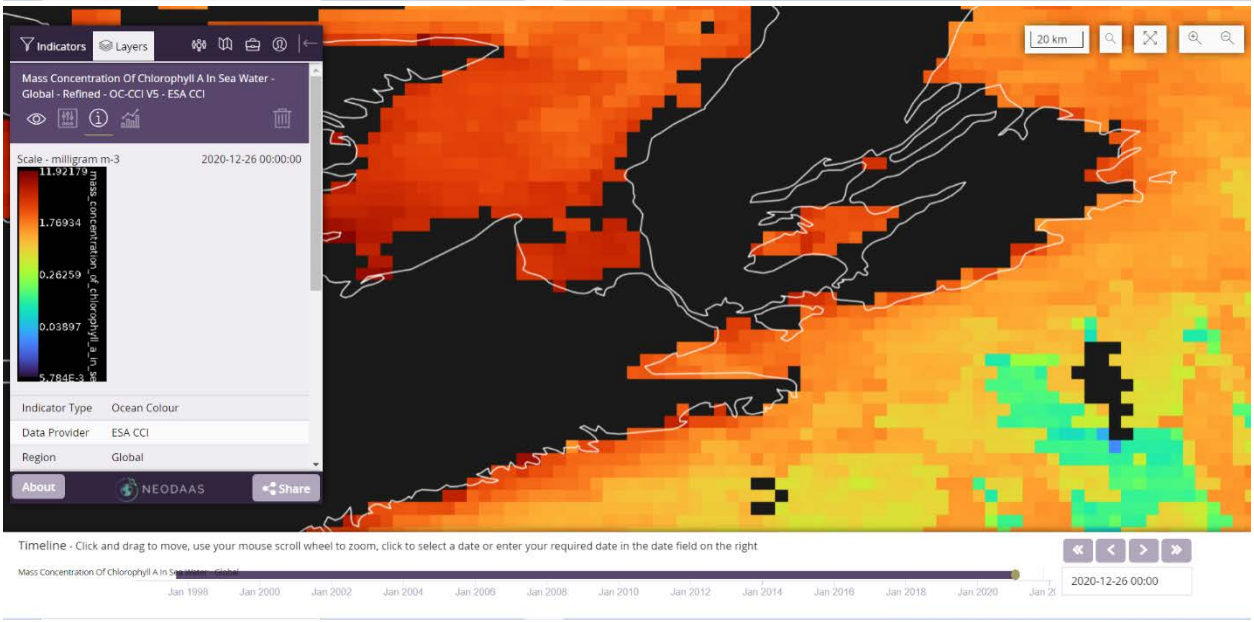

Indicators
Layers
Mass Concentration Of Chlorophyll A In Sea Water - Global - Refined - OC-CCI V5 - ESA CCI
Scale - milligram m-3
2020-07-09 00:00:00
18.64649
3.14545
0.59435
0.11231
0.02122
mass_concentration_of_chlorophyll_a_in_se
Indicator Type
Ocean Colour
Data Provider
ESA CCI
Region
Global
About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
Mass Concentration Of Chlorophyll A In Sea Water - Global
Jan 1998
Jan 2000
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 2012
Jan 2014
Jan 2016
Jan 2018
Jan 2020
2020-07-09 00:00


Indicators
Layers
Mass Concentration Of Chlorophyll A In Sea Water - Global - Refined - OC-CCI V5 - ESA CCI
Scale - milligram m-3
2020-08-23 00:00:00
14.01533
2.73504
0.53373
0.10416
0.02038
mass_concentration_of_chlorophyll_a_in_se
Indicator Type
Ocean Colour
Data Provider
ESA CCI
Region
Global
About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
Mass Concentration Of Chlorophyll A In Sea Water - Global
Jan 1998
Jan 2000
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 2012
Jan 2014
Jan 2016
Jan 2018
Jan 2020
2020-08-23 00:00


Indicators
Layers
Mass Concentration Of Chlorophyll A In Sea Water - Global - Refined - OC-CCI V5 - ESA CCI
Scale - milligram m-3
2020-09-22 00:00:00
14.08345
2.88762
0.59207
0.1214
0.02489
mass_concentration_of_chlorophyll_a_in_sea
Indicator Type
Ocean Colour
Data Provider
ESA CCI
Region
Global
About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
Jan 1998
Jan 2000
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 2012
Jan 2014
Jan 2016
Jan 2018
Jan 2020
2020-09-22 00:00


Indicators
Layers
Mass Concentration Of Chlorophyll A In Sea Water - Global - Refined - OC-CCI V5 - ESA CCI
Scale - milligram m-3
2020-10-12 00:00:00
15.858
2.91562
0.53806
0.09856
0.01812
mass_concentration_of_chlorophyll_a_in_sea
Indicator Type
Ocean Colour
Data Provider
ESA CCI
Region
Global
About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
Jan 1998
Jan 2000
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 2012
Jan 2014
Jan 2016
Jan 2018
Jan 2020
2020-10-12 00:00


Indicators
Layers
Mass Concentration Of Chlorophyll A In Sea Water - Global - Refined - OC-CCI V5 - ESA CCI
Scale - milligram m-3
2020-11-11 00:00:00
14.20182
2.26883
0.36246
0.05791
9.251E-3
mass_concentration_of_chlorophyll_a_in_sea
Indicator Type
Ocean Colour
Data Provider
ESA CCI
Region
Global
About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
Mass Concentration Of Chlorophyll A In Sea Water - Global
Jan 1998
Jan 2000
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 2012
Jan 2014
Jan 2016
Jan 2018
Jan 2020
2020-11-11 00:00


Indicators
Layers
Mass Concentration Of Chlorophyll A In Sea Water - Global - Refined - OC-CCI V5 - ESA CCI
Scale - milligram m-3
2020-12-26 00:00:00
11.92179
1.76934
0.26259
0.03897
5.784E-3
mass_concentration_of_chlorophyll_a_in_sea
Indicator Type
Ocean Colour
Data Provider
ESA CCI
Region
Global
About
NEODAAS
Share
20 km
Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right
Mass Concentration Of Chlorophyll A In Sea Water - Global
Jan 1998
Jan 2000
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 2012
Jan 2014
Jan 2016
Jan 2018
Jan 2020
2020-12-26 00:00

Appendix D

Biotoxin Report 2019 to 2021 Martinique

Denver Marine Ltd

Oyster Lease Application

April 2022

APPENDIX D

BIOTOXIN SAMPLING RESULTS for NOVA SCOTIA **This report *does not* contain all sites sampled and analysed where no toxin detection occurred**

HARVEST AREA (NS)		SPECIES	May 6-10, 2019			May 13-17, 2019			May 20-24, 2019			May 27-31, 2019			June 3-7, 2019			June 10-14, 2019		June 17-21, 2019			June 24-28, 2019			July 1-5, 2019			July 8-12, 2019		
			ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP
NS-1	WALLACE	MUSSELS	ND	ND					ND	ND	ND				ND	ND				ND	ND	ND				ND	ND				
NS-1	MITCHELL'S ISLAND	MUSSELS										ND	ND	ND									ND	ND	ND						
NS-1	SEAGROVE	MUSSELS				ND	ND											ND	ND										ND	ND	ND
NS-2	MALAGASH BAY	MUSSELS				ND	ND					ND	ND					ND	ND				ND	ND					ND	ND	ND
NS-2	MALAGASH BAY	OYSTERS																													
NS-2	CARIBOU	MUSSELS																								ND	ND	0.1 0.09			0.09
NS-3	LITTLE HARBOUR	MUSSELS																													
NS-3	BIG ISLAND	MUSSELS				ND	ND	ND				ND	ND	ND				ND	ND				ND	ND					ND	ND	ND
NS-4	LINWOOD	MUSSELS	ND	10	ND															ND	ND	ND									
NS-4	LONG POND	MUSSELS																													
NS-5	MABOU HARBOUR	MERICAN OYSTERS							ND	ND								ND	ND	ND	ND					ND	ND	ND			
NS-6	MARBLE MOUNTAIN	MUSSELS							ND	ND	ND									ND	ND	ND				ND	ND	ND			
NS-6	NORTH HARBOUR	MUSSELS																											ND	ND	0.06
NS-6	JERSEY COVE	MUSEELS																													
NS-6	ESKASONI	MUSSELS																													
NS-7	MALAGAWATCH	MUSSELS																													
NS-7	BIG HARBOUR	MUSSELS																								ND	11	ND		ND	
NS-07	CHAPEL ISLAND	OYSTERS																													
NS-8	WADDEN	MUSSELS																													
NS-8	FOURCHU	MUSSELS													ND	ND	ND									ND	ND	ND			
NS-9	MARTINIQUE	MUSSELS	ND	ND								ND	ND	ND				ND	ND	ND	ND					ND	ND	ND			
NS-9	ARICHAT	MUSSELS	ND	ND														ND	ND	ND	1					ND	4	ND			
NS-10	WHITEHEAD	OYSTERS				ND	ND	ND										ND	ND				ND	ND	ND						
NS-11	MARIE-JOSEPH	OYSTERS							ND	ND	ND							ND	ND				ND	ND	ND	ND	ND	ND			
NS-11	WINE HARBOUR	OYSTERS																ND	ND	ND	ND								ND	ND	ND
NS-11	COUNTRY HARBOUR	OYSTERS							ND	ND	ND				ND	ND				ND	ND	ND	ND	ND	ND				ND	1	0.08
NS-11	COUNTRY HARBOUR	MUSSELS																													
NS-11	SHIP HARBOUR	MUSSELS										ND	3	ND	ND	ND	ND			ND	1	ND	ND	ND		ND	1	ND	ND	ND	ND

Area is recommended for closure when: ASP >= 20 µg/g, PSP >= 80µg/100 g, DSP >= 0.2 µg/g

Legend: ND (not detected), 1st, 2nd , 3rd (indicate samples taken for potential re-opening)

NB: This report is prepared and distributed each week when toxins are detected and will contain reported detections of marine biotoxins from the previous weeks.

Questions should be directed to the Local Office associated with the Sampling Site.

July 15-19, 2019			July 22-26, 2019			July 29- Aug 2, 2019			Aug 5-9, 2019			August 12-16, 2019			August 19-23, 2019			August 26-30, 2019			Sept 3-6, 2019			Sept-9-13, 2019			Sept 16-20, 2019			Sept 23-27, 2019			Sept 30-Oct 4, 2019		
ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP
ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND					ND	ND	ND				ND	ND				
			ND	ND	ND										ND	ND												ND	ND	ND						
																					ND	ND												ND	ND	
			ND	ND	ND				ND	8					ND	ND					ND	ND					ND	ND							
ND	2	ND				ND	ND	ND										ND	ND					ND	ND	ND				ND	ND	ND			
ND	1	ND				ND	ND	ND				ND	ND					ND	ND					ND	ND					ND	ND				
			ND	ND	ND				ND	ND	ND				ND	ND								ND	ND	ND	ND	ND				ND	ND	ND
ND	ND	ND				ND	ND	ND										ND	ND	ND				ND	ND	ND									
						ND	4	ND																ND	ND	ND									
ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND					ND	ND	ND				ND	ND		ND	ND	ND
																														ND	ND	ND			
ND	ND	ND	ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND
						ND	ND					ND	ND	ND				ND	ND															ND	ND	
																														ND	ND	ND			
ND	1	0.06				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND			
ND	2					ND	ND	ND				ND	ND					ND	ND	ND							ND	ND					ND	ND	
ND	ND	ND	ND	5	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND							ND	ND	ND	ND	ND	ND
ND	ND	ND										ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND			
			ND	ND	ND				ND	ND	ND				ND	ND	ND										ND	ND	ND				ND	ND	ND
ND	ND	.18 .17			0.09	ND	ND	0.05			ND	ND	ND	0.04				ND	ND	0.01				ND	ND	ND				ND	ND	ND			
		0.04			ND																														
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				ND	ND	0.08	ND	ND	ND	ND	ND	0.08	ND	ND	.06

Oct 7-11, 2019			Oct 14-18, 2019			Oct 21-25, 2019			Oct 28- Nov 1, 2019			Nov 4-8, 2019			Nov 12-15, 2019			Nov 18-22, 2019			Dec 2-6, 2019			Dec 23- 27, 2019			Jan 6-10, 2020			Jan 13-17, 2020			Feb 10-14, 2020			Apr 6-10, 2020		
ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP
ND	ND	ND				ND	ND					ND	ND	ND							ND	ND	ND												ND	ND	
			ND	ND	ND										ND	ND	ND																				
									ND	ND																												
			ND	ND					ND	ND					ND	ND																					
ND	ND	ND				ND	ND	ND										ND	ND	ND															ND	ND	
ND	ND					ND	ND					ND	ND					ND	ND		ND	ND													ND	ND	
			ND	ND					ND	ND	ND				ND	ND																					
ND	ND	ND																																				
ND	ND					ND	ND					ND	ND					ND	ND		ND	ND															
						ND	ND	ND				ND	ND	ND																								
			ND	ND	ND				ND	ND	ND				ND	ND	ND																				
ND	ND					ND	ND					ND	ND	ND							ND	ND															
						ND	ND	ND										ND	ND	ND																ND	ND	
ND	ND	ND				ND	ND	ND				ND	ND	ND													ND	ND	ND						ND	ND	ND
						ND	ND																				ND	ND							ND	ND	
			ND	ND	ND				ND	ND	ND							ND	ND	ND																
ND	ND	ND				ND	ND	ND				ND	ND	ND																ND	ND	ND					
			ND	ND	ND				ND	ND	ND							ND	ND	ND										ND	ND	ND					
ND	ND	ND				ND	ND	ND				ND	ND	ND																ND	ND	ND					
ND	ND	0.05	ND	ND	0.07	ND	ND	ND	ND	ND	ND							ND	ND	0.01																	

Apr 13-18, 2020			Apr 20-24, 2020			Apr 27- May 1, 2020			May 4-8, 2020			May 11-15, 2020			May 18-22, 2020			May 25-29, 2020			June 1-5, 2020			June 8-12, 2020			June 15-19, 2020			June 22-26, 2020			June 29- July 3, 2020			July 6-10, 2020		
ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP
									ND	ND					ND	13					ND	4					ND	ND	ND							ND	1				
ND	ND	ND										ND	ND	ND										ND	3	ND										ND	ND	ND
			ND	6														ND	ND											ND	1							
ND	ND											ND	ND					ND	ND					ND	8	0.15	ND	ND	ND	ND	ND	0.09				ND	ND	0.06
																										0.02			ND	ND	ND	0.02						
									ND	1	ND				ND	ND	ND				ND	9	ND				ND	ND	ND				ND	ND	ND				
									ND	ND					ND	1	ND				ND	6					ND	ND	ND				ND	8					
ND	ND	ND										ND	ND					ND	ND					ND	5					ND	ND					ND	ND	ND
									ND	ND	ND										ND	ND	ND										ND	ND	ND			
ND	ND	ND							ND	ND	ND				ND	ND					ND	5	ND				ND	3					ND	ND	ND			
									ND	ND	ND				ND	ND	ND				ND	ND	ND	ND	2	ND				ND	ND	ND				ND	ND	ND
									ND	ND	ND										ND	ND	ND										ND	8	ND			
												ND	2	ND				ND	ND	ND				ND	14	ND				ND	ND	ND				ND	6	ND
									ND	1	ND				ND	ND	ND				ND	7	ND				ND	ND					ND	3	ND			
												ND	1											ND	ND	ND										ND	ND	ND
									ND	ND											ND	2	ND				ND	ND					ND	ND	ND			
																					ND	6	ND				ND	ND					ND	3	ND			
									ND	ND	ND										ND	ND	ND										ND	4	ND			
									ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	4	ND				ND	7	ND			
									ND	ND	ND										ND	ND	ND				ND	2					ND	ND	ND			
									ND	ND	ND	ND	ND	ND							ND	ND	ND	ND	ND	ND				ND	ND	ND				ND	ND	ND
ND	ND								ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND			
ND	1	ND										ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND
			ND	5	ND				ND	ND	ND							ND	ND		ND	ND	ND				ND	ND	ND				ND	1	ND			
ND	ND	ND				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	ND	ND	6	ND	ND	8	ND	ND	1	ND	ND	39	ND	ND	44	0.02	ND	20	ND

July 13-17, 2020			July 20-24, 2020			July 27-31, 2020			Aug 3-7, 2020			Aug 10-14, 2020			Aug 17-21, 2020			Aug 24-28, 2020			Aug 31- Sept 4, 2020			Sept 7-11, 2020			Sept 14-18, 2020			Sept 21-25, 2020			Sept 28-Oct 2, 2020			Oct 5-9, 2020		
ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP
ND	1					ND	ND					ND	ND					ND	ND					ND	ND					ND	ND					ND	1	
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Feb 8-12, 2021			Feb 22-26, 2021			Mar 8-12, 2021			Apr 5-9, 2021			Apr 12-16, 2021			Apr 19-23, 2021			Apr 26-30, 2021			May 3-7, 2021			May 10-14, 2021			May 17-21, 2021			May 24-28, 2021			May31-Jun 4, 2021			Jun 7-11, 2021			Jun 14-18, 2021		
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Jun 21-25, 2021			Jun 28-July2, 2021			July 5-9, 2021			July12-16, 2021			July 19-23, 2021			July 26-30, 2021		
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ND	ND	0.08	ND	ND	ND			ND	ND	ND	ND						
ND	ND	1st ND	ND	ND	2nd ND			3rd ND	ND	ND	ND						
			ND	ND		ND	ND	ND	ND	ND	ND						
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ND	12	ND	ND	1	ND	ND	1	ND	ND	ND	ND	ND	ND				

BIOTOXIN SAMPLING RESULTS for NOVA SCOTIA **This report *does not* contain all sites sampled and analysed where no toxin detection occurred**

HARVEST AREA (NS)		SPECIES	July 5-9, 2021			July12-16, 2021			July 19-23, 2021			July 26-30, 2021			Aug 2-6, 2021			Aug 9-13, 2021			Aug 16-20, 2021			Aug 23-27, 2021			Aug 30-Sept 3, 2021			Sept 6-10, 2021			Sept 13-17, 2021		
			ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP	ASP	PSP	DSP
NS-1	WALLACE	MUSSELS				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND			
NS-1	MITCHELL'S ISLAND	MUSSELS			ND	ND	ND	ND				ND	ND	ND				ND	ND					ND	ND	ND				ND	ND				
NS-1	SEAGROVE	MUSSELS	ND	1	ND										ND	1					ND	ND					ND	ND					ND	ND	
NS-2	MALAGASH BAY	MUSSELS			ND	ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND			
NS-2	MALAGASH BAY	OYSTERS																ND	ND	ND															
NS-2	CARIBOU	MUSSELS			3rd ND	ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND			
NS-3	LITTLE HARBOUR	MUSSELS	ND	ND	ND	ND	ND	ND				ND	ND		ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
NS-3	BIG ISLAND	MUSSELS	ND	ND											ND	ND					ND	ND	ND				ND	ND					ND	ND	ND
NS-4	LINWOOD	MUSSELS				ND	ND	ND				ND	ND					ND	ND	ND				ND	ND	ND				ND	ND	ND			
NS-4	LONG POND	MUSSELS				ND	ND	ND				ND	ND					ND	ND	ND				ND	ND					ND	ND	ND			
NS-5	MABOU HARBOUR	MERICAN OYSTERS							ND	ND	ND	ND	ND	ND	ND	ND	ND				ND	ND	ND				ND	ND	ND	ND	3	ND	ND	ND	ND
NS-6	MARBLE MOUNTAIN	MUSSELS										ND	ND	ND	ND	ND	ND	ND	ND	ND				ND	ND	ND									
NS-6	NORTH HARBOUR	MUSSELS				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND			
NS-6	JERSEY COVE	MUSEELS	ND	1					ND	ND	ND				ND	ND					ND	ND	ND				ND	ND							
NS-6	ESKASONI	MUSSELS				ND	ND	ND				ND	ND					ND	ND	ND				ND	1										
NS-7	MALAGAWATCH	MUSSELS										ND	ND	ND																					
NS-7	BIG HARBOUR	MUSSELS	ND	ND					ND	ND	ND				ND	ND					ND	ND	ND				ND	ND							
NS-07	CHAPEL ISLAND	OYSTERS				ND	ND	ND				ND	ND	ND	ND	ND	ND	ND	ND	ND				ND	ND	ND				ND	ND	ND			
NS-8	WADDEN	MUSSELS	ND	ND					ND	ND	ND				ND	ND		ND	ND		ND	1								ND	ND		ND	ND	
NS-8	FOURCHU	MUSSELS	ND	1					ND	ND	ND				ND	ND					ND	ND	ND										ND	ND	ND
NS-9	MARTINIQUE	MUSSELS	ND	1	0.18				ND	ND	0.19			1st 0.11	ND	1	2nd 0.11			3rd 0.10	ND	ND	0.07				ND	ND	0.9	ND	0.08				
NS-9	ARICHAT	MUSSELS	ND	ND					ND	ND	ND				ND	ND					ND	ND	ND				ND	ND							
NS-10	WHITEHEAD	OYSTERS	ND	ND	ND										ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND
NS-11	MARIE-JOSEPH	OYSTERS				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND			
NS-11	WINE HARBOUR	OYSTERS				ND	ND	ND				ND	ND		ND	ND		ND	ND	ND				ND	ND					ND	ND	ND			
NS-11	COUNTRY HARBOUR	OYSTERS	ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND				ND	ND	ND
NS-11	COUNTRY HARBOUR	MUSSELS																																	
NS-11	SHIP HARBOUR	MUSSELS	ND	1	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05	ND		0.02	ND	0.01	0.07	ND	ND	

Appendix E

Oceanographic Environment

Denver Marine Ltd

Oyster Lease Application

April 2022

CENTRE FOR MARINE APPLIED RESEARCH

2020

WIND AND WAVE CONDITIONS – CHEDABUCTO BAY – REFERENCE LOCATIONS 1, 2, 3

Prepared by:

[redacted]

Dynamic Systems Analysis

27 Parker Street · Dartmouth, Nova Scotia · B2Y 4T5

CMAR.CA

Title	**Wind and Wave Conditions – Chedabucto Bay – Reference Locations 1, 2, 3**
DSA Document	Report-DSA-CMAR-19EXM-Chedabucto Bay Wind and Wave Conditions RevB.0.docx
Revision	B
Author	Meysam Karimi, PhD
Co-authors	Dean Steinke, P.Eng
Prepared for	CMAR
Client reference / project	N/A
DSA project	CMAR-19EXM
Last revised	2020-07-21
Pages (incl. Grove Br)	29

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Revision history

Revision	Date last revised	Summary of changes / Comments	Revisions by	Checked by	Approved for release by	Issued to / Distribution	Engineering review status (IFI / IFR / IFC)
A	2020-07-20	Report Draft	MEK	DMS	DMS	CMAR	IFR
B	2020-07-21	Approved for public release	MEK	DMS	DMS	CMAR	IFR

List of authors / reviewers

Initials	Name
MEK	Meysam Karimi, PhD
DMS	Dean M. Steinke, P.Eng.

Engineering Review Status Acronyms
IFI – Issued for information
IFR – Issued for review
IFC – Issued for construction

Executive Summary

In support of Centre for Marine Applied Research (CMAR), the following report presents wind and wave conditions at three reference locations in Chedabucto Bay, Nova Scotia, Canada.

In this report, wave and wind conditions are presented for 3 reference locations (as shown in the figure below):

- Chedabucto Bay Reference Location 1: 45° 21.868'N, 61° 3.643'W.
- Chedabucto Bay Reference Location 2: 45° 21.985'N, 61° 17.472'W.
- Chedabucto Bay Reference Location 3: 45° 32.041'N, 61° 16.463'W.

To determine the wave field evolution closer to shore at a specific site, and to determine more accurate 10 and 50 year return period wave data, near shore wave modelling can be used. For the Chedabucto Bay area, STWave was used to model the wave conditions inside the bay. The results showed reduced wave heights, in comparison to the hindcast source point (shown in blue in the figure above) which is located at the eastern entrance to the bay. The reduced wave heights are due to depth induced energy dissipation (bottom friction, breaking). The STWave model results are determined using wind and wave boundary condition data from the MSC50 HindCast model of the MSC50 location. The extreme wave conditions at the reference locations are determined in part by propagating waves from the offshore hindcast model location into the site of interested.

Contents

Figures

Tables

1 Introduction

1.1 Overview

For the reference locations in Chedabucto Bay shown in Figure 1, wind and wave conditions have been estimated. The following presents data on the predicted 10 and 50 year wind and wave conditions at these locations.

Figure 1 Three (3) reference locations at Chedabucto Bay [4]

Chedabucto Bay is overall protected from offshore waves by surrounding lands, but is vulnerable to waves from east and southeast which will travel directly into the bay, as can be seen in Figure 2. These waves are expected to lose energy by travelling into shallower waters. Detailed wave modelling is required to determine the amount of energy lost and wave height reduction.

Figure 2 Chedabucto Bay, Nova Scotia, Canada

The context of this project is that extreme wind and wave conditions are needed to select engineering load cases for those wishing to install finfish or shellfish farms in the area. For example, extreme environmental conditions with minimum 10-year and 50-year return periods are required for the design of a marine fish farm site, as per guidance in the Scottish technical standard [2] and NS9415 [3]. While the locations assessed as part of this modeling exercise are not actual aquaculture site locations, the data produced for these locations is useful for understanding the approximate wave climate in the region and can be used to evaluate any proposals for sites in the area. Understanding the wind and wave climates at aquaculture sites is important for mitigating risks.

1.2 Objective(s)

- Determine wave/wind conditions at three reference locations in Chedabucto Bay and find the conditions with 10 and 50 year return periods.

2 Abbreviations and acronyms

DSA	Dynamic Systems Analysis Ltd.
SMS	Surface-water Modeling System
CMAR	Centre for Marine Applied Research
CHS	Canadian Hydrographic Services

3 Reference documents and drawings

[1]	V. Swail, V. Cardone, M. Ferguson, D. Gummer, E. Harris, E. Orelup, and A. Cox, "The msc50 wind and wave reanalysis," in *9th International Workshop On Wave Hindcasting and Forecasting*, 2006.
[2]	Marine Scotland. (2015). A Technical Standard for Scottish Finfish Aquaculture. Ministerial Group for Sustainable Aquaculture's Scottish Technical Standard Steering Group
[3]	Norge, S. (2009). Norwegian Standard NS 9415. E: 2009. Marine Fish Farms—Requirements for Site Survey, Risk Analyses, Design, Dimensioning, Production, Installation and Operation. *Standard Norge, Lysaker*.
[4]	CMAR Proposed sites -RevB.kmz

4 Wave conditions

4.1 Overview

SMS version 12.2.13 was used to setup the bathymetric and computational grid. This section provides a description of the grid size, mesh size and offshore environmental conditions. Site bathymetry is provided in Figure 3. Note that a CHS hydrographic chart is used to generate the bathymetric data for wave modeling.

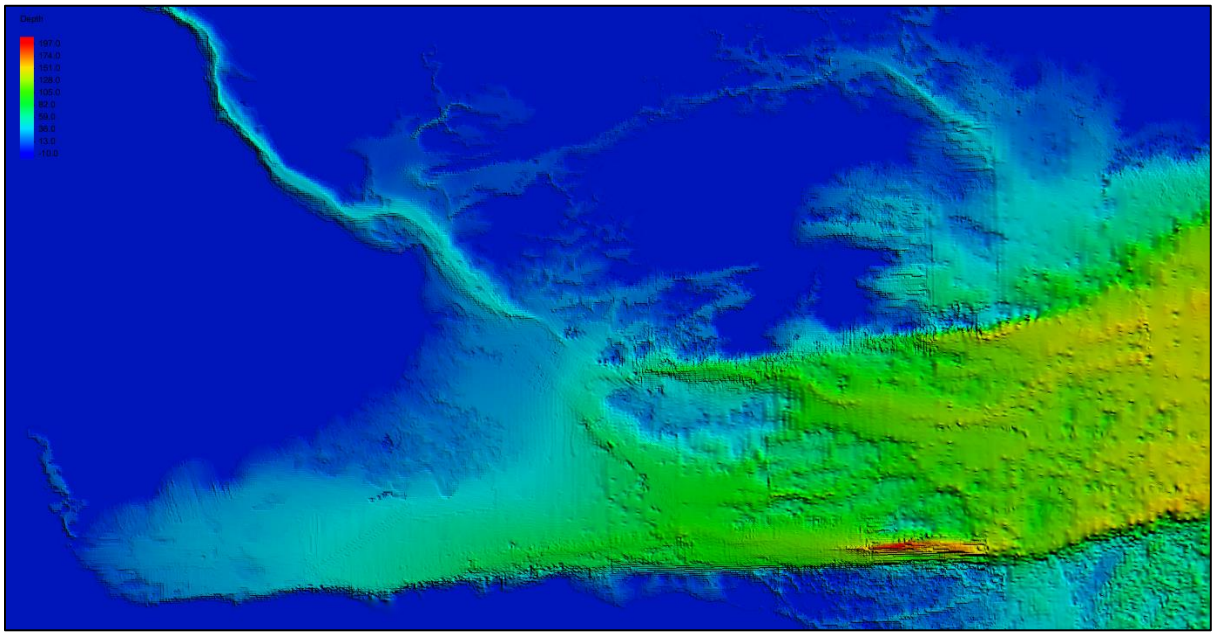


Figure 3 Bathymetry at site on hydrographic charts- Depth reported in meters

4.2 Wave Model Description

SMS, created by Aquaveo, is a modelling suite in which various water surface modelling tools, like wave and flow models, can be used. For this analysis SMS in combination with STWave is used. STWave is a nearshore spectral Hydraulics model, developed by U.S. Army Engineer Research and Development Center (ERDC) and Coastal and Hydraulics Laboratory (CHL). It is capable of modelling accurately wave transformation and propagation.

Two grids were setup, computational grid and spectral grid. The computational grid and its mesh sizes are mainly defined by the bathymetry. The bathymetry in SMS is presented in Figure 4. For this analysis the computational grid size was 51.7 km x 34.6 km. The mesh size was 20 m x 20 m, resulting in 2587 x 1734 = 4,485,858 grid cells.

The spectral domain was divided into 72 directions and 50 frequencies, with a minimum frequency of 0.03Hz and a maximum frequency of 1.01Hz.

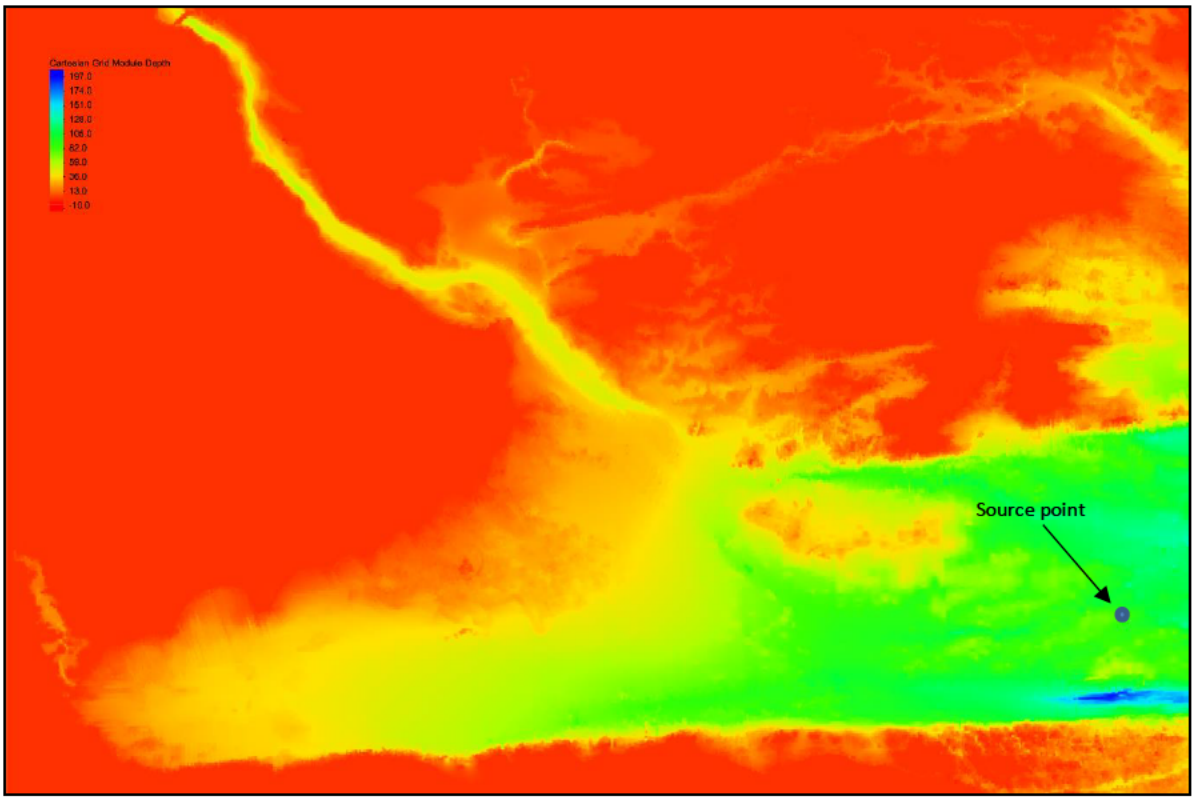


Figure 4 Bathymetry at site on STWave. Note the MSC50 HindCast model source point indicated at 45° 24.000'N, 60° 54.000'W

4.3 Boundary conditions – offshore wind and wave conditions

The MSC50 HindCast model [1] data from location 45° 24.000'N, 60° 54.000'W was used to determine the 10 and 50 year return periods for wind and wave of the Chedabucto Bay reference locations; the location is labelled as the “Source point” in Figure 4. The scatterplot of wave heights versus wave directions for the source point is shown in Figure 5. The scatter plot of wind speeds versus wind directions for the source point is also shown in Figure 6. Extreme waves and wind at the source point appear to originate more frequently from the east, and southeast.

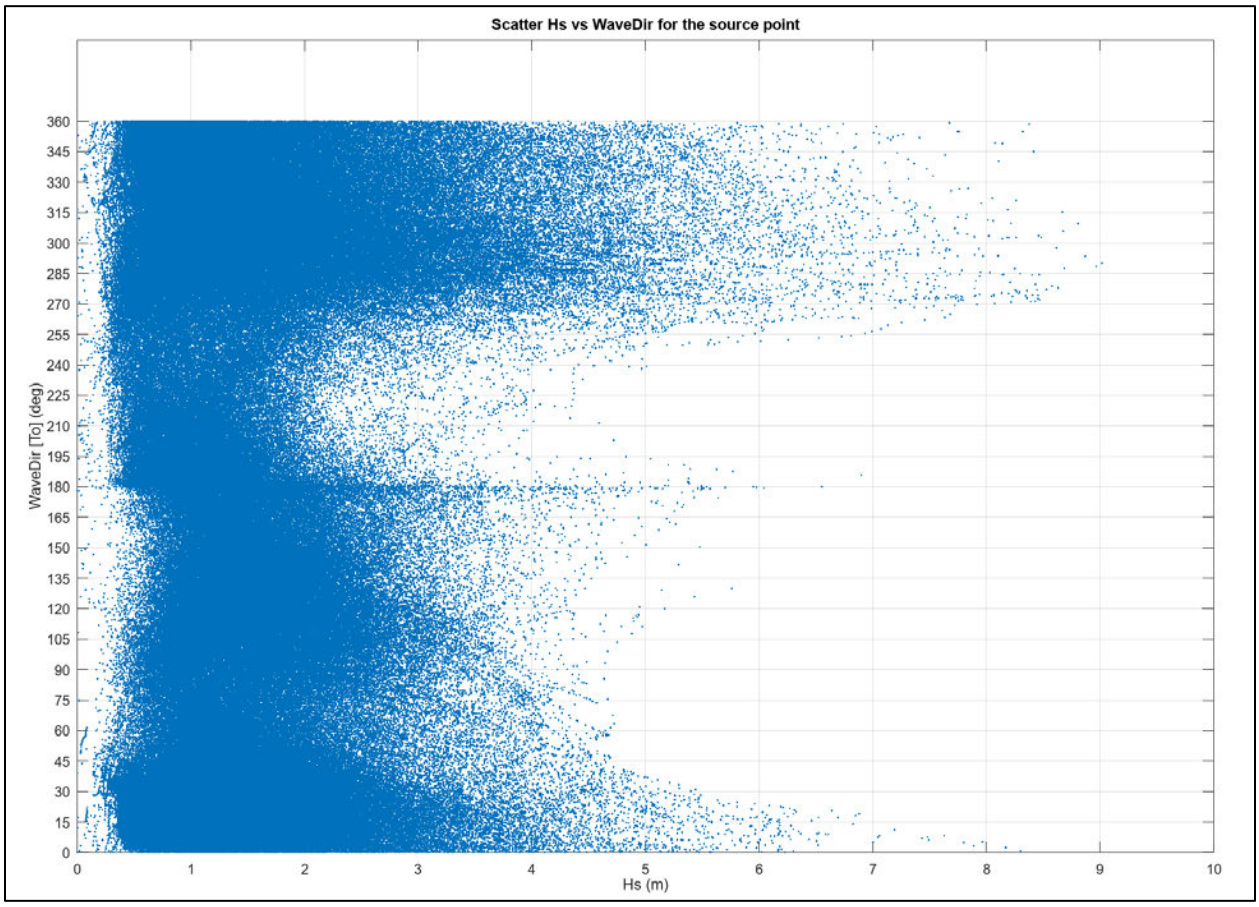


Figure 5 Wave height versus wave direction plot for the source point

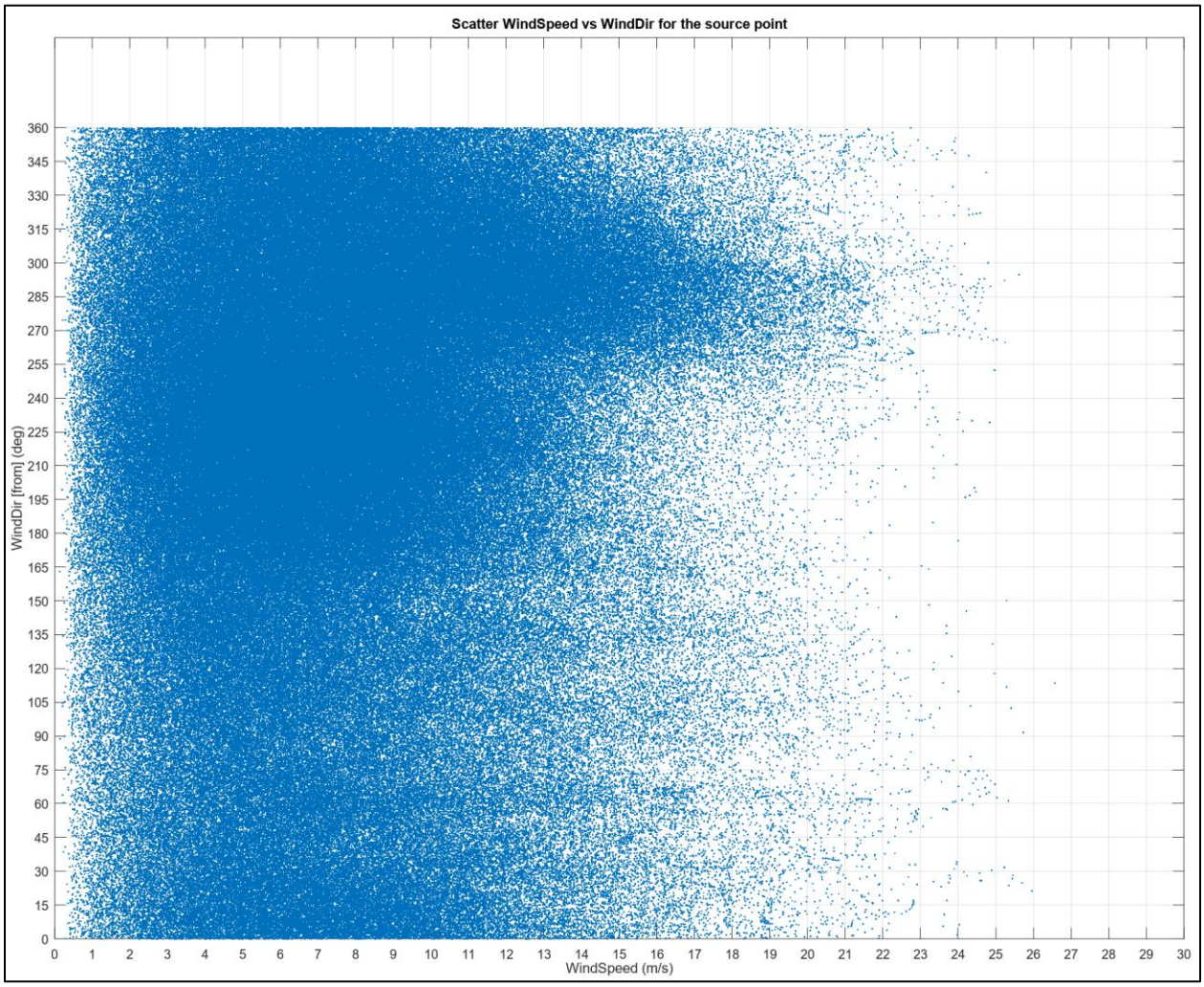
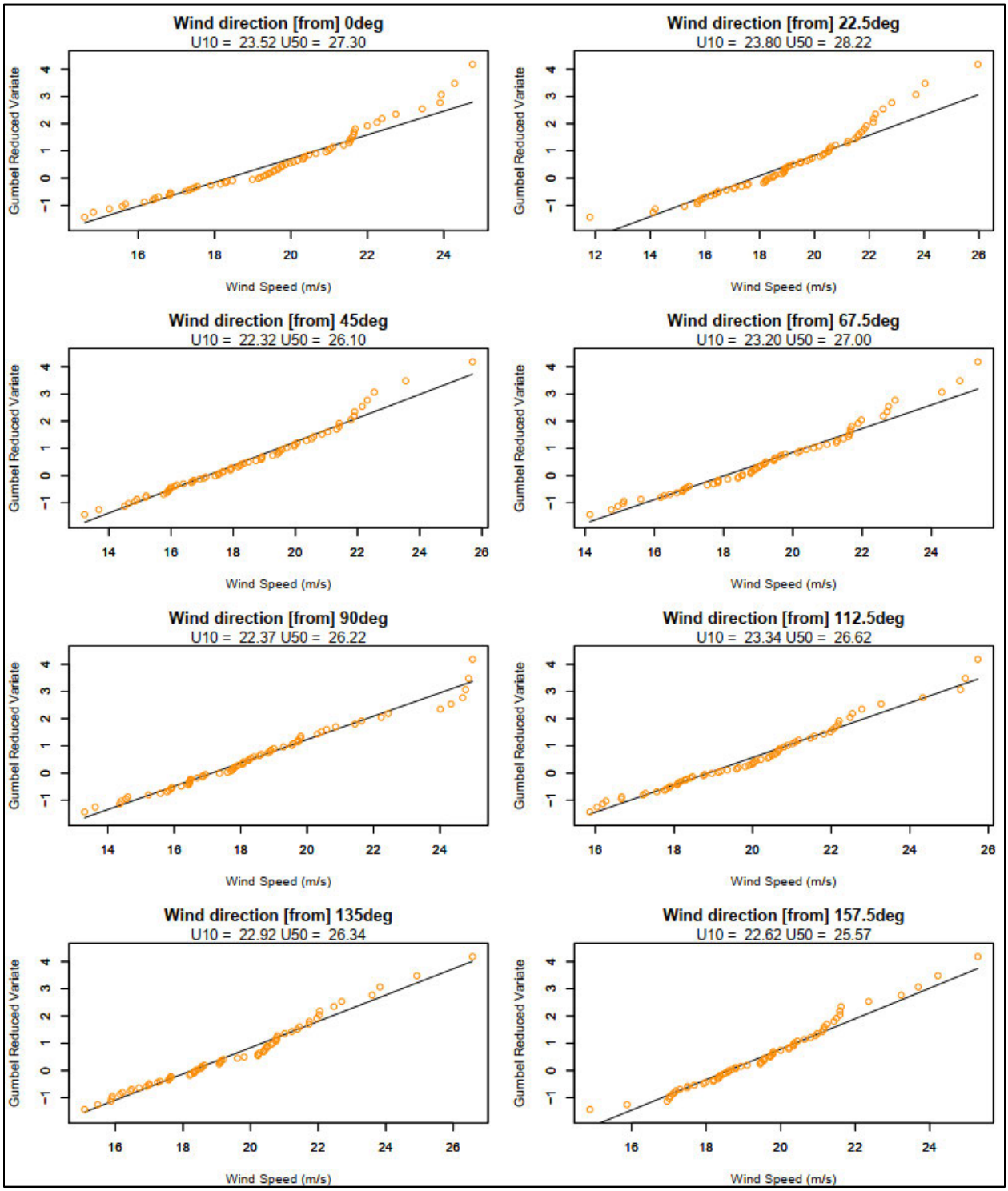


Figure 6 Wind speed versus wind direction plot for the source point

10 and 50 year return period conditions are in general achieved by:

- Obtaining measured or hindcast data for parameter in question
- For each parameter, bin data by direction
- Perform extreme value analysis.
    - Extract annual maxima
    - Fit Gumbel or Weibull distribution to this data
    - Use fitted distribution to calculate values corresponding to 10 and 50 year return period

The extreme value analysis of the wind velocities is presented in Figure 7. U10 and U50 represent the 10 and 50 year return period wind velocities, respectively.


Wind direction [from] 0deg
U10 = 23.52 U50 = 27.30
Wind direction [from] 22.5deg
U10 = 23.80 U50 = 28.22
Wind direction [from] 45deg
U10 = 22.32 U50 = 26.10
Wind direction [from] 67.5deg
U10 = 23.20 U50 = 27.00
Wind direction [from] 90deg
U10 = 22.37 U50 = 26.22
Wind direction [from] 112.5deg
U10 = 23.34 U50 = 26.62
Wind direction [from] 135deg
U10 = 22.92 U50 = 26.34
Wind direction [from] 157.5deg
U10 = 22.62 U50 = 25.57
Gumbel Reduced Variate
Wind Speed (m/s)

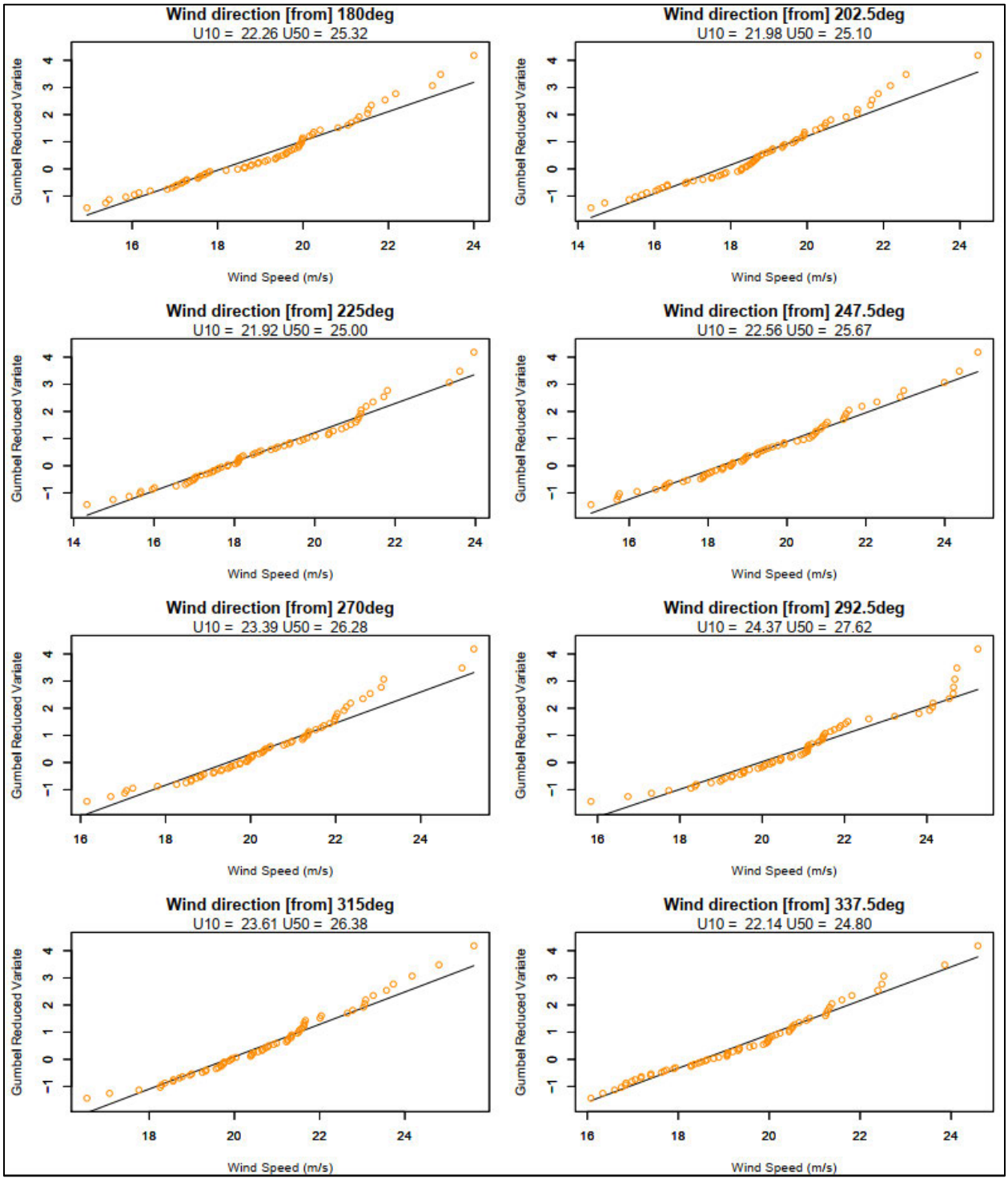
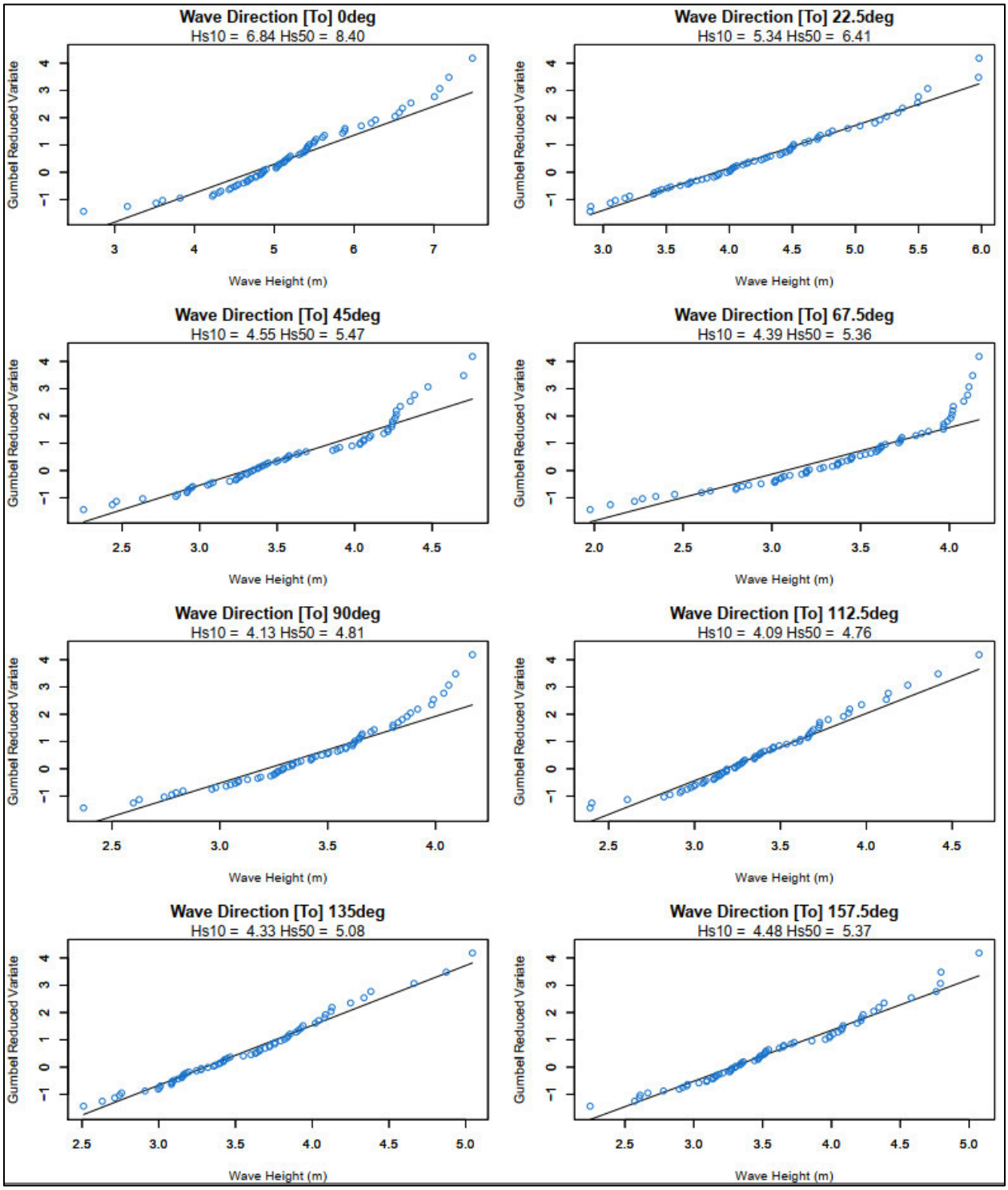


Figure 7: Extreme value analysis on wind data – for Source Point offshore location [1]

The extreme value analysis of the wave heights is presented in Figure 8. Similar to the presentation of the wind data, Hs10 and Hs50 represent the 10 and 50 year return period wave heights, respectively.


Wave Direction [To] 0deg
Hs10 = 6.84 Hs50 = 8.40
Wave Direction [To] 22.5deg
Hs10 = 5.34 Hs50 = 6.41
Wave Direction [To] 45deg
Hs10 = 4.55 Hs50 = 5.47
Wave Direction [To] 67.5deg
Hs10 = 4.39 Hs50 = 5.36
Wave Direction [To] 90deg
Hs10 = 4.13 Hs50 = 4.81
Wave Direction [To] 112.5deg
Hs10 = 4.09 Hs50 = 4.76
Wave Direction [To] 135deg
Hs10 = 4.33 Hs50 = 5.08
Wave Direction [To] 157.5deg
Hs10 = 4.48 Hs50 = 5.37
Gumbel Reduced Variate
Wave Height (m)

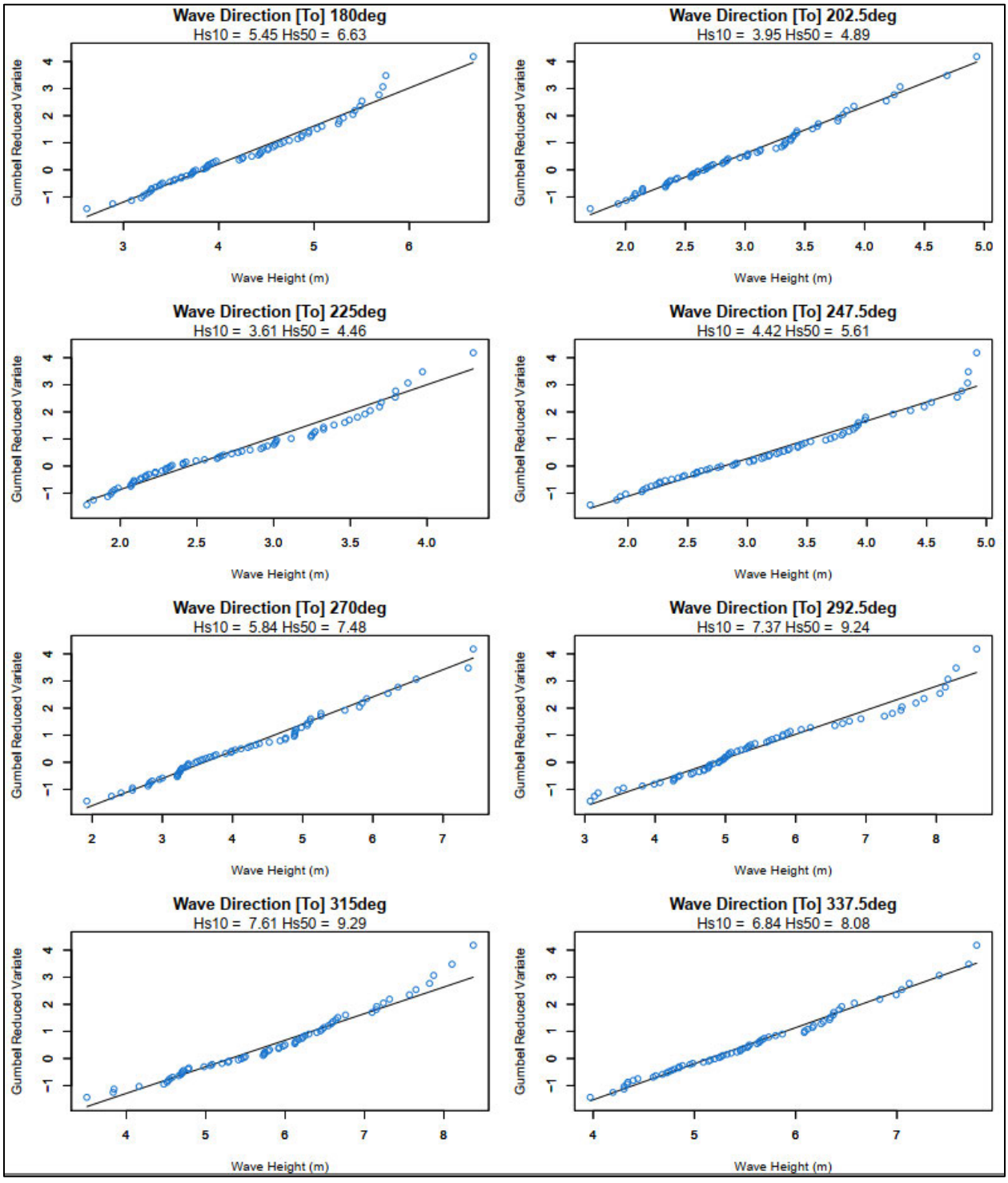


Figure 8: Extreme value analysis on wave data – for Source Point offshore location [1]

In summary, the following data was obtained from the extreme value analysis:

Table 1 Results extreme value analysis for wind and waves at the offshore source point location in Figure 4

Direction [from] [°]		$U_{wind,10year}$ [m/s]	$U_{wind,50year}$ [m/s]	$H_{s,10year}$ [m]	$H_{s,50year}$ [m]
0	N	23.52	27.3	5.45	6.63
23	NNE	23.8	28.22	3.95	4.89
45	NE	22.32	26.1	3.61	4.46
68	ENE	23.2	27	4.42	5.61
90	E	22.37	26.22	5.84	7.48
113	ESE	23.34	26.62	7.37	9.24
135	SE	22.92	26.34	7.61	9.29
158	SSE	22.62	25.57	6.83	8.09
180	S	22.26	25.32	6.84	8.4
203	SSW	21.2	25.1	5.34	6.41
225	SW	21.92	25	4.55	5.47
248	WSW	22.56	25.67	4.39	5.36
270	W	23.39	26.28	4.13	4.81
293	WNW	24.37	27.62	4.09	4.76
315	NW	23.61	26.38	4.33	5.08
338	NNW	22.14	24.8	4.48	5.37

Polar plots for maximum wind speeds and wave heights at 10 year and 50 year return periods are shown in Figure 9 to Figure 12, respectively.

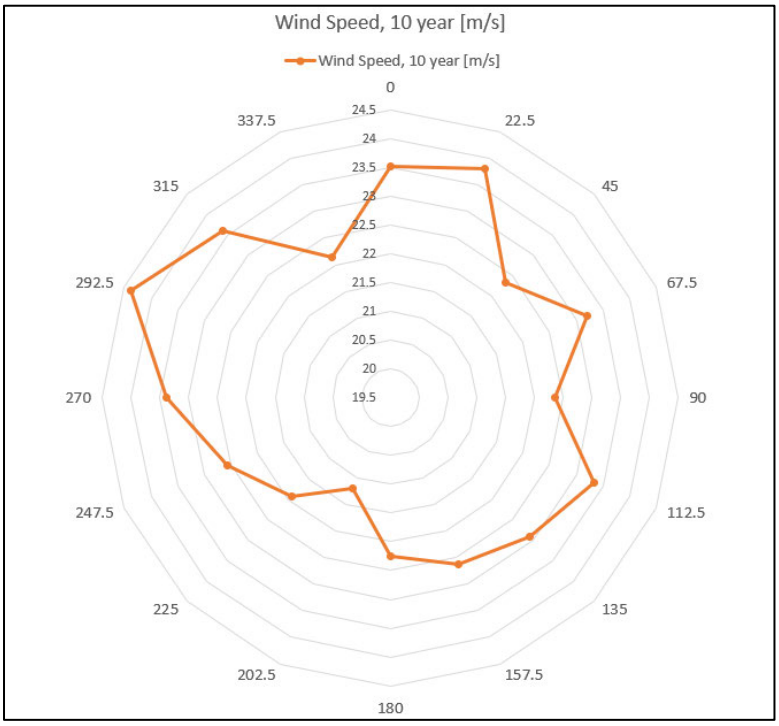


Figure 9 Maximum wind speed at 10 year return period and direction [from]- for Source Point offshore location [1]

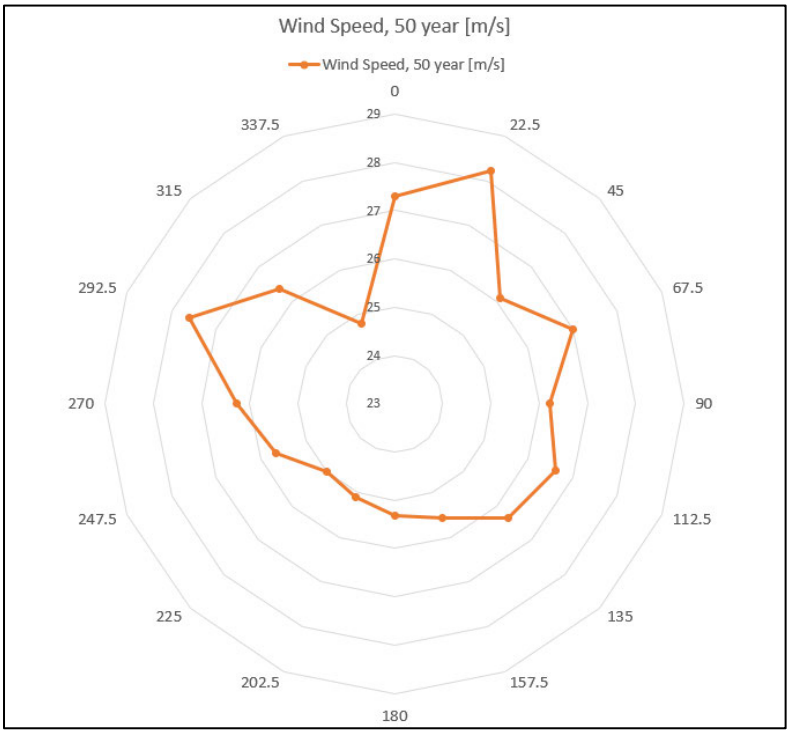


Figure 10 Maximum wind speed at 50 year return period and direction [from]- for Source Point offshore location [1]

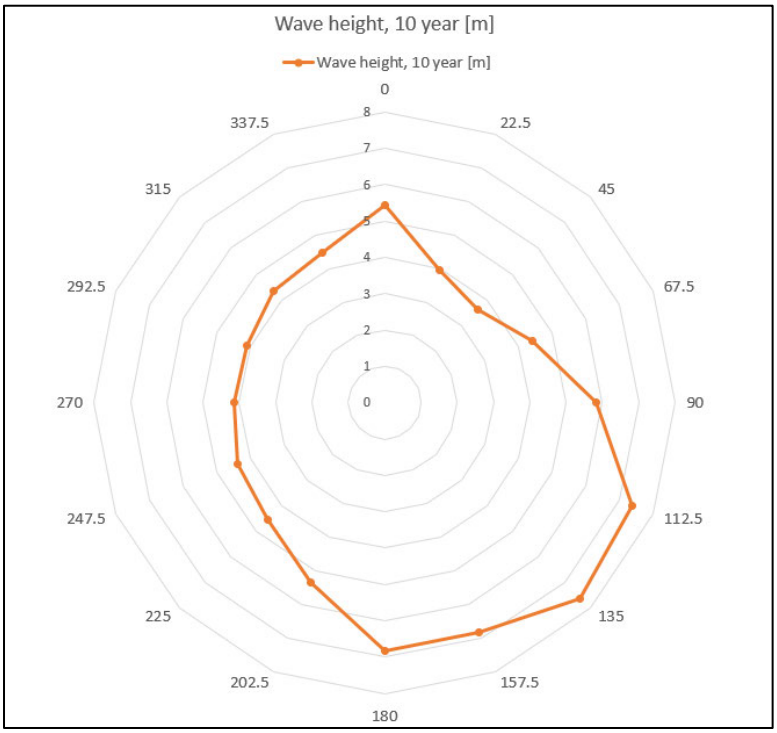


Figure 11 Maximum wave height at 10 year return period and direction [from]- for Source Point offshore location [1]

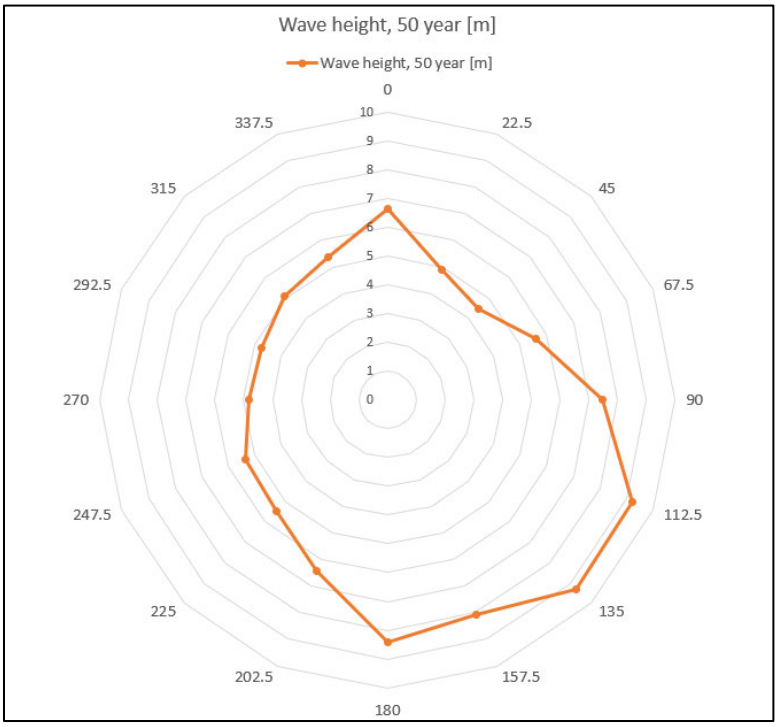


Figure 12 Maximum wave height at 50 year return period and direction [from]- for Source Point offshore location [1]

The wave data, presented in Table 1, was set as boundary condition and specified as a JONSWAP spectrum. The peak-enhancement factor was set to 3.3 and directional spreading was included as a $\cos^m(\theta)$ distribution.

Only wind-wave interaction was considered. Current-wave interaction was not included because local flow velocities are very small.

Eight headings were used, the wind direction was kept constant within its directional bin. T_p was varied in the presented range as shown in Table 2.

Table 2 T_p values used in analysis.

Direction [from] [°]		*T_p [s]*
0	N	6.15_14.25
23	NNE	4.46_12.37
45	NE	4.68_14.12
68	ENE	5.14_12.73
90	E	5.6_14.1
113	ESE	8.1_13.93
135	SE	8.9_13.25
158	SSE	9.03_12.87
180	S	7.37_14.36
203	SSW	7.77_14.56
225	SW	6.16_13
248	WSW	5.41_12.88
270	W	5.76_12.89
293	WNW	5.70_13.76
315	NW	5.69_15.29
338	NNW	5.08_15.58

In this method, wave design conditions for the project location are based on 10 and 50 year return period sea-state and winds for an offshore location, which have subsequently been transferred to the project location. This will provide reasonable design conditions; however, they cannot be linked directly to a return period at the site.

4.4 Wave modeling results

The results of the wave modeling are presented in Figure 13 to Figure 15 for directions from northeast, east, and southeast, respectively for three key wave headings with the highest wave heights. As stated in the previous section, the wind conditions are assumed to stay constant for the region. The results from STWave represent the maximum significant wave height value at the region including its spectral peak period and wave direction.

The reference locations in Chedabucto Bay are presented in Figure 1. The estimated wave and wind conditions for each site based on the STWave modeling are presented in the following sections.

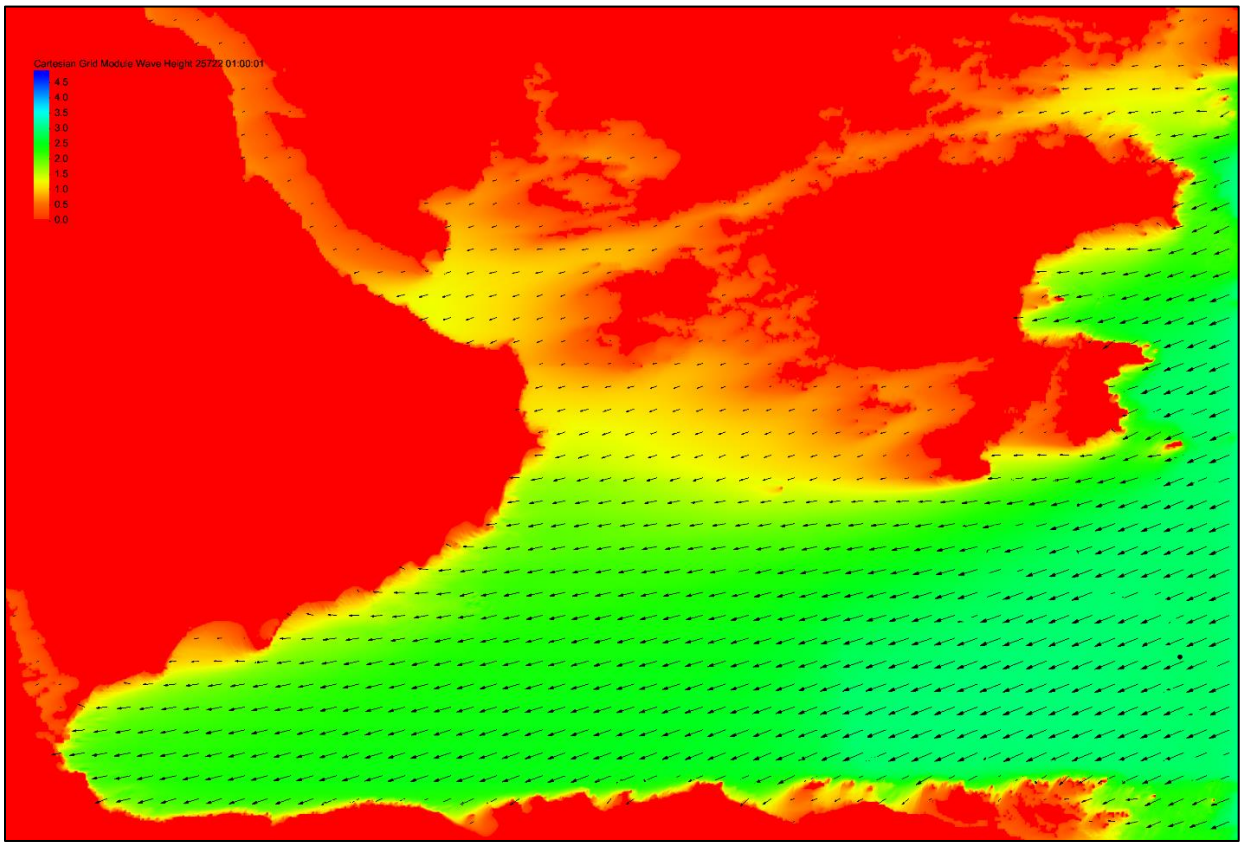


Figure 13 Wave modeling results for direction [From] 68 deg- NE

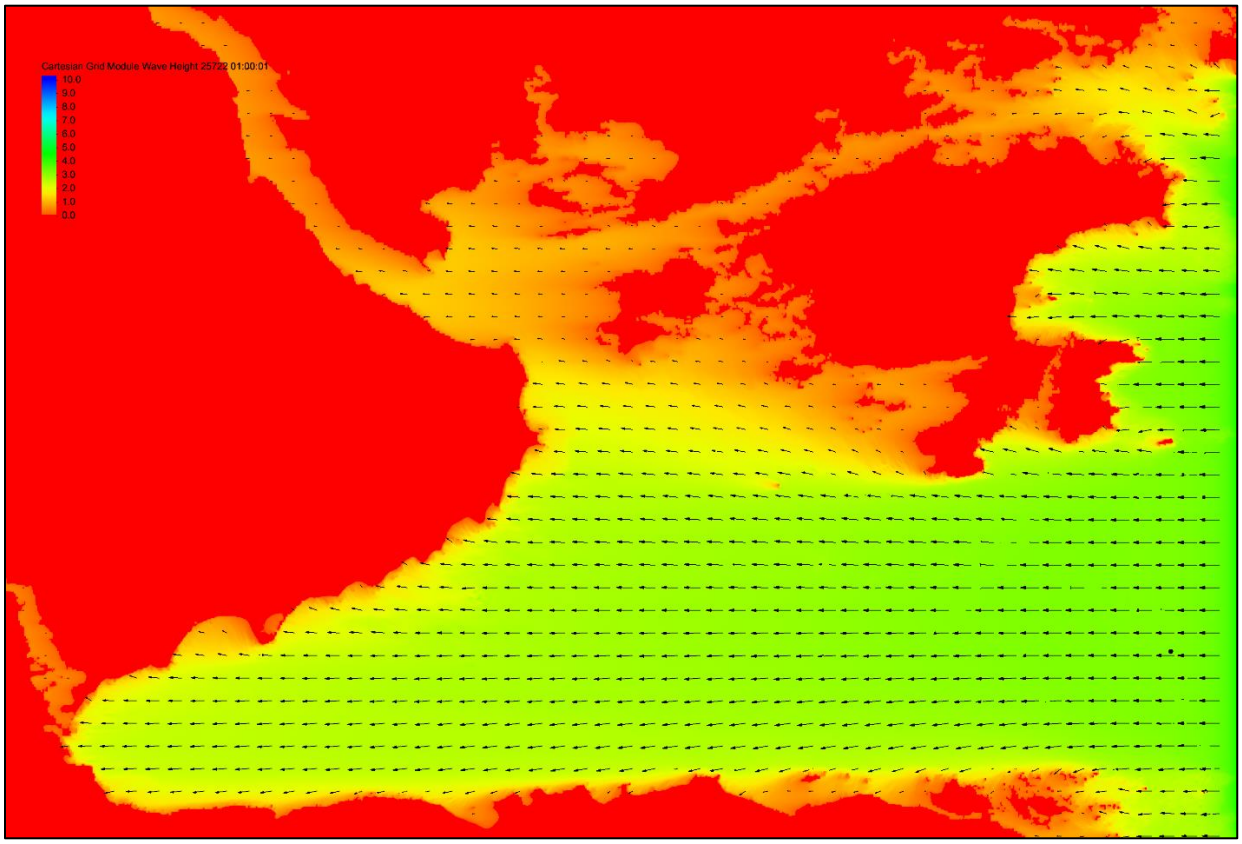


Figure 14 Wave modeling results for direction [From] 90 deg- E

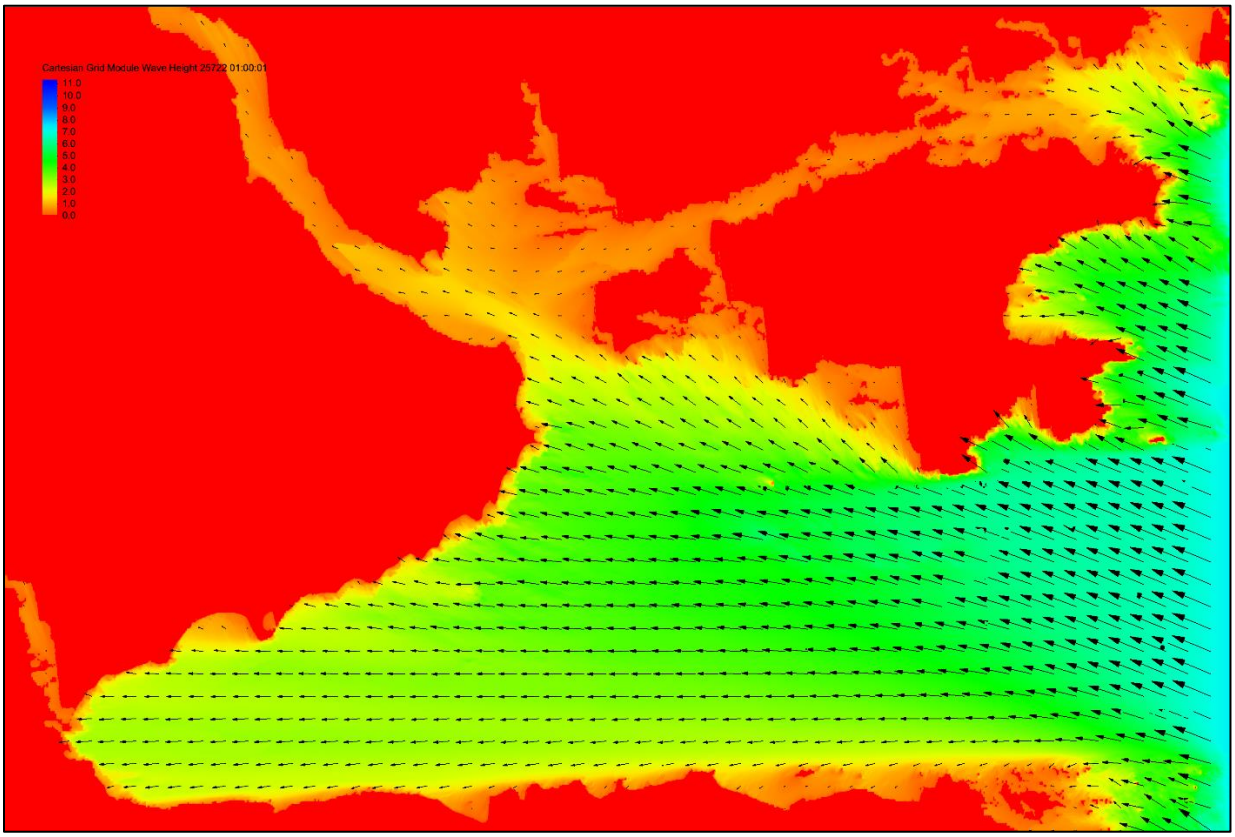


Figure 15 Wave modeling results for direction [From] 113 deg- SE

4.4.1 Wave/wind conditions for Chedabucto Bay- Reference Location 1

The wave and wind results from the STWave model, for the Chedabucto Bay- Reference Location 1 are summarized in Table 3. Note that the results in Table 3 indicate significant wave height (Hs) and peak period (T_P) for the selected site. These represent the extreme wave conditions at this coordinate: 45° 21.868'N, 61° 3.643'W.

Table 3 Estimated wave and wind design conditions for Chedabucto Bay- Reference Location 1

Wave/Wind conditions	Direction [from] [°]		Wind (m/s)	Hs (m)	Tp (s)
10yr wave/wind	*0*	N	23.52	1.77	4.02
	23	NNE	23.8	1.3	3.91
	45	NE	22.32	2.31	11.66
	68	ENE	23.2	3.81	11.02
	90	E	22.37	3.72	11.36
	113	ESE	23.34	0.64	2.5
	135	SE	22.92	0.72	2.42

	158	SSE	22.62	0.66	2.6
	180	S	22.26	0.56	2.16
	203	SSW	21.2	0.41	2.13
	225	SW	21.92	0.46	4.1
	248	WSW	22.56	1.23	4.1
	270	W	23.39	2	4.6
	293	WNW	24.37	1.64	4.2
	315	NW	23.61	1.93	4.39
	338	NNW	22.14	1.8	4.11
50yr wave/wind	*0*	N	27.3	2.1	4.3
	23	NNE	28.22	1.6	4.23
	45	NE	26.1	2.88	11.6
	68	ENE	27	4.92	10.91
	90	E	26.22	4.82	11.28
	113	ESE	26.62	0.75	2.65
	135	SE	26.34	0.85	2.6
	158	SSE	25.57	0.77	2.39
	180	S	25.32	0.65	2.28
	203	SSW	25.1	0.51	2.3
	225	SW	25	0.5	4.2
	248	WSW	25.67	1.39	4.25
	270	W	26.28	2.3	4.85
	293	WNW	27.62	1.9	4.46
	315	NW	26.38	2.17	4.6
	338	NNW	24.8	2.03	4.31

It should be noted that the return periods indicated for each wave parameter in Table 3 are representative of the boundary condition used to derive that value, not the value itself. Polar plots for maximum wave heights are presented in Figure 16 and Figure 17.

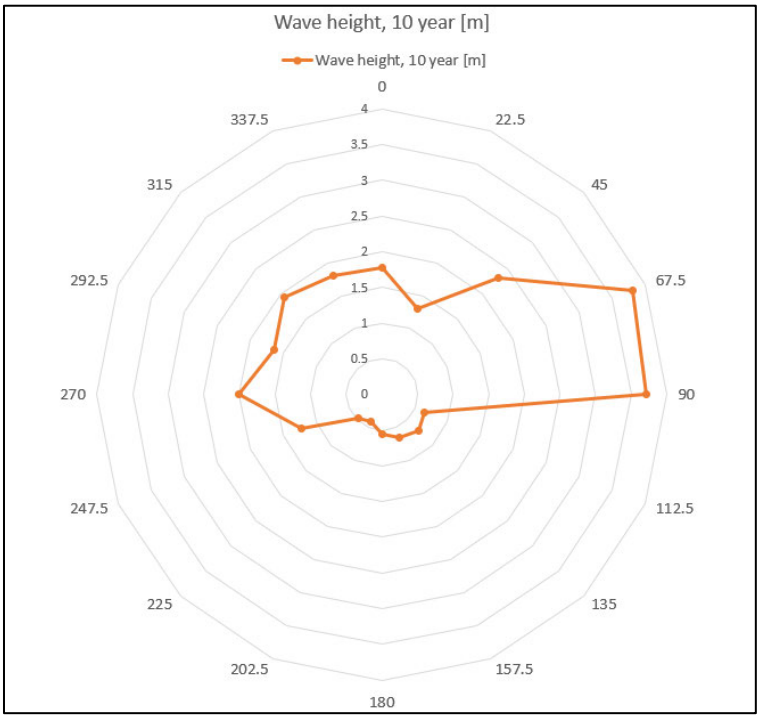


Figure 16 Maximum wave height at 10 year return period and direction [from]- Chedabucto Bay- Reference Location 1

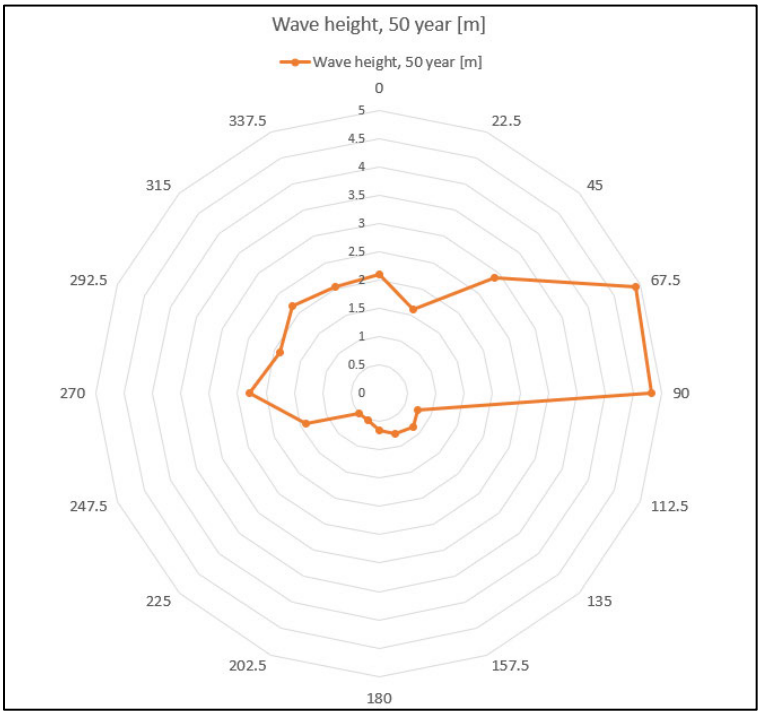


Figure 17 Maximum wave height at 50 year return period and direction [from]- Chedabucto Bay- Reference Location 1

4.4.2 Wave/wind conditions for Chedabucto Bay- Reference Location 2

The wave and wind results from the STWave model, for the Chedabucto Bay- Reference Location 2, are summarized in Table 4. Note that the results in Table 4 indicate significant wave height (Hs) and peak period (T_P) for the selected site. These represent the extreme wave conditions at this coordinate: 45° 21.985'N, 61° 17.472'W.

Table 4 Estimated wave and wind design conditions for Chedabucto Bay- Reference Location 2

Wave/Wind conditions	Direction [from] [°]		Wind (m/s)	Hs (m)	Tp (s)
10yr wave/wind	*0*	N	23.52	1.4	3.5
	23	NNE	23.8	1.39	4.1
	45	NE	22.32	1.8	4.74
	68	ENE	23.2	2.43	5.02
	90	E	22.37	2.85	8.87
	113	ESE	23.34	0.67	2.57
	135	SE	22.92	0.75	2.5
	158	SSE	22.62	0.71	2.34
	180	S	22.26	0.61	2.24
	203	SSW	21.2	0.43	2.1
	225	SW	21.92	0.57	4.47
	248	WSW	22.56	1.1	3.94
	270	W	23.39	1.67	4.02
	293	WNW	24.37	1.24	3.67
	315	NW	23.61	1.26	3.71
	338	NNW	22.14	1.21	3.41
50yr wave/wind	*0*	N	27.3	1.67	3.75
	23	NNE	28.22	1.67	4.44
	45	NE	26.1	2.13	4.99
	68	ENE	27	2.93	8.75
	90	E	26.22	2.9	5.32
	113	ESE	26.62	0.79	2.73
	135	SE	26.34	0.88	2.65
	158	SSE	25.57	0.82	2.47
	180	S	25.32	0.71	2.37
	203	SSW	25.1	0.53	2.24
	225	SW	25	0.69	4.77
	248	WSW	25.67	1.28	4.16

	270	W	26.28	1.92	4.23
	293	WNW	27.62	1.44	3.89
	315	NW	26.38	1.44	3.9
	338	NNW	24.8	1.39	3.59

It should be noted that the return periods indicated for each wave parameter in Table 4 are representative of the boundary condition used to derive that value, not the value itself. Polar plots for maximum wave heights are presented in Figure 18 and Figure 19.

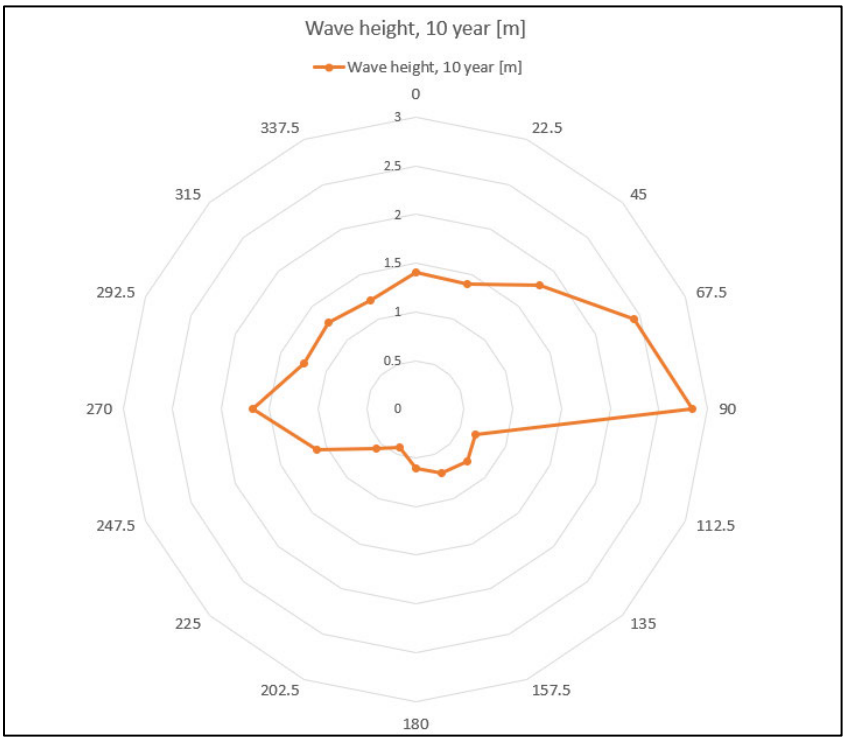


Figure 18 Maximum wave height at 10 year return period and direction [from]- Chedabucto Bay- Reference Location 2

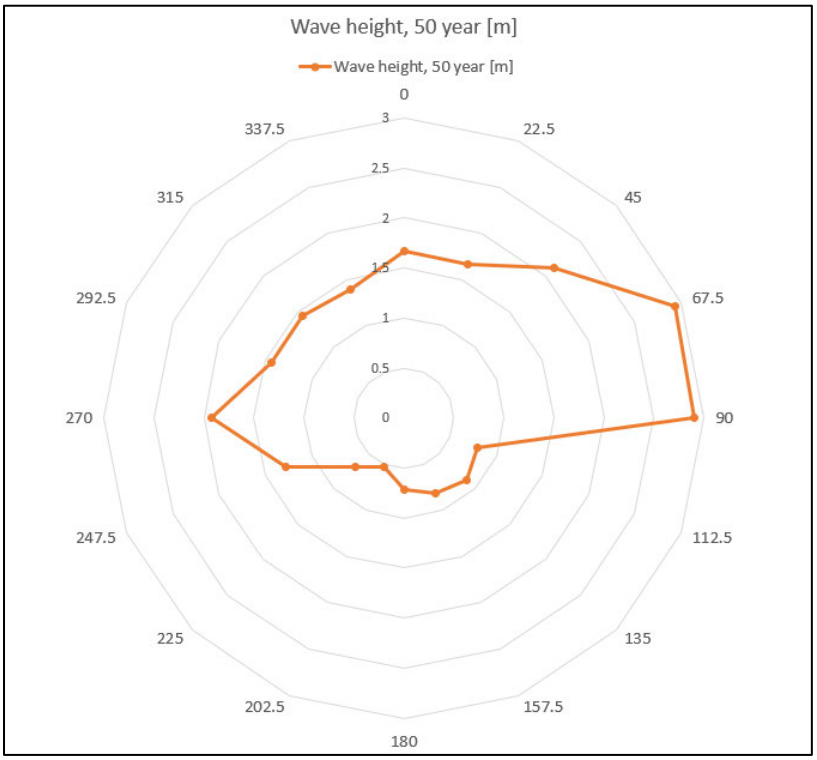


Figure 19 Maximum wave height at 50 year return period and direction [from]- Chedabucto Bay- Reference Location 2

4.4.3 Wave/wind conditions for Chedabucto Bay- Reference Location 3

The wave and wind results from the STWave model, for the Chedabucto Bay- Reference Location 3, are summarized in Table 4. Note that the results in Table 4 indicate significant wave height (Hs) and peak period (T_P) for the selected site. These represent the extreme wave conditions at this coordinate: 45° 32.041'N, 61° 16.463'W.

Table 5 Estimated wave and wind design conditions for Chedabucto Bay- Reference Location 3

Wave/Wind conditions	Direction [from] [°]		Wind (m/s)	Hs (m)	Tp (s)
10yr wave/wind	*0*	N	23.52	0.98	2.98
	23	NNE	23.8	0.89	3.14
	45	NE	22.32	0.98	3.43
	68	ENE	23.2	1.2	3.32
	90	E	22.37	1.12	3.25
	113	ESE	23.34	1.1	3.11
	135	SE	22.92	0.86	3
	158	SSE	22.62	0.62	2.41

	180	S	22.26	0.51	2.1
	203	SSW	21.2	0.32	1.85
	225	SW	21.92	0.42	2.48
	248	WSW	22.56	0.51	2.31
	270	W	23.39	0.66	2.32
	293	WNW	24.37	0.8	3.26
	315	NW	23.61	0.78	2.9
	338	NNW	22.14	0.7	2.87
50yr wave/wind	*0*	N	27.3	1.17	3.18
	23	NNE	28.22	1.08	3.4
	45	NE	26.1	1.18	3.67
	68	ENE	27	1.42	3.55
	90	E	26.22	1.34	3.48
	113	ESE	26.62	1.27	3.28
	135	SE	26.34	0.95	3
	158	SSE	25.57	0.71	2.5
	180	S	25.32	0.59	2.2
	203	SSW	25.1	0.41	1.96
	225	SW	25	0.49	2.63
	248	WSW	25.67	0.6	2.45
	270	W	26.28	0.76	2.44
	293	WNW	27.62	0.93	3.47
	315	NW	26.38	0.88	3.05
	338	NNW	24.8	0.8	3.02

It should be noted that the return periods indicated for each wave parameter in Table 4 are representative of the boundary condition used to derive that value, not the value itself. Polar plots for maximum wave heights are presented in Figure 18 and Figure 19.

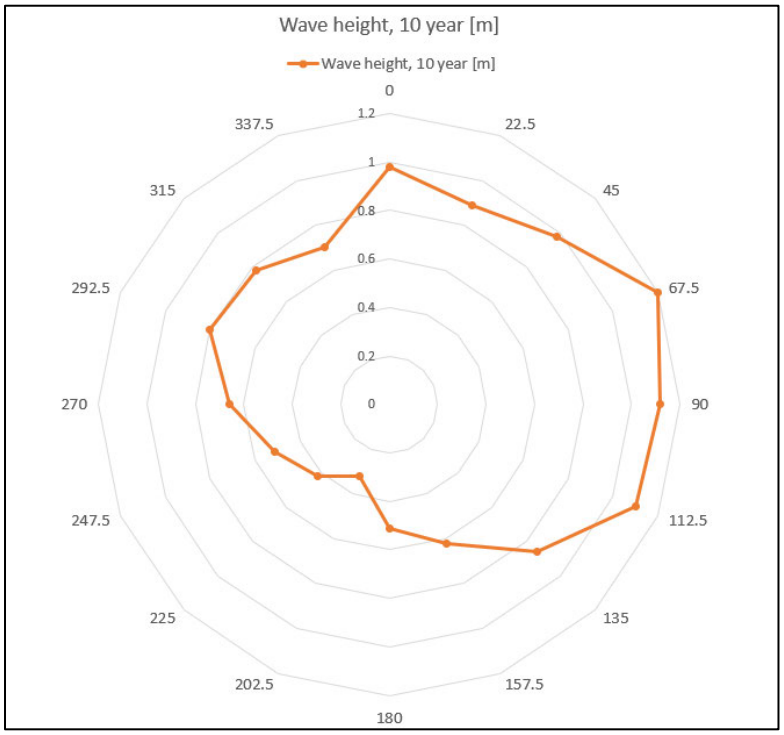


Figure 20 Maximum wave height at 10 year return period and direction [from]- Chedabucto Bay- Reference Location 3

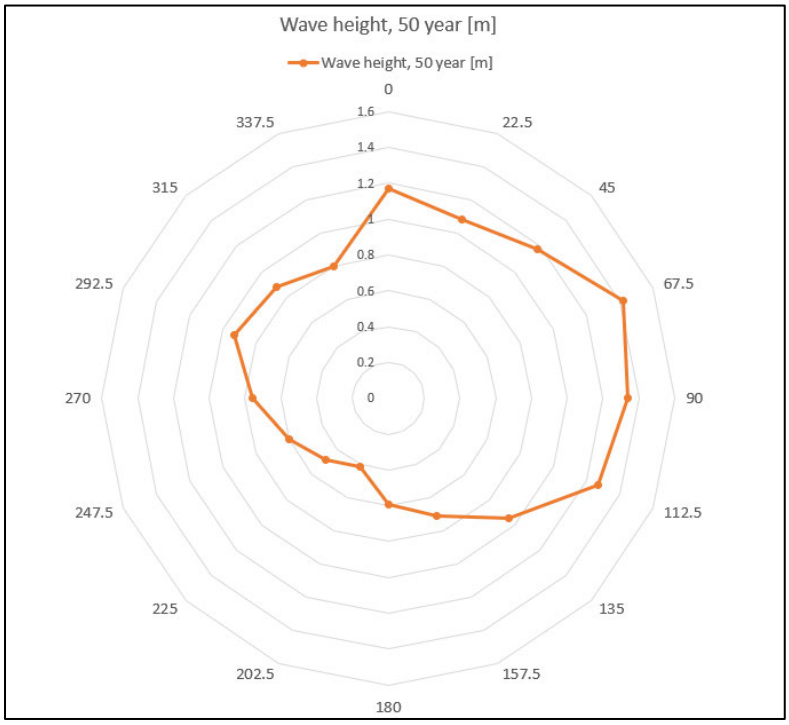


Figure 21 Maximum wave height at 50 year return period and direction [from]- Chedabucto Bay- Reference Location 3

CENTRE FOR MARINE APPLIED RESEARCH

V1

Coastal Monitoring Program Report: Richmond County

January 2021

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Table of Contents

1 Introduction

The Centre for Marine Applied Research (CMAR) measures environmental data throughout Nova Scotia's coastal waters as part of the Coastal Monitoring Program. This program was initiated by the Nova Scotia Department of Fisheries and Aquaculture in 2012 and CMAR became involved in 2017.

This document presents deployment details and summary figures of program data collected for **Richmond County** (Figure 1 and Figure 2).

The data are available for download from the Nova Scotia Open Data Portal. For more information on CMAR and the Coastal Monitoring Program, visit the CMAR website.

This document should be considered as a guide only, as data collection and retrieval are ongoing. The information may be revised pending ongoing data collection and analyses.

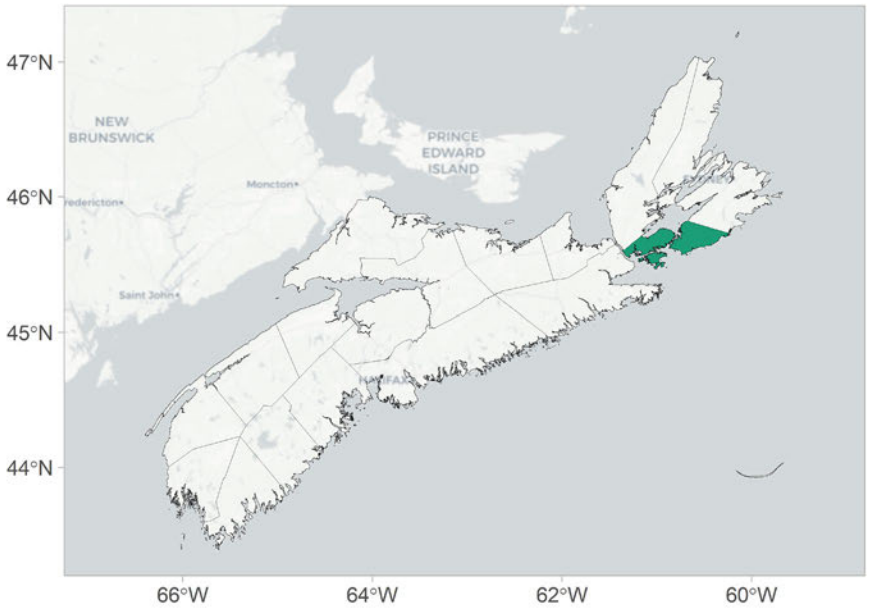


Figure 1: Richmond County (green).

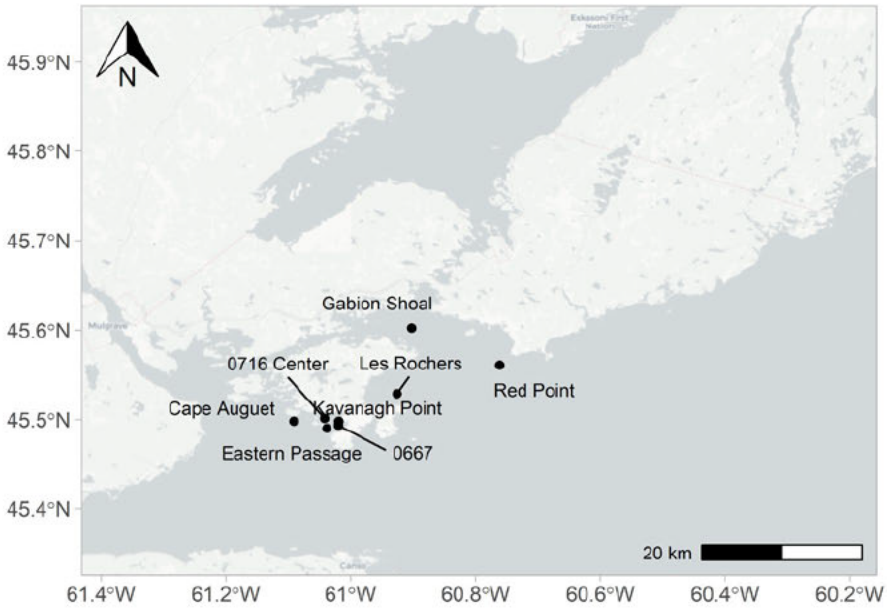


Figure 2: Sampling stations in Richmond County.

1.1 Data Collection

CMAR collects temperature, dissolved oxygen, and intermittent salinity data using autonomous sensors attached to moored lines, called 'sensor strings'. Each string is attached to the seafloor by an anchored acoustic release and suspended by a sub-surface buoy, with sensors attached at various depths (Figure 3). Sensor strings are typically deployed for several months, and data are measured every 1 minute to 1 hour depending on the sensor. This process may produce tens- to hundreds- of thousands of observations for a single deployment. Data are retrieved by triggering an acoustic release, enabling the sensor string to float to the surface for data download. Sensor strings may be re-deployed at the same location or moved to another area of interest depending on program objectives.

1.2 Data Processing

Some data were excluded from the dataset due to quality control processes.

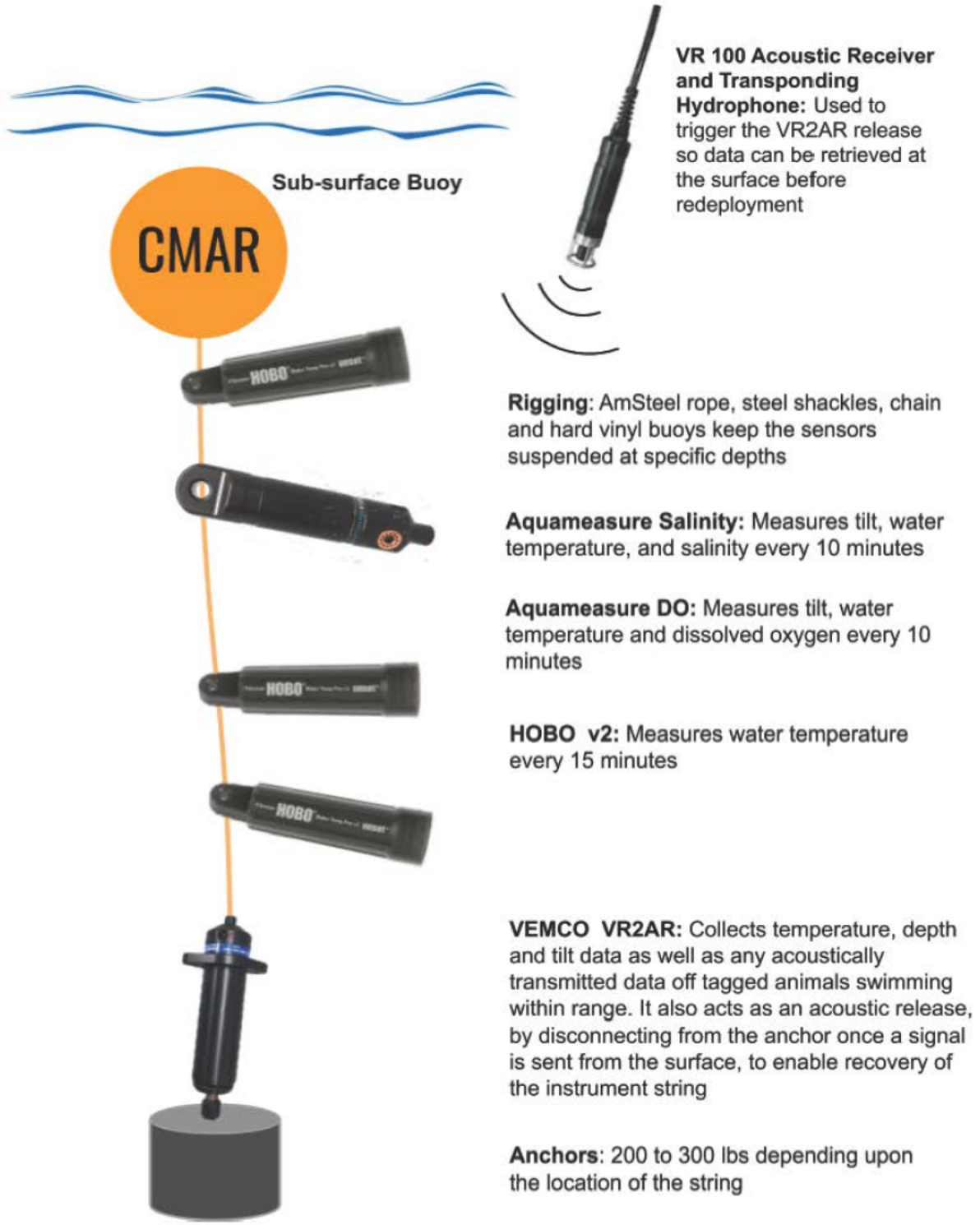


Figure 3: Example sensor string configuration (not to scale).

2 Richmond County Coastal Data

Coastal data is presented by waterbody. For each waterbody, there is a table of deployment details followed by figures showing the data at each station. A red line is included in temperature figures to indicate the -0.7°C freeze threshold for salmonids (for figures where the temperature falls below this threshold). Note the different axis scales for each figure.

2.1 Arichat Harbour

Table 1: Deployment details for Arichat Harbour.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Sensor Type	Depth (m)
0667	2015-Nov-26	2016-Sep-01	45.49341	-61.01947	Temperature	Sub-surface
0667	2015-Nov-26	2016-Sep-01	45.49341	-61.01947	Temperature	Middle
0667	2015-Nov-26	2016-Sep-01	45.49341	-61.01947	Temperature	Bottom
0716 Center	2018-Dec-12	2019-Apr-09	45.50135	-61.04197	Temperature	2
Cape Auguet	2020-Apr-30	2020-Dec-03	45.49824	-61.09130	Temperature	2
Cape Auguet	2020-Apr-30	2020-Dec-03	45.49824	-61.09130	Dissolved Oxygen	5
Cape Auguet	2020-Apr-30	2020-Dec-03	45.49824	-61.09130	Temperature	5
Cape Auguet	2020-Apr-30	2020-Dec-03	45.49824	-61.09130	Temperature	10
Cape Auguet	2020-Apr-30	2020-Dec-03	45.49824	-61.09130	Temperature	15
Eastern Passage	2018-Dec-12	2019-Apr-09	45.49028	-61.03831	Temperature	2
Eastern Passage	2018-Dec-12	2019-Apr-09	45.49028	-61.03831	Temperature	5
Kavanagh Point	2015-Nov-26	2016-Sep-01	45.49824	-61.01931	Temperature	1.5
Kavanagh Point	2015-Nov-26	2016-Sep-01	45.49824	-61.01931	Temperature	9
Kavanagh Point	2015-Nov-26	2016-Sep-01	45.49824	-61.01931	Temperature	22
Kavanagh Point	2016-Sep-01	2019-Jan-04	45.49824	-61.01931	Temperature	2
Kavanagh Point	2016-Sep-01	2019-Jan-04	45.49824	-61.01931	Temperature	10
Kavanagh Point	2016-Sep-01	2019-Jan-04	45.49824	-61.01931	Temperature	20

2.1.1 0667

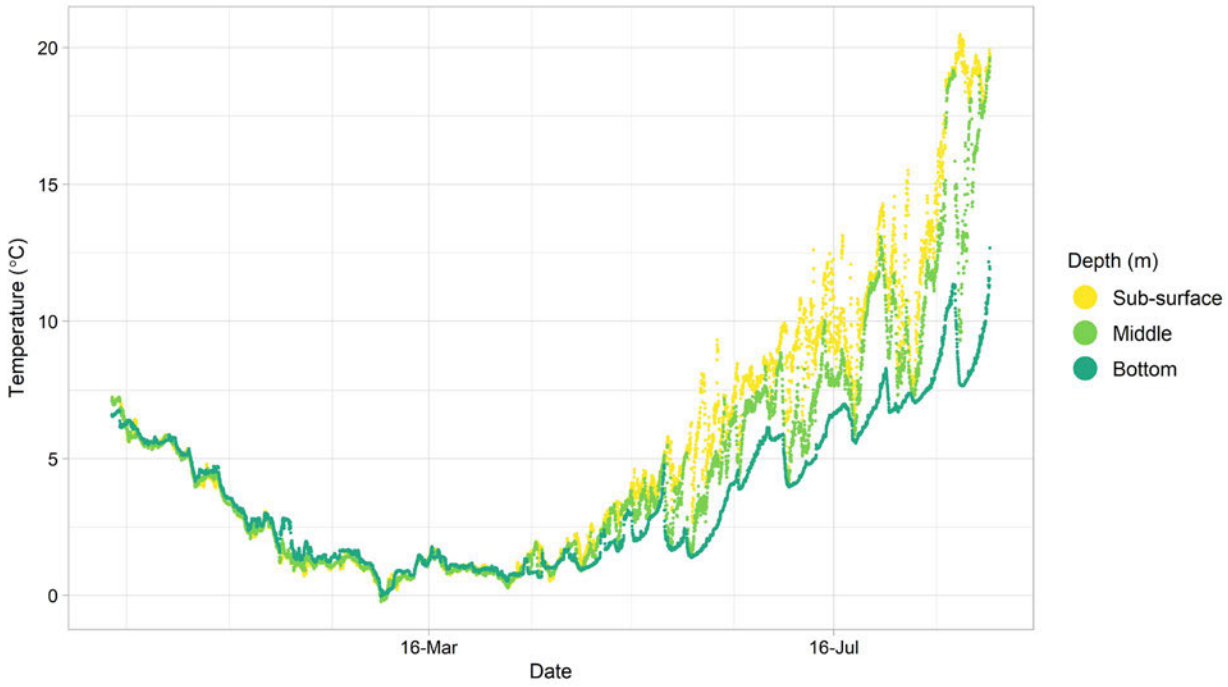


Figure 4: 0667 oceanographic data.

2.1.2 0716 Center

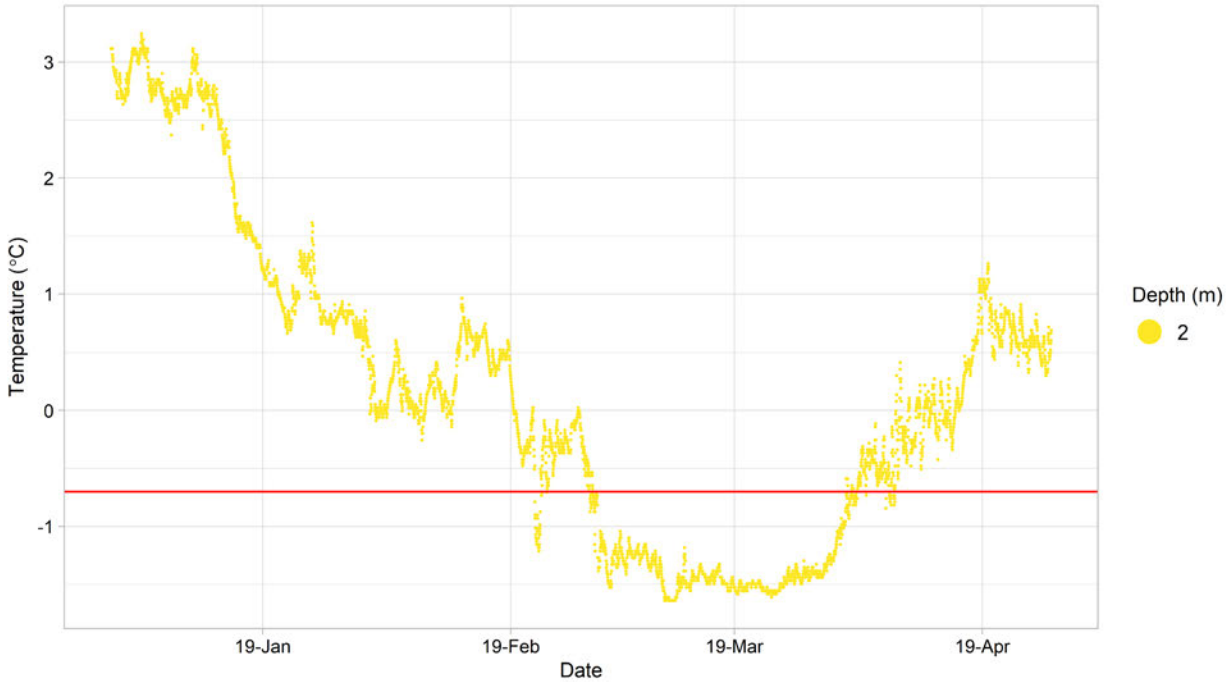


Figure 5: 0716 Center oceanographic data.

2.1.3 Cape Auguet

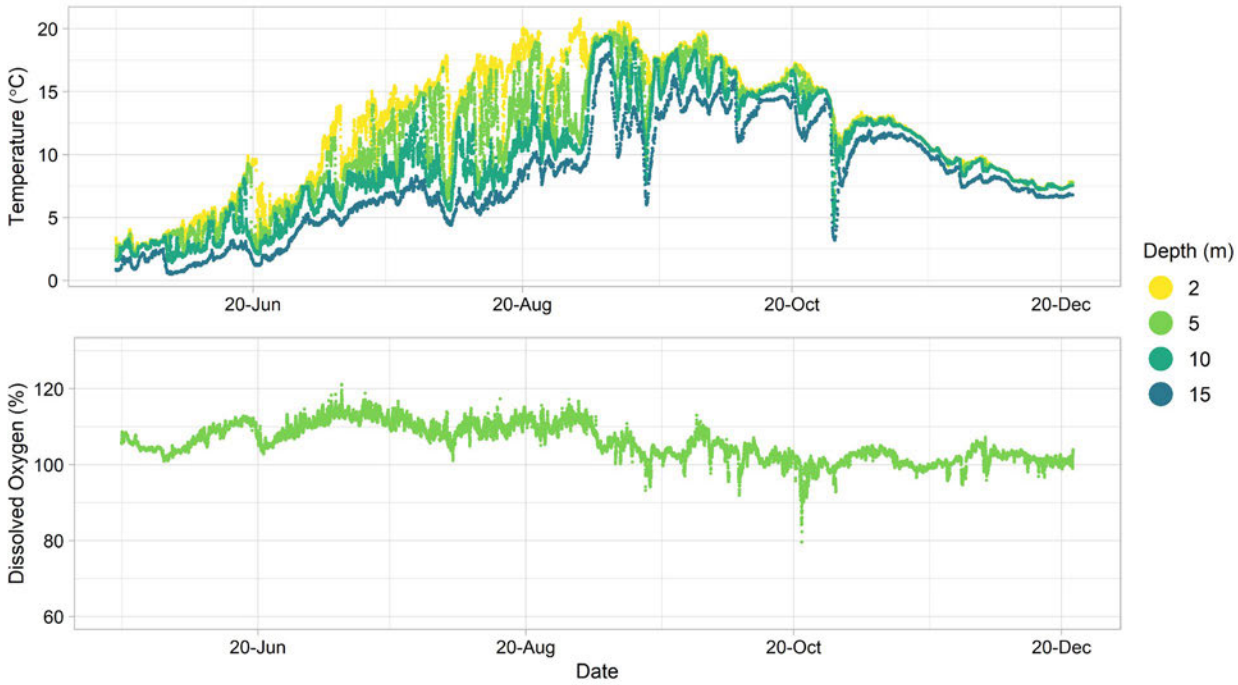


Figure 6: Cape Auguet oceanographic data.

2.1.4 Eastern Passage

Figure 7: Eastern Passage oceanographic data.

2.1.5 Kavanagh Point

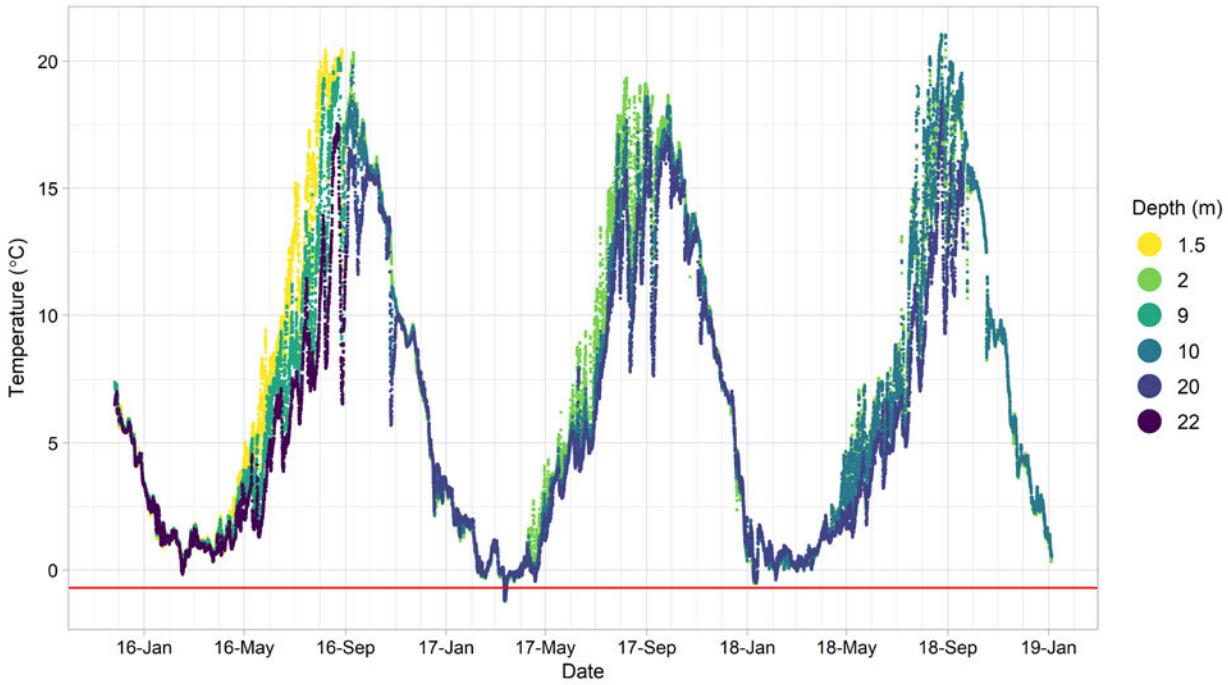


Figure 8: Kavanagh Point oceanographic data.

2.2 Bay of Rocks

Table 2: Deployment details for Bay of Rocks.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Sensor Type	Depth (m)
Les Rochers	2018-Dec-21	2019-Apr-10	45.52904	-60.92601	Temperature	2
Les Rochers	2018-Dec-21	2019-Apr-10	45.52904	-60.92601	Temperature	5
Les Rochers	2018-Dec-21	2019-Apr-10	45.52904	-60.92601	Temperature	10
Les Rochers	2018-Dec-21	2019-Apr-10	45.52904	-60.92601	Temperature	20
Les Rochers	2018-Dec-21	2019-Apr-10	45.52904	-60.92601	Temperature	30

2.2.1 Les Rochers

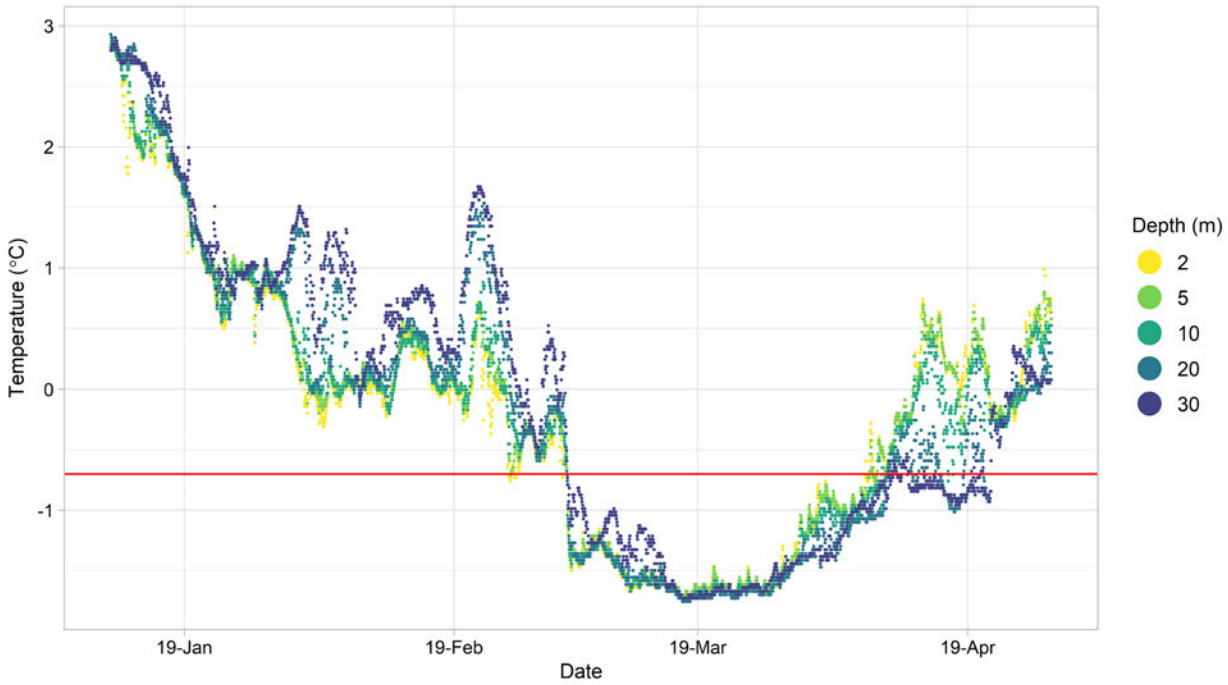


Figure 9: Les Rochers oceanographic data.

2.3 Lennox Passage

Table 3: Deployment details for Lennox Passage.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Sensor Type	Depth (m)
Gabion Shoal	2018-Dec-21	2019-Apr-10	45.6026	-60.90244	Temperature	2
Gabion Shoal	2018-Dec-21	2019-Apr-10	45.6026	-60.90244	Temperature	5
Gabion Shoal	2018-Dec-21	2019-Apr-10	45.6026	-60.90244	Temperature	10
Gabion Shoal	2018-Dec-21	2019-Apr-10	45.6026	-60.90244	Temperature	20
Gabion Shoal	2018-Dec-21	2019-Apr-10	45.6026	-60.90244	Temperature	30

2.3.1 Gabion Shoal

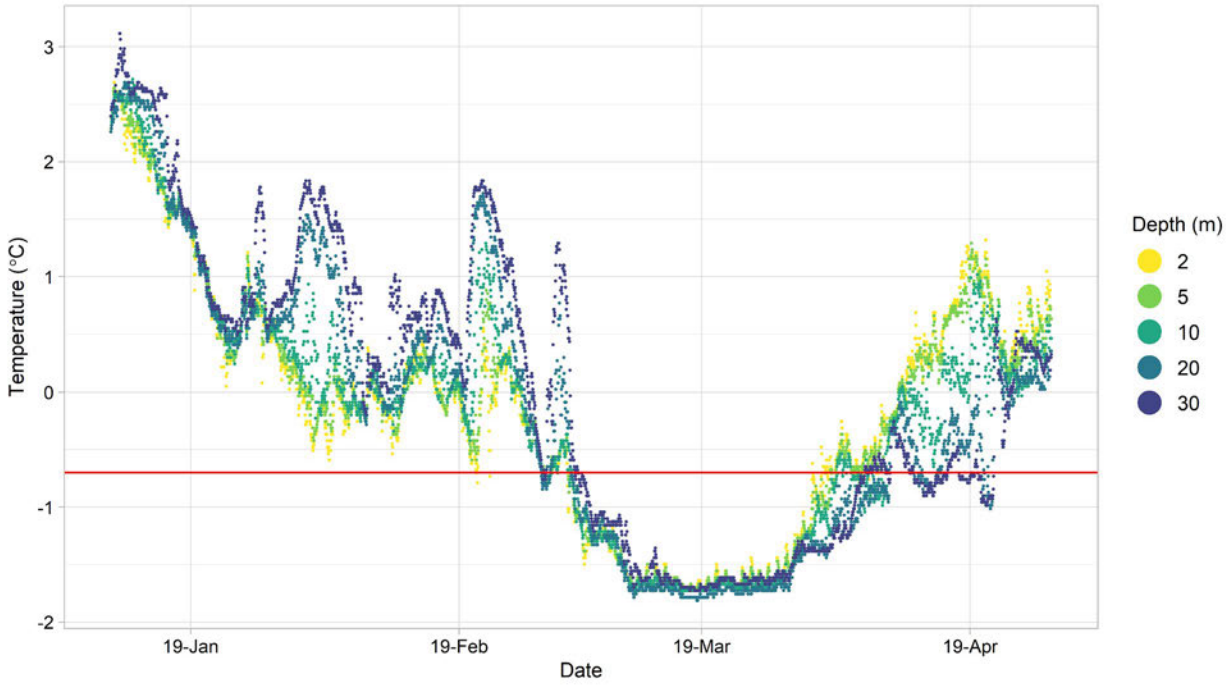


Figure 10: Gabion Shoal oceanographic data.

2.4 Little Harbour

Table 4: Deployment details for Little Harbour.

Station	Deployment Date	Retrieval Date	Latitude	Longitude	Sensor Type	Depth (m)
Red Point	2018-Dec-21	2019-Apr-10	45.56094	-60.76110	Temperature	2
Red Point	2018-Dec-21	2019-Apr-10	45.56094	-60.76110	Temperature	5
Red Point	2018-Dec-21	2019-Apr-10	45.56094	-60.76110	Temperature	10
Red Point	2018-Dec-21	2019-Apr-10	45.56094	-60.76110	Temperature	20
Red Point	2018-Dec-21	2019-Apr-10	45.56094	-60.76110	Temperature	29
Red Point	2019-Apr-10	2020-Apr-29	45.56078	-60.76142	Temperature	2
Red Point	2019-Apr-10	2020-Apr-29	45.56078	-60.76142	Temperature	5
Red Point	2019-Apr-10	2020-Apr-29	45.56078	-60.76142	Temperature	10
Red Point	2019-Apr-10	2020-Apr-29	45.56078	-60.76142	Temperature	20
Red Point	2019-Apr-10	2020-Apr-29	45.56078	-60.76142	Temperature	29

2.4.1 Red Point

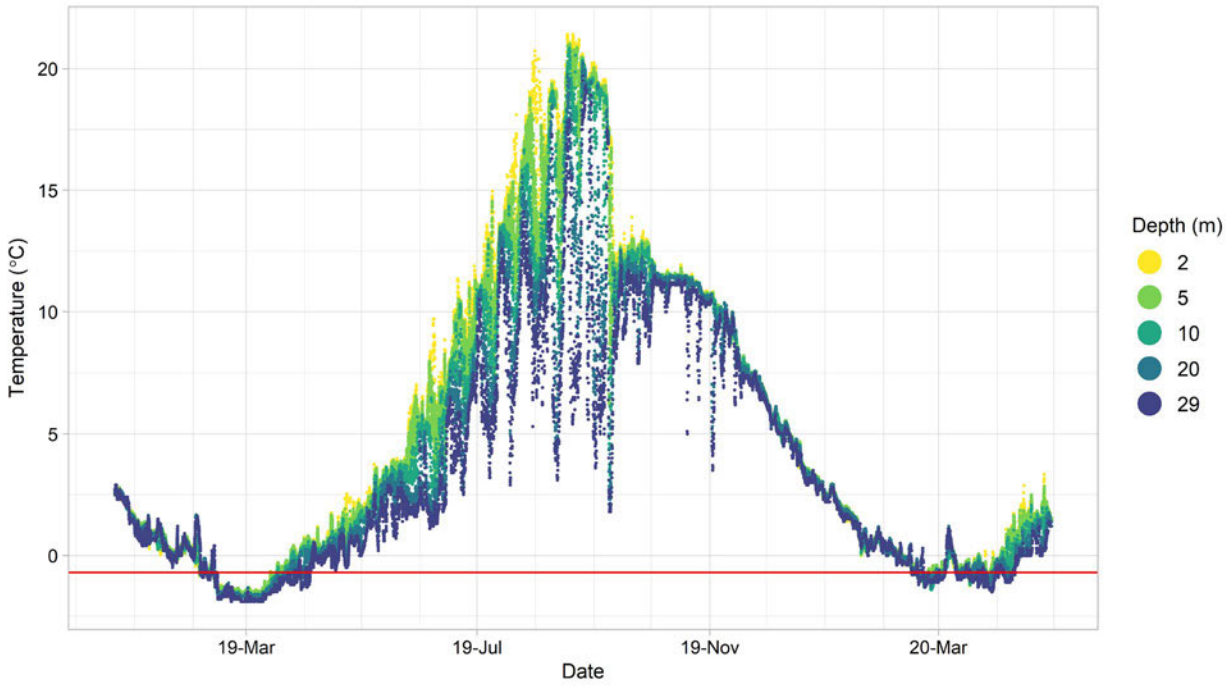


Figure 11: Red Point oceanographic data.

3 Document History

Table 5: Document history.

Version Number	Date	Amendments
V1	2021-01-27	New document

Gmail [redacted]

Re: Sea Surface Temperature

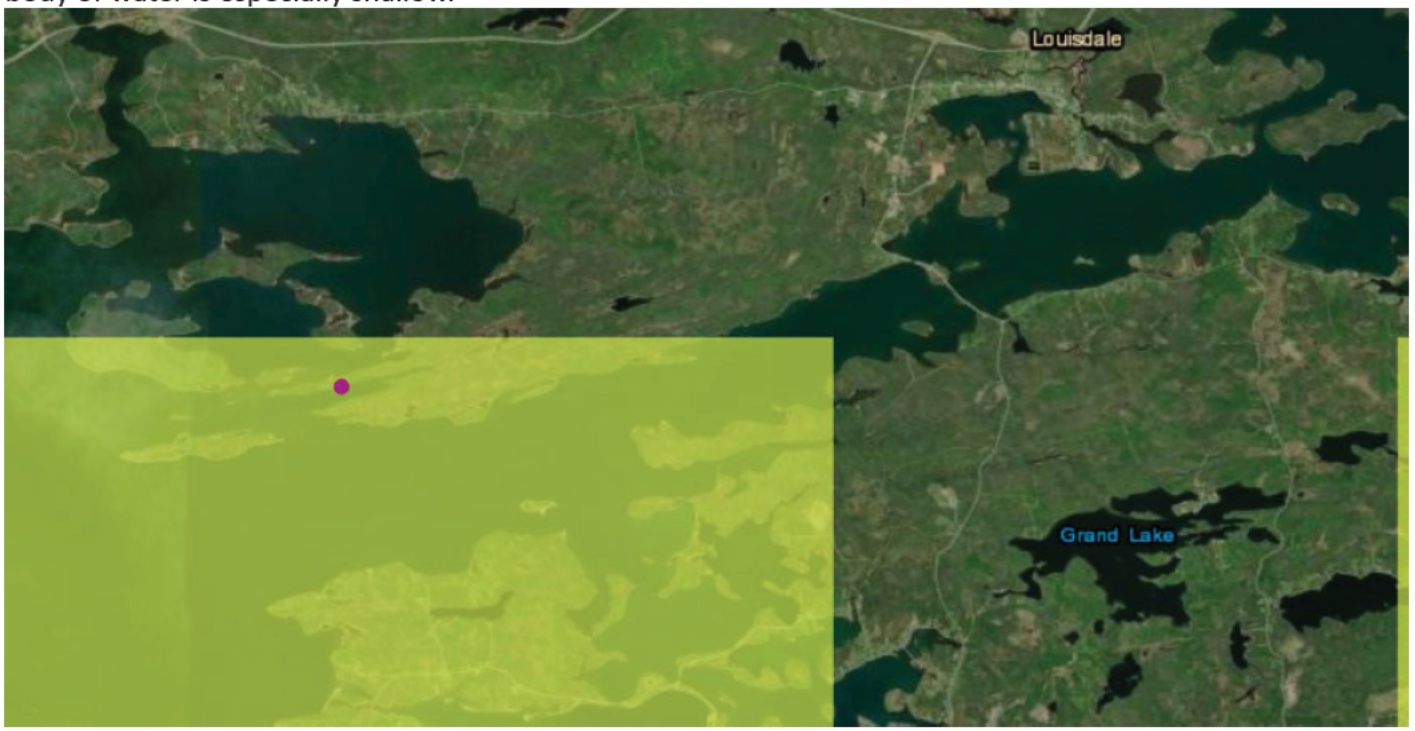
1 message

[redacted] Tue, Jul 20, 2021 at 9:59 AM
To: [redacted]
Cc: [redacted]

Hi [redacted] and [redacted],

I hope you both are doing well and that this information proves useful. Attached to this email I have included a time series plot of SST. I have also included a .csv version of the data that I used to create this time series in case you would like to investigate it further or recreate the plot yourself. The time series begins on April 3, 2008 and ends on June 30, 2021. If you require data for the last couple of weeks, please let me know and I can add it to the time series (this will take an extra day for processing).

Another thing I want to note is that the location nearest Lennox Passage does not have data because this straight is too narrow for Satellites to record values of SST. The other location which in indicated on the map is also a narrow passage, so while temperature might not have been measured directly in the cove it has been measured in the larger part of the passage and would be similar to values you would expect when measuring temperature in person. However, the temperatures in the cove could be slightly warmer if the body of water is especially shallow.



Please reach out if you have any questions or if I can provide any further assistance!

Best Regards,

[redacted]
Dalhousie University
Phone: [redacted]
Email: [redacted]

From: [redacted]
Sent: Tuesday, July 20, 2021 9:17 AM
To: [redacted]
Cc: [redacted]
Subject: Sea Surface Temperature

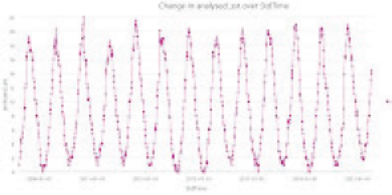
Hi [redacted]

Can you forward the sea surface temperature data products for Lennox Passage to [redacted] when available? Thank you!

Best regards,
[redacted] M.Sc.
Research Manager
27 Parker St.
Dartmouth, Nova Scotia
B2Y 4T5
[redacted]
www.cmar.ca

CENTRE FOR MARINE APPLIED RESEARCH

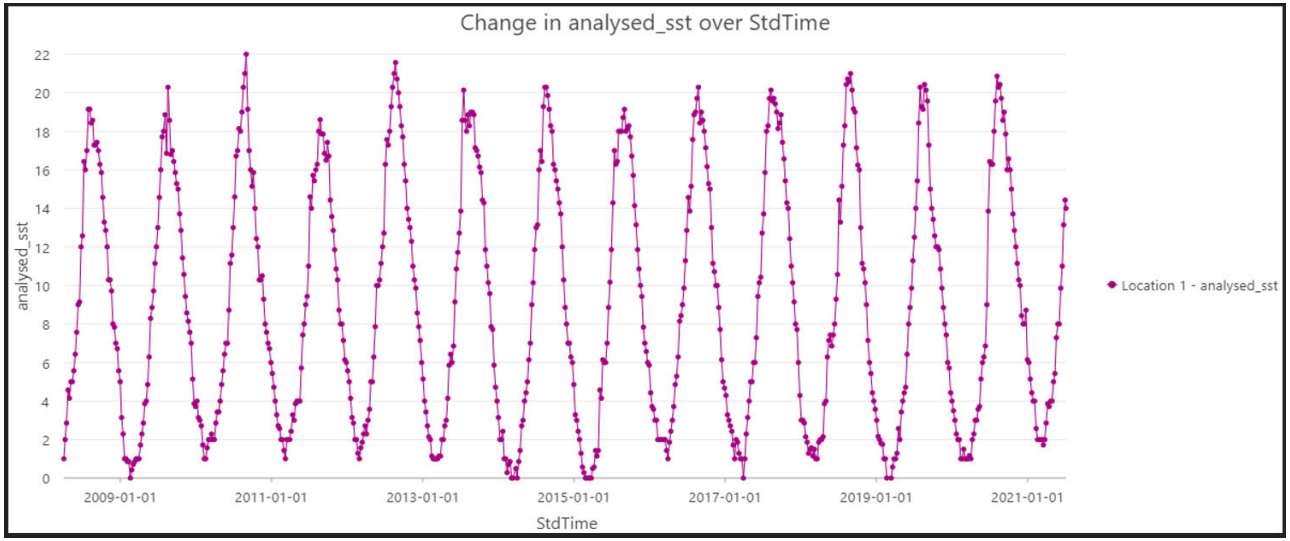
2 attachments



LennoxPassage_SST_profile.png
144K

LennoxPassage_data_table.csv
40K

Extracted Max and Min Temps (SST)			Notes
Year	Max	Min	
2008	19.14	1.00	from Apr 3 2008...
2009	20.29	0.00	
2010	22.00	1.00	
2011	18.60	1.00	
2012	21.57	1.00	
2013	20.14	1.00	
2014	20.29	0.00	
2015	19.14	0.00	
2016	20.29	1.00	
2017	20.14	0.00	
2018	21.00	1.00	
2019	20.43	0.00	
2020	20.86	1.00	
2021	14.43	1.71	...to July 5 2021



meteoblue
weather close to you

Climate Isle Madame

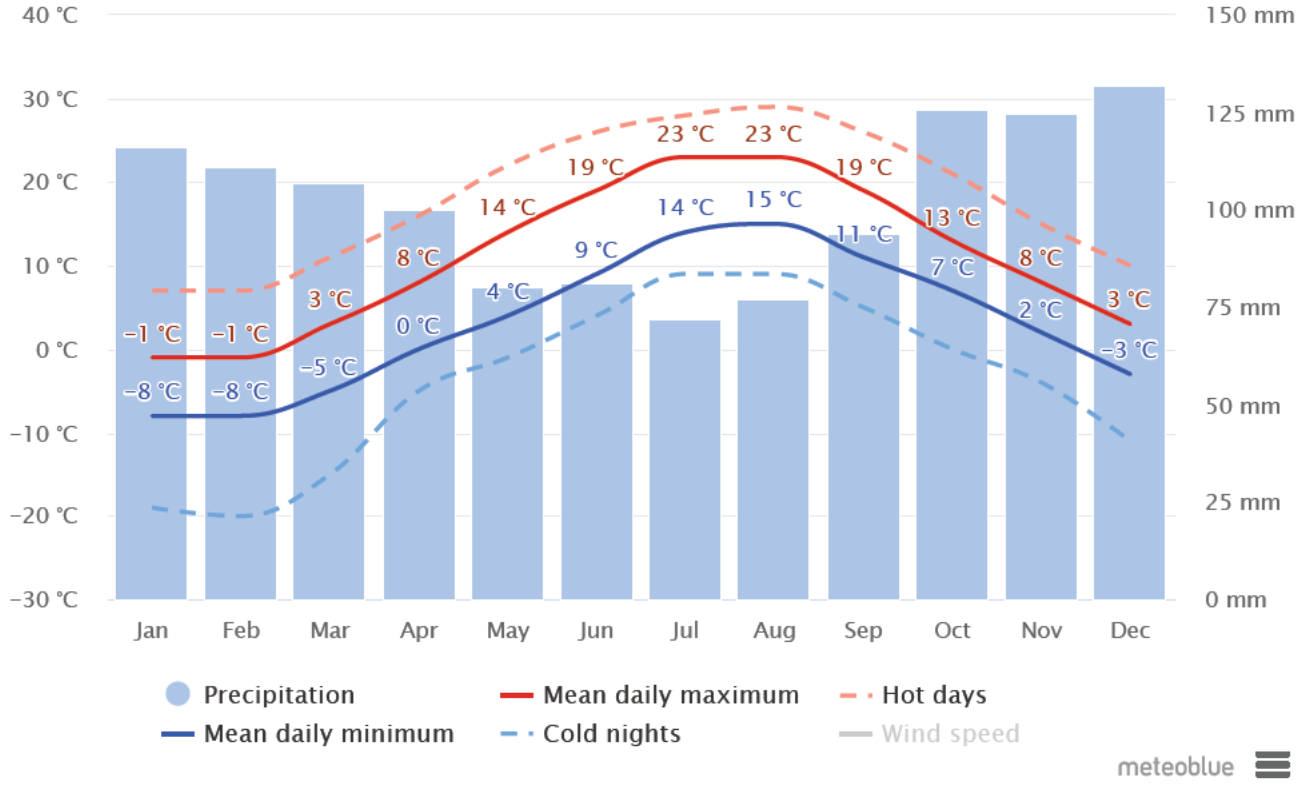
Nova Scotia, Canada, 45.55°N 61.05°W, 7m asl

The meteoblue climate diagrams are based on 30 years of hourly weather model simulations and available for every place on Earth. They give good indications of typical climate patterns and expected conditions (temperature, precipitation, sunshine and wind). The simulated weather data have a spatial resolution of approximately 30 km and may not reproduce all local weather effects, such as thunderstorms, local winds, or tornadoes, and local differences as they occur in urban, mountainous, or coastal areas.

You can explore the climate for any location like the Amazon rainforest, West Africa savannas, Sahara desert, Siberian Tundra or the Himalaya.

30 years of hourly historical weather data for Isle Madame can be purchased with history+. Download variables like temperature, wind, clouds and precipitation as CSV for any place on Earth. The last 2 weeks of past weather data for Isle Madame are available for free evaluation here.

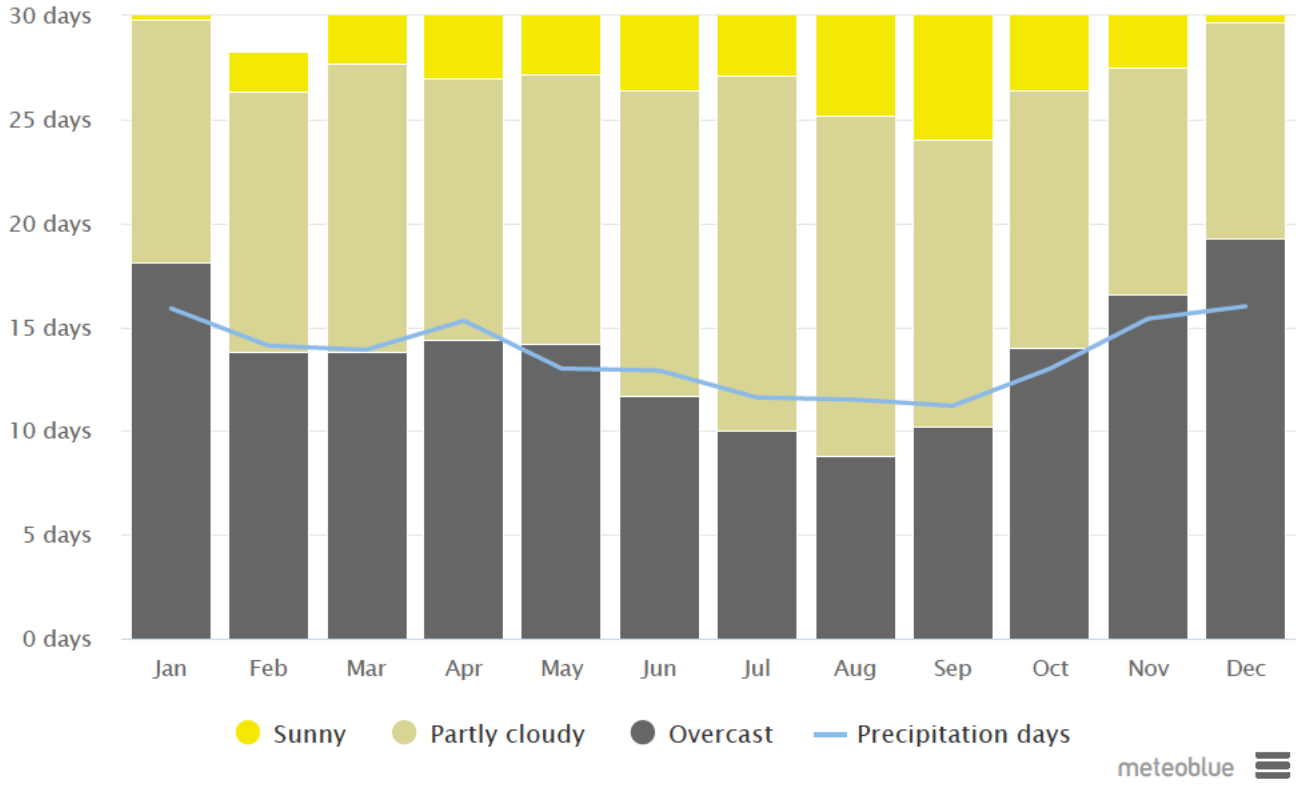
Average temperatures and precipitation



The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Isle Madame. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years. For vacation planning, you can expect the mean temperatures, and be prepared for hotter and colder days. Wind speeds are not displayed per default, but can be enabled at the bottom of the graph.

The precipitation chart is useful to plan for seasonal effects such as monsoon climate in India or wet season in Africa. Monthly precipitations above 150mm are mostly wet, below 30mm mostly dry. Note: Simulated precipitation amounts in tropical regions and complex terrain tend to be lower than local measurements.

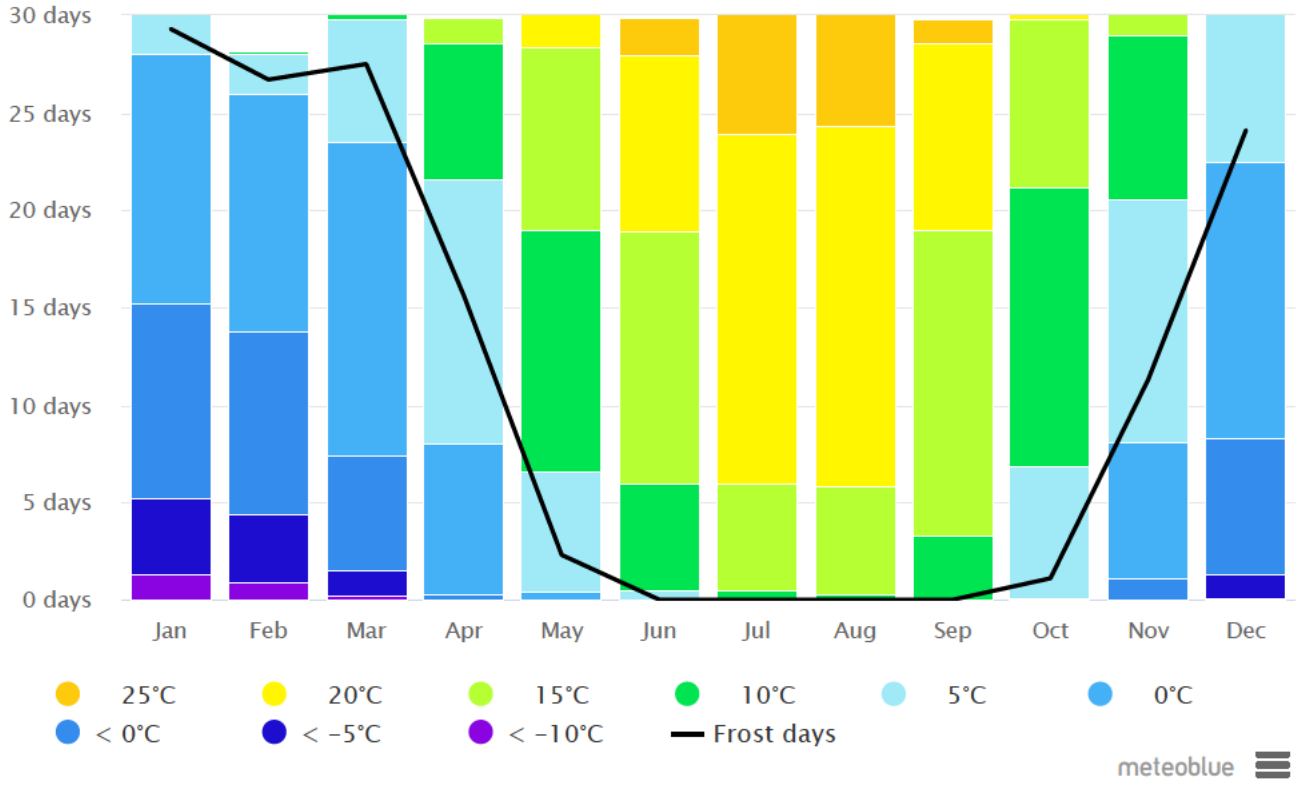
Cloudy, sunny, and precipitation days



The graph shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast. While Reykjavík on Iceland has mostly cloudy days, Sossusvlei in the Namib desert is one of the sunniest places on earth.

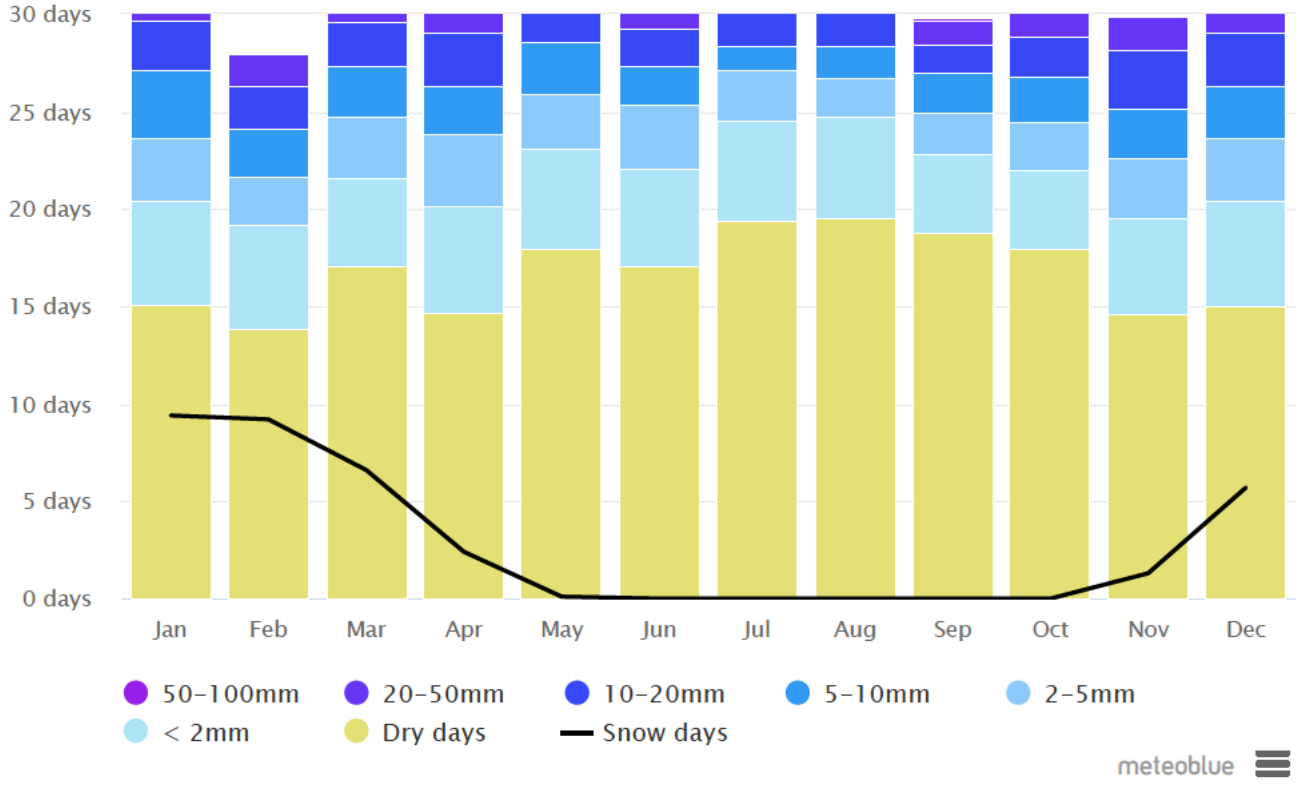
Note: In tropical climates like in Malaysia or Indonesia the number of precipitation days may be overestimated by a factor up to 2.

Maximum temperatures



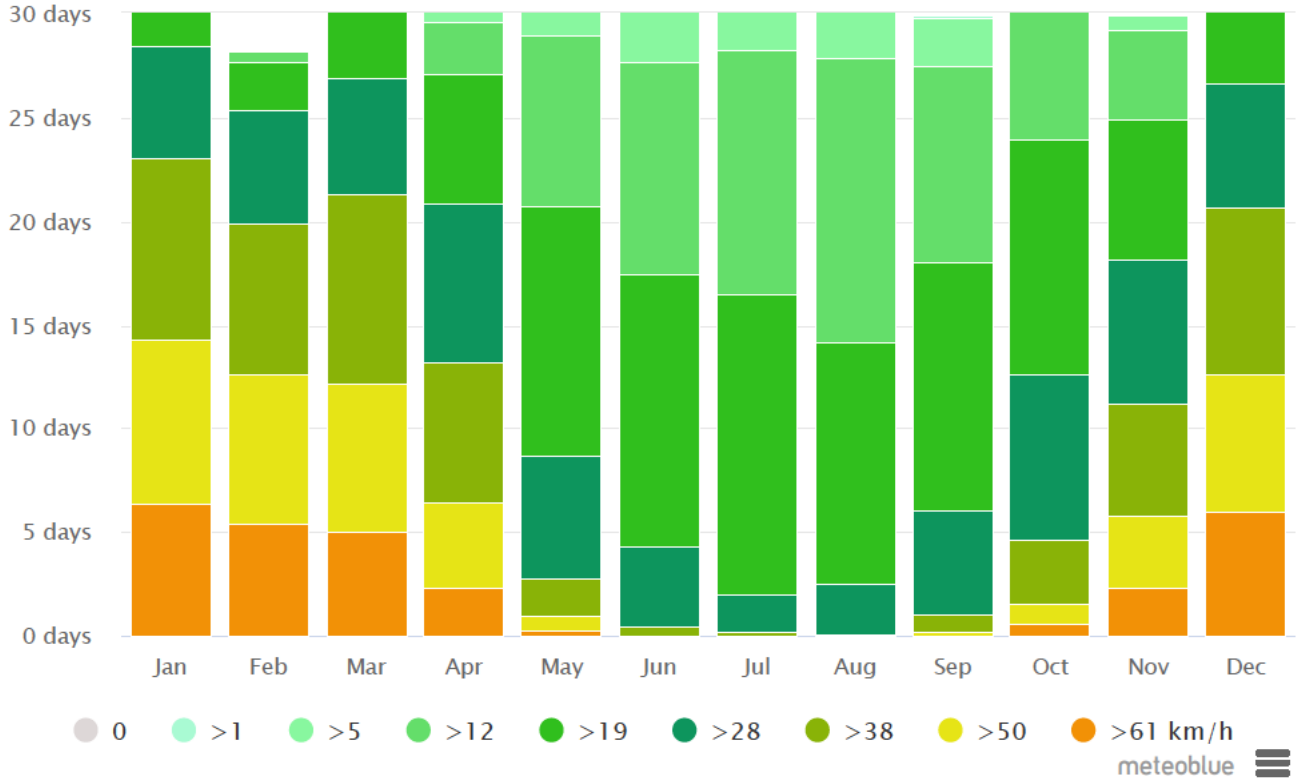
The maximum temperature diagram for Isle Madame displays how many days per month reach certain temperatures. Dubai, one of the hottest cities on earth, has almost none days below 40°C in July. You can also see the cold winters in Moscow with a few days that do not even reach -10°C as daily maximum.

Precipitation amounts



The precipitation diagram for Isle Madame shows on how many days per month, certain precipitation amounts are reached. In tropical and monsoon climates, the amounts may be underestimated.

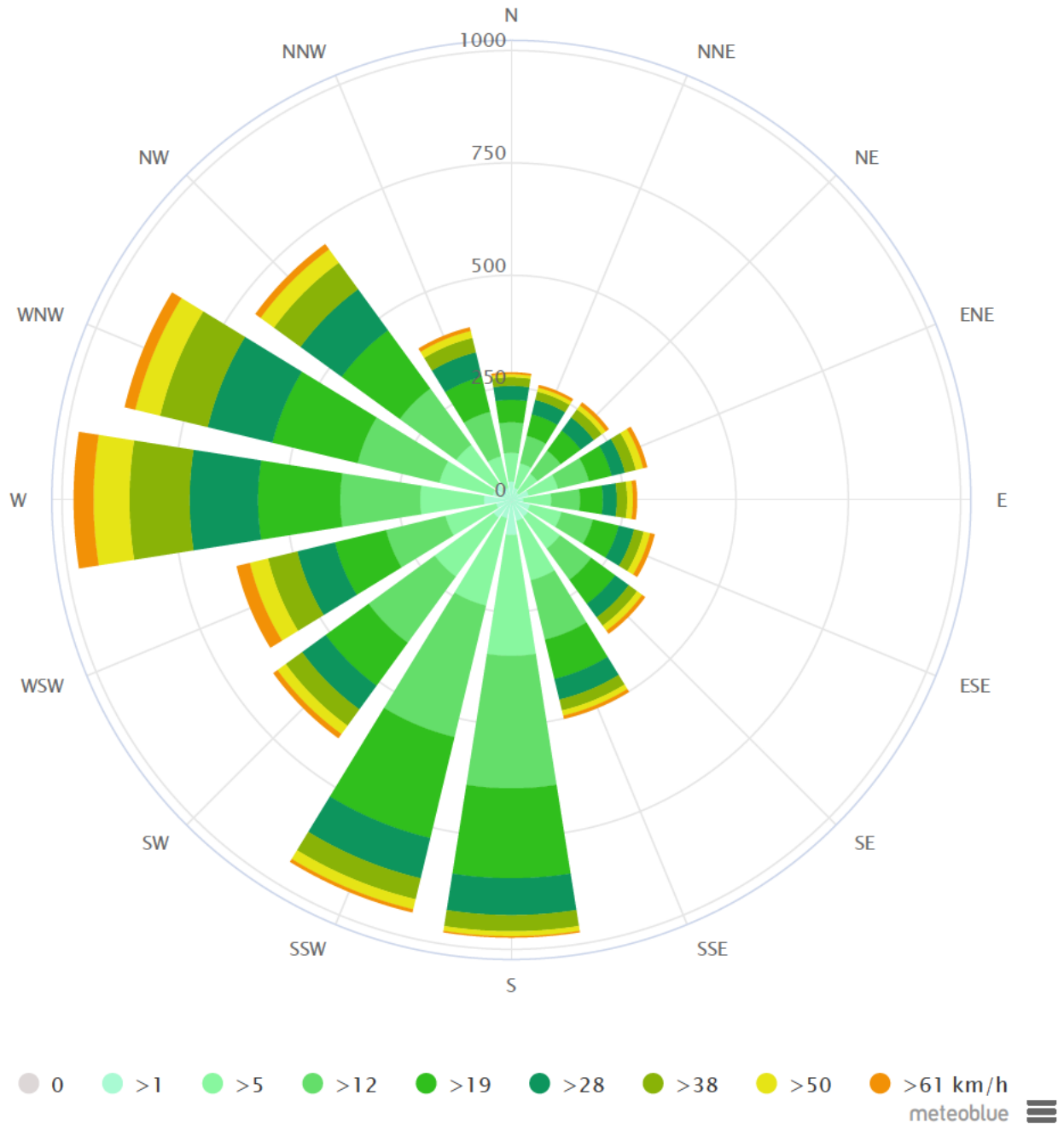
Wind speed



The diagram for Isle Madame shows the days per month, during which the wind reaches a certain speed. An interesting e ample is the Tibetan Plateau, where the monsoon creates steady strong winds from December to April, and calm winds from June to October.

Wind speed units can be changed in the preferences (top right).

Wind rose



The wind rose for Isle Madame shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE). Cape Horn, the southernmost land point of South America, has a characteristic strong west-wind, which makes crossings from East to West very difficult especially for sailing boats.

General information

Since 2007, meteoblue has been archiving weather model data. In 2014 we started to calculate weather models with historical data from 1985 onwards and generated a continuous 30-year global history with hourly weather data. The climate diagrams are the first simulated climate data-set made public on the net. Our weather history covers any place on earth at any given time regardless of availability of weather stations.

The data is derived from our global NEMS weather model at approximately 30km resolution and cannot reproduce detail local weather effects, such as heat islands, cold air flows, thunderstorms or tornadoes. For locations and events which require very high precision (such as energy generation, insurance, town planning, etc.), we offer high resolution simulations with hourly data through point+, history+ and our API.

License

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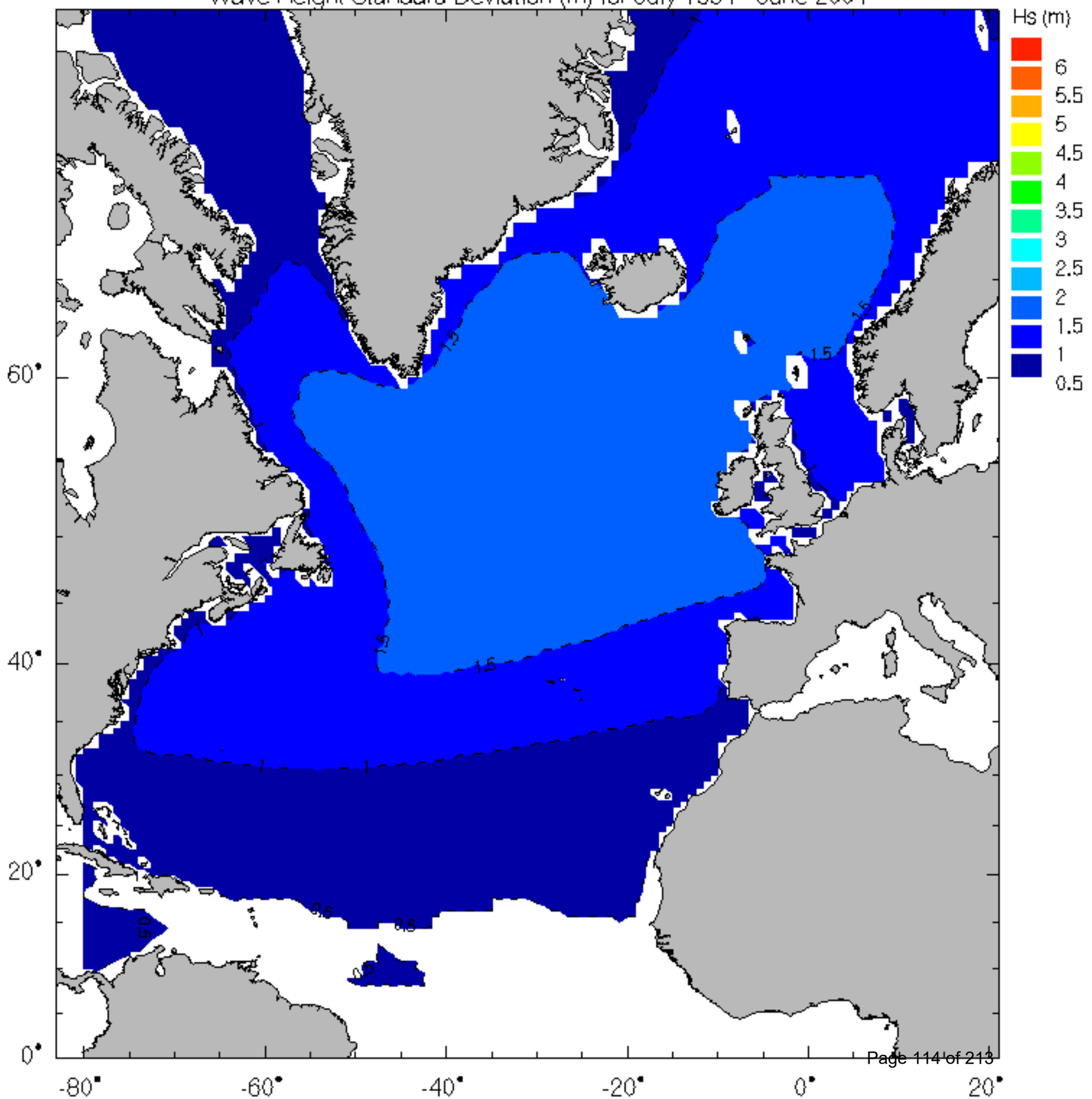
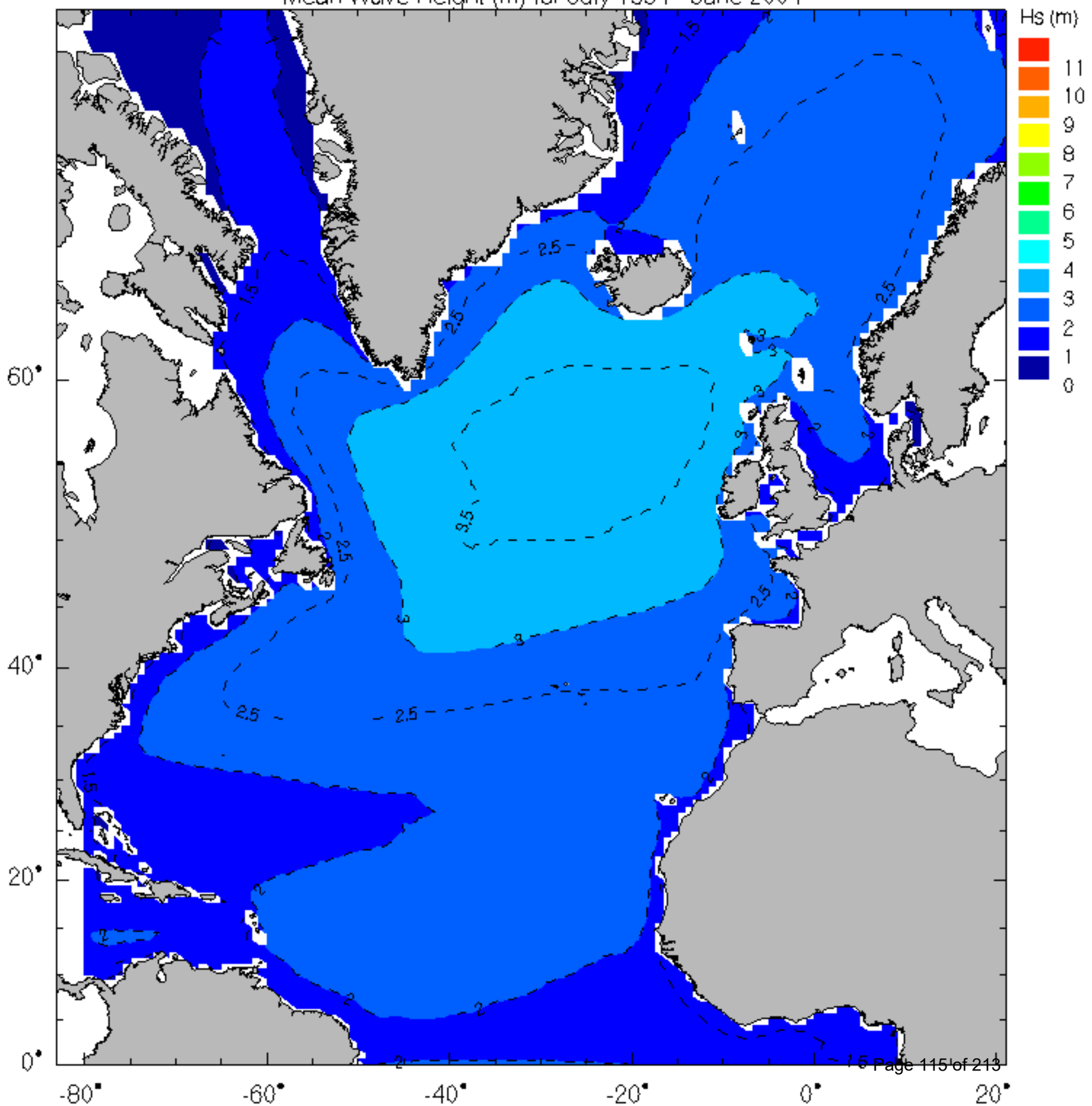

AES40 North Atlantic Wind and Wave Climatology
Wave Height Standard Deviation (m) for July 1954 - June 2004
Hs (m)
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
60°
40°
20°
0°
-80°
-60°
-40°
-20°
0°
20°


AES40 North Atlantic Wind and Wave Climatology
Mean Wave Height (m) for July 1954 - June 2004
Hs (m)
11
10
9
8
7
6
5
4
3
2
1
0
60°
40°
20°
0°
-80°
-60°
-40°
-20°
0°
20°

Appendix F

Baseline Environmental Monitoring

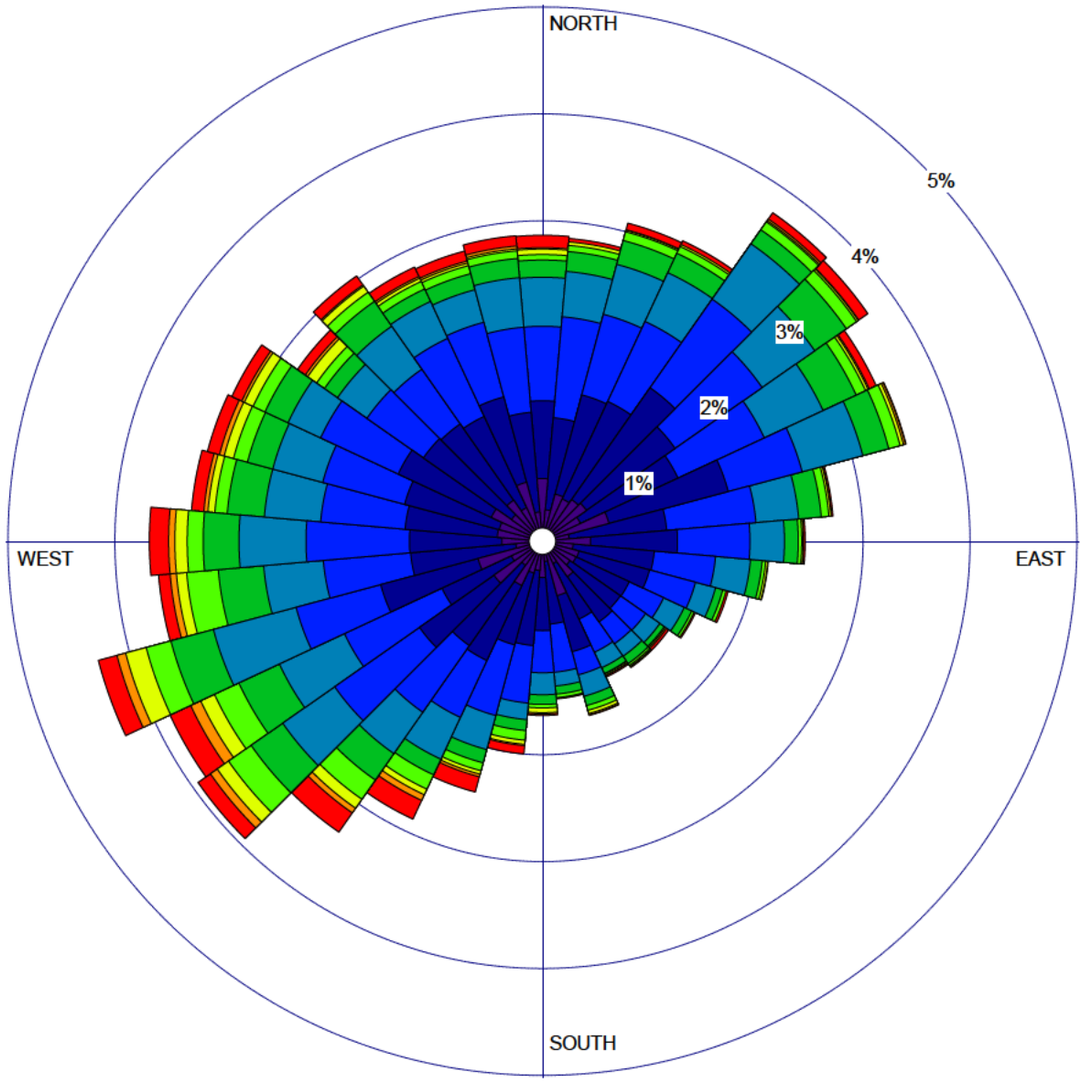
Denver Marine Ltd

Oyster Lease Application

April 2022

ROSE PLOT:

Average Current Speed and Direction
Lazares Island - September 2021



WIND SPEED
(m/s)

- >= 8.00
- 7.00 - 8.00
- 6.00 - 7.00
- 5.00 - 6.00
- 4.00 - 5.00
- 3.00 - 4.00
- 2.00 - 3.00
- 1.00 - 2.00
- 0.00 - 1.00

Calms: 0 00%

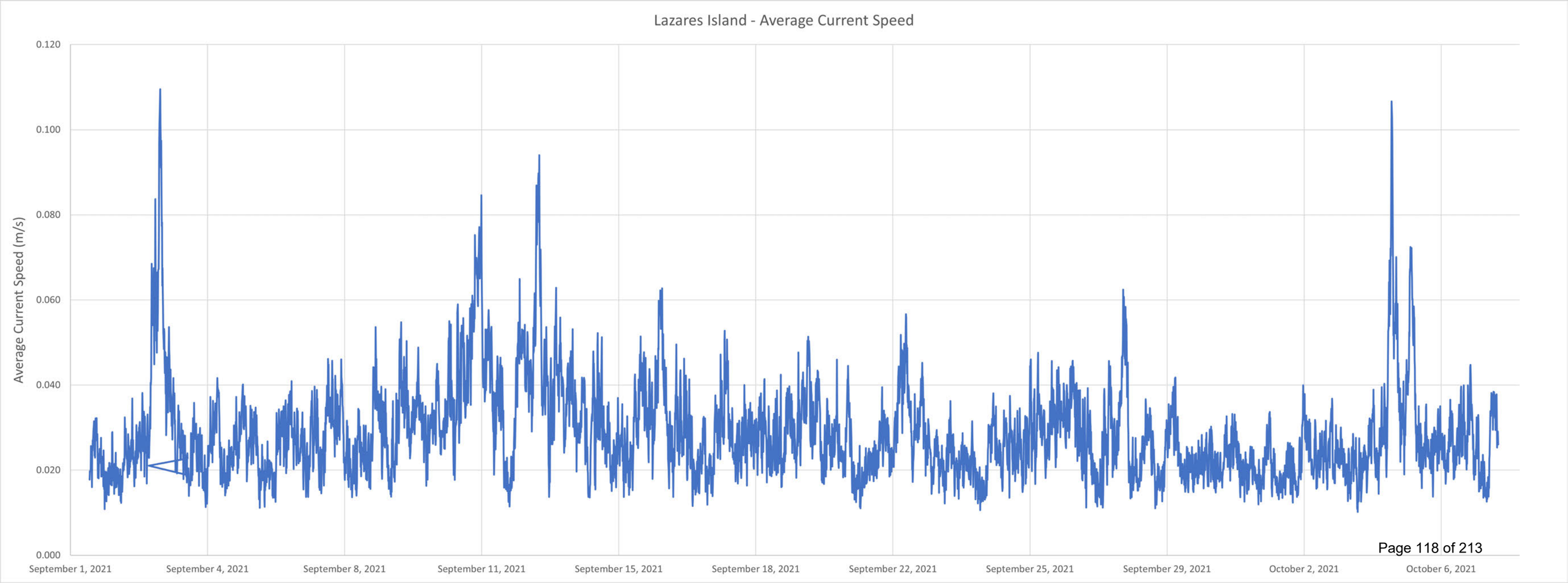
COMMENTS:

AVG. SPEED:

2.66 m/s

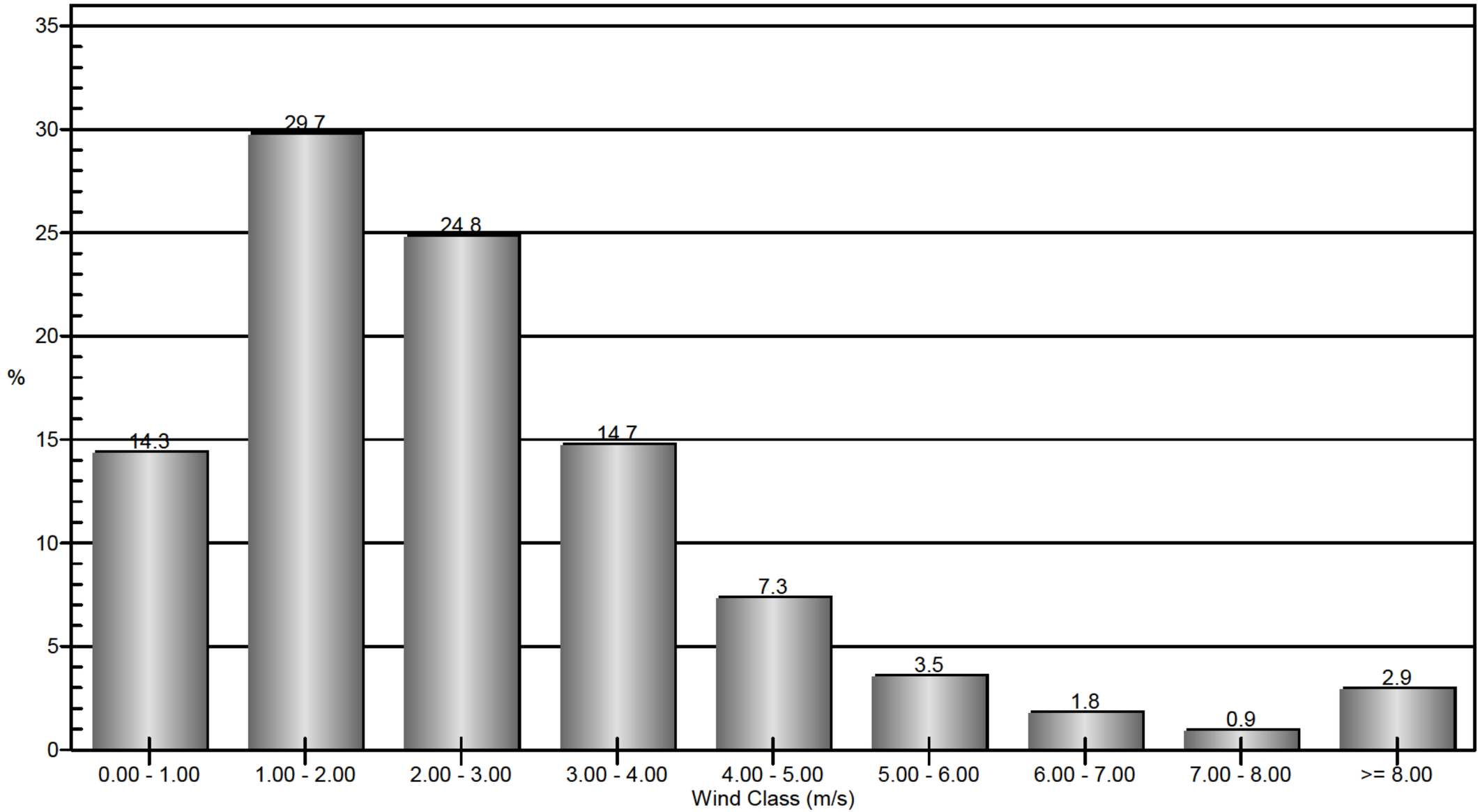
PROJECT NO.:

WRPLOT View - Lakes Environmental Software


Lazares Island - Average Current Speed
Average Current Speed (m/s)
0.120
0.100
0.080
0.060
0.040
0.020
0.000
September 1, 2021
September 4, 2021
September 8, 2021
September 11, 2021
September 15, 2021
September 18, 2021
September 22, 2021
September 25, 2021
September 29, 2021
October 2, 2021
October 6, 2021

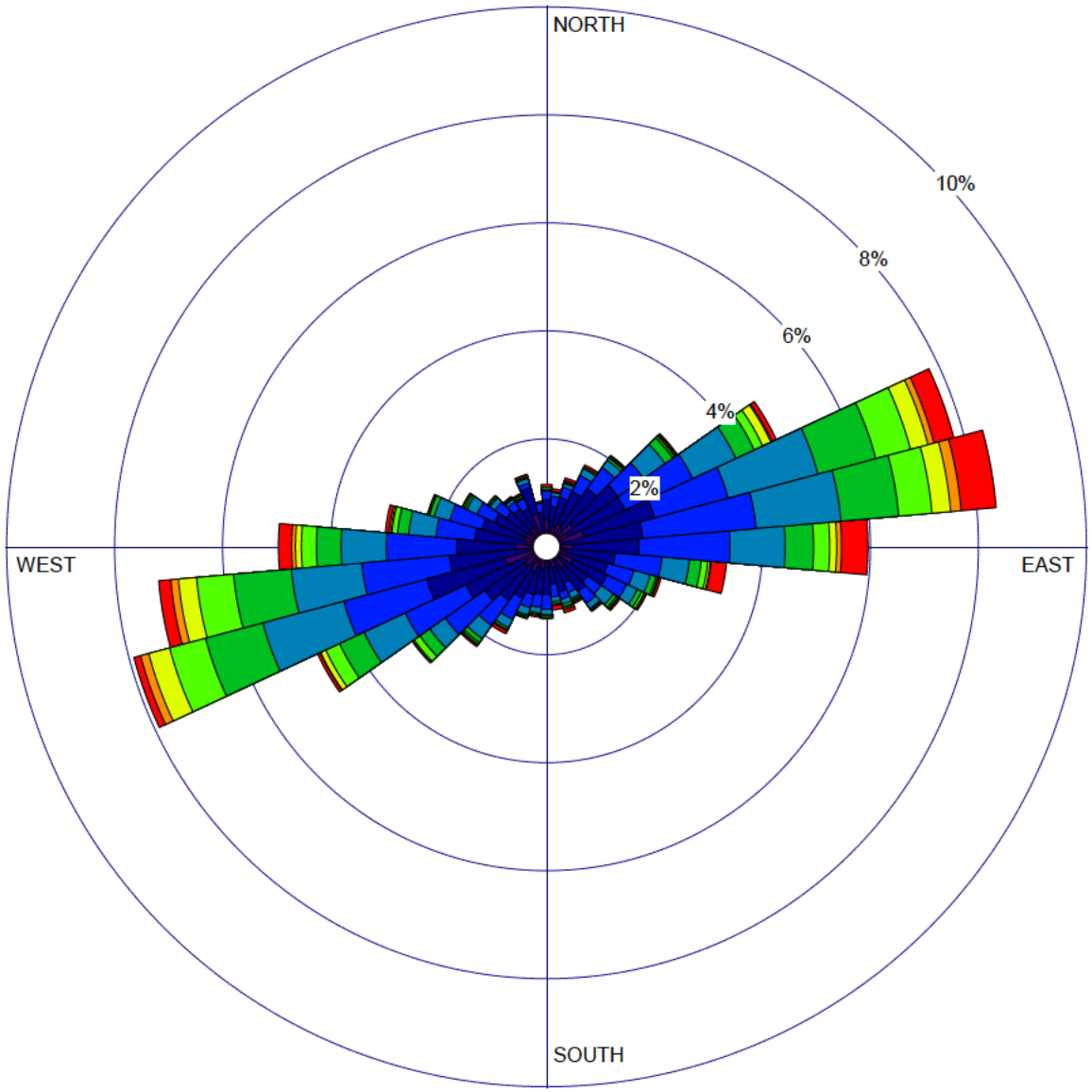
Current Speed Frequency Distribution

Lazares Island - September 2021



ROSE PLOT:

Average Current Speed and Direction
walsh's Deep Cove - September 2021



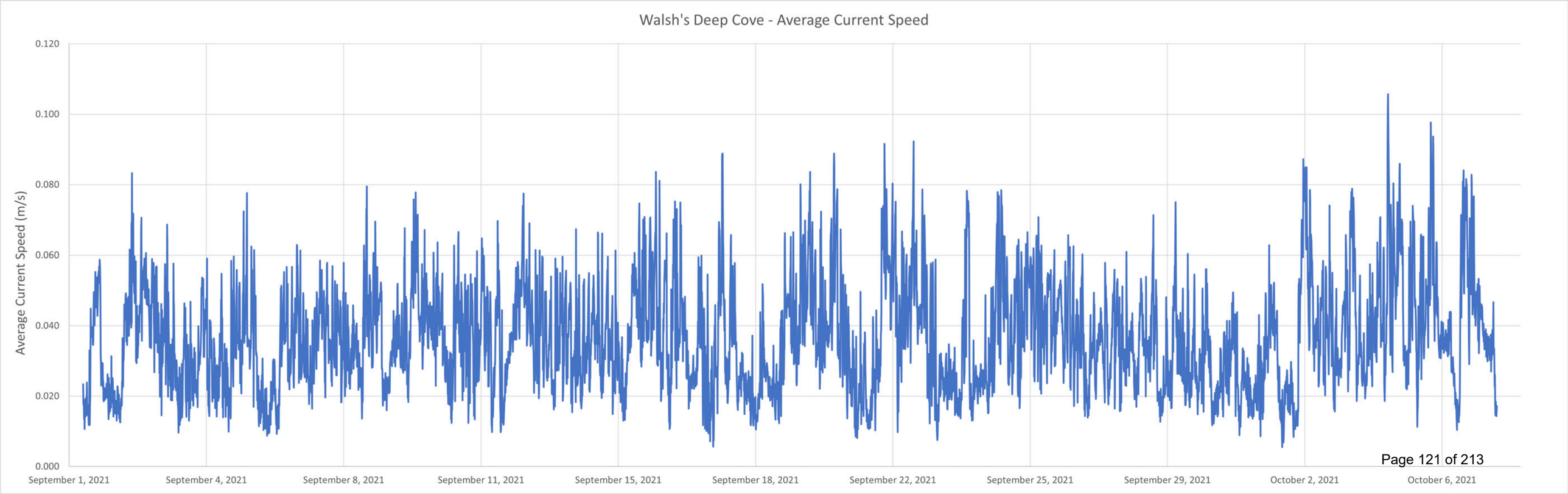
COMMENTS:

AVG. SPEED:

2.86 m/s

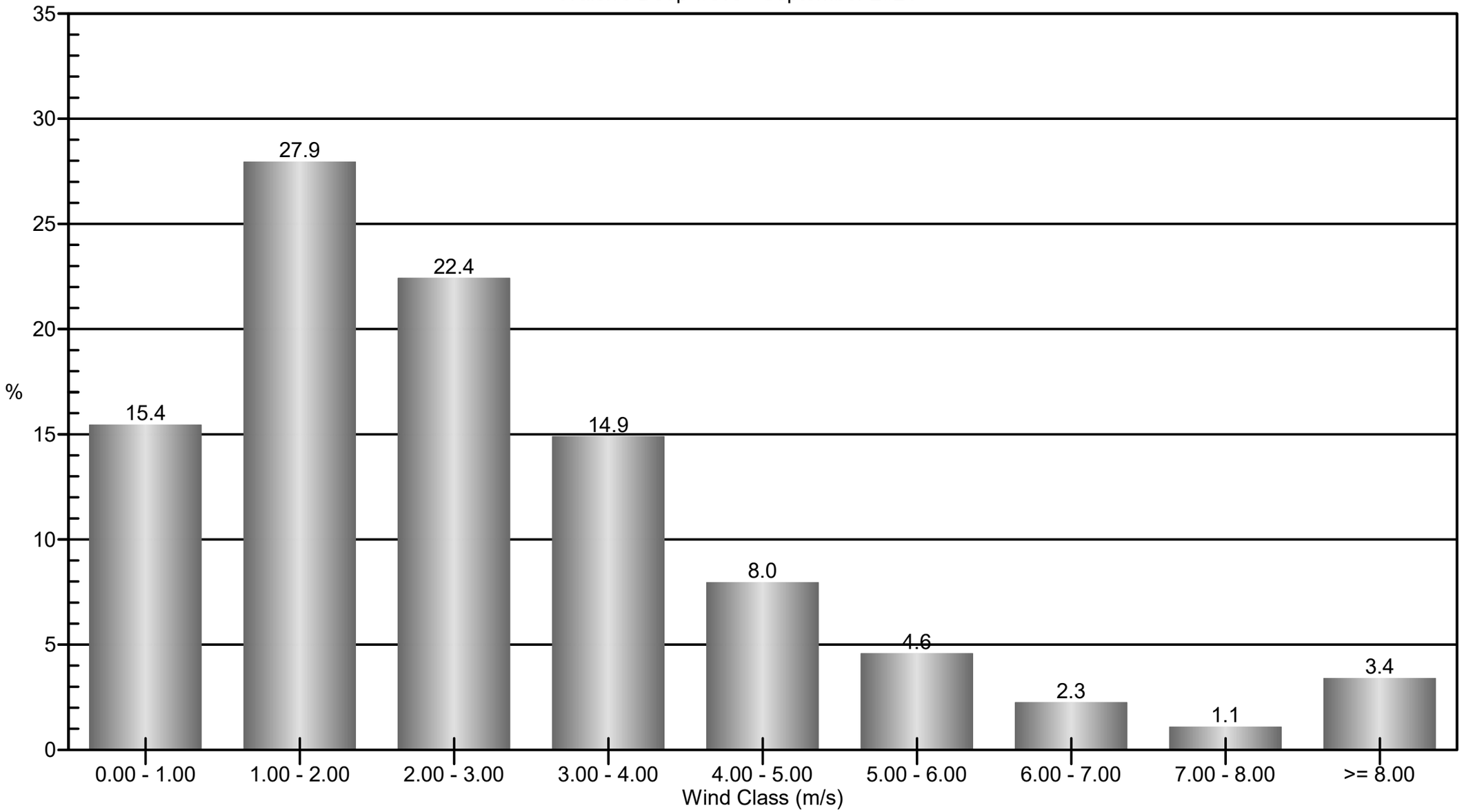
PROJECT NO.:

WRPLOT View - Lakes Environmental Software


Walsh's Deep Cove - Average Current Speed
Average Current Speed (m/s)
0.120
0.100
0.080
0.060
0.040
0.020
0.000
September 1, 2021
September 4, 2021
September 8, 2021
September 11, 2021
September 15, 2021
September 18, 2021
September 22, 2021
September 25, 2021
September 29, 2021
October 2, 2021
October 6, 2021

Current Speed Frequency Distribution

Walsh's Deep Cove - September 2021



Appendix G

First Nations Correspondence

Denver Marine Ltd

Oyster Lease Application

April 2022

Appendix G

RE: first nations community engagement

[redacted] <[redacted]
Tue 2021-10-05 9:52 AM

To: Denny David Denvermarineltd@outlook.com

This is a note to confirm our conversation concerning your proposed oyster leases and that I [redacted], Fishery Manager at Potlotek First Nation have no cerns or issues with the proposed leases and I wish you the best in your endeavour.

From: Denny David Denvermarineltd@outlook com
Sent: October 4, 2021 1:55 PM
To: [redacted]
Subject: first nations community engagement

Good afternoon [redacted], just a note to confirm our phone conversation on applying for the two proposed oyster leases in the Lennox Passage area, that there are no concerns or issues with my proposed locations. Thank you for your time. Denny

Appendix H

Significance of Proposal Area to Wildlife

Denver Marine Ltd

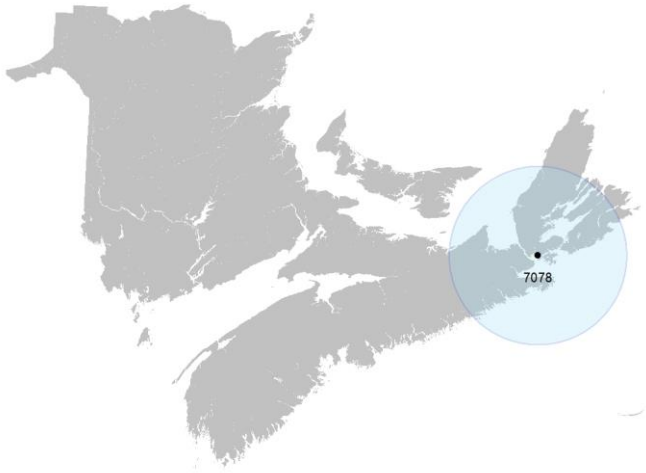
Oyster Lease Application

April 2022

DATA REPORT 7078: Walshs Deep Cove, NS

Prepared 28 September 2021
by [redacted], Data Manager

CONTENTS OF REPORT



Map 1. A 100 km buffer around the study area

1.0 PREFACE

The Atlantic Canada Conservation Data Centre (AC CDC; www.accdc.com) is part of a network of NatureServe data centres and heritage programs serving 50 states in the U.S.A, 10 provinces and 1 territory in Canada, plus several Central and South American countries. The NatureServe network is more than 30 years old and shares a common conservation data methodology. The AC CDC was founded in 1997, and maintains data for the jurisdictions of New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. Although a non-governmental agency, the AC CDC is supported by 6 federal agencies and 4 provincial governments, as well as through outside grants and data processing fees.

Upon request and for a fee, the AC CDC queries its database and produces customized reports of the rare and endangered flora and fauna known to occur in or near a specified study area. As a supplement to that data, the AC CDC includes locations of managed areas with some level of protection, and known sites of ecological interest or sensitivity.

1.1 DATA LIST

Included datasets:

Filename	Contents
WalshsDeepCvNS_7078ob.xls	Rare or legally-protected Flora and Fauna in your study area
WalshsDeepCvNS_7078ob100km.xls	A list of Rare and legally protected Flora and Fauna within 100 km of your study area
WalshsDeepCvNS_7078msa xls	Managed and Biologically Significant Areas in your study area
WalshsDeepCvNS_7078ff_py xls	Rare Freshwater Fish in your study area (DFO database)

1.2 RESTRICTIONS

The AC CDC makes a strong effort to verify the accuracy of all the data that it manages, but it shall not be held responsible for any inaccuracies in data that it provides. By accepting AC CDC data, recipients assent to the following limits of use:

a) Data is restricted to use by trained personnel who are sensitive to landowner interests and to potential threats to rare and/or endangered flora and fauna posed by the information provided.
b) Data is restricted to use by the specified Data User; any third party requiring data must make its own data request.
c) The AC CDC requires Data Users to cease using and delete data 12 months after receipt, and to make a new request for updated data if necessary at that time.
d) AC CDC data responses are restricted to the data in our Data System at the time of the data request.
e) Each record has an estimate of locational uncertainty, which must be referenced in order to understand the record's relevance to a particular location. Please see attached Data Dictionary for details.
f) AC CDC data responses are not to be construed as exhaustive inventories of taxa in an area.
g) The absence of a taxon cannot be inferred by its absence in an AC CDC data response.

1.3 ADDITIONAL INFORMATION

The accompanying Data Dictionary provides metadata for the data provided.

Please direct any additional questions about AC CDC data to the following individuals:

Plants, Lichens, Ranking Methods, All other Inquiries
[redacted], Senior Scientist, Executive Director
Tel: [redacted]
[redacted]

Animals (Fauna)
[redacted], Zoologist
[redacted]

Plant Communities
[redacted], Community Ecologist
[redacted]

Data Management, GIS
[redacted] Data Manager
[redacted]

Billing
[redacted]

Questions on the biology of Federal Species at Risk can be directed to AC CDC: (506) 364-2658, with questions on Species at Risk regulations to: Samara Eaton, Canadian Wildlife Service (NB and PE): (506) 364-5060 or Julie McKnight, Canadian Wildlife Service (NS): (902) 426-4196.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in New Brunswick, please contact Hubert Askanas, Energy and Resource Development: (506) 453-5873.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in Nova Scotia, please contact Donna Hurlburt, NS DLF: (902) 679-6886. To determine if location-sensitive species (section 4.3) occur near your study site please contact a NS DLF Regional Biologist:

Western: Emma Vost
(902) 670-8187
Emma.Vost@novascotia.ca

Western: Sarah Spencer
(902) 541-0081
Sarah.Spencer@novascotia.ca

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For provincial information about rare taxa and protected areas, or information about game animals, fish habitat etc., in Prince Edward Island, please contact Garry Gregory, PEI Dept. of Communities, Land and Environment: (902) 569-7595.

2.0 RARE AND ENDANGERED SPECIES

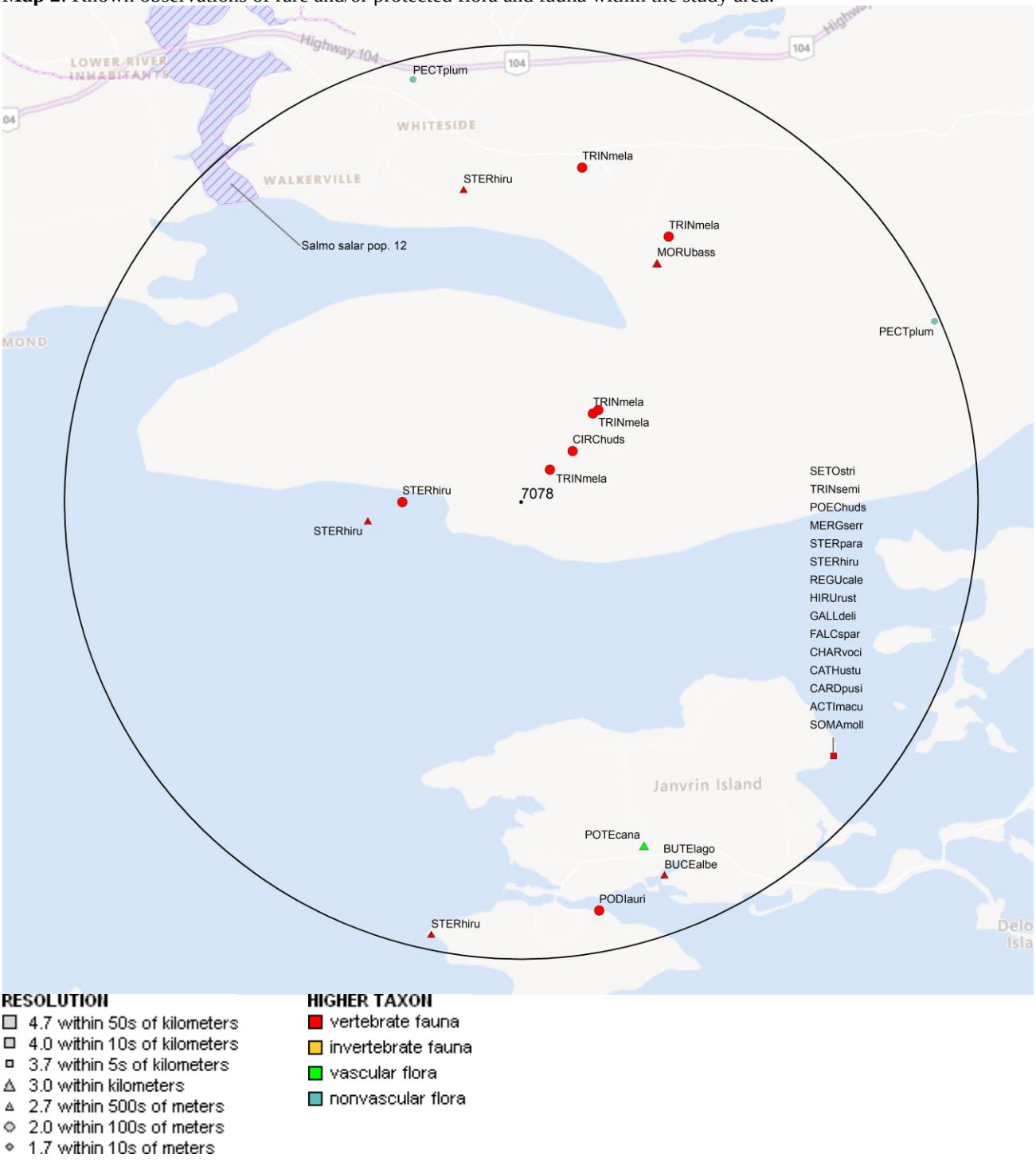
2.1 FLORA

The study area contains 1 record of 1 vascular, 2 records of 1 nonvascular flora (Map 2 and attached: *ob.xls).

2.2 FAUNA

The study area contains 50 records of 21 vertebrate, no records of invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if 'location-sensitive' species occur near your study site.

Map 2: Known observations of rare and/or protected flora and fauna within the study area.



3.0 SPECIAL AREAS

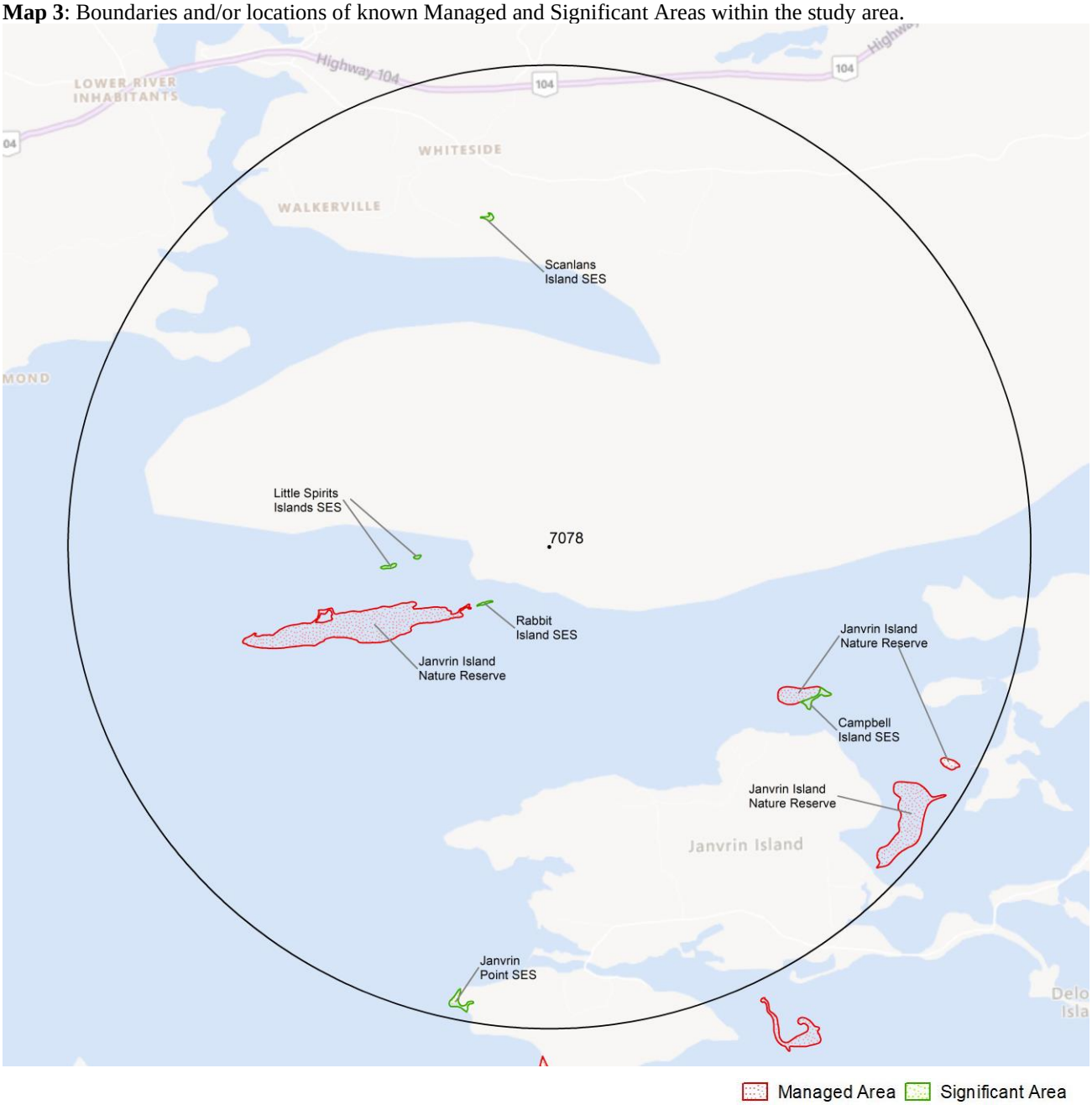
3.1 MANAGED AREAS

The GIS scan identified 1 managed area in the vicinity of the study area (Map 3 and attached file: *msa.xls).

3.2 SIGNIFICANT AREAS

The GIS scan identified 6 biologically significant sites in the vicinity of the study area (Map 3 and attached file: *msa.xls).

Map 3: Boundaries and/or locations of known Managed and Significant Areas within the study area.



4.0 RARE SPECIES LISTS

Rare and/or endangered taxa (excluding “location-sensitive” species, section 4.3) within the study area listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record). [P] = vascular plant, [N] = nonvascular plant, [A] = vertebrate animal, [I] = invertebrate animal, [C] = community. Note: records are from attached files *ob.xls/*ob.shp only.

4.1 FLORA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
N	*Pectenia plumbea*	Blue Felt Lichen	Special Concern	Special Concern	Vulnerable	S3	2	4.8 ± 0.0
P	*Potentilla canadensis*	Canada Cinquefoil				S2S3	1	4.0 ± 2.0

4.2 FAUNA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
A	*Hirundo rustica*	Barn Swallow	Special Concern	Threatened	Endangered	S2S3B	3	4.4 ± 7.0
A	*Podiceps auritus*	Horned Grebe	Special Concern	Special Concern		S4N	1	4.6 ± 0.0
A	*Sterna hirundo*	Common Tern	Not At Risk			S3B	7	1.3 ± 0.0
A	*Buteo lagopus*	Rough-legged Hawk	Not At Risk			S3N	1	4.4 ± 0.0
A	*Circus hudsonius*	Northern Harrier	Not At Risk			S3S4B	1	0.8 ± 0.0
A	*Tringa semipalmata*	Willet				S2S3B	5	4.4 ± 7.0
A	*Poecile hudsonicus*	Boreal Chickadee				S3	3	4.4 ± 7.0
A	*Falco sparverius*	American Kestrel				S3B	1	4.4 ± 7.0
A	*Charadrius vociferus*	Killdeer				S3B	1	4.4 ± 7.0
A	*Gallinago delicata*	Wilson's Snipe				S3B	1	4.4 ± 7.0
A	*Sterna paradisaea*	Arctic Tern				S3B	1	4.4 ± 7.0
A	*Cardellina pusilla*	Wilson's Warbler				S3B	1	4.4 ± 7.0
A	*Tringa melanoleuca*	Greater Yellowlegs				S3B,S3S4M	5	0.5 ± 0.0
A	*Somateria mollissima*	Common Eider				S3S4	5	4.4 ± 7.0
A	*Actitis macularius*	Spotted Sandpiper				S3S4B	2	4.4 ± 7.0
A	*Regulus calendula*	Ruby-crowned Kinglet				S3S4B	3	4.4 ± 7.0
A	*Catharus ustulatus*	Swainson's Thrush				S3S4B	3	4.4 ± 7.0
A	*Setophaga striata*	Blackpoll Warbler				S3S4B	1	4.4 ± 7.0
A	*Mergus serrator*	Red-breasted Merganser				S3S4B,S5N	3	4.4 ± 7.0
A	*Bucephala albeola*	Bufflehead				S3S4N	1	4.4 ± 0.0
A	*Morus bassanus*	Northern Gannet				SHB,S5M	1	3.0 ± 2.0

4.3 LOCATION SENSITIVE SPECIES

The Department of Natural Resources in each Maritimes province considers a number of species "location sensitive". Concern about exploitation of location-sensitive species precludes inclusion of precise coordinates in this report. Those intersecting your study area are indicated below with "YES".

Nova Scotia

Scientific *Name*	Common Name	SARA	Prov Legal Prot	Known within the Study Site?
Fraxinus nigra	Black Ash		Threatened	No
Emydoidea blandingii	*Blanding's Turtle - Nova Scotia pop.*	Endangered	Vulnerable	No
Glyptemys insculpta	Wood Turtle	Threatened	Threatened	No
Falco peregrinus pop. 1	Peregrine Falcon - anatum/tundrius pop.	Special Concern	Vulnerable	No
Bat hibernaculum or bat species occurrence		[Endangered][1]	[Endangered][1]	No

1 *Myotis lucifugus* (Little Brown Myotis), *Myotis septentrionalis* (Long-eared Myotis), and *Perimyotis subflavus* (Tri-colored Bat or Eastern Pipistrelle) are all Endangered under the Federal Species at Risk Act and the NS Endangered Species Act.

4.4 SOURCE BIBLIOGRAPHY

The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

# recs	CITATION
31	Lepage, D. 2014. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 407,838 recs.
10	iNaturalist. 2020. iNaturalist Data Export 2020. iNaturalist.org and iNaturalist.ca, Web site: 128728 recs.
6	Benjamin, L.K. (compiler). 2012. Significant Habitat & Species Database. Nova Scotia Dept Natural Resources, 4965 recs.
5	Erskine, A.J. 1992. Maritime Breeding Bird Atlas Database. NS Museum & Nimbus Publ., Halifax, 82,125 recs.
3	Wilhelm, S.I. et al. 2019. Colonial Waterbird Database. Canadian Wildlife Service.
1	Benjamin, L.K. (compiler). 2007. Significant Habitat & Species Database. Nova Scotia Dept Natural Resources, 8439 recs.
1	Canadian Wildlife Service. 2019. Canadian Protected and Conserved Areas Database (CPCAD). December 2019. ECCC.https://www.canada.ca/en/environment-climate-change/services/national-wildlife-areas/protected-conserved-areas-database html.
1	Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Sco ia Provincial Museum of Natural History, Halifax, Nova Scotia. 2013.
1	Neily, T.H. & Pepper, C. 2020. Nova Scotia SMP lichen surveys 2020. Mersey Tobea ic Research Institute.
1	Neily, T.H. 2017. Maritmes Lichen and Bryophyte records. A lantic Canada Conservation Data Centre, 1015 recs.
1	Wilhelm, S.I. et al. 2011. Colonial Waterbird Database. Canadian Wildlife Service, Sackville, 2698 sites, 9718 recs (8192 obs).

5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 31421 records of 151 vertebrate and 718 records of 54 invertebrate fauna; 5796 records of 250 vascular, 2471 records of 119 nonvascular flora (attached: *ob100km.xls).

Taxa within 100 km of the study site that are rare and/or endangered in the province in which the study site occurs (including "location-sensitive" species). All ranks correspond to the province in which the study site falls, even for out-of-province records. Taxa are listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record).

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Myotis lucifugus*	Little Brown Myotis	Endangered	Endangered	Endangered	S1	65	11.1 ± 1.0	NS
A	*Salmo salar pop. 4*	Atlantic Salmon - Eastern Cape Breton pop.	Endangered			S1	39	5.6 ± 0.0	NS
A	*Salmo salar pop. 6*	Altantic Salmon - Nova Scotia Southern Upland pop.	Endangered			S1	19	17.4 ± 1.0	NS
A	*Eubalaena glacialis*	North Atlantic Right Whale	Endangered	Endangered		S1	1	75.8 ± 1.0	NS
A	*Charadrius melodus melodus*	Piping Plover melodus ssp	Endangered	Endangered	Endangered	S1B	498	12.1 ± 1.0	NS
A	*Sterna dougallii*	Roseate Tern	Endangered	Endangered	Endangered	S1B	61	33.4 ± 7.0	NS
A	*Dermochelys coriacea (Atlantic pop)*	Leatherback Sea Turtle - Atlantic pop.	Endangered	Endangered		S1S2N	2	20.4 ± 0.0	NS
A	*Pagophila eburnea*	Ivory Gull	Endangered	Endangered		SNA	1	34.5 ± 0.0	NS
A	*Icteria virens*	Yellow-Breasted Chat	Endangered	Endangered		SNA	1	98.6 ± 0.0	NS
A	*Calcarius ornatus*	Chestnut-collared Longspur	Endangered	Threatened		SNA	7	94.4 ± 0.0	NS
A	*Antrostomus vociferus*	Eastern Whip-Poor-Will	Threatened	Threatened	Threatened	S1?B	3	59.1 ± 7.0	NS
A	*Catharus bicknelli*	Bicknell's Thrush	Threatened	Threatened	Endangered	S1S2B	20	24.5 ± 7.0	NS
A	*Asio flammeus*	Short-eared Owl	Threatened	Special Concern		S1S2B	6	54.7 ± 0.0	NS
A	*Limosa haemastica*	Hudsonian Godwit	Threatened			S1S2M	7	38.8 ± 0.0	NS
A	*Glyptemys insculpta*	Wood Turtle	Threatened	Threatened	Threatened	S2	3830	8 8 ± 10.0	NS
A	*Acipenser oxyrinchus*	Atlantic Sturgeon	Threatened			S2	1	76.9 ± 0.0	NS
A	*Anguilla rostrata*	American Eel	Threatened			S2	1	41.4 ± 0.0	NS
A	*Chaetura pelagica*	Chimney Swift	Threatened	Threatened	Endangered	S2B,S1M	104	23.7 ± 7.0	NS
A	*Riparia riparia*	Bank Swallow	Threatened	Threatened	Endangered	S2S3B	610	9 5 ± 0.0	NS
A	*Oceanodroma leucorhoa*	Leach's Storm-Petrel	Threatened			S3B,S5M	22	20.6 ± 0.0	NS
A	*Tringa flavipes*	Lesser Yellowlegs	Threatened			S3M	242	17.4 ± 0.0	NS
A	*Dolichonyx oryzivorus*	Bobolink	Threatened	Threatened	Vulnerable	S3S4B	386	18.4 ± 7.0	NS
A	*Sturnella magna*	Eastern Meadowlark	Threatened	Threatened		SHB	2	33.4 ± 7.0	NS
A	*Hylocichla mustelina*	Wood Thrush	Threatened	Threatened		SUB	8	38.7 ± 7.0	NS
A	*Salmo salar pop. 12*	Atlantic Salmon - Gaspe - Southern Gulf of St Lawrence pop.	Special Concern			S1	17	32.8 ± 1.0	NS
A	*Passerculus sandwichensis princeps*	Savannah Sparrow princeps ssp	Special Concern	Special Concern		S1B	2	37.5 ± 0.0	NS
A	*Bucephala islandica (Eastern pop)*	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern		S1N	45	72.2 ± 4.0	NS
A	*Euphagus carolinus*	Rusty Blackbird	Special Concern	Special Concern	Endangered	S2B	214	9 8 ± 7.0	NS
A	*Chordeiles minor*	Common Nighthawk	Special Concern	Threatened	Threatened	S2B	195	7.1 ± 7.0	NS
A	*Contopus cooperi*	Olive-sided Flycatcher	Special Concern	Threatened	Threatened	S2B	925	5 8 ± 0.0	NS
A	*Histrionicus histrionicus pop. 1*	Harlequin Duck - Eastern pop.	Special Concern	Special Concern	Endangered	S2N	18	21.4 ± 0.0	NS
A	*Balaenoptera physalus*	Fin Whale	Special Concern	Special Concern		S2S3	2	52.8 ± 0.0	NS
A	*Hirundo rustica*	Barn Swallow	Special Concern	Threatened	Endangered	S2S3B	817	4.4 ± 7.0	NS
A	*Morone saxatilis pop. 1*	Striped Bass- Southern Gulf of St Lawrence pop.	Special Concern			S2S3N	1	57.7 ± 1.0	NS
A	*Chelydra serpentina*	Snapping Turtle	Special Concern	Special Concern	Vulnerable	S3	107	10.3 ± 0.0	NS
A	*Cardellina canadensis*	Canada Warbler	Special Concern	Threatened	Endangered	S3B	525	7.1 ± 7.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Contopus virens*	Eastern Wood-Pewee	Special Concern	Special Concern	Vulnerable	S3S4B	439	18.1 ± 7.0	NS
A	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern	Special Concern	Vulnerable	S3S4B,S3N	713	7.1 ± 7.0	NS
A	*Phocoena phocoena*	Harbour Porpoise	Special Concern			S4	1	20.6 ± 0.0	NS
A	*Podiceps auritus*	Horned Grebe	Special Concern	Special Concern		S4N	11	4.6 ± 0.0	NS
A	*Chrysemys picta picta*	Eastern Painted Tur le	Special Concern			S4S5	1	68.4 ± 1.0	NS
A	*Calidris subruficollis*	Buff-breasted Sandpiper	Special Concern	Special Concern		SNA	1	38.8 ± 0.0	NS
A	*Ammodramus savannarum pratensis*	Grasshopper Sparrow, pratensis subspecies	Special Concern	Special Concern			1	77.2 ± 4.0	NS
A	*Lynx canadensis*	Canadian Lynx	Not At Risk		Endangered	S1	56	16.5 ± 1.0	NS
A	*Accipiter cooperii*	Cooper's Hawk	Not At Risk			S1?B	1	93.1 ± 7.0	NS
A	*Fulica americana*	American Coot	Not At Risk			S1B	3	52.8 ± 0.0	NS
A	*Chlidonias niger*	Black Tern	Not At Risk			S1B	3	45.2 ± 0.0	NS
A	*Falco peregrinus pop. 1*	Peregrine Falcon - anatum/tundrius	Not At Risk	Special Concern	Vulnerable	S1B,SNAM	6	18.1 ± 7.0	NS
A	*Sorex dispar*	Long-tailed Shrew	Not At Risk			S2	9	49.4 ± 0.0	NS
A	*Aegolius funereus*	Boreal Owl	Not At Risk			S2?B	7	44.7 ± 0.0	NS
A	*Hemidactylium scutatum*	Four-toed Salamander	Not At Risk			S3	19	16.6 ± 0.0	NS
A	*Megaptera novaeangliae*	Humpback Whale (NW Atlantic pop.)	Not At Risk			S3	2	20.2 ± 0.0	NS
A	*Sterna hirundo*	Common Tern	Not At Risk			S3B	536	1 3 ± 0.0	NS
A	*Sialia sialis*	Eastern Bluebird	Not At Risk			S3B	14	26.7 ± 7.0	NS
A	*Buteo lagopus*	Rough-legged Hawk	Not At Risk			S3N	8	4.4 ± 0.0	NS
A	*Accipiter gentilis*	Northern Goshawk	Not At Risk			S3S4	172	9 8 ± 7.0	NS
A	*Lagenorhynchus acutus*	Atlantic White-sided Dolphin	Not At Risk			S3S4	4	19.9 ± 0.0	NS
A	*Circus hudsonius*	Northern Harrier	Not At Risk			S3S4B	248	0 8 ± 0.0	NS
A	*Ammospiza nelsoni*	Nelson's Sparrow	Not At Risk			S3S4B	88	19.1 ± 0.0	NS
A	*Calidris canutus rufa*	Red Knot rufa subspecies	E,SC	Endangered	Endangered	S2M	20	12.1 ± 0.0	NS
A	*Morone saxatilis*	Striped Bass	E,SC			S2S3	6	56.5 ± 0.0	NS
A	*Martes americana*	American Marten			Endangered	S1	16	56.0 ± 1.0	NS
A	*Alces americanus*	Moose			Endangered	S1	72	23.2 ± 0.0	NS
A	*Picoides dorsalis*	American Three-toed Woodpecker				S1?	7	49.9 ± 0.0	NS
A	*Passerina cyanea*	Indigo Bunting				S1?B	7	44.3 ± 0.0	NS
A	*Uria aalge*	Common Murre				S1?B,S5N	4	26.4 ± 0.0	NS
A	*Nycticorax nycticorax*	Black-crowned Night-heron				S1B	2	59.1 ± 7.0	NS
A	*Anas acuta*	Northern Pintail				S1B	10	35.5 ± 0.0	NS
A	*Oxyura jamaicensis*	Ruddy Duck				S1B	6	66.2 ± 0.0	NS
A	*Haematopus palliatus*	American Oystercatcher				S1B	7	26.4 ± 7.0	NS
A	*Myiarchus crinitus*	Great Crested Flycatcher				S1B	1	64.8 ± 3.0	NS
A	*Mimus polyglottos*	Northern Mockingbird				S1B	18	14.7 ± 0.0	NS
A	*Toxostoma rufum*	Brown Thrasher				S1B	3	43.8 ± 0.0	NS
A	*Vireo gilvus*	Warbling Vireo				S1B	6	18.4 ± 7.0	NS
A	*Setophaga pinus*	Pine Warbler				S1B	5	15.0 ± 0.0	NS
A	*Calidris minutilla*	Least Sandpiper				S1B,S3M	151	12.1 ± 0.0	NS
A	*Charadrius semipalmatus*	Semipalmated Plover				S1B,S3S4M	287	12.1 ± 0.0	NS
A	*Vespertilionidae sp.*	bat species				S1S2	115	14.1 ± 0.0	NS
A	*Pluvialis dominica*	American Golden-Plover				S1S2M	26	26.3 ± 1.0	NS
A	*Microtus chrotorrhinus*	Rock Vole				S2	12	49.4 ± 0.0	NS
A	*Vireo philadelphicus*	Philadelphia Vireo				S2?B	11	23.2 ± 0.0	NS
A	*Spatula clypeata*	Northern Shoveler				S2B	2	44.5 ± 0.0	NS
A	*Mareca strepera*	Gadwall				S2B	2	47.1 ± 7.0	NS
A	*Empidonax traillii*	Willow Flycatcher				S2B	8	57.0 ± 7.0	NS
A	*Setophaga tigrina*	Cape May Warbler				S2B	142	14.4 ± 7.0	NS
A	*Piranga olivacea*	Scarlet Tanager				S2B	8	39.6 ± 7.0	NS
A	*Pooecetes gramineus*	Vesper Sparrow				S2B	8	18.4 ± 7.0	NS
A	*Molothrus ater*	Brown-headed Cowbird				S2B	46	9 8 ± 7.0	NS
A	*Alca torda*	Razorbill				S2B,S4N	20	51.8 ± 0.0	NS
A	*Bucephala clangula*	Common Goldeneye				S2B,S5N	214	9 9 ± 9.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Branta bernicla*	Brant				S2M	1	22.0 ± 16.0	NS
A	*Phalacrocorax carbo*	Great Cormorant				S2S3	220	15.4 ± 3.0	NS
A	*Asio otus*	Long-eared Owl				S2S3	24	12.9 ± 0.0	NS
A	*Spinus pinus*	Pine Siskin				S2S3	731	7.1 ± 7.0	NS
A	*Cathartes aura*	Turkey Vulture				S2S3B	5	32.4 ± 0.0	NS
A	*Rallus limicola*	Virginia Rail				S2S3B	8	7.1 ± 7.0	NS
A	*Tringa semipalmata*	Willet				S2S3B	562	4.4 ± 7.0	NS
A	*Petrochelidon pyrrhonota*	Cliff Swallow				S2S3B	186	10.2 ± 0.0	NS
A	*Pheucticus ludovicianus*	Rose-breasted Grosbeak				S2S3B	323	6 5 ± 0.0	NS
A	*Icterus galbula*	Baltimore Oriole				S2S3B	20	14.7 ± 0.0	NS
A	*Pinicola enucleator*	Pine Grosbeak				S2S3B,S5N	168	6 2 ± 0.0	NS
A	*Numenius phaeopus hudsonicus*	Hudsonian Whimbrel				S2S3M	66	16.8 ± 0.0	NS
A	*Calidris melanotos*	Pectoral Sandpiper				S2S3M	26	26.3 ± 1.0	NS
A	*Perisoreus canadensis*	Canada Jay				S3	555	5 8 ± 0.0	NS
A	*Poecile hudsonicus*	Boreal Chickadee				S3	1216	4.4 ± 7.0	NS
A	*Sitta canadensis*	Red-breasted Nuthatch				S3	1356	7.1 ± 7.0	NS
A	*Alosa pseudoharengus*	Alewife				S3	36	10.4 ± 0.0	NS
A	*Salvelinus fontinalis*	Brook Trout				S3	53	5.6 ± 0.0	NS
A	*Menidia menidia*	Atlantic Silverside				S3	1	26.3 ± 0.0	NS
A	*Synaptomys cooperi*	Southern Bog Lemming				S3	4	49.4 ± 0.0	NS
A	*Pekania pennanti*	Fisher				S3	6	61.2 ± 0.0	NS
A	*Calidris maritima*	Purple Sandpiper				S3?N	28	10.7 ± 10.0	NS
A	*Calcarius lapponicus*	Lapland Longspur				S3?N	1	57.6 ± 0.0	NS
A	*Falco sparverius*	American Kestrel				S3B	288	4.4 ± 7.0	NS
A	*Charadrius vociferus*	Killdeer				S3B	175	4.4 ± 7.0	NS
A	*Gallinago delicata*	Wilson's Snipe				S3B	620	4.4 ± 7.0	NS
A	*Sterna paradisaea*	Arctic Tern				S3B	101	4.4 ± 7.0	NS
A	*Coccyzus erythropthalmus*	Black-billed Cuckoo				S3B	44	17.5 ± 0.0	NS
A	*Tyrannus tyrannus*	Eastern Kingbird				S3B	94	15.0 ± 4.0	NS
A	*Dumetella carolinensis*	Gray Catbird				S3B	245	7.1 ± 7.0	NS
A	*Cardellina pusilla*	Wilson's Warbler				S3B	148	4.4 ± 7.0	NS
A	*Tringa melanoleuca*	Greater Yellowlegs				S3B,S3S4M	298	0 5 ± 0.0	NS
A	*Rissa tridactyla*	Black-legged Kittiwake				S3B,S5N	21	15.4 ± 3.0	NS
A	*Fratercula arctica*	Atlantic Puffin				S3B,S5N	16	59.0 ± 0.0	NS
A	*Pluvialis squatarola*	Black-bellied Plover				S3M	252	12.1 ± 0.0	NS
A	*Arenaria interpres*	Ruddy Turnstone				S3M	107	12.1 ± 0.0	NS
A	*Calidris pusilla*	Semipalmated Sandpiper				S3M	199	26.3 ± 7.0	NS
A	*Calidris fuscicollis*	White-rumped Sandpiper				S3M	65	12.1 ± 0.0	NS
A	*Limnodromus griseus*	Short-billed Dowitcher				S3M	106	26.3 ± 22.0	NS
A	*Calidris alba*	Sanderling				S3M,S2N	113	12.1 ± 0.0	NS
A	*Chroicocephalus ridibundus*	Black-headed Gull				S3N	94	31.4 ± 0.0	NS
A	*Somateria mollissima*	Common Eider				S3S4	456	4.4 ± 7.0	NS
A	*Picoides arcticus*	Black-backed Woodpecker				S3S4	89	11.8 ± 0.0	NS
A	*Loxia curvirostra*	Red Crossbill				S3S4	87	9 8 ± 7.0	NS
A	*Botaurus lentiginosus*	American Bittern				S3S4B	197	7.1 ± 7.0	NS
A	*Spatula discors*	Blue-winged Teal				S3S4B	101	7.1 ± 7.0	NS
A	*Actitis macularius*	Spotted Sandpiper				S3S4B	747	4.4 ± 7.0	NS
A	*Empidonax flaviventris*	Yellow-bellied Flycatcher				S3S4B	1129	7.1 ± 7.0	NS
A	*Regulus calendula*	Ruby-crowned Kinglet				S3S4B	3370	4.4 ± 7.0	NS
A	*Catharus fuscescens*	Veery				S3S4B	497	7.1 ± 7.0	NS
A	*Catharus ustulatus*	Swainson's Thrush				S3S4B	2233	4.4 ± 7.0	NS
A	*Oreothlypis peregrina*	Tennessee Warbler				S3S4B	397	7.1 ± 7.0	NS
A	*Setophaga castanea*	Bay-breasted Warbler				S3S4B	343	6 2 ± 0.0	NS
A	*Setophaga striata*	Blackpoll Warbler				S3S4B	148	4.4 ± 7.0	NS
A	*Passerella iliaca*	Fox Sparrow				S3S4B	157	9 8 ± 7.0	NS
A	*Mergus serrator*	Red-breasted Merganser				S3S4B,S5N	201	4.4 ± 7.0	NS
A	*Bucephala albeola*	Bufflehead				S3S4N	95	4.4 ± 0.0	NS

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A	*Lanius borealis*	Northern Shrike				S3S4N	13	26.5 ± 1.0	NS
A	*Leucophaeus atricilla*	Laughing Gull				SHB	5	33.2 ± 0.0	NS
A	*Progne subis*	Purple Martin				SHB	4	59.0 ± 0.0	NS
A	*Morus bassanus*	Northern Gannet				SHB,S5M	181	3 0 ± 2.0	NS
I	*Bombus (Psithyrus) bohemicus*	Gypsy Cuckoo Bumble Bee	Endangered	Endangered	Endangered	S1	17	46.3 ± 0.0	NS
I	*Danaus plexippus*	Monarch	Endangered	Special Concern	Endangered	S2B	49	9 9 ± 1.0	NS
I	*Lampsilis cariosa*	Yellow Lampmussel	Special Concern	Special Concern	Threatened	S1	39	87.2 ± 0.0	NS
I	*Alasmidonta varicosa*	Brook Floater	Special Concern	Special Concern	Threatened	S1S2	8	35.4 ± 0.0	NS
I	*Bombus terricola*	Yellow-banded Bumblebee	Special Concern	Special Concern	Vulnerable	S3	99	22.8 ± 0.0	NS
I	*Coccinella transversoguttata richardsoni*	Transverse Lady Beetle	Special Concern		Endangered	SH	1	57.2 ± 2.0	NS
I	*Papilio brevicauda bretonensis*	Short-tailed Swallowtail				S1	5	66.5 ± 2.0	NS
I	*Neurocordulia michaeli*	Broadtailed Shadowdragon				S1	22	76.2 ± 0.0	NS
I	*Coenagrion interrogatum*	Subarctic Bluet				S1	1	90.0 ± 0.0	NS
I	*Leptodea ochracea*	Tidewater Mucket				S1	19	83.9 ± 1.0	NS
I	*Lycaena dorcas*	Dorcas Copper				S1?	31	33.5 ± 0.0	NS
I	*Polygonia satyrus*	Satyr Comma				S1?	1	68.5 ± 2.0	NS
I	*Strymon melinus*	Grey Hairstreak				S1S2	2	18.8 ± 0.0	NS
I	*Nymphalis l-album*	Compton Tortoiseshell				S1S2	2	70.1 ± 2.0	NS
I	*Haematopota rara*	Shy Cleg				S1S3	1	38.1 ± 0.0	NS
I	*Lycaena hyllus*	Bronze Copper				S2	2	60.3 ± 0.0	NS
I	*Lycaena dospassosi*	Salt Marsh Copper				S2	1	57.6 ± 0.0	NS
I	*Boloria chariclea*	Arctic Fritillary				S2	2	70.1 ± 2.0	NS
I	*Aglais milberti*	Milbert's Tortoiseshell				S2	2	68.0 ± 2.0	NS
I	*Somatochlora septentrionalis*	Muskeg Emerald				S2	8	75.0 ± 0.0	NS
I	*Somatochlora williamsoni*	Williamson's Emerald				S2	8	74.3 ± 0.0	NS
I	*Margaritifera margaritifera*	Eastern Pearlshell				S2	100	17.6 ± 0.0	NS
I	*Pantala hymenaea*	Spot-Winged Glider				S2?B	2	78.5 ± 0.0	NS
I	*Thorybes pylades*	Northern Cloudywing				S2S3	13	30.6 ± 0.0	NS
I	*Amblyscirtes hegon*	Pepper and Salt Skipper				S2S3	7	32.2 ± 1.0	NS
I	*Euphydryas phaeton*	Baltimore Checkerspot				S2S3	25	10.9 ± 2.0	NS
I	*Gomphus descriptus*	Harpoon Clubtail				S2S3	16	25.7 ± 0.0	NS
I	*Ophiogomphus aspersus*	Brook Snaketail				S2S3	5	25.7 ± 0.0	NS
I	*Ophiogomphus mainensis*	Maine Snaketail				S2S3	4	74.9 ± 0.0	NS
I	*Ophiogomphus rupinsulensis*	Rusty Snaketail				S2S3	36	76.1 ± 0.0	NS
I	*Somatochlora forcipata*	Forcipate Emerald				S2S3	7	61.8 ± 1.0	NS
I	*Alasmidonta undulata*	Triangle Floater				S2S3	5	14.5 ± 0.0	NS
I	*Naemia seriata*	a Ladybird beetle				S3	1	63.6 ± 0.0	NS
I	*Iphthiminus opacus*	a Darkling Beetle				S3	1	37.1 ± 0.0	NS
I	*Monochamus marmorator*	a Longhorned Beetle				S3	2	73.3 ± 0.0	NS
I	*Callophrys henrici*	Henry's Elfin				S3	2	55.6 ± 0.0	NS
I	*Speyeria aphrodite*	Aphrodite Fritillary				S3	6	57.5 ± 2.0	NS
I	*Polygonia faunus*	Green Comma				S3	16	36.0 ± 0.0	NS
I	*Megisto cymela*	Little Wood-satyr				S3	1	25.7 ± 1.0	NS
I	*Oeneis jutta*	Jutta Arctic				S3	6	32.8 ± 0.0	NS
I	*Aeshna clepsydra*	Mottled Darner				S3	3	19.7 ± 0.0	NS
I	*Boyeria grafiana*	Ocellated Darner				S3	7	77.3 ± 0.0	NS
I	*Gomphaeschna furcillata*	Harlequin Darner				S3	3	18.0 ± 0.0	NS
I	*Somatochlora tenebrosa*	Clamp-Tipped Emerald				S3	1	83.1 ± 0.0	NS
I	*Nannothemis bella*	Elfin Skimmer				S3	3	18.0 ± 0.0	NS
I	*Sympetrum danae*	Black Meadowhawk				S3	9	23.1 ± 0.0	NS
I	*Enallagma vernale*	Vernal Bluet				S3	8	23.8 ± 0.0	NS
I	*Amphiagrion saucium*	Eastern Red Damsel				S3	11	35.8 ± 0.0	NS
I	*Polygonia interrogationis*	Question Mark				S3B	18	16.3 ± 0.0	NS
I	*Erynnis juvenalis*	Juvenal's Duskywing				S3S4	1	60.7 ± 1.0	NS
I	*Amblyscirtes vialis*	Common Roadside-Skipper				S3S4	7	36.4 ± 0.0	NS

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I	*Polygonia progne*	Grey Comma				S3S4	29	20.3 ± 0.0	NS
I	*Lanthus parvulus*	Northern Pygmy Clubtail				S3S4	23	51.0 ± 1.0	NS
I	*Lampsilis radiata*	Eastern Lampmussel				S3S4	20	32.7 ± 0.0	NS
N	*Erioderma pedicellatum (Atlantic pop)*	Boreal Felt Lichen - Atlantic pop.	Endangered	Endangered	Endangered	S1	377	34.7 ± 3.0	NS
N	*Erioderma mollissimum*	Graceful Felt Lichen	Endangered	Endangered	Endangered	S1S2	5	95.8 ± 0.0	NS
N	*Peltigera hydrothyria*	Eastern Waterfan	Threatened	Threatened	Threatened	S1	35	14.3 ± 0.0	NS
N	*Pannaria lurida*	Wrinkled Shingle Lichen	Threatened	Threatened	Threatened	S1S2	23	46.6 ± 0.0	NS
N	*Fuscopannaria leucosticta*	White-rimmed Shingle Lichen	Threatened			S2S3	1	89.0 ± 0.0	NS
N	*Anzia colpodes*	Black-foam Lichen	Threatened	Threatened	Threatened	S3	5	91.4 ± 1.0	NS
N	*Sclerophora peronella (Atlantic pop)*	Frosted Glass-whiskers (Atlantic popula ion)	Special Concern	Special Concern		S1?	11	20.1 ± 0.0	NS
N	*Pectenia plumbea*	Blue Felt Lichen	Special Concern	Special Concern	Vulnerable	S3	462	4 8 ± 0.0	NS
N	*Fissidens exilis*	Pygmy Pocket Moss	Not At Risk			S1S2	7	51.1 ± 0.0	NS
N	*Pseudevernia cladonia*	Ghost Antler Lichen	Not At Risk			S2S3	2	52.0 ± 0.0	NS
N	*Cinclidium stygium*	Sooty Cupola Moss				S1	2	37.8 ± 0.0	NS
N	*Cladonia brevis*	Short Peg Lichen				S1	1	38.7 ± 0.0	NS
N	*Lathagrium cristatum*	Fingered Jelly Lichen				S1	1	48.8 ± 0.0	NS
N	*Peltigera lepidophora*	Scaly Pelt Lichen				S1	2	48.5 ± 0.0	NS
N	*Hypogymnia hultenii*	Powdered Honeycomb Lichen				S1	22	24.1 ± 0.0	NS
N	*Eocalypogeia schusteriana*	Schuster's Pouchwort				S1?	2	72.8 ± 0.0	NS
N	*Moerckia hibernica*	Irish Ruffwort				S1?	2	72.8 ± 0.0	NS
N	*Brachythecium erythrorrhizon*	Taiga Ragged Moss				S1?	4	73.2 ± 0.0	NS
N	*Conardia compacta*	Coast Creeping Moss				S1?	2	56.7 ± 2.0	NS
N	*Oligotrichum hercynicum*	Hercynian Hair Moss				S1?	3	48.3 ± 0.0	NS
N	*Paludella squarrosa*	Tufted Fen Moss				S1?	1	70.5 ± 5.0	NS
N	*Syntrichia ruralis*	a Moss				S1?	1	99.6 ± 1.0	NS
N	*Polychidium muscicola*	Eyed Mossthorns Woollybear Lichen				S1?	1	11.3 ± 0.0	NS
N	*Parmeliella parvula*	Poor-man's Shingles Lichen				S1?	17	35.2 ± 0.0	NS
N	*Buxbaumia minakatae*	Hump-Backed Elves				S1S2	1	74.6 ± 100.0	NS
N	*Platydictya confervoides*	a Moss				S1S2	1	93.2 ± 3.0	NS
N	*Sphagnum platyphyllum*	Flat-leaved Peat Moss				S1S2	4	29.3 ± 0.0	NS
N	*Hamatocaulis vernicosus*	a Moss				S1S2	1	43.0 ± 0.0	NS
N	*Enchylium bachmanianum*	Bachman's Jelly Lichen				S1S2	1	54.3 ± 0.0	NS
N	*Sticta limbata*	Powdered Moon Lichen				S1S2	2	17.8 ± 2.0	NS
N	*Barbilophozia lycopodioides*	Greater Pawwort				S1S3	1	47.8 ± 0.0	NS
N	*Odontoschisma sphagni*	Bog-Moss Flapwort				S1S3	1	62.5 ± 0.0	NS
N	*Peltigera neckeri*	Black-saddle Pelt Lichen				S1S3	2	29.0 ± 0.0	NS
N	*Stereocaulon grande*	Grand Foam Lichen				S1S3	1	94.8 ± 0.0	NS
N	*Nephroma resupinatum*	a lichen				S2	1	48.7 ± 0.0	NS
N	*Anaptychia crinalis*	Hanging Fringed Lichen				S2	3	79.5 ± 0.0	NS
N	*Riccardia multifida*	Delicate Germanderwort				S2?	1	73.4 ± 0.0	NS
N	*Anacamptodon splachnoides*	a Moss				S2?	1	22.3 ± 0.0	NS
N	*Anomodon viticulosus*	a Moss				S2?	1	57.4 ± 0.0	NS
N	*Atrichum angustatum*	Lesser Smoo hcap Moss				S2?	2	63.8 ± 3.0	NS
N	*Drepanocladus polygamus*	Polygamous Hook Moss				S2?	1	40.8 ± 0.0	NS
N	*Pseudocampylium radicale*	Long-stalked Fine Wet Moss				S2?	1	35.0 ± 0.0	NS
N	*Fissidens taxifolius*	Yew-leaved Pocket Moss				S2?	2	57.4 ± 0.0	NS
N	*Fontinalis sullivantii*	Sullivant's Water Moss				S2?	1	74.6 ± 100.0	NS
N	*Grimmia anomala*	Mountain Forest Grimmia				S2?	1	97.8 ± 0.0	NS
N	*Philonotis marchica*	a Moss				S2?	1	68.3 ± 0.0	NS
N	*Platydictya jungermannioides*	False Willow Moss				S2?	3	49.2 ± 0.0	NS
N	*Pohlia sphagnicola*	a moss				S2?	1	34.3 ± 0.0	NS

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N	*Scorpidium scorpioides*	Hooked Scorpion Moss				S2?	11	35.0 ± 0.0	NS
N	*Sphagnum subnitens*	Lustrous Peat Moss				S2?	2	42.6 ± 0.0	NS
N	*Tetraplodon angustatus*	Toothed-leaved Nitrogen Moss				S2?	2	16.6 ± 0.0	NS
N	*Tortella fragilis*	Fragile Twisted Moss				S2?	7	45.8 ± 0.0	NS
N	*Cyrtomnium hymenophylloides*	Short-pointed Lantern Moss				S2?	1	77.7 ± 0.0	NS
N	*Scytinium teretiusculum*	Curly Jellyskin Lichen				S2?	3	59.2 ± 0.0	NS
N	*Cladonia labradorica*	Labrador Lichen				S2?	1	51.4 ± 0.0	NS
N	*Rostania occultata*	Crusted Tarpaper Lichen				S2?	4	53.9 ± 5.0	NS
N	*Scytinium imbricatum*	Scaly Jellyskin Lichen				S2?	1	70.2 ± 0.0	NS
N	*Nephroma arcticum*	Arctic Kidney Lichen				S2?	2	48.4 ± 0.0	NS
N	*Peltigera collina*	Tree Pelt Lichen				S2?	70	9.4 ± 0.0	NS
N	*Tetraplodon mnioides*	Entire-leaved Nitrogen Moss				S2S3	1	31.2 ± 0.0	NS
N	*Scorpidium revolvens*	Limprichtia Moss				S2S3	7	28.9 ± 0.0	NS
N	*Collema leptaleum*	Crumpled Bat's Wing Lichen				S2S3	14	68.6 ± 0.0	NS
N	*Solorina saccata*	Woodland Owl Lichen				S2S3	6	18.7 ± 0.0	NS
N	*Ahtiana aurescens*	Eastern Candlewax Lichen				S2S3	1	98.9 ± 6.0	NS
N	*Cetraria muricata*	Spiny Heath Lichen				S2S3	2	46.9 ± 0.0	NS
N	*Cladonia incrassata*	Powder-foot Bri ish Soldiers Lichen				S2S3	1	98.3 ± 0.0	NS
N	*Scytinium tenuissimum*	Birdnest Jellyskin Lichen				S2S3	13	48.5 ± 0.0	NS
N	*Parmelia fertilis*	Fertile Shield Lichen				S2S3	3	44.8 ± 0.0	NS
N	*Parmeliopsis ambigua*	Green Starburst Lichen				S2S3	2	42.2 ± 0.0	NS
N	*Usnea mutabilis*	Bloody Beard Lichen				S2S3	1	36.3 ± 0.0	NS
N	*Usnea rubicunda*	Red Beard Lichen				S2S3	3	39.4 ± 0.0	NS
N	*Stereocaulon condensatum*	Granular Soil Foam Lichen				S2S3	4	81.5 ± 0.0	NS
N	*Cladonia coccifera*	Eastern Boreal Pixie-cup Lichen				S2S3	3	38.8 ± 0.0	NS
N	*Ramalina thrausta*	Angelhair Ramalina Lichen				S3	10	26.6 ± 0.0	NS
N	*Enchylium tenax*	Soil Tarpaper Lichen				S3	4	48.5 ± 0.0	NS
N	*Sticta fuliginosa*	Peppered Moon Lichen				S3	15	9.4 ± 0.0	NS
N	*Scytinium subtile*	Appressed Jellyskin Lichen				S3	6	64.7 ± 0.0	NS
N	*Fuscopannaria ahlneri*	Corrugated Shingles Lichen				S3	67	9.7 ± 0.0	NS
N	*Heterodermia speciosa*	Powdered Fringe Lichen				S3	8	28.9 ± 0.0	NS
N	*Heterodermia squamulosa*	Scaly Fringe Lichen				S3	6	97.8 ± 0.0	NS
N	*Leptogium corticola*	Blistered Jellyskin Lichen				S3	2	55.8 ± 0.0	NS
N	*Scytinium lichenoides*	Tattered Jellyskin Lichen				S3	12	18.7 ± 0.0	NS
N	*Nephroma bellum*	Naked Kidney Lichen				S3	8	40.6 ± 0.0	NS
N	*Platismatia norvegica*	Oldgrowth Rag Lichen				S3	151	46.2 ± 0.0	NS
N	*Moelleropsis nebulosa ssp. frullaniae*	Blue-gray Moss Shingle Lichen				S3	1	99.1 ± 0.0	NS
N	*Moelleropsis nebulosa*	Blue-gray Moss Shingle Lichen				S3	22	46.5 ± 0.0	NS
N	*Fuscopannaria sorediata*	a Lichen				S3	9	14.0 ± 0.0	NS
N	*Ephebe lanata*	Waterside Rockshag Lichen				S3	2	19.9 ± 0.0	NS
N	*Calliergon giganteum*	Giant Spear Moss				S3?	3	48.4 ± 0.0	NS
N	*Mnium stellare*	Star Leafy Moss				S3?	2	73.2 ± 0.0	NS
N	*Sphagnum riparium*	Streamside Peat Moss				S3?	3	48.3 ± 0.0	NS
N	*Phaeophyscia pusilloides*	Pompom-tipped Shadow Lichen				S3?	5	42.7 ± 0.0	NS
N	*Cladonia pocillum*	Rosette Pixie-cup Lichen				S3?	1	72.8 ± 0.0	NS
N	*Cladonia stygia*	Black-footed Reindeer Lichen				S3?	3	72.2 ± 0.0	NS
N	*Dicranella varia*	a Moss				S3S4	4	29.9 ± 0.0	NS
N	*Dicranum leioneuron*	a Dicranum Moss				S3S4	1	12.4 ± 0.0	NS
N	*Encalypta procera*	Slender Extinguisher Moss				S3S4	7	41.4 ± 0.0	NS
N	*Sphagnum lindbergii*	Lindberg's Peat Moss				S3S4	4	34.3 ± 0.0	NS

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N	*Splachnum ampullaceum*	Cruet Dung Moss				S3S4	1	37.2 ± 0.0	NS
N	*Thamnobryum alleghaniense*	a Moss				S3S4	25	69.7 ± 0.0	NS
N	*Schistidium agassizii*	Elf Bloom Moss				S3S4	1	77.6 ± 3.0	NS
N	*Hylocomiastrum pyrenaicum*	a Feather Moss				S3S4	1	67.9 ± 3.0	NS
N	*Arctoparmelia incurva*	Finger Ring Lichen				S3S4	7	32.4 ± 0.0	NS
N	*Hypogymnia vittata*	Slender Monk's Hood Lichen				S3S4	277	11.2 ± 0.0	NS
N	*Leptogium acadiense*	Acadian Jellyskin Lichen				S3S4	18	17.5 ± 0.0	NS
N	*Cladonia floerkeana*	Gritty Bri ish Soldiers Lichen				S3S4	4	39.0 ± 0.0	NS
N	*Vahliella leucophaea*	Shelter Shingle Lichen				S3S4	23	51.5 ± 0.0	NS
N	*Melanohalea olivacea*	Spotted Camouflage Lichen				S3S4	3	71.0 ± 0.0	NS
N	*Parmeliopsis hyperopta*	Gray Starburst Lichen				S3S4	1	42.2 ± 0.0	NS
N	*Parmotrema perlatum*	Powdered Ruffle Lichen				S3S4	1	97.8 ± 0.0	NS
N	*Peltigera hymenina*	Cloudy Pelt Lichen				S3S4	2	17.1 ± 0.0	NS
N	*Physconia detersa*	Bottlebrush Frost Lichen				S3S4	4	35.2 ± 0.0	NS
N	*Sphaerophorus fragilis*	Fragile Coral Lichen				S3S4	1	33.5 ± 0.0	NS
N	*Coccocarpia palmicola*	Salted Shell Lichen				S3S4	451	26.5 ± 0.0	NS
N	*Physcia tenella*	Fringed Rosette Lichen				S3S4	2	97.2 ± 2.0	NS
N	*Anaptychia palmulata*	Shaggy Fringed Lichen				S3S4	46	17.5 ± 0.0	NS
N	*Evernia prunastri*	Valley Oakmoss Lichen				S3S4	5	57.6 ± 0.0	NS
N	*Dermatocarpon luridum*	Brookside Stippleback Lichen				S3S4	8	46.6 ± 0.0	NS
N	*Heterodermia neglecta*	Fringe Lichen				S3S4	45	14.3 ± 0.0	NS
P	*Fraxinus nigra*	Black Ash	Threatened		Threatened	S1S2	130	14.8 ± 0.0	NS
P	*Liatris spicata*	Dense Blazing Star	Threatened	Threatened		SNA	1	71.2 ± 0.0	NS
P	*Juncus caesariensis*	New Jersey Rush	Special Concern	Special Concern	Vulnerable	S2	240	36.2 ± 0.0	NS
P	*Isoetes prototypus*	Prototype Quillwort	Special Concern	Special Concern	Vulnerable	S2	11	95.3 ± 0.0	NS
P	*Floerkea proserpinacoides*	False Mermaidweed	Not At Risk			S2	21	8 0 ± 7.0	NS
P	*Salix candida*	Sage Willow			Endangered	S1	47	63.7 ± 0.0	NS
P	*Thuja occidentalis*	Eastern White Cedar			Vulnerable	S1	3	46.9 ± 0.0	NS
P	*Sanicula odorata*	Clustered Sanicle				S1	5	23.2 ± 0.0	NS
P	*Zizia aurea*	Golden Alexanders				S1	7	50.1 ± 5.0	NS
P	*Arnica lonchophylla*	Northern Arnica				S1	1	15.2 ± 7.0	NS
P	*Bidens hyperborea*	Estuary Beggar icks				S1	3	57.6 ± 1.0	NS
P	*Ageratina altissima*	White Snakeroot				S1	2	57.0 ± 7.0	NS
P	*Cardamine dentata*	Toothed Bittercress				S1	4	30.3 ± 0.0	NS
P	*Cochlearia tridactylites*	Limestone Scurvy-grass				S1	4	39.1 ± 0.0	NS
P	*Draba norvegica*	Norwegian Whitlow-Grass				S1	1	97.4 ± 2.0	NS
P	*Stellaria crassifolia*	Fleshy S itchwort				S1	1	37.7 ± 2.0	NS
P	*Hudsonia tomentosa*	Woolly Beach-heath				S1	5	49.3 ± 1.0	NS
P	*Bistorta vivipara*	Alpine Bistort				S1	1	25.1 ± 1.0	NS
P	*Montia fontana*	Water Blinks				S1	2	14.4 ± 3.0	NS
P	*Agalinis purpurea var. parviflora*	Small-flowered Purple False Foxglove				S1	1	33.9 ± 0.0	NS
P	*Scrophularia lanceolata*	Lance-leaved Figwort				S1	2	29.1 ± 1.0	NS
P	*Pilea pumila*	Dwarf Clearweed				S1	1	97.6 ± 6.0	NS
P	*Carex alopecoidea*	Foxtail Sedge				S1	2	47.4 ± 0.0	NS
P	*Carex granularis*	Limestone Meadow Sedge				S1	21	34.1 ± 0.0	NS
P	*Carex gynocrates*	Northern Bog Sedge				S1	16	34.6 ± 0.0	NS
P	*Carex haydenii*	Hayden's Sedge				S1	2	37.6 ± 0.0	NS
P	*Carex tenuiflora*	Sparse-Flowered Sedge				S1	3	36.0 ± 0.0	NS
P	*Carex tincta*	Tinged Sedge				S1	1	47.4 ± 1.0	NS
P	*Carex viridula var. elatior*	Greenish Sedge				S1	54	37.3 ± 0.0	NS
P	*Carex grisea*	Inflated Narrow-leaved Sedge				S1	6	56.9 ± 0.0	NS
P	*Cyperus lupulinus ssp. macilentus*	Hop Flatsedge				S1	13	48.4 ± 0.0	NS
P	*Eleocharis erythropoda*	Red-stemmed Spikerush				S1	7	40.5 ± 0.0	NS
P	*Rhynchospora capillacea*	Slender Beakrush				S1	8	53.5 ± 10.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
P	*Scirpus atrovirens*	Dark-green Bulrush				S1	1	65.2 ± 0.0	NS
P	*Iris prismatica*	Slender Blue Flag				S1	4	69.0 ± 0.0	NS
P	*Luzula spicata*	Spiked Woodrush				S1	1	57.1 ± 0.0	NS
P	*Triantha glutinosa*	Sticky False-Asphodel				S1	14	63.7 ± 0.0	NS
P	*Malaxis monophyllos var. brachypoda*	North American White Adder's-mouth				S1	1	26.7 ± 7.0	NS
P	*Bromus latiglumis*	Broad-Glumed Brome				S1	11	14.3 ± 0.0	NS
P	*Calamagrostis stricta ssp. inexpansa*	Slim-stemmed Reed Grass				S1	1	39.7 ± 0.0	NS
P	*Elymus wiegandii*	Wiegand's Wild Rye				S1	8	18.6 ± 0.0	NS
P	*Torreyochloa pallida var. pallida*	Pale False Manna Grass				S1	2	76.6 ± 1.0	NS
P	*Graphephorum melicoides*	Purple False Oats				S1	2	91.4 ± 0.0	NS
P	*Potamogeton nodosus*	Long-leaved Pondweed				S1	1	89.8 ± 5.0	NS
P	*Sparganium androcladum*	Branching Bur-Reed				S1	3	29.8 ± 1.0	NS
P	*Dryopteris goldiana*	Goldie's Woodfern				S1	1	69.6 ± 0.0	NS
P	*Equisetum palustre*	Marsh Horsetail				S1	8	56.3 ± 0.0	NS
P	*Bolboschoenus robustus*	Sturdy Bulrush				S1?	2	67.6 ± 5.0	NS
P	*Rudbeckia laciniata*	Cut-Leaved Coneflower				S1S2	2	57.0 ± 7.0	NS
P	*Betula minor*	Dwarf White Birch				S1S2	1	71.1 ± 0.0	NS
P	*Arabis pycnocarpa*	Cream-flowered Rockcress				S1S2	1	94.7 ± 0.0	NS
P	*Cornus suecica*	Swedish Bunchberry				S1S2	6	29.4 ± 0.0	NS
P	*Anemone virginiana var. alba*	Virginia Anemone				S1S2	6	44.9 ± 1.0	NS
P	*Ranunculus sceleratus*	Cursed Buttercup				S1S2	1	77.3 ± 7.0	NS
P	*Parnassia parviflora*	Small-flowered Grass-of-Parnassus				S1S2	17	60.5 ± 1.0	NS
P	*Carex livida*	Livid Sedge				S1S2	27	27.3 ± 5.0	NS
P	*Juncus greenei*	Greene's Rush				S1S2	1	49.4 ± 1.0	NS
P	*Juncus alpinoarticulatus ssp. americanus*	Northern Green Rush				S1S2	11	29.1 ± 1.0	NS
P	*Juncus bulbosus*	Bulbous Rush				S1S2	5	98.5 ± 1.0	NS
P	*Platanthera huronensis*	Fragrant Green Orchid				S1S2	7	38.9 ± 0.0	NS
P	*Calamagrostis stricta ssp. stricta*	Slim-stemmed Reed Grass				S1S2	1	70.5 ± 1.0	NS
P	*Cinna arundinacea*	Sweet Wood Reed Grass				S1S2	24	12.4 ± 0.0	NS
P	*Sparganium hyperboreum*	Northern Burreed				S1S2	8	49.7 ± 0.0	NS
P	*Cryptogramma stelleri*	Steller's Rockbrake				S1S2	17	47.9 ± 0.0	NS
P	*Selaginella selaginoides*	Low Spikemoss				S1S2	5	32.1 ± 0.0	NS
P	*Carex vacillans*	Estuarine Sedge				S1S3	2	47.4 ± 0.0	NS
P	*Osmorhiza longistylis*	Smooth Sweet Cicely				S2	17	34.0 ± 1.0	NS
P	*Erigeron philadelphicus*	Philadelphia Fleabane				S2	9	39.6 ± 7.0	NS
P	*Symphyotrichum ciliolatum*	Fringed Blue Aster				S2	3	35.0 ± 0.0	NS
P	*Impatiens pallida*	Pale Jewelweed				S2	25	19.6 ± 1.0	NS
P	*Caulophyllum thalictroides*	Blue Cohosh				S2	19	18.8 ± 0.0	NS
P	*Boechera stricta*	Drummond's Rockcress				S2	2	90.7 ± 1.0	NS
P	*Draba arabisans*	Rock Whitlow-Grass				S2	3	50.7 ± 1.0	NS
P	*Lobelia kalmii*	Brook Lobelia				S2	95	25.4 ± 0.0	NS
P	*Stellaria humifusa*	Saltmarsh Starwort				S2	4	89.2 ± 0.0	NS
P	*Stellaria longifolia*	Long-leaved Starwort				S2	1	19.3 ± 0.0	NS
P	*Oxybasis rubra*	Red Goosefoot				S2	3	59.1 ± 7.0	NS
P	*Hypericum majus*	Large St John's-wort				S2	2	53.4 ± 1.0	NS
P	*Crassula aquatica*	Water Pygmyweed				S2	4	24.5 ± 7.0	NS
P	*Myriophyllum farwellii*	Farwell's Water Milfoil				S2	4	27.5 ± 7.0	NS
P	*Myriophyllum verticillatum*	Whorled Water Milfoil				S2	4	49.5 ± 0.0	NS
P	*Utricularia resupinata*	Inverted Bladderwort				S2	1	48.9 ± 0.0	NS
P	*Oenothera fruticosa ssp. tetragona*	Narrow-leaved Evening Primrose				S2	1	71.0 ± 1.0	NS

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P	*Persicaria arifolia*	Halberd-leaved Tearthumb				S2	7	36.0 ± 0.0	NS
P	*Rumex triangulivalvis*	Triangular-valve Dock				S2	9	11.6 ± 6.0	NS
P	*Anemonastrum canadense*	Canada Anemone				S2	2	29.1 ± 3.0	NS
P	*Anemone quinquefolia*	Wood Anemone				S2	14	69.9 ± 1.0	NS
P	*Anemone virginiana*	Virginia Anemone				S2	30	47.3 ± 0.0	NS
P	*Caltha palustris*	Yellow Marsh Marigold				S2	20	59.3 ± 1.0	NS
P	*Galium labradoricum*	Labrador Bedstraw				S2	87	32.4 ± 0.0	NS
P	*Salix pedicellaris*	Bog Willow				S2	12	34.5 ± 0.0	NS
P	*Salix sericea*	Silky Willow				S2	1	68.4 ± 0.0	NS
P	*Comandra umbellata*	Bastard's Toadflax				S2	32	48.0 ± 0.0	NS
P	*Saxifraga paniculata ssp. laestadii*	Laestadius' Saxifrage				S2	4	47.7 ± 7.0	NS
P	*Tiarella cordifolia*	Heart-leaved Foamflower				S2	1	5 3 ± 3.0	NS
P	*Viola nephrophylla*	Northern Bog Violet				S2	10	20.2 ± 0.0	NS
P	*Carex bebbii*	Bebb's Sedge				S2	31	36.4 ± 0.0	NS
P	*Carex castanea*	Chestnut Sedge				S2	17	28.4 ± 0.0	NS
P	*Carex comosa*	Bearded Sedge				S2	1	77.9 ± 1.0	NS
P	*Carex hystericina*	Porcupine Sedge				S2	37	34.6 ± 0.0	NS
P	*Carex scirpoidea*	Scirpuslike Sedge				S2	2	99.9 ± 4.0	NS
P	*Carex tenera*	Tender Sedge				S2	3	30.2 ± 3.0	NS
P	*Carex tuckermanii*	Tuckerman's Sedge				S2	2	74.3 ± 0.0	NS
P	*Carex atratiformis*	Scabrous Black Sedge				S2	2	47.3 ± 7.0	NS
P	*Eleocharis quinqueflora*	Few-flowered Spikerush				S2	30	32.0 ± 0.0	NS
P	*Juncus stygius ssp. americanus*	Moor Rush				S2	32	32.0 ± 1.0	NS
P	*Allium schoenoprasum*	Wild Chives				S2	1	98.6 ± 0.0	NS
P	*Allium schoenoprasum var. sibiricum*	Wild Chives				S2	3	13.7 ± 7.0	NS
P	*Lilium canadense*	Canada Lily				S2	30	12.8 ± 0.0	NS
P	*Cypripedium parviflorum var. pubescens*	Yellow Lady's-slipper				S2	32	18.1 ± 7.0	NS
P	*Cypripedium parviflorum var. makasin*	Small Yellow Lady's-Slipper				S2	17	24.0 ± 0.0	NS
P	*Cypripedium reginae*	Showy Lady's-Slipper				S2	327	28.8 ± 0.0	NS
P	*Platanthera flava var. herbiola*	Pale Green Orchid				S2	1	28.0 ± 1.0	NS
P	*Spiranthes lucida*	Shining Ladies'-Tresses				S2	27	47.5 ± 0.0	NS
P	*Potamogeton friesii*	Fries' Pondweed				S2	7	19.7 ± 0.0	NS
P	*Potamogeton richardsonii*	Richardson's Pondweed				S2	10	20.2 ± 0.0	NS
P	*Cystopteris laurentiana*	Laurentian Bladder Fern				S2	6	47.3 ± 10.0	NS
P	*Dryopteris fragrans*	Fragrant Wood Fern				S2	4	16.8 ± 7.0	NS
P	*Polystichum lonchitis*	Northern Holly Fern				S2	5	29.1 ± 5.0	NS
P	*Woodsia glabella*	Smooth Cliff Fern				S2	6	47.3 ± 7.0	NS
P	*Symphyotrichum boreale*	Boreal Aster				S2?	57	33.3 ± 0.0	NS
P	*Cuscuta cephalanthi*	Buttonbush Dodder				S2?	5	47.1 ± 7.0	NS
P	*Epilobium coloratum*	Purple-veined Willowherb				S2?	6	19.7 ± 0.0	NS
P	*Rumex persicarioides*	Peach-leaved Dock				S2?	1	58.6 ± 0.0	NS
P	*Crataegus submollis*	Quebec Hawthorn				S2?	2	76.9 ± 7.0	NS
P	*Eleocharis ovata*	Ovate Spikerush				S2?	3	44.7 ± 0.0	NS
P	*Scirpus pedicellatus*	Stalked Bulrush				S2?	6	14.3 ± 0.0	NS
P	*Hieracium robinsonii*	Robinson's Hawkweed				S2S3	3	92.6 ± 1.0	NS
P	*Senecio pseudoarnica*	Seabeach Ragwort				S2S3	10	14.4 ± 1.0	NS
P	*Betula michauxii*	Michaux's Dwarf Birch				S2S3	14	55.1 ± 0.0	NS
P	*Sagina nodosa*	Knotted Pearlwort				S2S3	3	29.7 ± 5.0	NS
P	*Hypericum x dissimulatum*	Disguised St. John's-wort				S2S3	2	34.4 ± 1.0	NS
P	*Triosteum aurantiacum*	Orange-fruited Tinker's Weed				S2S3	157	34.4 ± 0.0	NS
P	*Shepherdia canadensis*	Soapberry				S2S3	136	56.0 ± 0.0	NS

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P	*Empetrum atropurpureum*	Purple Crowberry				S2S3	1	30.0 ± 3.0	NS
P	*Euphorbia polygonifolia*	Seaside Spurge				S2S3	13	33.0 ± 0.0	NS
P	*Halenia deflexa*	Spurred Gentian				S2S3	30	14.5 ± 0.0	NS
P	*Hedeoma pulegioides*	American False Pennyroyal				S2S3	2	73.7 ± 5.0	NS
P	*Polygonum aviculare ssp. buxiforme*	Box Knotweed				S2S3	1	97.3 ± 7.0	NS
P	*Polygonum oxyspermum ssp. raii*	Ray's Knotweed				S2S3	10	32.3 ± 1.0	NS
P	*Amelanchier fernaldii*	Fernald's Serviceberry				S2S3	4	40.3 ± 1.0	NS
P	*Potentilla canadensis*	Canada Cinquefoil				S2S3	1	4 0 ± 2.0	NS
P	*Galium aparine*	Common Bedstraw				S2S3	2	57.3 ± 0.0	NS
P	*Salix pellita*	Satiny Willow				S2S3	5	14.7 ± 1.0	NS
P	*Carex adusta*	Lesser Brown Sedge				S2S3	1	94.2 ± 5.0	NS
P	*Carex hirtifolia*	Pubescent Sedge				S2S3	11	18.6 ± 0.0	NS
P	*Eleocharis flavescens var. olivacea*	Bright-green Spikerush				S2S3	3	62.4 ± 0.0	NS
P	*Eriophorum gracile*	Slender Cottongrass				S2S3	8	35.7 ± 0.0	NS
P	*Oreojuncus trifidus*	Highland Rush				S2S3	2	47.7 ± 0.0	NS
P	*Cypripedium parviflorum*	Yellow Lady's-slipper				S2S3	102	22.8 ± 0.0	NS
P	*Poa glauca*	Glaucous Blue Grass				S2S3	11	47.9 ± 0.0	NS
P	*Stuckenia filiformis*	Thread-leaved Pondweed				S2S3	41	11.6 ± 0.0	NS
P	*Botrychium lanceolatum ssp. angustisegmentum*	Narrow Triangle Moonwort				S2S3	7	30.0 ± 0.0	NS
P	*Botrychium simplex*	Least Moonwort				S2S3	3	42.6 ± 5.0	NS
P	*Ophioglossum pusillum*	Northern Adder's-tongue				S2S3	1	90.6 ± 5.0	NS
P	*Angelica atropurpurea*	Purple-stemmed Angelica				S3	26	11.0 ± 0.0	NS
P	*Erigeron hyssopifolius*	Hyssop-leaved Fleabane				S3	79	47.5 ± 0.0	NS
P	*Bidens beckii*	Water Beggarticks				S3	9	60.6 ± 0.0	NS
P	*Packera paupercula*	Balsam Groundsel				S3	156	18.6 ± 0.0	NS
P	*Betula pumila var. pumila*	Bog Birch				S3	2	57.6 ± 7.0	NS
P	*Betula pumila*	Bog Birch				S3	9	34.6 ± 0.0	NS
P	*Campanula aparinoides*	Marsh Bellflower				S3	5	45.3 ± 5.0	NS
P	*Viburnum edule*	Squashberry				S3	1	98.1 ± 7.0	NS
P	*Empetrum eamesii*	Pink Crowberry				S3	1	87.8 ± 0.0	NS
P	*Vaccinium boreale*	Northern Blueberry				S3	25	40.3 ± 1.0	NS
P	*Vaccinium cespitosum*	Dwarf Bilberry				S3	20	65.7 ± 7.0	NS
P	*Vaccinium uliginosum*	Alpine Bilberry				S3	3	67.5 ± 0.0	NS
P	*Bartonia virginica*	Yellow Bartonia				S3	1	26.3 ± 0.0	NS
P	*Proserpinaca palustris*	Marsh Mermaidweed				S3	53	13.5 ± 0.0	NS
P	*Teucrium canadense*	Canada Germander				S3	69	8.4 ± 0.0	NS
P	*Decodon verticillatus*	Swamp Loosestrife				S3	5	30.0 ± 7.0	NS
P	*Epilobium hornemannii*	Hornemann's Willowherb				S3	7	79.3 ± 2.0	NS
P	*Epilobium strictum*	Downy Willowherb				S3	21	11.6 ± 5.0	NS
P	*Polygala sanguinea*	Blood Milkwort				S3	2	50.0 ± 0.0	NS
P	*Persicaria pensylvanica*	Pennsylvania Smartweed				S3	10	11.8 ± 1.0	NS
P	*Fallopia scandens*	Climbing False Buckwheat				S3	17	13.6 ± 0.0	NS
P	*Plantago rugelii*	Rugel's Plantain				S3	1	41.6 ± 0.0	NS
P	*Primula laurentiana*	Laurentian Primrose				S3	1	90.3 ± 7.0	NS
P	*Samolus parviflorus*	Seaside Brookweed				S3	21	34.9 ± 0.0	NS
P	*Pyrola asarifolia*	Pink Pyrola				S3	6	39.1 ± 0.0	NS
P	*Pyrola minor*	Lesser Pyrola				S3	8	48.3 ± 2.0	NS
P	*Ranunculus gmelinii*	Gmelin's Water Buttercup				S3	134	17.4 ± 0.0	NS
P	*Endotropis alnifolia*	alder-leaved buckthorn				S3	465	14.6 ± 0.0	NS
P	*Agrimonia gryposepala*	Hooked Agrimony				S3	269	18.6 ± 0.0	NS
P	*Amelanchier spicata*	Running Serviceberry				S3	7	15.4 ± 0.0	NS
P	*Galium kamtschaticum*	Northern Wild Licorice				S3	10	43.0 ± 0.0	NS
P	*Geocaulon lividum*	Northern Comandra				S3	77	9.4 ± 0.0	NS
P	*Limosella australis*	Southern Mudwort				S3	6	33.0 ± 5.0	NS

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P	*Lindernia dubia*	Yellow-seeded False Pimperel				S3	4	18.6 ± 0.0	NS
P	*Laportea canadensis*	Canada Wood Nettle				S3	18	13.6 ± 0.0	NS
P	*Verbena hastata*	Blue Vervain				S3	35	44.8 ± 0.0	NS
P	*Carex cryptolepis*	Hidden-scaled Sedge				S3	15	19.9 ± 0.0	NS
P	*Carex eburnea*	Bristle-leaved Sedge				S3	163	46.9 ± 0.0	NS
P	*Carex lupulina*	Hop Sedge				S3	9	59.1 ± 0.0	NS
P	*Carex rosea*	Rosy Sedge				S3	6	50.2 ± 0.0	NS
P	*Carex tribuloides*	Blunt Broom Sedge				S3	14	20.6 ± 1.0	NS
P	*Carex wiegandii*	Wiegand's Sedge				S3	2	11.1 ± 0.0	NS
P	*Carex foenea*	Fernald's Hay Sedge				S3	1	83.5 ± 0.0	NS
P	*Schoenoplectus americanus*	Olney's Bulrush				S3	1	57.1 ± 0.0	NS
P	*Elodea canadensis*	Canada Waterweed				S3	8	65.6 ± 0.0	NS
P	*Juncus subcaudatus*	Woods-Rush				S3	8	36.7 ± 1.0	NS
P	*Juncus dudleyi*	Dudley's Rush				S3	83	34.0 ± 0.0	NS
P	*Goodyera oblongifolia*	Menzies' Rattlesnake-plantain				S3	13	77.3 ± 7.0	NS
P	*Goodyera repens*	Lesser Rattlesnake-plantain				S3	21	19.8 ± 0.0	NS
P	*Neottia bifolia*	Southern Twayblade				S3	47	9 2 ± 0.0	NS
P	*Platanthera grandiflora*	Large Purple Fringed Orchid				S3	49	12.9 ± 0.0	NS
P	*Platanthera hookeri*	Hooker's Orchid				S3	3	16.2 ± 0.0	NS
P	*Platanthera orbiculata*	Small Round-leaved Orchid				S3	6	30.1 ± 5.0	NS
P	*Spiranthes ochroleuca*	Yellow Ladies'-tresses				S3	4	33.5 ± 0.0	NS
P	*Alopecurus aequalis*	Short-awned Foxtail				S3	16	19.7 ± 0.0	NS
P	*Dichanthelium clandestinum*	Deer-tongue Panic Grass				S3	81	75.4 ± 0.0	NS
P	*Potamogeton obtusifolius*	Blunt-leaved Pondweed				S3	19	19.7 ± 0.0	NS
P	*Potamogeton praelongus*	White-stemmed Pondweed				S3	14	14.8 ± 0.0	NS
P	*Potamogeton zosteriformis*	Flat-stemmed Pondweed				S3	9	57.3 ± 7.0	NS
P	*Sparganium natans*	Small Burreed				S3	16	25.5 ± 0.0	NS
P	*Asplenium trichomanes*	Maidenhair Spleenwort				S3	9	16.2 ± 0.0	NS
P	*Asplenium viride*	Green Spleenwort				S3	28	24.9 ± 0.0	NS
P	*Equisetum pratense*	Meadow Horsetail				S3	21	35.5 ± 0.0	NS
P	*Equisetum variegatum*	Variegated Horsetail				S3	38	13.8 ± 0.0	NS
P	*Isoetes tuckermanii ssp. acadiensis*	Acadian Quillwort				S3	8	26.3 ± 1.0	NS
P	*Diphasiastrum sitchense*	Sitka Ground-cedar				S3	23	15.1 ± 0.0	NS
P	*Huperzia appressa*	Mountain Firmoss				S3	2	51.6 ± 1.0	NS
P	*Sceptridium dissectum*	Dissected Moonwort				S3	2	78.2 ± 1.0	NS
P	*Polypodium appalachianum*	Appalachian Polypody				S3	4	39.2 ± 0.0	NS
P	*Persicaria amphibia var. emersa*	Long-root Smartweed				S3?	1	69.7 ± 0.0	NS
P	*Diphasiastrum x sabinifolium*	Savin-leaved Ground-cedar				S3?	9	51.0 ± 1.0	NS
P	*Atriplex glabriuscula var. franktonii*	Frankton's Saltbush				S3S4	8	12.7 ± 0.0	NS
P	*Suaeda calceoliformis*	Horned Sea-blite				S3S4	2	30.4 ± 0.0	NS
P	*Myriophyllum sibiricum*	Siberian Water Milfoil				S3S4	13	19.9 ± 0.0	NS
P	*Sanguinaria canadensis*	Bloodroot				S3S4	182	18.6 ± 0.0	NS
P	*Polygonum fowleri*	Fowler's Knotweed				S3S4	2	56.9 ± 0.0	NS
P	*Fragaria vesca ssp. americana*	Woodland Strawberry				S3S4	72	14.0 ± 0.0	NS
P	*Fragaria vesca*	Woodland Strawberry				S3S4	2	65.7 ± 0.0	NS
P	*Salix petiolaris*	Meadow Willow				S3S4	4	34.4 ± 0.0	NS
P	*Agalinis neoscotica*	Nova Scotia Agalinis				S3S4	2	53.4 ± 0.0	NS
P	*Carex argyrantha*	Silvery-flowered Sedge				S3S4	1	63.8 ± 0.0	NS
P	*Eriophorum russeolum*	Russet Cottongrass				S3S4	5	11.2 ± 1.0	NS
P	*Sisyrinchium atlanticum*	Eastern Blue-Eyed-Grass				S3S4	1	79.5 ± 0.0	NS
P	*Triglochin gaspensis*	Gasp├⌐ Arrowgrass				S3S4	6	7 9 ± 0.0	NS
P	*Juncus acuminatus*	Sharp-Fruit Rush				S3S4	4	46.3 ± 0.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
P	*Luzula parviflora ssp. melanocarpa*	Black-fruited Woodrush				S3S4	9	66.5 ± 0.0	NS
P	*Liparis loeselii*	Loesel's Twayblade				S3S4	16	14.8 ± 1.0	NS
P	*Panicum philadelphicum*	Philadelphia Panicgrass				S3S4	1	25.0 ± 0.0	NS
P	*Trisetum spicatum*	Narrow False Oats				S3S4	5	48.2 ± 0.0	NS
P	*Cystopteris bulbifera*	Bulblet Bladder Fern				S3S4	430	13.8 ± 0.0	NS
P	*Equisetum hyemale ssp. affine*	Common Scouring-rush				S3S4	47	14.1 ± 11.0	NS
P	*Equisetum scirpoides*	Dwarf Scouring-Rush				S3S4	74	35.3 ± 0.0	NS
P	*Diphasiastrum complanatum*	Northern Ground-cedar				S3S4	4	30.1 ± 5.0	NS
P	*Schizaea pusilla*	Little Curlygrass Fern				S3S4	18	22.8 ± 0.0	NS
P	*Viola canadensis*	Canada Violet				SH	1	54.9 ± 0.0	NS

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The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

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Atlantic Canada Conservation Data Centre
Data Dictionary

Revised: July 21, 2021

I. Biodiversity Database

The following fields of data may be included (and may or may not be populated) in occurrence records.
Text fields are 255 char max. (and may truncate text).

TAXONOMY		
Field	***Type***	***Definition***
MCODE	TXT	8 character 'Museum Code' (1 to 4 = genus, 5 to 8 = sp+ssp)
ELCODE	TXT	Unique Identifier of taxon
SCINAME	TXT	Global Scientific Name of taxon
COMNAME	TXT	English Common Name of taxon
NOMCOMMUN	TXT	French Common Name

LOCATION		
Field	***Type***	***Definition***
SURVEYSITE	TXT	General locality of occurrence
DIRECTIONS	TXT	Specific locality: e.g. bearings and distance from enduring landmark
SUBNAT	TXT	Province/State: 2 character ISO code
COCODE	TXT	County Code (2 chars for province + 4 chars for county name)
MAPCODE	TXT	Map number: NTS identifier in Canada
UTME20	INT	Easting in UTM Zone 20
UTMN20	INT	Northing in UTM Zone 20
LONDEC	DEC	Decimal Longitude
LATDEC	DEC	Decimal Latitude
LOCUNCM	INT	Horizontal precision in metres
PREC	DEC	Precision in metres by power of 10 (e.g. 3 = 10 to the 3rd = 1000 m = 1 km):

prec	*common speech*	*example*	*unit size*	*literal range*
6.0	within province	province	1000.0 km	562.3 - 1778.3 km
5.7	in part of province	'NW NB'	500.0 km	281.2 - 889.1 km
5.0	within in county	county	100.0 km	56.2 - 177.8 km
4.7	within 50s of kilometres		50.0 km	28.1 - 88.9 km
4.0	within 10s of kilometres	BBA grid	10.0 km	5.6 - 17 8 km
3.7	within 5s of kilometres		5.0 km	2.8 - 8.9 km
3.0	within kilometres	topo grid	1.0 km	0.6 - 1.8 km
2.7	within 500s of metres		500.0 m	281.2 - 889.1 m
2.0	within 100s of metres	ball field	100.0 m	56.2 - 177.8 m
1.7	within 50s of metres		50.0 m	28.1 - 88.9 m
1.0	within 10s of metres	boxcar	10.0 m	5.6 - 17.8 m
0.7	within 5s of metres		5 0 m	2.8 - 8.9 m
0.0	***NOT USED***	pace	1 0 m	0.6 - 1.8 m
-1.0	within 10s of centimetres	fingernail	0.1 m	0.1 - 0.2 m

RARITY / STATUS		
Field	***Type***	***Definition***
NRANK	TXT	National Rarity Rank of taxon (in Canada)
NPROT	TXT	National Protection Status of taxon (i.e., COSEWIC in Canada)
NPROTSAR	TXT	National Protection Status of taxon (i.e., SARA in Canada):

code	*Rank and short definition*
X	Extinct in Canada and elsewhere
XT	Extirpated in Canada but surviving elsewhere
E	Endangered in Canada
T	Threatened in Canada
V	Vulnerable in Canada
SC	Special Concern in Canada
DD	Data Deficient: data inadequate for assessment
NAR	Not At Risk in Canada

SRANK	TXT	Subnational (Provincial) Rarity Rank of taxon:

code	*Rank and short definition*
SX	Extinct or extirpated in province
SH	Historically occurring but curren ly undetected in province
S1	Extremely rare in province
S2	Rare in province

		S3	Uncommon in province
		S4	Widespread, common and apparently secure in province
		S5	Widespread, abundant and demonstrably secure in province
		SE	Exotic in province
		SA	Accidental, infrequent and outside of range within province
		SNA	Ranking not applicable in province
		SNR	Not yet assessed in province
IUCN	TXT	International Union of Conservation Naturalists rarity rank:	
		code	***Rank and short definition***
		EX	Extinct: no individuals remaining
		EW	Extinct in the Wild: only captive or naturalised survivors
		CR	Cri ically Endangered: extreme risk of extinction in wild
		EN	Endangered: high risk of extinction in wild
		VU	Vulnerable: high risk of endangerment in wild
		NT	Near Threatened: likely to become endangered soon
		LC	Least Concern: lowest risk, widespread and abundant
		DD	Data Deficient: data inadequate for assessment
		NE	Not Evaluated, not yet assessed against criteria
OBSERVATION			
Field	***Type***	***Definition***	
OBSERVER	TXT	Individual(s) that observed the taxon	
OBDATE	TXT	Date of observation (YYYY MM DD)	
OBDATA	TXT	Concatenation of fields below, relating to observation	
OBEVID	TXT	Type of evidence (e.g., specimen, photo)	
OBCOUNT	TXT	Number of individuals at location	
OBABUN	TXT	Relative rarity of taxon at location, e.g. 'common', 'scattered'	
OBSIZE	TXT	Size of individual	
SIZE	TXT	Size of occurrence 'patch' (in m^2, ha or acres)	
OBDESC	TXT	Details of specimen appearance or conditions	
OBPHEN	TXT	Lifestage of individual (e.g., bud, flowering)	
OBSEX	TXT	Male/female if relevant	
OBACTIV	TXT	Activity of individual when observed (e.g., nesting, crossing road)	
OBASSP	TXT	Other taxa associated with the observation	
NOTETAX	TXT	Identifier's note on taxonomic issues	
GENDESC	TXT	Concatenation of fields below, relating to site	
HABITAT	TXT	Habitat characterization of location	
ECODIST	NUM	National Ecological Framework EcoDistrict identifier	
WSCODE	TXT	Quaternary Watershed identifier	
GENCOM	TXT	General Comments: concatenation of Notes (NOTE1, NOTE2, NOTE3)	
COLLECTION			
Field	***Type***	***Definition***	
CITATION	TXT	Primary source of data	
DATA MANAGEMENT			
Field	***Type***	***Definition***	
IDNUM	TXT	AC CDC record Unique ID	
EDITION	TXT	Last editor's initials and date (YYYY MM DD)	

II. Managed and Biologically Significant Areas (MSA) Database

The following fields of data may be included (and may or may not be populated) for Managed and Biologically Significant Areas.

IDENTITY AND DESCRIPTION		
Field	***Type***	***Definition***
msaGIS	INT	Unique GIS feature identifier
msaCode	TXT	Unique identifier for the MSA feature
msaClass	TXT	Whether the MSA feature is a Managed Area (MA) or biologically Significant Area (SA)
msaName	TXT	MSA feature name
msaNameFr	TXT	MSA feature name (French)
description	TXT	Description of the MSA feature
notes	TXT	Additional notes about the MSA feature
JURISDICTION / OWNERSHIP		
Field	***Type***	***Definition***
localJuris	TXT	Mandated agency with jurisdiction over property
owner	TXT	Property owner
ownerCom	TXT	Details of multiparty arrangements

ownerDate	TXT	Date of property possession	
CLASSIFICATION			
Field	***Type***	***Definition***	
protStat	TXT	Activities permitted or restricted (when known)	
legalAct	TXT	Title of enabling legislation	
legalDate	TXT	Year of enabling legislation	
estabDate	TXT	Year of site designation	
aichit11	TXT	Whether the site counts towards the Aichi Target 11 and Canada Target 1 biodiversity targets (yes or no)	
oecm	TXT	Other effective area-based conservation means (yes or no)	
iucnCat	TXT	IUCN protected area category. For complete category descriptions, visit https://www.iucn.org/theme/protected-areas/about/protected-area-categories. Features categorized as "YES" are sites which meet the standard definition of a protected area, but the category of protection has not yet been determined and features categorized as "N/A" are other area-based conservation measures or sites that do not meet the protected area definition (2018 Canadian Protected and Conserved Areas Database (CPCAD) User Manual).	
msaType	TXT	MSA feature type:	
		group	***Designation***
		Conservation	Conservation Area
			Conservation Easement
			Fee-Simple Ownership by Environmental Non-Governmental Conservation Organization
			Land Trust Property
			Natural Area
			Nature Preserve
			Nature Reserve
			Nature Reserve and Conservation Easement
			Nature Trail
			Other Effective Area-Based Conservation Measure
			Privately Owned Conservation Area
			Privately Owned Natural Area
			Protected Area
			Protected Beach
			Protected Natural Area
			Provincially Owned Natural Area
			To be determined
		Heritage	Heritage River
			Museum
			National Historic Event
			National Historic Site
			Provincial Heritage Site
			Provincial Historic Site
			Provincial Historic/Heritage Park
			UNESCO World Heritage Site
		Parks	Municipal Park
			National Park
			Nature Park
			Park
			Privately Owned Park
			Provincial Park
			Provincial Park Beach
		Wilderness	Ecological Reserve
			Environmentally Sensitive Area
			Significant Ecological Area
			Significant Ecological Area/International Biological Program
			Wilderness Area
			Wilderness Reserve
		Wildlife	Eastern Habitat Joint Venture
			Important Bird Area (IBA)
			Marine Protected Area
			Migratory Bird Sanctuary
			National Wildlife Area
			Privately Owned Wildlife Management Area
			Provincial Wildlife Management Area
			Wildlife Management Area
			Wildlife Park
			Wildlife Refuge
			Wildlife Reserve
			Wildlife Sanctuary
		Other	Education Area
			Experimental Area
			Federal Corrections Facility
			Fossil Site
			International Biological Program

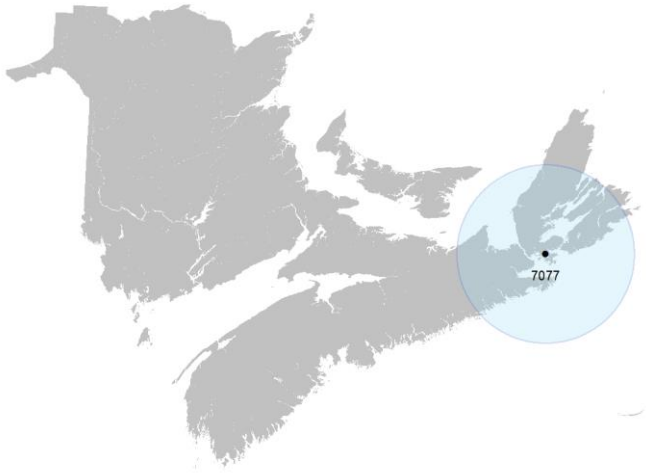
			Memorial Site
			Other Managed Area
			RAMSAR Wetland Site
			Special Management Area
			Water Supply Area
			Watershed
LOCATION AND SPATIAL ATTRIBUTES			
Field	***Type***	***Definition***	
subnat	TXT	Two-letter jurisdiction code (NB, NS, PE, NF, LB)	
location	TXT	Directions to the MSA feature	
biome	TXT	Whether an MSA feature falls within the terrestrial (T) or marine (M) environment	
mapCode	TXT	The National Topographic System (NTS) map square the centre of the MSA feature falls within	
coCode	TXT	Provincial county code (2 chars for province + 4 chars for county name)	
latDec	DEC	Latitude of the centre of the MSA feature	
lonDec	DEC	Longitude of the centre of the MSA feature	
utmE20	INT	Easting of the centre of the MSA feature (NAD83 UTM Zone 20N)	
utmN20	INT	Northing of the centre of the MSA feature (NAD83 UTM Zone 20N)	
extentN	DEC	Northern extent of the MSA feature	
extentS	DEC	Southern extent of the MSA feature	
extentE	DEC	Eastern extent of the MSA feature	
extentW	DEC	Western extent of the MSA feature	
areaHa	DEC	Area of the polygon (ha)	
SOURCE ATTRIBUTES			
Field	***Type***	***Definition***	
sourceId	TXT	Unique ID of the MSA feature in the source dataset	
jurisId	TXT	Unique ID of the MSA feature in the original dataset	
srcFeatType	TXT	Whether the feature was a point (PT) or polygon feature (PY) in the source dataset. True boundaries of point MSA features are not known. Points have been buffered by 15m to be included in this MSA database	
url	TXT	Associated website holding additional information about the source feature or database	
bestSource	TXT	Unique identifier for the source database	
citation	TXT	Primary source of data	
edition	TXT	Initials and date (YYYY MM DD) pertaining to the last edit to the MSA feature	

Atlantic Canada Conservation Data Centre
Centre de données sur la conservation du Canada atlantique

DATA REPORT 7077: Lazares Island, NS

Prepared 28 September 2021
by [redacted], Data Manager

CONTENTS OF REPORT



Map 1. A 100 km buffer around the study area

1.0 PREFACE

The Atlantic Canada Conservation Data Centre (AC CDC; www.accdc.com) is part of a network of NatureServe data centres and heritage programs serving 50 states in the U.S.A, 10 provinces and 1 territory in Canada, plus several Central and South American countries. The NatureServe network is more than 30 years old and shares a common conservation data methodology. The AC CDC was founded in 1997, and maintains data for the jurisdictions of New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. Although a non-governmental agency, the AC CDC is supported by 6 federal agencies and 4 provincial governments, as well as through outside grants and data processing fees.

Upon request and for a fee, the AC CDC queries its database and produces customized reports of the rare and endangered flora and fauna known to occur in or near a specified study area. As a supplement to that data, the AC CDC includes locations of managed areas with some level of protection, and known sites of ecological interest or sensitivity.

1.1 DATA LIST

Included datasets:

Filename	Contents
LazaresIsNS_7077ob xls	Rare or legally-protected Flora and Fauna in your study area
LazaresIsNS_7077ob100km xls	A list of Rare and legally protected Flora and Fauna within 100 km of your study area
LazaresIsNS_7077msa.xls	Managed and Biologically Significant Areas in your study area

1.2 RESTRICTIONS

The AC CDC makes a strong effort to verify the accuracy of all the data that it manages, but it shall not be held responsible for any inaccuracies in data that it provides. By accepting AC CDC data, recipients assent to the following limits of use:

a) Data is restricted to use by trained personnel who are sensitive to landowner interests and to potential threats to rare and/or endangered flora and fauna posed by the information provided.
b) Data is restricted to use by the specified Data User; any third party requiring data must make its own data request.
c) The AC CDC requires Data Users to cease using and delete data 12 months after receipt, and to make a new request for updated data if necessary at that time.
d) AC CDC data responses are restricted to the data in our Data System at the time of the data request.
e) Each record has an estimate of locational uncertainty, which must be referenced in order to understand the record's relevance to a particular location. Please see attached Data Dictionary for details.
f) AC CDC data responses are not to be construed as exhaustive inventories of taxa in an area.
g) The absence of a taxon cannot be inferred by its absence in an AC CDC data response.

1.3 ADDITIONAL INFORMATION

The accompanying Data Dictionary provides metadata for the data provided.

Please direct any additional questions about AC CDC data to the following individuals:

Plants, Lichens, Ranking Methods, All other Inquiries
[redacted], Senior Scientist, Executive Director
[redacted]

Animals (Fauna)
[redacted], Zoologist
[redacted]

Plant Communities
[redacted], Community Ecologist
[redacted]

Data Management, GIS
[redacted]l, Data Manager
[redacted]

Billing
[redacted]

Questions on the biology of Federal Species at Risk can be directed to AC CDC: (506) 364-2658, with questions on Species at Risk regulations to: Samara Eaton, Canadian Wildlife Service (NB and PE): (506) 364-5060 or Julie McKnight, Canadian Wildlife Service (NS): (902) 426-4196.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in New Brunswick, please contact Hubert Askanas, Energy and Resource Development: (506) 453-5873.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in Nova Scotia, please contact Donna Hurlburt, NS DLF: (902) 679-6886. To determine if location-sensitive species (section 4.3) occur near your study site please contact a NS DLF Regional Biologist:

Western: Emma Vost
(902) 670-8187
Emma.Vost@novascotia.ca

Western: Sarah Spencer
(902) 541-0081
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Eastern: Maureen Cameron-MacMillan
(902) 295-2554
Maureen.Cameron-MacMillan@novascotia.ca

Eastern: Elizabeth Walsh
(902) 563-3370
Elizabeth.Walsh@novascotia.ca

For provincial information about rare taxa and protected areas, or information about game animals, fish habitat etc., in Prince Edward Island, please contact Garry Gregory, PEI Dept. of Communities, Land and Environment: (902) 569-7595.

2.0 RARE AND ENDANGERED SPECIES

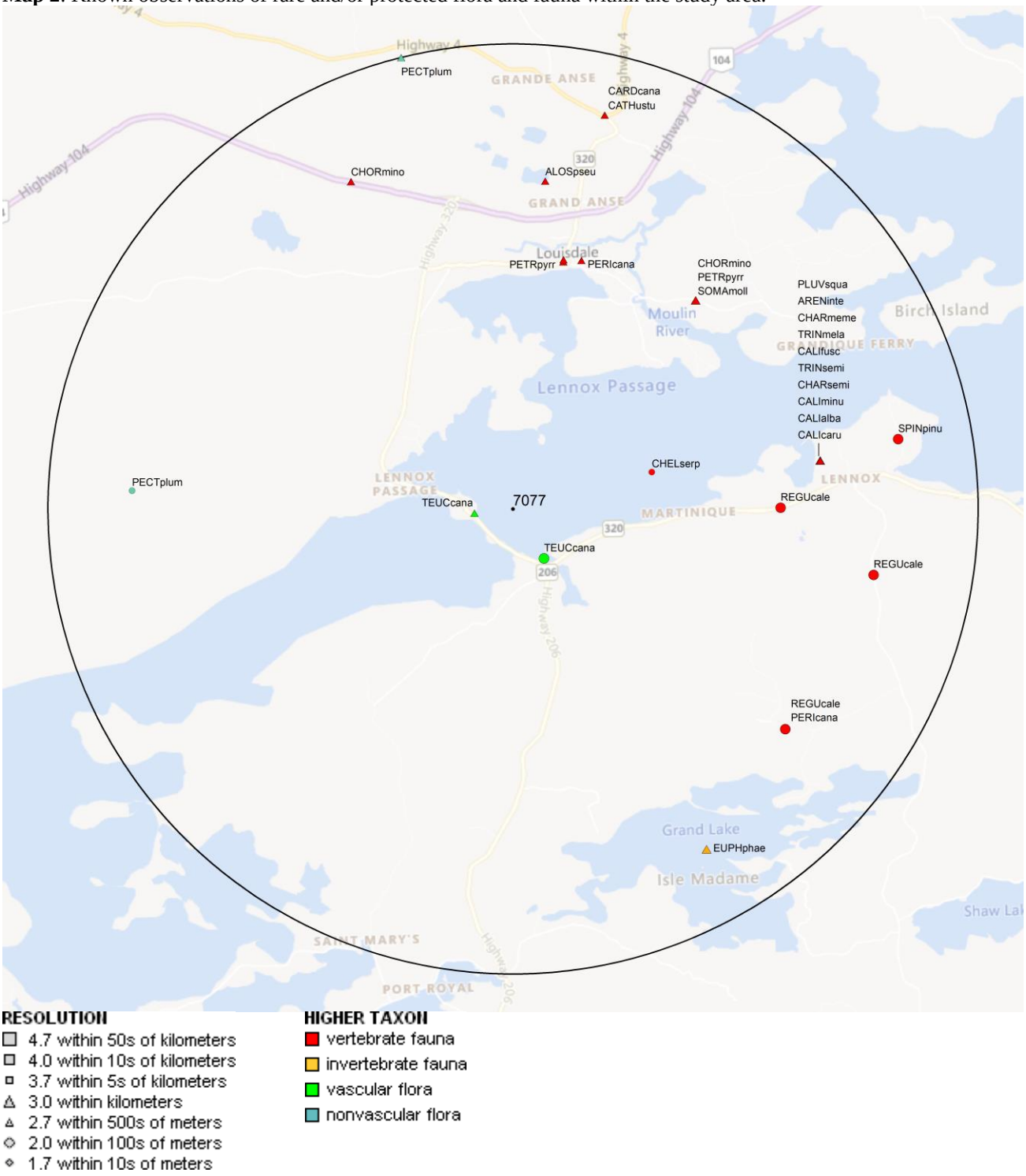
2.1 FLORA

The study area contains 2 records of 1 vascular, 5 records of 1 nonvascular flora (Map 2 and attached: *ob.xls).

2.2 FAUNA

The study area contains 31 records of 20 vertebrate, 1 record of 1 invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if 'location-sensitive' species occur near your study site.

Map 2: Known observations of rare and/or protected flora and fauna within the study area.



3.0 SPECIAL AREAS

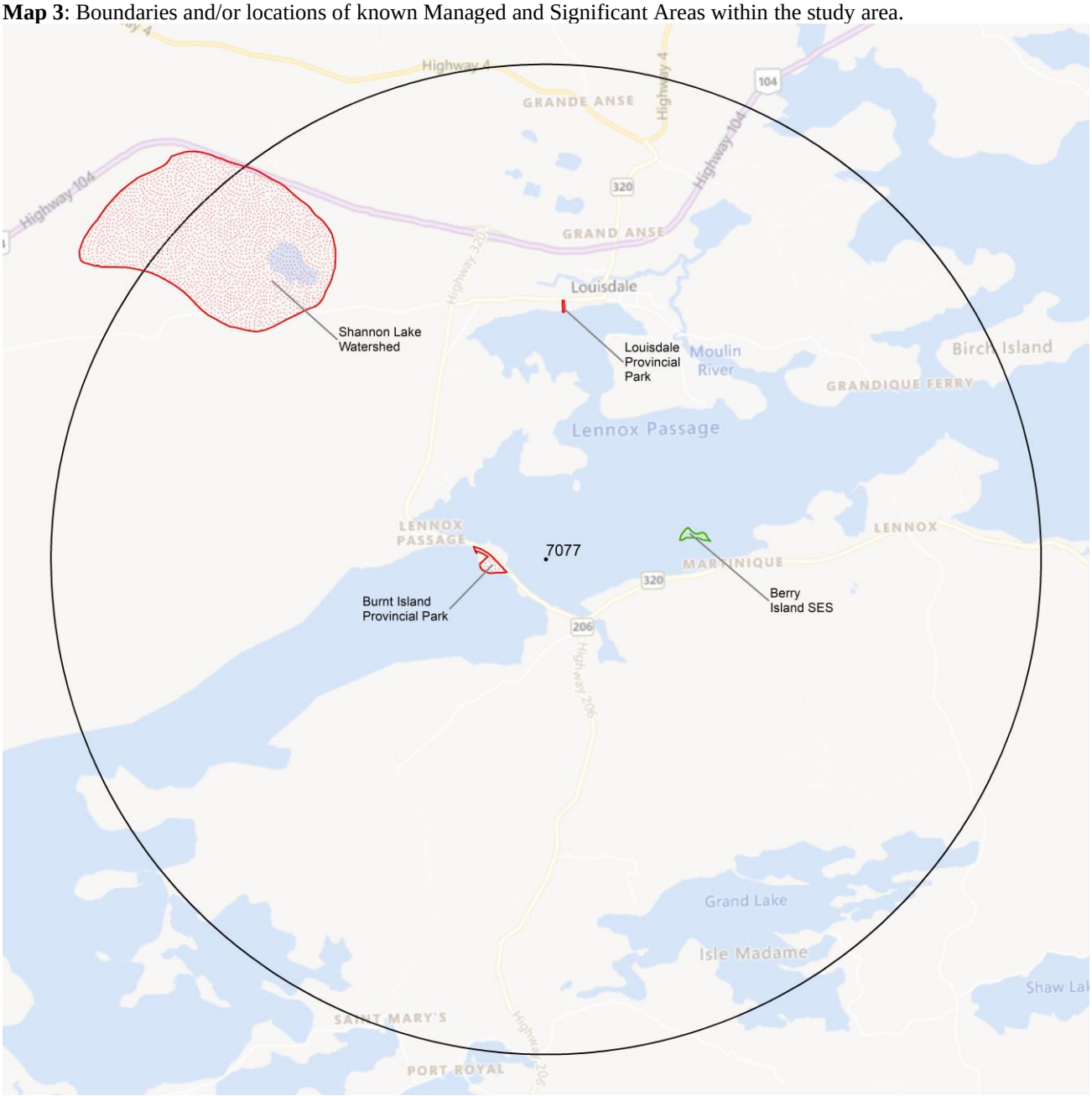
3.1 MANAGED AREAS

The GIS scan identified 3 managed areas in the vicinity of the study area (Map 3 and attached file: *msa.xls).

3.2 SIGNIFICANT AREAS

The GIS scan identified 1 biologically significant site in the vicinity of the study area (Map 3 and attached file: *msa.xls).

Map 3: Boundaries and/or locations of known Managed and Significant Areas within the study area.



4.0 RARE SPECIES LISTS

Rare and/or endangered taxa (excluding "location-sensitive" species, section 4.3) within the study area listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record). [P] = vascular plant, [N] = nonvascular plant, [A] = vertebrate animal, [I] = invertebrate animal, [C] = community. Note: records are from attached files *ob.xls/*ob.shp only.

4.1 FLORA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
N	*Pectenia plumbea*	Blue Felt Lichen	Special Concern	Special Concern	Vulnerable	S3	5	4.1 ± 0.0
P	*Teucrium canadense*	Canada Germander				S3	2	0.4 ± 0.0

4.2 FAUNA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
A	*Charadrius melodus melodus*	Piping Plover melodus ssp	Endangered	Endangered	Endangered	S1B	1	3.3 ± 1.0
A	*Chordeiles minor*	Common Nighthawk	Special Concern	Threatened	Threatened	S2B	2	3.0 ± 0.0
A	*Chelydra serpentina*	Snapping Turtle	Special Concern	Special Concern	Vulnerable	S3	1	1.5 ± 0.0
A	*Cardellina canadensis*	Canada Warbler	Special Concern	Threatened	Endangered	S3B	1	4.3 ± 0.0
A	*Calidris canutus rufa*	Red Knot rufa subspecies	E,SC	Endangered	Endangered	S2M	1	3.3 ± 0.0
A	*Calidris minutilla*	Least Sandpiper				S1B,S3M	1	3.3 ± 0.0
A	*Charadrius semipalmatus*	Semipalmated Plover				S1B,S3S4M	2	3.3 ± 0.0
A	*Spinus pinus*	Pine Siskin				S2S3	1	4.2 ± 0.0
A	*Tringa semipalmata*	Willet				S2S3B	1	3.3 ± 0.0
A	*Petrochelidon pyrrhonota*	Cliff Swallow				S2S3B	5	2.7 ± 0.0
A	*Perisoreus canadensis*	Canada Jay				S3	2	2.8 ± 0.0
A	*Alosa pseudoharengus*	Alewife				S3	1	3.5 ± 0.0
A	*Tringa melanoleuca*	Greater Yellowlegs				S3B,S3S4M	1	3.3 ± 0.0
A	*Pluvialis squatarola*	Black-bellied Plover				S3M	1	3.3 ± 0.0
A	*Arenaria interpres*	Ruddy Turnstone				S3M	1	3.3 ± 0.0
A	*Calidris fuscicollis*	White-rumped Sandpiper				S3M	1	3.3 ± 0.0
A	*Calidris alba*	Sanderling				S3M,S2N	1	3.3 ± 0.0
A	*Somateria mollissima*	Common Eider				S3S4	3	3.0 ± 1.0
A	*Regulus calendula*	Ruby-crowned Kinglet				S3S4B	3	2.9 ± 0.0
A	*Catharus ustulatus*	Swainson's Thrush				S3S4B	1	4.3 ± 0.0
I	*Euphydryas phaeton*	Baltimore Checkerspot				S2S3	1	4.2 ± 2.0

4.3 LOCATION SENSITIVE SPECIES

The Department of Natural Resources in each Maritimes province considers a number of species "location sensitive". Concern about exploitation of location-sensitive species precludes inclusion of precise coordinates in this report. Those intersecting your study area are indicated below with "YES".

Nova Scotia

Scientific *Name*	Common Name	SARA	Prov Legal Prot	Known within the Study Site?
Fraxinus nigra	Black Ash		Threatened	No
Emydoidea blandingii	*Blanding's Turtle - Nova Scotia pop.*	Endangered	Vulnerable	No
Glyptemys insculpta	Wood Turtle	Threatened	Threatened	No
Falco peregrinus pop. 1	Peregrine Falcon - anatum/tundrius pop.	Special Concern	Vulnerable	No
Bat hibernaculum or bat species occurrence		[Endangered][1]	[Endangered][1]	No

1 *Myotis lucifugus* (Little Brown Myotis), *Myotis septentrionalis* (Long-eared Myotis), and *Perimyotis subflavus* (Tri-colored Bat or Eastern Pipistrelle) are all Endangered under the Federal Species at Risk Act and the NS Endangered Species Act.

4.4 SOURCE BIBLIOGRAPHY

The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

# recs	CITATION
13	eBird. 2020. eBird Basic Dataset. Version: EBD_relFeb-2020. Ithaca, New York. Feb 2020, Cape Breton Bras d'Or Lakes Watershed subset. Cornell Lab of Ornithology, 5063 recs.
12	Benjamin, L.K. (compiler). 2012. Significant Habitat & Species Database. Nova Scotia Dept Natural Resources, 4965 recs.
4	Clayden, S. Digitization of Wolfgang Maass Nova Scotia forest lichen collec ions, 1964-2004. New Brunswick Museum. 2018.
4	Lepage, D. 2014. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 407,838 recs.
2	Nova Scotia Department of Lands and Forestry. 2020. NS Lands Proposed or Pending Protection. NSDLF, 231 features. Received via email.
1	Amirault, D.L. 1995. Atlantic Canada Conservation Area Database (ARCAD). Canadian Wildlife Service, Sackville.
1	Benjamin, L.K. (compiler). 2007. Significant Habitat & Species Database. Nova Scotia Dept Natural Resources, 8439 recs.
1	iNaturalist. 2020. iNaturalist Data Export 2020. iNaturalist.org and iNaturalist.ca, Web site: 128728 recs.
1	Layberry, R.A. & Hall, P.W., LaFontaine, J.D. 1998. The Butterflies of Canada. University of Toronto Press. 280 pp+plates.
1	Neily, T.H. & Pepper, C. 2020. Nova Scotia SMP lichen surveys 2020. Mersey Tobeatic Research Institute.
1	Newell, R.E. 2005. E.C. Smith Digital Herbarium. E.C. Smith Herbarium, Irving Biodiversity Collection, Acadia University, Web site: http://luxor.acadiau.ca/library/Herbarium/project/. 582 recs.
1	Power, T.; Gilhen, J. 2018. Status, distribution, and nesting ecology of Snapping Turtle (Chelydra serpentina) on Cape Breton Island, Nova Scotia, Canada. The Canadian Field Naturalist, 132(1): 8-17.
1	Roland, A.E. & Smith, E.C. 1969. The Flora of Nova Scotia, 1st Ed. Nova Scotia Museum, Halifax, 743pp.

5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 31171 records of 154 vertebrate and 750 records of 55 invertebrate fauna; 5894 records of 257 vascular, 2287 records of 115 nonvascular flora (attached: *ob100km.xls).

Taxa within 100 km of the study site that are rare and/or endangered in the province in which the study site occurs (including “location-sensitive” species). All ranks correspond to the province in which the study site falls, even for out-of-province records. Taxa are listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record).

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Myotis lucifugus*	Little Brown Myotis	Endangered	Endangered	Endangered	S1	69	7.9 ± 0.0	NS
A	*Salmo salar pop. 4*	Atlantic Salmon - Eastern Cape Breton pop.	Endangered			S1	46	12.3 ± 0.0	NS
A	*Salmo salar pop. 6*	Altantic Salmon - Nova Sco ia Southern Upland pop.	Endangered			S1	15	25.2 ± 1.0	NS
A	*Eubalaena glacialis*	North Atlantic Right Whale	Endangered	Endangered		S1	1	75.9 ± 1.0	NS
A	*Charadrius melodus melodus*	Piping Plover melodus ssp	Endangered	Endangered	Endangered	S1B	400	3.3 ± 1.0	NS
A	*Sterna dougallii*	Roseate Tern	Endangered	Endangered	Endangered	S1B	55	37.8 ± 7.0	NS
A	*Dermochelys coriacea (Atlantic pop)*	Leatherback Sea Turtle - Atlantic pop.	Endangered	Endangered		S1S2N	2	28.1 ± 0.0	NS
A	*Pagophila eburnea*	Ivory Gull	Endangered	Endangered		SNA	1	25.8 ± 0.0	NS
A	*Icteria virens*	Yellow-Breasted Chat	Endangered	Endangered		SNA	7	91.1 ± 0.0	NS
A	*Calcarius ornatus*	Chestnut-collared Longspur	Endangered	Threatened		SNA	7	88.7 ± 0.0	NS
A	*Antrostomus vociferus*	Eastern Whip-Poor-Will	Threatened	Threatened	Threatened	S1?B	3	67.0 ± 7.0	NS
A	*Catharus bicknelli*	Bicknell's Thrush	Threatened	Threatened	Endangered	S1S2B	29	15.8 ± 7.0	NS
A	*Asio flammeus*	Short-eared Owl	Threatened	Special Concern		S1S2B	5	61.6 ± 0.0	NS
A	*Limosa haemastica*	Hudsonian Godwit	Threatened			S1S2M	8	30.2 ± 0.0	NS
A	*Glyptemys insculpta*	Wood Turtle	Threatened	Threatened	Threatened	S2	3745	15.3 ± 0.0	NS
A	*Acipenser oxyrinchus*	Atlantic Sturgeon	Threatened			S2	1	68.5 ± 0.0	NS
A	*Anguilla rostrata*	American Eel	Threatened			S2	1	39.5 ± 0.0	NS
A	*Chaetura pelagica*	Chimney Swift	Threatened	Threatened	Endangered	S2B,S1M	93	26.4 ± 1.0	NS
A	*Riparia riparia*	Bank Swallow	Threatened	Threatened	Endangered	S2S3B	441	6.6 ± 7.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Oceanodroma leucorhoa*	Leach's Storm-Petrel	Threatened			S3B,S5M	22	25.0 ± 7.0	NS
A	*Tringa flavipes*	Lesser Yellowlegs	Threatened			S3M	170	13.7 ± 0.0	NS
A	*Dolichonyx oryzivorus*	Bobolink	Threatened	Threatened	Vulnerable	S3S4B	390	15.8 ± 7.0	NS
A	*Sturnella magna*	Eastern Meadowlark	Threatened	Threatened		SHB	2	37.8 ± 7.0	NS
A	*Hylocichla mustelina*	Wood Thrush	Threatened	Threatened		SUB	8	46.7 ± 0.0	NS
A	*Salmo salar pop. 12*	Atlantic Salmon - Gaspe - Southern Gulf of St Lawrence pop.	Special Concern			S1	19	41.3 ± 1.0	NS
A	*Passerculus sandwichensis princeps*	Savannah Sparrow princeps ssp	Special Concern	Special Concern		S1B	4	28.9 ± 0.0	NS
A	*Bucephala islandica (Eastern pop)*	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern		S1N	94	66.8 ± 4.0	NS
A	*Euphagus carolinus*	Rusty Blackbird	Special Concern	Special Concern	Endangered	S2B	215	5.9 ± 0.0	NS
A	*Chordeiles minor*	Common Nighthawk	Special Concern	Threatened	Threatened	S2B	186	3.0 ± 0.0	NS
A	*Contopus cooperi*	Olive-sided Flycatcher	Special Concern	Threatened	Threatened	S2B	884	5.1 ± 0.0	NS
A	*Histrionicus histrionicus pop. 1*	Harlequin Duck - Eastern pop.	Special Concern	Special Concern	Endangered	S2N	49	14.9 ± 0.0	NS
A	*Balaenoptera physalus*	Fin Whale	Special Concern	Special Concern		S2S3	2	44.0 ± 0.0	NS
A	*Hirundo rustica*	Barn Swallow	Special Concern	Threatened	Endangered	S2S3B	832	6.6 ± 7.0	NS
A	*Morone saxatilis pop. 1*	Striped Bass- Southern Gulf of St Lawrence pop.	Special Concern			S2S3N	1	66.2 ± 1.0	NS
A	*Chelydra serpentina*	Snapping Turtle	Special Concern	Special Concern	Vulnerable	S3	118	1.5 ± 0.0	NS
A	*Cardellina canadensis*	Canada Warbler	Special Concern	Threatened	Endangered	S3B	492	4.3 ± 0.0	NS
A	*Contopus virens*	Eastern Wood-Pewee	Special Concern	Special Concern	Vulnerable	S3S4B	423	16.2 ± 7.0	NS
A	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern	Special Concern	Vulnerable	S3S4B,S3N	714	8.7 ± 0.0	NS
A	*Phocoena phocoena*	Harbour Porpoise	Special Concern			S4	1	28.3 ± 0.0	NS
A	*Podiceps auritus*	Horned Grebe	Special Concern	Special Concern		S4N	13	10.0 ± 0.0	NS
A	*Chrysemys picta picta*	Eastern Painted Turtle	Special Concern			S4S5	1	77.2 ± 1.0	NS
A	*Calidris subruficollis*	Buff-breasted Sandpiper	Special Concern	Special Concern		SNA	2	30.2 ± 0.0	NS
A	*Ammodramus savannarum pratensis*	Grasshopper Sparrow, pratensis subspecies	Special Concern	Special Concern			1	71.3 ± 4.0	NS
A	*Lynx canadensis*	Canadian Lynx	Not At Risk		Endangered	S1	56	16.5 ± 1.0	NS
A	*Accipiter cooperii*	Cooper's Hawk	Not At Risk			S1?B	2	85.3 ± 7.0	NS
A	*Fulica americana*	American Coot	Not At Risk			S1B	5	47.1 ± 0.0	NS
A	*Chlidonias niger*	Black Tern	Not At Risk			S1B	4	53.5 ± 0.0	NS
A	*Falco peregrinus pop. 1*	Peregrine Falcon - anatum/tundrius	Not At Risk	Special Concern	Vulnerable	S1B,SNAM	7	17.7 ± 22.0	NS
A	*Sorex dispar*	Long-tailed Shrew	Not At Risk			S2	9	46.3 ± 0.0	NS
A	*Aegolius funereus*	Boreal Owl	Not At Risk			S2?B	7	53.5 ± 0.0	NS
A	*Hemidactylium scutatum*	Four-toed Salamander	Not At Risk			S3	18	25.4 ± 0.0	NS
A	*Megaptera novaeangliae*	Humpback Whale (NW Atlantic pop.)	Not At Risk			S3	2	27.8 ± 0.0	NS
A	*Sterna hirundo*	Common Tern	Not At Risk			S3B	645	5.1 ± 0.0	NS
A	*Sialia sialis*	Eastern Bluebird	Not At Risk			S3B	14	35.5 ± 7.0	NS
A	*Buteo lagopus*	Rough-legged Hawk	Not At Risk			S3N	9	9.2 ± 0.0	NS
A	*Accipiter gentilis*	Northern Goshawk	Not At Risk			S3S4	173	6.2 ± 0.0	NS
A	*Lagenorhynchus acutus*	Atlantic White-sided Dolphin	Not At Risk			S3S4	4	27.5 ± 0.0	NS
A	*Circus hudsonius*	Northern Harrier	Not At Risk			S3S4B	258	7.3 ± 7.0	NS
A	*Ammospiza nelsoni*	Nelson's Sparrow	Not At Risk			S3S4B	84	15.8 ± 7.0	NS
A	*Calidris canutus rufa*	Red Knot rufa subspecies	E,SC	Endangered	Endangered	S2M	22	3.3 ± 0.0	NS
A	*Morone saxatilis*	Striped Bass	E,SC			S2S3	6	62.8 ± 0.0	NS
A	*Martes americana*	American Marten			Endangered	S1	17	54.0 ± 1.0	NS
A	*Alces americanus*	Moose			Endangered	S1	50	22.1 ± 0.0	NS
A	*Picoides dorsalis*	American Three-toed Woodpecker				S1?	7	51.3 ± 0.0	NS
A	*Passerina cyanea*	Indigo Bunting				S1?B	8	53.0 ± 0.0	NS
A	*Uria aalge*	Common Murre				S1?B,S5N	7	17.8 ± 0.0	NS
A	*Nycticorax nycticorax*	Black-crowned Night-heron				S1B	2	62.6 ± 1.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Anas acuta*	Northern Pintail				S1B	17	26.9 ± 0.0	NS
A	*Oxyura jamaicensis*	Ruddy Duck				S1B	9	65.5 ± 4.0	NS
A	*Haematopus palliatus*	American Oystercatcher				S1B	7	25.0 ± 7.0	NS
A	*Myiarchus crinitus*	Great Crested Flycatcher				S1B	1	60.2 ± 3.0	NS
A	*Mimus polyglottos*	Northern Mockingbird				S1B	20	15.8 ± 7.0	NS
A	*Toxostoma rufum*	Brown Thrasher				S1B	3	52.2 ± 0.0	NS
A	*Vireo gilvus*	Warbling Vireo				S1B	6	15.8 ± 7.0	NS
A	*Setophaga pinus*	Pine Warbler				S1B	5	22.9 ± 0.0	NS
A	*Calidris minutilla*	Least Sandpiper				S1B,S3M	127	3.3 ± 0.0	NS
A	*Charadrius semipalmatus*	Semipalmated Plover				S1B,S3S4M	227	3.3 ± 0.0	NS
A	*Vespertilionidae sp.*	bat species				S1S2	125	8.1 ± 0.0	NS
A	*Pluvialis dominica*	American Golden-Plover				S1S2M	26	17.7 ± 1.0	NS
A	*Microtus chrotorrhinus*	Rock Vole				S2	14	46.3 ± 0.0	NS
A	*Vireo philadelphicus*	Philadelphia Vireo				S2?B	12	22.1 ± 0.0	NS
A	*Spatula clypeata*	Northern Shoveler				S2B	7	43.0 ± 0.0	NS
A	*Mareca strepera*	Gadwall				S2B	4	55.5 ± 7.0	NS
A	*Empidonax traillii*	Willow Flycatcher				S2B	8	63.2 ± 0.0	NS
A	*Setophaga tigrina*	Cape May Warbler				S2B	139	21.0 ± 7.0	NS
A	*Piranga olivacea*	Scarlet Tanager				S2B	8	35.8 ± 7.0	NS
A	*Pooecetes gramineus*	Vesper Sparrow				S2B	8	21.7 ± 7.0	NS
A	*Molothrus ater*	Brown-headed Cowbird				S2B	53	15.8 ± 7.0	NS
A	*Alca torda*	Razorbill				S2B,S4N	25	46.0 ± 0.0	NS
A	*Bucephala clangula*	Common Goldeneye				S2B,S5N	233	5.7 ± 0.0	NS
A	*Branta bernicla*	Brant				S2M	2	26.8 ± 16.0	NS
A	*Phalacrocorax carbo*	Great Cormorant				S2S3	393	17.7 ± 10.0	NS
A	*Asio otus*	Long-eared Owl				S2S3	23	15.8 ± 7.0	NS
A	*Spinus pinus*	Pine Siskin				S2S3	757	4.2 ± 0.0	NS
A	*Cathartes aura*	Turkey Vulture				S2S3B	6	26.7 ± 0.0	NS
A	*Rallus limicola*	Virginia Rail				S2S3B	6	15.9 ± 7.0	NS
A	*Tringa semipalmata*	Willet				S2S3B	412	3.3 ± 0.0	NS
A	*Petrochelidon pyrrhonota*	Cliff Swallow				S2S3B	204	2.7 ± 0.0	NS
A	*Pheucticus ludovicianus*	Rose-breasted Grosbeak				S2S3B	314	15.0 ± 0.0	NS
A	*Icterus galbula*	Baltimore Oriole				S2S3B	26	22.7 ± 0.0	NS
A	*Pinicola enucleator*	Pine Grosbeak				S2S3B,S5N	179	14.6 ± 0.0	NS
A	*Numenius phaeopus hudsonicus*	Hudsonian Whimbrel				S2S3M	39	12.7 ± 0.0	NS
A	*Calidris melanotos*	Pectoral Sandpiper				S2S3M	24	17.7 ± 7.0	NS
A	*Phalaropus fulicarius*	Red Phalarope				S2S3M	1	97.5 ± 0.0	NS
A	*Perisoreus canadensis*	Canada Jay				S3	551	2.8 ± 0.0	NS
A	*Poecile hudsonicus*	Boreal Chickadee				S3	1224	6.6 ± 7.0	NS
A	*Sitta canadensis*	Red-breasted Nuthatch				S3	1422	6.6 ± 7.0	NS
A	*Alosa pseudoharengus*	Alewife				S3	44	3.5 ± 0.0	NS
A	*Salvelinus fontinalis*	Brook Trout				S3	64	12.3 ± 0.0	NS
A	*Menidia menidia*	Atlantic Silverside				S3	2	17.8 ± 0.0	NS
A	*Synaptomys cooperi*	Southern Bog Lemming				S3	6	46.3 ± 0.0	NS
A	*Pekania pennanti*	Fisher				S3	6	69.2 ± 0.0	NS
A	*Calidris maritima*	Purple Sandpiper				S3?N	44	18.9 ± 10.0	NS
A	*Calcarius lapponicus*	Lapland Longspur				S3?N	4	65.7 ± 0.0	NS
A	*Falco sparverius*	American Kestrel				S3B	288	5.1 ± 0.0	NS
A	*Charadrius vociferus*	Killdeer				S3B	190	6.6 ± 7.0	NS
A	*Gallinago delicata*	Wilson's Snipe				S3B	629	6.6 ± 7.0	NS
A	*Sterna paradisaea*	Arctic Tern				S3B	105	6.9 ± 7.0	NS
A	*Coccyzus erythropthalmus*	Black-billed Cuckoo				S3B	37	9.5 ± 0.0	NS
A	*Tyrannus tyrannus*	Eastern Kingbird				S3B	93	15.0 ± 4.0	NS
A	*Dumetella carolinensis*	Gray Catbird				S3B	248	6.6 ± 7.0	NS
A	*Cardellina pusilla*	Wilson's Warbler				S3B	143	5.9 ± 0.0	NS
A	*Tringa melanoleuca*	Greater Yellowlegs				S3B,S3S4M	244	3.3 ± 0.0	NS
A	*Rissa tridactyla*	Black-legged Kittiwake				S3B,S5N	32	23.5 ± 3.0	NS
A	*Fratercula arctica*	Atlantic Puffin				S3B,S5N	19	53.7 ± 1.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Pluvialis squatarola*	Black-bellied Plover				S3M	217	3.3 ± 0.0	NS
A	*Arenaria interpres*	Ruddy Turnstone				S3M	119	3.3 ± 0.0	NS
A	*Calidris pusilla*	Semipalmated Sandpiper				S3M	159	17.7 ± 22.0	NS
A	*Calidris fuscicollis*	White-rumped Sandpiper				S3M	75	3.3 ± 0.0	NS
A	*Limnodromus griseus*	Short-billed Dowitcher				S3M	40	17.7 ± 22.0	NS
A	*Calidris alba*	Sanderling				S3M,S2N	88	3.3 ± 0.0	NS
A	*Chroicocephalus ridibundus*	Black-headed Gull				S3N	166	22.6 ± 0.0	NS
A	*Somateria mollissima*	Common Eider				S3S4	561	3.0 ± 4.0	NS
A	*Picoides arcticus*	Black-backed Woodpecker				S3S4	90	10.2 ± 0.0	NS
A	*Loxia curvirostra*	Red Crossbill				S3S4	80	9.5 ± 0.0	NS
A	*Botaurus lentiginosus*	American Bittern				S3S4B	172	15.9 ± 7.0	NS
A	*Spatula discors*	Blue-winged Teal				S3S4B	105	7.3 ± 7.0	NS
A	*Actitis macularius*	Spotted Sandpiper				S3S4B	732	6.6 ± 7.0	NS
A	*Empidonax flaviventris*	Yellow-bellied Flycatcher				S3S4B	1076	6.6 ± 7.0	NS
A	*Regulus calendula*	Ruby-crowned Kinglet				S3S4B	3233	2.9 ± 0.0	NS
A	*Catharus fuscescens*	Veery				S3S4B	489	6.6 ± 7.0	NS
A	*Catharus ustulatus*	Swainson's Thrush				S3S4B	2090	4.3 ± 0.0	NS
A	*Oreothlypis peregrina*	Tennessee Warbler				S3S4B	376	6.6 ± 7.0	NS
A	*Setophaga castanea*	Bay-breasted Warbler				S3S4B	292	6.6 ± 7.0	NS
A	*Setophaga striata*	Blackpoll Warbler				S3S4B	166	6.6 ± 7.0	NS
A	*Passerella iliaca*	Fox Sparrow				S3S4B	178	6.6 ± 7.0	NS
A	*Mergus serrator*	Red-breasted Merganser				S3S4B,S5N	219	6.6 ± 7.0	NS
A	*Bucephala albeola*	Bufflehead				S3S4N	304	9.2 ± 0.0	NS
A	*Lanius borealis*	Northern Shrike				S3S4N	14	18.0 ± 1.0	NS
A	*Leucophaeus atricilla*	Laughing Gull				SHB	6	24.4 ± 0.0	NS
A	*Progne subis*	Purple Martin				SHB	4	64.9 ± 0.0	NS
A	*Eremophila alpestris*	Horned Lark				SHB,S4S5N	4	96.2 ± 0.0	NS
A	*Morus bassanus*	Northern Gannet				SHB,S5M	246	7.2 ± 2.0	NS
A	*Aythya americana*	Redhead				SHB,SNAM	17	95.6 ± 0.0	NS
I	*Bombus (Psithyrus) bohemicus*	Gypsy Cuckoo Bumble Bee	Endangered	Endangered	Endangered	S1	20	44.6 ± 0.0	NS
I	*Danaus plexippus*	Monarch	Endangered	Special Concern	Endangered	S2B	62	7.2 ± 1.0	NS
I	*Lampsilis cariosa*	Yellow Lampmussel	Special Concern	Special Concern	Threatened	S1	40	79.6 ± 0.0	NS
I	*Alasmidonta varicosa*	Brook Floater	Special Concern	Special Concern	Threatened	S1S2	8	43.4 ± 0.0	NS
I	*Bombus terricola*	Yellow-banded Bumblebee	Special Concern	Special Concern	Vulnerable	S3	134	14.4 ± 0.0	NS
I	*Coccinella transversoguttata richardsoni*	Transverse Lady Beetle	Special Concern		Endangered	SH	1	58.2 ± 2.0	NS
I	*Quedius spelaeus*	Spelean Rove Beetle				S1	1	97.6 ± 1.0	NS
I	*Papilio brevicauda bretonensis*	Short-tailed Swallowtail				S1	5	61.0 ± 2.0	NS
I	*Neurocordulia michaeli*	Broadtailed Shadowdragon				S1	17	84.2 ± 0.0	NS
I	*Coenagrion interrogatum*	Subarctic Bluet				S1	1	85.4 ± 0.0	NS
I	*Leptodea ochracea*	Tidewater Mucket				S1	19	76.1 ± 1.0	NS
I	*Lycaena dorcas*	Dorcas Copper				S1?	31	24.7 ± 0.0	NS
I	*Polygonia satyrus*	Satyr Comma				S1?	2	64.9 ± 2.0	NS
I	*Strymon melinus*	Grey Hairstreak				S1S2	3	10.3 ± 0.0	NS
I	*Nymphalis l-album*	Compton Tortoiseshell				S1S2	2	64.4 ± 2.0	NS
I	*Haematopota rara*	Shy Cleg				S1S3	1	29.3 ± 0.0	NS
I	*Lycaena hyllus*	Bronze Copper				S2	2	69.1 ± 0.0	NS
I	*Lycaena dospassosi*	Salt Marsh Copper				S2	1	59.4 ± 0.0	NS
I	*Boloria chariclea*	Arctic Fritillary				S2	2	64.4 ± 2.0	NS
I	*Aglais milberti*	Milbert's Tortoiseshell				S2	3	62.7 ± 2.0	NS
I	*Somatochlora septentrionalis*	Muskeg Emerald				S2	8	72.4 ± 0.0	NS
I	*Somatochlora williamsoni*	Williamson's Emerald				S2	8	69.6 ± 0.0	NS
I	*Margaritifera margaritifera*	Eastern Pearlshell				S2	106	21.9 ± 0.0	NS
I	*Pantala hymenaea*	Spot-Winged Glider				S2?B	2	74.8 ± 0.0	NS
I	*Thorybes pylades*	Northern Cloudywing				S2S3	12	26.9 ± 0.0	NS
I	*Amblyscirtes hegon*	Pepper and Salt Skipper				S2S3	6	32.8 ± 1.0	NS
I	*Euphydryas phaeton*	Baltimore Checkerspot				S2S3	25	4.2 ± 2.0	NS
I	*Gomphus descriptus*	Harpoon Clubtail				S2S3	16	29.0 ± 1.0	NS
I	*Ophiogomphus aspersus*	Brook Snaketail				S2S3	5	29.2 ± 0.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
I	*Ophiogomphus mainensis*	Maine Snaketail				S2S3	1	83.6 ± 0.0	NS
I	*Ophiogomphus rupinsulensis*	Rusty Snaketail				S2S3	28	84.2 ± 0.0	NS
I	*Somatochlora forcipata*	Forcipate Emerald				S2S3	7	57.1 ± 1.0	NS
I	*Alasmidonta undulata*	Triangle Floater				S2S3	5	7.9 ± 0.0	NS
I	*Naemia seriata*	a Ladybird beetle				S3	1	72.1 ± 0.0	NS
I	*Iphthiminus opacus*	a Darkling Beetle				S3	1	36.5 ± 0.0	NS
I	*Monochamus marmorator*	a Longhorned Beetle				S3	1	80.9 ± 0.0	NS
I	*Callophrys henrici*	Henry's Elfin				S3	2	62.4 ± 0.0	NS
I	*Speyeria aphrodite*	Aphrodite Fritillary				S3	6	61.7 ± 2.0	NS
I	*Polygonia faunus*	Green Comma				S3	16	37.1 ± 0.0	NS
I	*Megisto cymela*	Little Wood-satyr				S3	1	21.0 ± 1.0	NS
I	*Oeneis jutta*	Jutta Arctic				S3	6	33.2 ± 0.0	NS
I	*Aeshna clepsydra*	Mottled Darner				S3	1	26.4 ± 0.0	NS
I	*Boyeria grafiana*	Ocellated Darner				S3	5	84.4 ± 1.0	NS
I	*Gomphaeschna furcillata*	Harlequin Darner				S3	3	24.6 ± 0.0	NS
I	*Somatochlora tenebrosa*	Clamp-Tipped Emerald				S3	1	77.9 ± 0.0	NS
I	*Nannothemis bella*	Elfin Skimmer				S3	3	24.6 ± 0.0	NS
I	*Sympetrum danae*	Black Meadowhawk				S3	9	27.7 ± 0.0	NS
I	*Enallagma vernale*	Vernal Bluet				S3	8	28.0 ± 0.0	NS
I	*Amphiagrion saucium*	Eastern Red Damsel				S3	12	34.9 ± 0.0	NS
I	*Polygonia interrogationis*	Question Mark				S3B	17	10.3 ± 0.0	NS
I	*Erynnis juvenalis*	Juvenal's Duskywing				S3S4	1	69.3 ± 1.0	NS
I	*Amblyscirtes vialis*	Common Roadside-Skipper				S3S4	6	43.6 ± 0.0	NS
I	*Polygonia progne*	Grey Comma				S3S4	26	23.5 ± 0.0	NS
I	*Lanthus parvulus*	Northern Pygmy Clubtail				S3S4	20	46.1 ± 1.0	NS
I	*Lampsilis radiata*	Eastern Lampmussel				S3S4	20	41.1 ± 0.0	NS
N	*Erioderma pedicellatum (Atlantic pop)*	Boreal Felt Lichen - Atlantic pop.	Endangered	Endangered	Endangered	S1	327	26.1 ± 3.0	NS
N	*Peltigera hydrothyria*	Eastern Waterfan	Threatened	Threatened	Threatened	S1	31	21.8 ± 0.0	NS
N	*Pannaria lurida*	Wrinkled Shingle Lichen	Threatened	Threatened	Threatened	S1S2	23	38.0 ± 0.0	NS
N	*Fuscopannaria leucosticta*	White-rimmed Shingle Lichen	Threatened			S2S3	1	82.1 ± 0.0	NS
N	*Sclerophora peronella (Atlantic pop)*	Frosted Glass-whiskers (Atlantic population)	Special Concern	Special Concern		S1?	12	16.0 ± 1.0	NS
N	*Pectenia plumbea*	Blue Felt Lichen	Special Concern	Special Concern	Vulnerable	S3	447	4.1 ± 0.0	NS
N	*Fissidens exilis*	Pygmy Pocket Moss	Not At Risk			S1S2	6	58.5 ± 0.0	NS
N	*Pseudevernia cladonia*	Ghost An ler Lichen	Not At Risk			S2S3	2	59.9 ± 0.0	NS
N	*Cinclidium stygium*	Sooty Cupola Moss				S1	2	36.2 ± 0.0	NS
N	*Cladonia brevis*	Short Peg Lichen				S1	1	30.0 ± 0.0	NS
N	*Lathagrium cristatum*	Fingered Jelly Lichen				S1	1	43.7 ± 0.0	NS
N	*Peltigera lepidophora*	Scaly Pelt Lichen				S1	2	43.2 ± 0.0	NS
N	*Cetraria laevigata*	Pin-striped Icelandmoss Lichen				S1	1	91.7 ± 0.0	NS
N	*Hypogymnia hultenii*	Powdered Honeycomb Lichen				S1	23	15.6 ± 0.0	NS
N	*Eocalypogeia schusteriana*	Schuster's Pouchwort				S1?	2	67.0 ± 0.0	NS
N	*Moerckia hibernica*	Irish Ruffwort				S1?	2	67.0 ± 0.0	NS
N	*Brachythecium erythrorrhizon*	Taiga Ragged Moss				S1?	4	67.6 ± 0.0	NS
N	*Conardia compacta*	Coast Creeping Moss				S1?	2	57.5 ± 2.0	NS
N	*Oligotrichum hercynicum*	Hercynian Hair Moss				S1?	3	39.5 ± 0.0	NS
N	*Paludella squarrosa*	Tufted Fen Moss				S1?	1	65.8 ± 5.0	NS
N	*Syntrichia ruralis*	a Moss				S1?	1	94.3 ± 1.0	NS
N	*Polychidium muscicola*	Eyed Mossthorns Woollybear Lichen				S1?	1	19.9 ± 0.0	NS
N	*Parmeliella parvula*	Poor-man's Shingles Lichen				S1?	14	35.2 ± 0.0	NS
N	*Buxbaumia minakatae*	Hump-Backed Elves				S1S2	1	69.6 ± 100.0	NS
N	*Platydictya confervoides*	a Moss				S1S2	1	86.3 ± 3.0	NS
N	*Sphagnum platyphyllum*	Flat-leaved Peat Moss				S1S2	4	26.2 ± 0.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
N	*Hamatocaulis vernicosus*	a Moss				S1S2	1	42.2 ± 0.0	NS
N	*Enchylium bachmanianum*	Bachman's Jelly Lichen				S1S2	1	48.9 ± 0.0	NS
N	*Sticta limbata*	Powdered Moon Lichen				S1S2	2	9.0 ± 2.0	NS
N	*Barbilophozia lycopodioides*	Greater Pawwort				S1S3	1	39.2 ± 0.0	NS
N	*Odontoschisma sphagni*	Bog-Moss Flapwort				S1S3	1	53.7 ± 0.0	NS
N	*Peltigera neckeri*	Black-saddle Pelt Lichen				S1S3	2	27.1 ± 0.0	NS
N	*Stereocaulon grande*	Grand Foam Lichen				S1S3	1	89.2 ± 0.0	NS
N	*Nephroma resupinatum*	a lichen				S2	1	57.5 ± 0.0	NS
N	*Anaptychia crinalis*	Hanging Fringed Lichen				S2	3	70.8 ± 0.0	NS
N	*Riccardia multifida*	Delicate Germanderwort				S2?	1	80.9 ± 0.0	NS
N	*Anacamptodon splachnoides*	a Moss				S2?	1	30.9 ± 0.0	NS
N	*Anomodon viticulosus*	a Moss				S2?	1	58.5 ± 0.0	NS
N	*Atrichum angustatum*	Lesser Smoothcap Moss				S2?	2	70.9 ± 30.0	NS
N	*Drepanocladus polygamus*	Polygamous Hook Moss				S2?	1	32.6 ± 0.0	NS
N	*Pseudocampylium radicale*	Long-stalked Fine Wet Moss				S2?	1	34.6 ± 0.0	NS
N	*Fissidens taxifolius*	Yew-leaved Pocket Moss				S2?	2	58.5 ± 0.0	NS
N	*Fontinalis sullivantii*	Sullivant's Water Moss				S2?	1	69.6 ± 100.0	NS
N	*Grimmia anomala*	Mountain Forest Grimmia				S2?	1	95.0 ± 0.0	NS
N	*Philonotis marchica*	a Moss				S2?	1	60.0 ± 0.0	NS
N	*Platydictya jungermannioides*	False Willow Moss				S2?	3	51.7 ± 0.0	NS
N	*Pohlia sphagnicola*	a moss				S2?	1	36.8 ± 0.0	NS
N	*Scorpidium scorpioides*	Hooked Scorpion Moss				S2?	11	27.5 ± 0.0	NS
N	*Sphagnum subnitens*	Lustrous Peat Moss				S2?	2	34.1 ± 0.0	NS
N	*Tetraplodon angustatus*	Too hed-leaved Nitrogen Moss				S2?	1	25.4 ± 0.0	NS
N	*Tortella fragilis*	Fragile Twisted Moss				S2?	7	41.6 ± 0.0	NS
N	*Cyrtomnium hymenophylloides*	Short-pointed Lantern Moss				S2?	1	73.3 ± 0.0	NS
N	*Scytinium teretiusculum*	Curly Jellyskin Lichen				S2?	2	67.3 ± 0.0	NS
N	*Cladonia labradorica*	Labrador Lichen				S2?	1	59.3 ± 0.0	NS
N	*Rostania occultata*	Crusted Tarpaper Lichen				S2?	4	46.8 ± 0.0	NS
N	*Scytinium imbricatum*	Scaly Jellyskin Lichen				S2?	1	71.5 ± 0.0	NS
N	*Nephroma arcticum*	Arctic Kidney Lichen				S2?	2	40.5 ± 0.0	NS
N	*Peltigera collina*	Tree Pelt Lichen				S2?	66	5.2 ± 0.0	NS
N	*Tetraplodon mnioides*	Entire-leaved Nitrogen Moss				S2S3	1	29.8 ± 0.0	NS
N	*Scorpidium revolvens*	Limprichtia Moss				S2S3	7	25.9 ± 0.0	NS
N	*Collema leptaleum*	Crumpled Bat's Wing Lichen				S2S3	14	63.8 ± 0.0	NS
N	*Solorina saccata*	Woodland Owl Lichen				S2S3	6	26.1 ± 0.0	NS
N	*Cetraria muricata*	Spiny Heath Lichen				S2S3	2	38.3 ± 0.0	NS
N	*Scytinium tenuissimum*	Birdnest Jellyskin Lichen				S2S3	13	43.2 ± 0.0	NS
N	*Parmelia fertilis*	Fertile Shield Lichen				S2S3	2	46.8 ± 3.0	NS
N	*Parmeliopsis ambigua*	Green Starburst Lichen				S2S3	2	47.5 ± 0.0	NS
N	*Umbilicaria hyperborea*	Blistered Rocktripe Lichen				S2S3	1	94.5 ± 0.0	NS
N	*Umbilicaria polyphylla*	Petalled Rocktripe Lichen				S2S3	1	94.5 ± 0.0	NS
N	*Usnea mutabilis*	Bloody Beard Lichen				S2S3	1	36.9 ± 0.0	NS
N	*Usnea rubicunda*	Red Beard Lichen				S2S3	3	30.9 ± 0.0	NS
N	*Stereocaulon condensatum*	Granular Soil Foam Lichen				S2S3	3	90.1 ± 0.0	NS
N	*Cladonia coccifera*	Eastern Boreal Pixie-cup Lichen				S2S3	4	30.1 ± 0.0	NS
N	*Ramalina thrausta*	Angelhair Ramalina Lichen				S3	9	28.6 ± 0.0	NS
N	*Enchylium tenax*	Soil Tarpaper Lichen				S3	4	43.2 ± 0.0	NS
N	*Sticta fuliginosa*	Peppered Moon Lichen				S3	13	5.2 ± 0.0	NS
N	*Scytinium subtile*	Appressed Jellyskin Lichen				S3	6	64.8 ± 0.0	NS
N	*Fuscopannaria ahlneri*	Corrugated Shingles Lichen				S3	62	5.1 ± 0.0	NS
N	*Heterodermia speciosa*	Powdered Fringe Lichen				S3	8	26.9 ± 0.0	NS
N	*Leptogium corticola*	Blistered Jellyskin Lichen				S3	1	47.1 ± 0.0	NS
N	*Scytinium lichenoides*	Tattered Jellyskin Lichen				S3	12	26.1 ± 0.0	NS
N	*Nephroma bellum*	Naked Kidney Lichen				S3	8	32.5 ± 0.0	NS
N	*Platismatia norvegica*	Oldgrowth Rag Lichen				S3	153	38.2 ± 0.0	NS

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N	*Moelleropsis nebulosa*	Blue-gray Moss Shingle Lichen				S3	16	37.7 ± 0.0	NS
N	*Fuscopannaria sorediata*	a Lichen				S3	8	22.2 ± 0.0	NS
N	*Ephebe lanata*	Waterside Rockshag Lichen				S3	2	28.6 ± 0.0	NS
N	*Calliergon giganteum*	Giant Spear Moss				S3?	3	43.7 ± 0.0	NS
N	*Mnium stellare*	Star Leafy Moss				S3?	2	67.6 ± 0.0	NS
N	*Sphagnum riparium*	Streamside Peat Moss				S3?	3	39.5 ± 0.0	NS
N	*Phaeophyscia pusilloides*	Pompom-tipped Shadow Lichen				S3?	5	39.9 ± 1.0	NS
N	*Cladonia pocillum*	Rosette Pixie-cup Lichen				S3?	2	67.0 ± 0.0	NS
N	*Cladonia stygia*	Black-footed Reindeer Lichen				S3?	1	63.5 ± 0.0	NS
N	*Dicranella varia*	a Moss				S3S4	4	26.4 ± 0.0	NS
N	*Dicranum leioneuron*	a Dicranum Moss				S3S4	1	8.5 ± 0.0	NS
N	*Encalypta procera*	Slender Extinguisher Moss				S3S4	7	33.1 ± 0.0	NS
N	*Sphagnum lindbergii*	Lindberg's Peat Moss				S3S4	4	36.8 ± 0.0	NS
N	*Splachnum ampullaceum*	Cruet Dung Moss				S3S4	1	28.5 ± 0.0	NS
N	*Thamnobryum alleghaniense*	a Moss				S3S4	25	65.1 ± 0.0	NS
N	*Schistidium agassizii*	Elf Bloom Moss				S3S4	1	85.6 ± 3.0	NS
N	*Hylocomiastrum pyrenaicum*	a Feather Moss				S3S4	1	66.6 ± 3.0	NS
N	*Arctoparmelia incurva*	Finger Ring Lichen				S3S4	7	30.9 ± 0.0	NS
N	*Hypogymnia vittata*	Slender Monk's Hood Lichen				S3S4	266	12.4 ± 0.0	NS
N	*Leptogium acadiense*	Acadian Jellyskin Lichen				S3S4	18	12.9 ± 0.0	NS
N	*Cladonia floerkeana*	Gritty British Soldiers Lichen				S3S4	5	30.3 ± 0.0	NS
N	*Vahliella leucophaea*	Shelter Shingle Lichen				S3S4	23	43.6 ± 0.0	NS
N	*Melanohalea olivacea*	Spotted Camouflage Lichen				S3S4	2	63.3 ± 0.0	NS
N	*Parmeliopsis hyperopta*	Gray Starburst Lichen				S3S4	1	47.5 ± 0.0	NS
N	*Peltigera hymenina*	Cloudy Pelt Lichen				S3S4	2	8.5 ± 0.0	NS
N	*Physconia detersa*	Bottlebrush Frost Lichen				S3S4	3	42.6 ± 0.0	NS
N	*Sphaerophorus fragilis*	Fragile Coral Lichen				S3S4	2	32.0 ± 0.0	NS
N	*Coccocarpia palmicola*	Salted Shell Lichen				S3S4	410	22.8 ± 0.0	NS
N	*Physcia tenella*	Fringed Rosette Lichen				S3S4	1	88.5 ± 2.0	NS
N	*Anaptychia palmulata*	Shaggy Fringed Lichen				S3S4	36	12.9 ± 0.0	NS
N	*Evernia prunastri*	Valley Oakmoss Lichen				S3S4	5	66.1 ± 0.0	NS
N	*Dermatocarpon luridum*	Brookside Stippleback Lichen				S3S4	8	38.0 ± 0.0	NS
N	*Heterodermia neglecta*	Fringe Lichen				S3S4	34	13.5 ± 0.0	NS
P	*Fraxinus nigra*	Black Ash	Threatened		Threatened	S1S2	130	7.3 ± 0.0	NS
P	*Liatris spicata*	Dense Blazing Star	Threatened	Threatened		SNA	1	72.3 ± 0.0	NS
P	*Juncus caesariensis*	New Jersey Rush	Special Concern	Special Concern	Vulnerable	S2	240	27.4 ± 0.0	NS
P	*Isoetes prototypus*	Prototype Quillwort	Special Concern	Special Concern	Vulnerable	S2	14	88.2 ± 0.0	NS
P	*Floerkea proserpinacoides*	False Mermaidweed	Not At Risk			S2	21	7.5 ± 7.0	NS
P	*Salix candida*	Sage Willow			Endangered	S1	47	63.9 ± 0.0	NS
P	*Thuja occidentalis*	Eastern White Cedar			Vulnerable	S1	3	47.2 ± 0.0	NS
P	*Sanicula odorata*	Clustered Sanicle				S1	5	22.1 ± 0.0	NS
P	*Zizia aurea*	Golden Alexanders				S1	7	58.7 ± 5.0	NS
P	*Arnica lonchophylla*	Northern Arnica				S1	1	7.3 ± 7.0	NS
P	*Bidens hyperborea*	Estuary Beggarticks				S1	3	66.0 ± 1.0	NS
P	*Nabalus racemosus*	Glaucous Rattlesnakeroot				S1	1	98.5 ± 3.0	NS
P	*Ageratina altissima*	White Snakeroot				S1	2	65.4 ± 7.0	NS
P	*Cardamine dentata*	Too hed Bittercress				S1	4	29.2 ± 0.0	NS
P	*Cochlearia tridactylites*	Limestone Scurvy-grass				S1	4	39.7 ± 0.0	NS
P	*Draba norvegica*	Norwegian Whitlow-Grass				S1	1	94.6 ± 2.0	NS
P	*Stellaria crassifolia*	Fleshy Stitchwort				S1	1	35.5 ± 2.0	NS
P	*Hudsonia tomentosa*	Woolly Beach-heath				S1	1	57.7 ± 1.0	NS
P	*Bistorta vivipara*	Alpine Bistort				S1	1	16.5 ± 1.0	NS
P	*Montia fontana*	Water Blinks				S1	2	22.4 ± 3.0	NS
P	*Agalinis purpurea var. parviflora*	Small-flowered Purple False				S1	1	33.2 ± 0.0	NS

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		Foxglove							
P	*Scrophularia lanceolata*	Lance-leaved Figwort				S1	2	37.5 ± 1.0	NS
P	*Carex alopecoidea*	Foxtail Sedge				S1	2	55.8 ± 0.0	NS
P	*Carex granularis*	Limestone Meadow Sedge				S1	21	33.2 ± 0.0	NS
P	*Carex gynocrates*	Northern Bog Sedge				S1	16	33.6 ± 0.0	NS
P	*Carex haydenii*	Hayden's Sedge				S1	2	37.5 ± 0.0	NS
P	*Carex rariflora*	Loose-flowered Alpine Sedge				S1	1	94.0 ± 5.0	NS
P	*Carex tenuiflora*	Sparse-Flowered Sedge				S1	3	27.3 ± 0.0	NS
P	*Carex tincta*	Tinged Sedge				S1	1	55.8 ± 1.0	NS
P	*Carex viridula var. elatior*	Greenish Sedge				S1	54	37.1 ± 0.0	NS
P	*Carex grisea*	Inflated Narrow-leaved Sedge				S1	6	65.5 ± 0.0	NS
P	*Cyperus lupulinus ssp. macilentus*	Hop Flatsedge				S1	13	56.7 ± 0.0	NS
P	*Eleocharis erythropoda*	Red-stemmed Spikerush				S1	7	37.5 ± 0.0	NS
P	*Rhynchospora capillacea*	Slender Beakrush				S1	8	51.8 ± 10.0	NS
P	*Scirpus atrovirens*	Dark-green Bulrush				S1	1	65.3 ± 0.0	NS
P	*Iris prismatica*	Slender Blue Flag				S1	4	68.8 ± 0.0	NS
P	*Luzula spicata*	Spiked Woodrush				S1	1	65.6 ± 0.0	NS
P	*Triantha glutinosa*	Sticky False-Asphodel				S1	14	63.8 ± 0.0	NS
P	*Malaxis monophyllos var. brachypoda*	North American White Adder's-mouth				S1	1	35.5 ± 7.0	NS
P	*Bromus latiglumis*	Broad-Glumed Brome				S1	11	18.3 ± 0.0	NS
P	*Calamagrostis stricta ssp. inexpansa*	Slim-stemmed Reed Grass				S1	1	31.1 ± 0.0	NS
P	*Elymus wiegandii*	Wiegand's Wild Rye				S1	9	22.4 ± 0.0	NS
P	*Phleum alpinum*	Alpine Timothy				S1	2	99.3 ± 0.0	NS
P	*Torreyochloa pallida var. pallida*	Pale False Manna Grass				S1	2	67.8 ± 1.0	NS
P	*Graphephorum melicoides*	Purple False Oats				S1	3	88.7 ± 0.0	NS
P	*Potamogeton nodosus*	Long-leaved Pondweed				S1	1	97.3 ± 5.0	NS
P	*Sparganium androcladum*	Branching Bur-Reed				S1	3	28.3 ± 1.0	NS
P	*Dryopteris goldiana*	Goldie's Woodfern				S1	1	64.8 ± 0.0	NS
P	*Equisetum palustre*	Marsh Horsetail				S1	8	58.6 ± 0.0	NS
P	*Botrychium lunaria*	Common Moonwort				S1	2	97.3 ± 1.0	NS
P	*Bolboschoenus robustus*	Sturdy Bulrush				S1?	2	62.3 ± 5.0	NS
P	*Rudbeckia laciniata*	Cut-Leaved Coneflower				S1S2	2	65.4 ± 7.0	NS
P	*Betula minor*	Dwarf White Birch				S1S2	1	78.5 ± 0.0	NS
P	*Arabis pycnocarpa*	Cream-flowered Rockcress				S1S2	7	87.7 ± 0.0	NS
P	*Cornus suecica*	Swedish Bunchberry				S1S2	15	27.5 ± 0.0	NS
P	*Anemone virginiana var. alba*	Virginia Anemone				S1S2	8	40.5 ± 1.0	NS
P	*Ranunculus sceleratus*	Cursed Buttercup				S1S2	1	75.6 ± 7.0	NS
P	*Parnassia parviflora*	Small-flowered Grass-of-Parnassus				S1S2	17	62.8 ± 1.0	NS
P	*Carex livida*	Livid Sedge				S1S2	28	18.5 ± 5.0	NS
P	*Juncus greenei*	Greene's Rush				S1S2	1	57.8 ± 1.0	NS
P	*Juncus alpinoarticulatus ssp. americanus*	Northern Green Rush				S1S2	11	28.7 ± 1.0	NS
P	*Juncus bulbosus*	Bulbous Rush				S1S2	10	89.9 ± 1.0	NS
P	*Platanthera huronensis*	Fragrant Green Orchid				S1S2	8	38.1 ± 0.0	NS
P	*Calamagrostis stricta ssp. stricta*	Slim-stemmed Reed Grass				S1S2	1	65.7 ± 1.0	NS
P	*Cinna arundinacea*	Sweet Wood Reed Grass				S1S2	24	16.3 ± 0.0	NS
P	*Sparganium hyperboreum*	Northern Burreed				S1S2	9	55.5 ± 0.0	NS
P	*Cryptogramma stelleri*	Steller's Rockbrake				S1S2	17	46.4 ± 0.0	NS
P	*Woodsia alpina*	Alpine Cliff Fern				S1S2	4	99.2 ± 2.0	NS
P	*Selaginella selaginoides*	Low Spikemoss				S1S2	5	23.3 ± 0.0	NS
P	*Carex vacillans*	Estuarine Sedge				S1S3	2	55.8 ± 0.0	NS
P	*Osmorhiza longistylis*	Smooth Sweet Cicely				S2	17	34.9 ± 1.0	NS
P	*Erigeron philadelphicus*	Philadelphia Fleabane				S2	9	35.8 ± 7.0	NS
P	*Symphyotrichum ciliolatum*	Fringed Blue Aster				S2	3	43.2 ± 0.0	NS
P	*Impatiens pallida*	Pale Jewelweed				S2	25	23.4 ± 1.0	NS

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P	*Caulophyllum thalictroides*	Blue Cohosh				S2	19	22.6 ± 0.0	NS
P	*Boechera stricta*	Drummond's Rockcress				S2	4	83.9 ± 1.0	NS
P	*Draba arabisans*	Rock Whitlow-Grass				S2	11	50.1 ± 1.0	NS
P	*Lobelia kalmii*	Brook Lobelia				S2	95	23.7 ± 0.0	NS
P	*Stellaria humifusa*	Saltmarsh Starwort				S2	2	93.7 ± 0.0	NS
P	*Stellaria longifolia*	Long-leaved Starwort				S2	1	23.1 ± 0.0	NS
P	*Oxybasis rubra*	Red Goosefoot				S2	3	67.0 ± 7.0	NS
P	*Hypericum majus*	Large St John's-wort				S2	2	48.3 ± 1.0	NS
P	*Crassula aquatica*	Water Pygmyweed				S2	6	15.8 ± 7.0	NS
P	*Myriophyllum farwellii*	Farwell's Water Milfoil				S2	4	35.6 ± 7.0	NS
P	*Myriophyllum verticillatum*	Whorled Water Milfoil				S2	4	45.6 ± 0.0	NS
P	*Utricularia resupinata*	Inverted Bladderwort				S2	1	40.2 ± 0.0	NS
P	*Oenothera fruticosa ssp. tetragona*	Narrow-leaved Evening Primrose				S2	1	69.6 ± 1.0	NS
P	*Persicaria arifolia*	Halberd-leaved Tearthumb				S2	6	44.1 ± 0.0	NS
P	*Rumex triangulivalvis*	Triangular-valve Dock				S2	9	15.5 ± 6.0	NS
P	*Anemonastrum canadense*	Canada Anemone				S2	2	36.7 ± 3.0	NS
P	*Anemone quinquefolia*	Wood Anemone				S2	14	66.6 ± 1.0	NS
P	*Anemone virginiana*	Virginia Anemone				S2	30	49.7 ± 0.0	NS
P	*Caltha palustris*	Yellow Marsh Marigold				S2	20	61.4 ± 1.0	NS
P	*Galium labradoricum*	Labrador Bedstraw				S2	89	32.3 ± 0.0	NS
P	*Salix pedicellaris*	Bog Willow				S2	12	34.6 ± 0.0	NS
P	*Salix sericea*	Silky Willow				S2	1	63.7 ± 0.0	NS
P	*Comandra umbellata*	Bastard's Toadflax				S2	33	47.8 ± 7.0	NS
P	*Saxifraga paniculata ssp. laestadii*	Laestadius' Saxifrage				S2	7	47.9 ± 7.0	NS
P	*Tiarella cordifolia*	Heart-leaved Foamflower				S2	1	12.9 ± 3.0	NS
P	*Viola nephrophylla*	Northern Bog Violet				S2	10	23.6 ± 0.0	NS
P	*Carex bebbii*	Bebb's Sedge				S2	31	34.9 ± 0.0	NS
P	*Carex castanea*	Chestnut Sedge				S2	18	25.7 ± 0.0	NS
P	*Carex comosa*	Bearded Sedge				S2	1	77.5 ± 1.0	NS
P	*Carex hystericina*	Porcupine Sedge				S2	37	35.5 ± 0.0	NS
P	*Carex scirpoidea*	Scirpuslike Sedge				S2	3	97.0 ± 4.0	NS
P	*Carex tenera*	Tender Sedge				S2	3	28.7 ± 3.0	NS
P	*Carex tuckermanii*	Tuckerman's Sedge				S2	2	69.6 ± 0.0	NS
P	*Carex atratiformis*	Scabrous Black Sedge				S2	3	45.7 ± 7.0	NS
P	*Eleocharis quinqueflora*	Few-flowered Spikerush				S2	30	28.6 ± 0.0	NS
P	*Vallisneria americana*	Wild Celery				S2	1	94.4 ± 10.0	NS
P	*Juncus stygius ssp. americanus*	Moor Rush				S2	34	23.1 ± 1.0	NS
P	*Allium schoenoprasum*	Wild Chives				S2	1	91.1 ± 0.0	NS
P	*Allium schoenoprasum var. sibiricum*	Wild Chives				S2	4	6.6 ± 7.0	NS
P	*Lilium canadense*	Canada Lily				S2	29	16.9 ± 0.0	NS
P	*Cypripedium parviflorum var. pubescens*	Yellow Lady's-slipper				S2	32	25.8 ± 7.0	NS
P	*Cypripedium parviflorum var. makasin*	Small Yellow Lady's-Slipper				S2	18	32.8 ± 0.0	NS
P	*Cypripedium reginae*	Showy Lady's-Slipper				S2	334	26.3 ± 0.0	NS
P	*Platanthera flava*	Southern Rein-Orchid				S2	2	99.4 ± 0.0	NS
P	*Platanthera flava var. herbiola*	Pale Green Orchid				S2	1	36.5 ± 1.0	NS
P	*Spiranthes lucida*	Shining Ladies'-Tresses				S2	27	42.6 ± 5.0	NS
P	*Piptatheropsis pungens*	Slender Ricegrass				S2	1	98.9 ± 10.0	NS
P	*Potamogeton friesii*	Fries' Pondweed				S2	7	23.3 ± 0.0	NS
P	*Potamogeton richardsonii*	Richardson's Pondweed				S2	10	23.8 ± 0.0	NS
P	*Cystopteris laurentiana*	Laurentian Bladder Fern				S2	6	45.7 ± 10.0	NS
P	*Dryopteris fragrans*	Fragrant Wood Fern				S2	6	25.6 ± 7.0	NS
P	*Polystichum lonchitis*	Northern Holly Fern				S2	5	28.6 ± 5.0	NS
P	*Woodsia glabella*	Smooth Cliff Fern				S2	10	45.7 ± 7.0	NS
P	*Symphyotrichum boreale*	Boreal Aster				S2?	57	32.5 ± 0.0	NS
P	*Cuscuta cephalanthi*	Buttonbush Dodder				S2?	5	55.5 ± 7.0	NS
P	*Epilobium coloratum*	Purple-veined Willowherb				S2?	6	27.3 ± 0.0	NS
P	*Rumex persicarioides*	Peach-leaved Dock				S2?	1	54.1 ± 0.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
P	*Crataegus submollis*	Quebec Hawthorn				S2?	2	85.4 ± 7.0	NS
P	*Eleocharis ovata*	Ovate Spikerush				S2?	3	53.0 ± 0.0	NS
P	*Scirpus pedicellatus*	Stalked Bulrush				S2?	6	18.4 ± 0.0	NS
P	*Hieracium robinsonii*	Robinson's Hawkweed				S2S3	6	87.6 ± 1.0	NS
P	*Senecio pseudoarnica*	Seabeach Ragwort				S2S3	10	23.0 ± 1.0	NS
P	*Betula michauxii*	Michaux's Dwarf Birch				S2S3	14	62.0 ± 0.0	NS
P	*Sagina nodosa*	Knotted Pearlwort				S2S3	2	28.1 ± 5.0	NS
P	*Hypericum x dissimulatum*	Disguised St. John's-wort				S2S3	2	42.1 ± 1.0	NS
P	*Triosteum aurantiacum*	Orange-fruited Tinker's Weed				S2S3	157	35.3 ± 0.0	NS
P	*Shepherdia canadensis*	Soapberry				S2S3	137	58.4 ± 0.0	NS
P	*Empetrum atropurpureum*	Purple Crowberry				S2S3	1	28.3 ± 3.0	NS
P	*Euphorbia polygonifolia*	Seaside Spurge				S2S3	12	34.0 ± 5.0	NS
P	*Halenia deflexa*	Spurred Gentian				S2S3	34	8.8 ± 0.0	NS
P	*Hedeoma pulegioides*	American False Pennyroyal				S2S3	2	81.4 ± 5.0	NS
P	*Polygonum aviculare ssp. buxiforme*	Box Knotweed				S2S3	1	95.6 ± 7.0	NS
P	*Polygonum oxyspermum ssp. raii*	Ray's Knotweed				S2S3	10	34.0 ± 5.0	NS
P	*Amelanchier fernaldii*	Fernald's Serviceberry				S2S3	5	45.5 ± 1.0	NS
P	*Potentilla canadensis*	Canada Cinquefoil				S2S3	1	9.1 ± 2.0	NS
P	*Galium aparine*	Common Bedstraw				S2S3	1	65.9 ± 0.0	NS
P	*Salix pellita*	Satiny Willow				S2S3	5	23.3 ± 1.0	NS
P	*Carex hirtifolia*	Pubescent Sedge				S2S3	11	22.4 ± 0.0	NS
P	*Eleocharis flavescens var. olivacea*	Bright-green Spikerush				S2S3	3	71.2 ± 0.0	NS
P	*Eriophorum gracile*	Slender Cottongrass				S2S3	8	35.8 ± 0.0	NS
P	*Oreojuncus trifidus*	Highland Rush				S2S3	6	43.3 ± 0.0	NS
P	*Cypripedium parviflorum*	Yellow Lady's-slipper				S2S3	102	22.1 ± 0.0	NS
P	*Poa glauca*	Glaucous Blue Grass				S2S3	14	46.4 ± 0.0	NS
P	*Stuckenia filiformis*	Thread-leaved Pondweed				S2S3	41	15.5 ± 0.0	NS
P	*Botrychium lanceolatum ssp. angustisegmentum*	Narrow Triangle Moonwort				S2S3	8	26.5 ± 0.0	NS
P	*Botrychium simplex*	Least Moonwort				S2S3	3	44.4 ± 5.0	NS
P	*Ophioglossum pusillum*	Northern Adder's-tongue				S2S3	1	83.9 ± 5.0	NS
P	*Angelica atropurpurea*	Purple-stemmed Angelica				S3	26	15.2 ± 0.0	NS
P	*Erigeron hyssopifolius*	Hyssop-leaved Fleabane				S3	82	43.1 ± 0.0	NS
P	*Bidens beckii*	Water Beggarticks				S3	9	60.1 ± 0.0	NS
P	*Packera paupercula*	Balsam Groundsel				S3	156	26.1 ± 0.0	NS
P	*Betula pumila var. pumila*	Bog Birch				S3	2	57.5 ± 7.0	NS
P	*Betula pumila*	Bog Birch				S3	9	34.4 ± 0.0	NS
P	*Campanula aparinoides*	Marsh Bellflower				S3	5	43.6 ± 5.0	NS
P	*Viburnum edule*	Squashberry				S3	4	95.6 ± 7.0	NS
P	*Empetrum eamesii*	Pink Crowberry				S3	1	87.2 ± 0.0	NS
P	*Vaccinium boreale*	Northern Blueberry				S3	23	45.5 ± 2.0	NS
P	*Vaccinium cespitosum*	Dwarf Bilberry				S3	13	56.9 ± 7.0	NS
P	*Vaccinium uliginosum*	Alpine Bilberry				S3	3	58.7 ± 0.0	NS
P	*Bartonia virginica*	Yellow Bartonia				S3	1	17.8 ± 0.0	NS
P	*Proserpinaca palustris*	Marsh Mermaidweed				S3	53	17.7 ± 0.0	NS
P	*Teucrium canadense*	Canada Germander				S3	68	0.4 ± 0.0	NS
P	*Decodon verticillatus*	Swamp Loosestrife				S3	5	26.8 ± 7.0	NS
P	*Epilobium hornemannii*	Hornemann's Willowherb				S3	11	76.3 ± 2.0	NS
P	*Epilobium strictum*	Downy Willowherb				S3	22	15.5 ± 5.0	NS
P	*Polygala sanguinea*	Blood Milkwort				S3	2	57.7 ± 0.0	NS
P	*Persicaria pensylvanica*	Pennsylvania Smartweed				S3	10	15.6 ± 1.0	NS
P	*Fallopia scandens*	Climbing False Buckwheat				S3	17	17.8 ± 0.0	NS
P	*Plantago rugelii*	Rugel's Plantain				S3	1	38.2 ± 0.0	NS
P	*Primula laurentiana*	Laurentian Primrose				S3	1	86.7 ± 7.0	NS
P	*Samolus parviflorus*	Seaside Brookweed				S3	21	31.5 ± 0.0	NS
P	*Pyrola asarifolia*	Pink Pyrola				S3	6	39.8 ± 0.0	NS
P	*Pyrola minor*	Lesser Pyrola				S3	9	40.7 ± 1.0	NS
P	*Ranunculus gmelinii*	Gmelin's Water Buttercup				S3	134	22.6 ± 0.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
P	*Endotropis alnifolia*	alder-leaved buckthorn				S3	470	19.0 ± 0.0	NS
P	*Agrimonia gryposepala*	Hooked Agrimony				S3	270	22.4 ± 0.0	NS
P	*Amelanchier spicata*	Running Serviceberry				S3	7	24.2 ± 0.0	NS
P	*Galium kamtschaticum*	Northern Wild Licorice				S3	10	41.7 ± 0.0	NS
P	*Geocaulon lividum*	Northern Comandra				S3	72	18.2 ± 0.0	NS
P	*Limosella australis*	Southern Mudwort				S3	7	24.2 ± 5.0	NS
P	*Lindernia dubia*	Yellow-seeded False Pimperel				S3	4	22.5 ± 0.0	NS
P	*Laportea canadensis*	Canada Wood Nettle				S3	18	17.8 ± 0.0	NS
P	*Verbena hastata*	Blue Vervain				S3	32	43.2 ± 0.0	NS
P	*Carex cryptolepis*	Hidden-scaled Sedge				S3	15	23.4 ± 0.0	NS
P	*Carex eburnea*	Bris le-leaved Sedge				S3	163	42.6 ± 0.0	NS
P	*Carex lupulina*	Hop Sedge				S3	9	67.2 ± 0.0	NS
P	*Carex rosea*	Rosy Sedge				S3	6	51.8 ± 0.0	NS
P	*Carex tribuloides*	Blunt Broom Sedge				S3	15	24.2 ± 0.0	NS
P	*Carex wiegandii*	Wiegand's Sedge				S3	2	19.9 ± 0.0	NS
P	*Carex foenea*	Fernald's Hay Sedge				S3	1	92.0 ± 0.0	NS
P	*Schoenoplectus americanus*	Olney's Bulrush				S3	2	65.6 ± 0.0	NS
P	*Elodea canadensis*	Canada Waterweed				S3	8	64.8 ± 0.0	NS
P	*Juncus subcaudatus*	Woods-Rush				S3	8	28.0 ± 1.0	NS
P	*Juncus dudleyi*	Dudley's Rush				S3	77	33.1 ± 0.0	NS
P	*Goodyera oblongifolia*	Menzies' Rattlesnake-plantain				S3	13	75.6 ± 7.0	NS
P	*Goodyera repens*	Lesser Rattlesnake-plantain				S3	22	23.0 ± 0.0	NS
P	*Neottia bifolia*	Southern Twayblade				S3	47	18.0 ± 0.0	NS
P	*Platanthera grandiflora*	Large Purple Fringed Orchid				S3	50	17.0 ± 0.0	NS
P	*Platanthera hookeri*	Hooker's Orchid				S3	3	24.8 ± 0.0	NS
P	*Platanthera orbiculata*	Small Round-leaved Orchid				S3	12	26.8 ± 5.0	NS
P	*Spiranthes ochroleuca*	Yellow Ladies'-tresses				S3	5	32.8 ± 0.0	NS
P	*Alopecurus aequalis*	Short-awned Foxtail				S3	17	23.3 ± 0.0	NS
P	*Dichanthelium clandestinum*	Deer-tongue Panic Grass				S3	70	83.7 ± 0.0	NS
P	*Potamogeton obtusifolius*	Blunt-leaved Pondweed				S3	19	23.3 ± 0.0	NS
P	*Potamogeton praelongus*	White-stemmed Pondweed				S3	15	7.3 ± 0.0	NS
P	*Potamogeton zosteriformis*	Flat-stemmed Pondweed				S3	11	55.7 ± 7.0	NS
P	*Sparganium natans*	Small Burreed				S3	16	23.8 ± 0.0	NS
P	*Asplenium trichomanes*	Maidenhair Spleenwort				S3	9	24.8 ± 0.0	NS
P	*Asplenium viride*	Green Spleenwort				S3	29	30.4 ± 0.0	NS
P	*Equisetum pratense*	Meadow Horsetail				S3	22	37.3 ± 0.0	NS
P	*Equisetum variegatum*	Variegated Horsetail				S3	38	22.5 ± 0.0	NS
P	*Isoetes tuckermanii ssp. acadiensis*	Acadian Quillwort				S3	10	29.5 ± 1.0	NS
P	*Diphasiastrum sitchense*	Sitka Ground-cedar				S3	25	23.9 ± 0.0	NS
P	*Huperzia appressa*	Mountain Firmoss				S3	3	53.2 ± 1.0	NS
P	*Sceptridium dissectum*	Dissected Moonwort				S3	2	83.9 ± 5.0	NS
P	*Polypodium appalachianum*	Appalachian Polypody				S3	4	36.3 ± 0.0	NS
P	*Persicaria amphibia var. emersa*	Long-root Smartweed				S3?	1	78.4 ± 0.0	NS
P	*Diphasiastrum x sabinifolium*	Savin-leaved Ground-cedar				S3?	10	50.3 ± 1.0	NS
P	*Atriplex glabriuscula var. franktonii*	Frankton's Saltbush				S3S4	8	21.5 ± 0.0	NS
P	*Suaeda calceoliformis*	Horned Sea-blite				S3S4	2	38.9 ± 0.0	NS
P	*Myriophyllum sibiricum*	Siberian Water Milfoil				S3S4	13	23.4 ± 0.0	NS
P	*Sanguinaria canadensis*	Bloodroot				S3S4	181	22.4 ± 0.0	NS
P	*Polygonum fowleri*	Fowler's Knotweed				S3S4	2	65.3 ± 0.0	NS
P	*Fragaria vesca ssp. americana*	Woodland Strawberry				S3S4	72	12.3 ± 0.0	NS
P	*Fragaria vesca*	Woodland Strawberry				S3S4	2	65.9 ± 0.0	NS
P	*Salix petiolaris*	Meadow Willow				S3S4	4	34.4 ± 0.0	NS
P	*Agalinis neoscotica*	Nova Scotia Agalinis				S3S4	2	60.7 ± 0.0	NS
P	*Carex argyrantha*	Silvery-flowered Sedge				S3S4	1	60.1 ± 0.0	NS
P	*Eriophorum russeolum*	Russet Cottongrass				S3S4	4	18.9 ± 1.0	NS
P	*Sisyrinchium atlanticum*	Eastern Blue-Eyed-Grass				S3S4	1	70.8 ± 0.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
P	*Triglochin gaspensis*	Gasp ├⌐ Arrowgrass				S3S4	6	13.0 ± 0.0	NS
P	*Juncus acuminatus*	Sharp-Fruit Rush				S3S4	4	45.2 ± 0.0	NS
P	*Luzula parviflora ssp. melanocarpa*	Black-fruited Woodrush				S3S4	8	57.7 ± 0.0	NS
P	*Liparis loeselii*	Loesel's Twayblade				S3S4	17	9.2 ± 1.0	NS
P	*Panicum philadelphicum*	Philadelphia Panicgrass				S3S4	1	22.9 ± 0.0	NS
P	*Trisetum spicatum*	Narrow False Oats				S3S4	10	43.8 ± 0.0	NS
P	*Cystopteris bulbifera*	Bulblet Bladder Fern				S3S4	430	12.1 ± 0.0	NS
P	*Equisetum hyemale ssp. affine*	Common Scouring-rush				S3S4	48	7.2 ± 11.0	NS
P	*Equisetum scirpoides*	Dwarf Scouring-Rush				S3S4	74	32.1 ± 0.0	NS
P	*Diphasiastrum complanatum*	Northern Ground-cedar				S3S4	4	26.8 ± 5.0	NS
P	*Schizaea pusilla*	Little Curlygrass Fern				S3S4	18	26.5 ± 0.0	NS
P	*Viola canadensis*	Canada Violet				SH	1	55.9 ± 0.0	NS
P	*Botrychium minganense*	Mingan Moonwort				SH	1	94.8 ± 1.0	NS

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The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

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1	Clayden, S.R. 1998. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 19759 recs.
1	COSEWIC (Committee on the Status of Wildlife in Canada). 2013. COSEWIC Assessment and Status Report on the Eastern Waterfan Peltigera hydrothyria in Canada. COSEWIC, 46 pp.
1	Crowell, M. 2013. email to Sean Blaney regarding Listera australis at Bear Head and Mill Cove Canadian Forces Station. Jacques Whitford Environmental Ltd., 2.
1	Doucet, D.A. 2009. Census of Globally Rare, Endemic Butterflies of Nova Scotia Gulf of St Lawrence Salt Marshes. Nova Scotia Dept of Natural Resources, Species at Risk, 155 recs.
1	e-Butterfly. 2018. Selected Maritimes butterfly records from 2016 and 2017. Maxim Larrivee, Sambo Zhang (ed.) e-butterfly.org.
1	Frittaion, C. 2012. NSNT 2012 Field Observations. Nova Scotia Nature Trust, Pers comm. to S. Blaney Feb. 7, 34 recs.
1	Klymko, J.J.D. 2012. Maritimes Butterfly Atlas, 2010 and 2011 records. Atlantic Canada Conservation Data Centre, 6318 recs.
1	Klymko, J.J.D. 2018. 2017 field data. Atlantic Canada Conservation Data Centre.
1	Manthorne, A. 2019. Incidental aerial insectivore observations. Birds Canada.
1	McKendry, Karen. 2016. Rare species observations, 2016. Nova Scotia Nature Trust, 19 recs.
1	McNeil, J.A. 2019. Snapping Turtle records, 2019. Mersey Tobeatic Research Institute.
1	Neily, T.H. & Pepper, C.; Toms, B. 2019. Boreal Felt Lichen Observation, January 2019. Mersey Tobeatic Research Institute, 1 rec.
1	Neily, T.H. & Pepper, C.; Toms, B. 2020. Nova Scotia lichen database [as of 2020-05-25]. Mersey Tobea ic Research Institute, 668 recs.
1	Newell, R.B.; Sam, D. 2014. 2014 Bloodroot personal communication report, Antigonish, NS. NS Department of Natural Resources.
1	Powell, B.C. 1967. Female sexual cycles of Chrysemy spicta & Clemmys insculpta in Nova Scotia. Can. Field-Nat., 81:134-139. 26 recs.
1	Schmidt, B.C. 2017. Details about a Speyeria aphrodite specimen at the Canadian National Collection from Baddeck, NS, sent via email on 15 February 2017.
1	Standley, L.A. 2002. Carex haydenii in Nova Scotia. , Pers. comm. to C.S. Blaney. 4 recs.
1	White, S. 2019. Notable species sightings, 2018. East Coast Aquatics.
1	Whittam, R.M. 2000. Senecio pseudoarnica on Country Island. , Pers. comm. to S. Gerriets. 1 rec.

Atlantic Canada Conservation Data Centre
Data Dictionary

Revised: July 21, 2021

I. Biodiversity Database

The following fields of data may be included (and may or may not be populated) in occurrence records.
Text fields are 255 char max. (and may truncate text).

TAXONOMY		
Field	***Type***	***Definition***
MCODE	TXT	8 character 'Museum Code' (1 to 4 = genus, 5 to 8 = sp+ssp)
ELCODE	TXT	Unique Identifier of taxon
SCINAME	TXT	Global Scientific Name of taxon
COMNAME	TXT	English Common Name of taxon
NOMCOMMUN	TXT	French Common Name
LOCATION		
Field	***Type***	***Definition***
SURVEYSITE	TXT	General locality of occurrence
DIRECTIONS	TXT	Specific locality: e.g. bearings and distance from enduring landmark
SUBNAT	TXT	Province/State: 2 character ISO code
COCODE	TXT	County Code (2 chars for province + 4 chars for county name)
MAPCODE	TXT	Map number: NTS identifier in Canada
UTME20	INT	Easting in UTM Zone 20
UTMN20	INT	Northing in UTM Zone 20
LONDEC	DEC	Decimal Longitude
LATDEC	DEC	Decimal Latitude
LOCUNCM	INT	Horizontal precision in metres
PREC	DEC	Precision in metres by power of 10 (e.g. 3 = 10 to the 3rd = 1000 m = 1 km):

prec	***common speech***	***example***	***unit size***	***literal range***
6.0	within province	province	1000.0 km	562.3 - 1778.3 km
5.7	in part of province	'NW NB'	500.0 km	281.2 - 889.1 km
5.0	within in county	county	100.0 km	56.2 - 177.8 km
4.7	within 50s of kilometres		50.0 km	28.1 - 88.9 km
4.0	within 10s of kilometres	BBA grid	10.0 km	5.6 - 17 8 km
3.7	within 5s of kilometres		5.0 km	2.8 - 8.9 km
3.0	within kilometres	topo grid	1.0 km	0.6 - 1.8 km
2.7	within 500s of metres		500.0 m	281.2 - 889.1 m
2.0	within 100s of metres	ball field	100.0 m	56.2 - 177.8 m
1.7	within 50s of metres		50.0 m	28.1 - 88.9 m
1.0	within 10s of metres	boxcar	10.0 m	5.6 - 17.8 m
0.7	within 5s of metres		5 0 m	2.8 - 8.9 m
0.0	***NOT USED***	pace	1 0 m	0.6 - 1.8 m
-1.0	within 10s of centimetres	fingernail	0.1 m	0.1 - 0.2 m

RARITY / STATUS		
Field	***Type***	***Definition***
NRANK	TXT	National Rarity Rank of taxon (in Canada)
NPROT	TXT	National Protection Status of taxon (i.e., COSEWIC in Canada)
NPROTSAR	TXT	National Protection Status of taxon (i.e., SARA in Canada):

code	***Rank and short definition***
X	Extinct in Canada and elsewhere
XT	Extirpated in Canada but surviving elsewhere
E	Endangered in Canada
T	Threatened in Canada
V	Vulnerable in Canada
SC	Special Concern in Canada
DD	Data Deficient: data inadequate for assessment
NAR	Not At Risk in Canada

SRANK	TXT	Subnational (Provincial) Rarity Rank of taxon:

code	***Rank and short definition***
SX	Extinct or extirpated in province
SH	Historically occurring but curren ly undetected in province
S1	Extremely rare in province
S2	Rare in province

		S3	Uncommon in province
		S4	Widespread, common and apparently secure in province
		S5	Widespread, abundant and demonstrably secure in province
		SE	Exotic in province
		SA	Accidental, infrequent and outside of range within province
		SNA	Ranking not applicable in province
		SNR	Not yet assessed in province
IUCN	TXT	International Union of Conservation Naturalists rarity rank:	
		code	***Rank and short definition***
		EX	Extinct: no individuals remaining
		EW	Extinct in the Wild: only captive or naturalised survivors
		CR	Cri ically Endangered: extreme risk of extinction in wild
		EN	Endangered: high risk of extinction in wild
		VU	Vulnerable: high risk of endangerment in wild
		NT	Near Threatened: likely to become endangered soon
		LC	Least Concern: lowest risk, widespread and abundant
		DD	Data Deficient: data inadequate for assessment
		NE	Not Evaluated, not yet assessed against criteria
OBSERVATION			
Field	***Type***	***Definition***	
OBSERVER	TXT	Individual(s) that observed the taxon	
OBDATE	TXT	Date of observation (YYYY MM DD)	
OBDATA	TXT	Concatenation of fields below, relating to observation	
OBEVID	TXT	Type of evidence (e.g., specimen, photo)	
OBCOUNT	TXT	Number of individuals at location	
OBABUN	TXT	Relative rarity of taxon at location, e.g. 'common', 'scattered'	
OBSIZE	TXT	Size of individual	
SIZE	TXT	Size of occurrence 'patch' (in m^2, ha or acres)	
OBDESC	TXT	Details of specimen appearance or conditions	
OBPHEN	TXT	Lifestage of individual (e.g., bud, flowering)	
OBSEX	TXT	Male/female if relevant	
OBACTIV	TXT	Activity of individual when observed (e.g., nesting, crossing road)	
OBASSP	TXT	Other taxa associated with the observation	
NOTETAX	TXT	Identifier's note on taxonomic issues	
GENDESC	TXT	Concatenation of fields below, relating to site	
HABITAT	TXT	Habitat characterization of location	
ECODIST	NUM	National Ecological Framework EcoDistrict identifier	
WSCODE	TXT	Quaternary Watershed identifier	
GENCOM	TXT	General Comments: concatenation of Notes (NOTE1, NOTE2, NOTE3)	
COLLECTION			
Field	***Type***	***Definition***	
CITATION	TXT	Primary source of data	
DATA MANAGEMENT			
Field	***Type***	***Definition***	
IDNUM	TXT	AC CDC record Unique ID	
EDITION	TXT	Last editor's initials and date (YYYY MM DD)	

II. Managed and Biologically Significant Areas (MSA) Database

The following fields of data may be included (and may or may not be populated) for Managed and Biologically Significant Areas.

IDENTITY AND DESCRIPTION		
Field	***Type***	***Definition***
msaGIS	INT	Unique GIS feature identifier
msaCode	TXT	Unique identifier for the MSA feature
msaClass	TXT	Whether the MSA feature is a Managed Area (MA) or biologically Significant Area (SA)
msaName	TXT	MSA feature name
msaNameFr	TXT	MSA feature name (French)
description	TXT	Description of the MSA feature
notes	TXT	Additional notes about the MSA feature
JURISDICTION / OWNERSHIP		
Field	***Type***	***Definition***
localJuris	TXT	Mandated agency with jurisdiction over property
owner	TXT	Property owner
ownerCom	TXT	Details of multiparty arrangements

ownerDate	TXT	Date of property possession	
CLASSIFICATION			
Field	***Type***	***Definition***	
protStat	TXT	Activities permitted or restricted (when known)	
legalAct	TXT	Title of enabling legislation	
legalDate	TXT	Year of enabling legislation	
estabDate	TXT	Year of site designation	
aichit11	TXT	Whether the site counts towards the Aichi Target 11 and Canada Target 1 biodiversity targets (yes or no)	
oecm	TXT	Other effective area-based conservation means (yes or no)	
iucnCat	TXT	IUCN protected area category. For complete category descriptions, visit https://www.iucn.org/theme/protected-areas/about/protected-area-categories. Features categorized as "YES" are sites which meet the standard definition of a protected area, but the category of protection has not yet been determined and features categorized as "N/A" are other area-based conservation measures or sites that do not meet the protected area definition (2018 Canadian Protected and Conserved Areas Database (CPCAD) User Manual).	
msaType	TXT	MSA feature type:	
		group	***Designation***
		Conservation	Conservation Area
			Conservation Easement
			Fee-Simple Ownership by Environmental Non-Governmental Conservation Organization
			Land Trust Property
			Natural Area
			Nature Preserve
			Nature Reserve
			Nature Reserve and Conservation Easement
			Nature Trail
			Other Effective Area-Based Conservation Measure
			Privately Owned Conservation Area
			Privately Owned Natural Area
			Protected Area
			Protected Beach
			Protected Natural Area
			Provincially Owned Natural Area
			To be determined
		Heritage	Heritage River
			Museum
			National Historic Event
			National Historic Site
			Provincial Heritage Site
			Provincial Historic Site
			Provincial Historic/Heritage Park
			UNESCO World Heritage Site
		Parks	Municipal Park
			National Park
			Nature Park
			Park
			Privately Owned Park
			Provincial Park
			Provincial Park Beach
		Wilderness	Ecological Reserve
			Environmentally Sensitive Area
			Significant Ecological Area
			Significant Ecological Area/International Biological Program
			Wilderness Area
			Wilderness Reserve
		Wildlife	Eastern Habitat Joint Venture
			Important Bird Area (IBA)
			Marine Protected Area
			Migratory Bird Sanctuary
			National Wildlife Area
			Privately Owned Wildlife Management Area
			Provincial Wildlife Management Area
			Wildlife Management Area
			Wildlife Park
			Wildlife Refuge
			Wildlife Reserve
			Wildlife Sanctuary
		Other	Education Area
			Experimental Area
			Federal Corrections Facility
			Fossil Site
			International Biological Program

			Memorial Site
			Other Managed Area
			RAMSAR Wetland Site
			Special Management Area
			Water Supply Area
			Watershed
LOCATION AND SPATIAL ATTRIBUTES			
Field	***Type***	***Definition***	
subnat	TXT	Two-letter jurisdiction code (NB, NS, PE, NF, LB)	
location	TXT	Directions to the MSA feature	
biome	TXT	Whether an MSA feature falls within the terrestrial (T) or marine (M) environment	
mapCode	TXT	The National Topographic System (NTS) map square the centre of the MSA feature falls within	
coCode	TXT	Provincial county code (2 chars for province + 4 chars for county name)	
latDec	DEC	Latitude of the centre of the MSA feature	
lonDec	DEC	Longitude of the centre of the MSA feature	
utmE20	INT	Easting of the centre of the MSA feature (NAD83 UTM Zone 20N)	
utmN20	INT	Northing of the centre of the MSA feature (NAD83 UTM Zone 20N)	
extentN	DEC	Northern extent of the MSA feature	
extentS	DEC	Southern extent of the MSA feature	
extentE	DEC	Eastern extent of the MSA feature	
extentW	DEC	Western extent of the MSA feature	
areaHa	DEC	Area of the polygon (ha)	
SOURCE ATTRIBUTES			
Field	***Type***	***Definition***	
sourceId	TXT	Unique ID of the MSA feature in the source dataset	
jurisId	TXT	Unique ID of the MSA feature in the original dataset	
srcFeatType	TXT	Whether the feature was a point (PT) or polygon feature (PY) in the source dataset. True boundaries of point MSA features are not known. Points have been buffered by 15m to be included in this MSA database	
url	TXT	Associated website holding additional information about the source feature or database	
bestSource	TXT	Unique identifier for the source database	
citation	TXT	Primary source of data	
edition	TXT	Initials and date (YYYY MM DD) pertaining to the last edit to the MSA feature	

Appendix I

Transport Canada Protection Act NPA NOW Form

Denver Marine Ltd

Oyster Lease Application

April 2022

Application for approval submitted

Denny David <Denvermarineltd@outlook.com>

Sat 2021-09-25 8:43 PM

Appendix I

From: NWAR-ESS <nwaress@notification.canada.ca>
Sent: July 26, 2021 12:37 PM
To: denvermarineltd@outlook.com <denvermarineltd@outlook.com>
Subject: Application for approval submitted

Government of Canada | Gouvernement du Canada

Your Application for Approval to the Navigation Protection Program (NPP) has been successfully submitted

From: Denny David

Located on: Lennox Passage, Richmond County, Nova Scotia

For: Aquaculture facility

Your project information has been sent to your regional Navigation Protection Program office for review.

An NPP officer will contact you to let you know what are the next steps.

Application for approval submitted

NWAR-ESS <nwaress@notification.canada.ca>

Mon 2022-03-21 5:25 PM

To: denvermarineltd@outlook.com <denvermarineltd@outlook.com>

Government of Canada | Gouvernement du Canada

Your Application for Approval to the Navigation Protection Program (NPP) has been successfully submitted.

From: Denny David

Located on: Lennox Passage, Richmond County, Nova Scotia

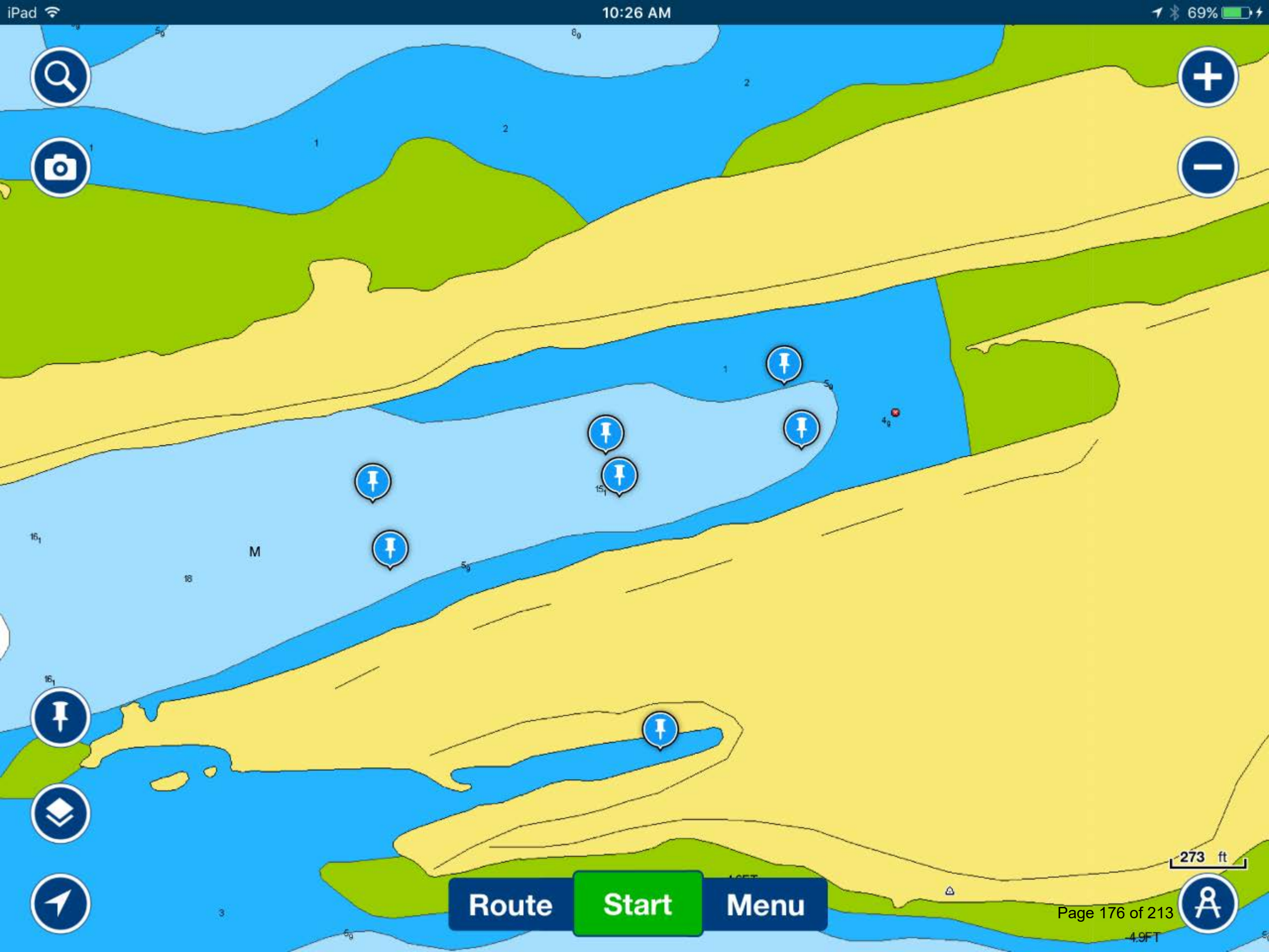
For: Aquaculture facility

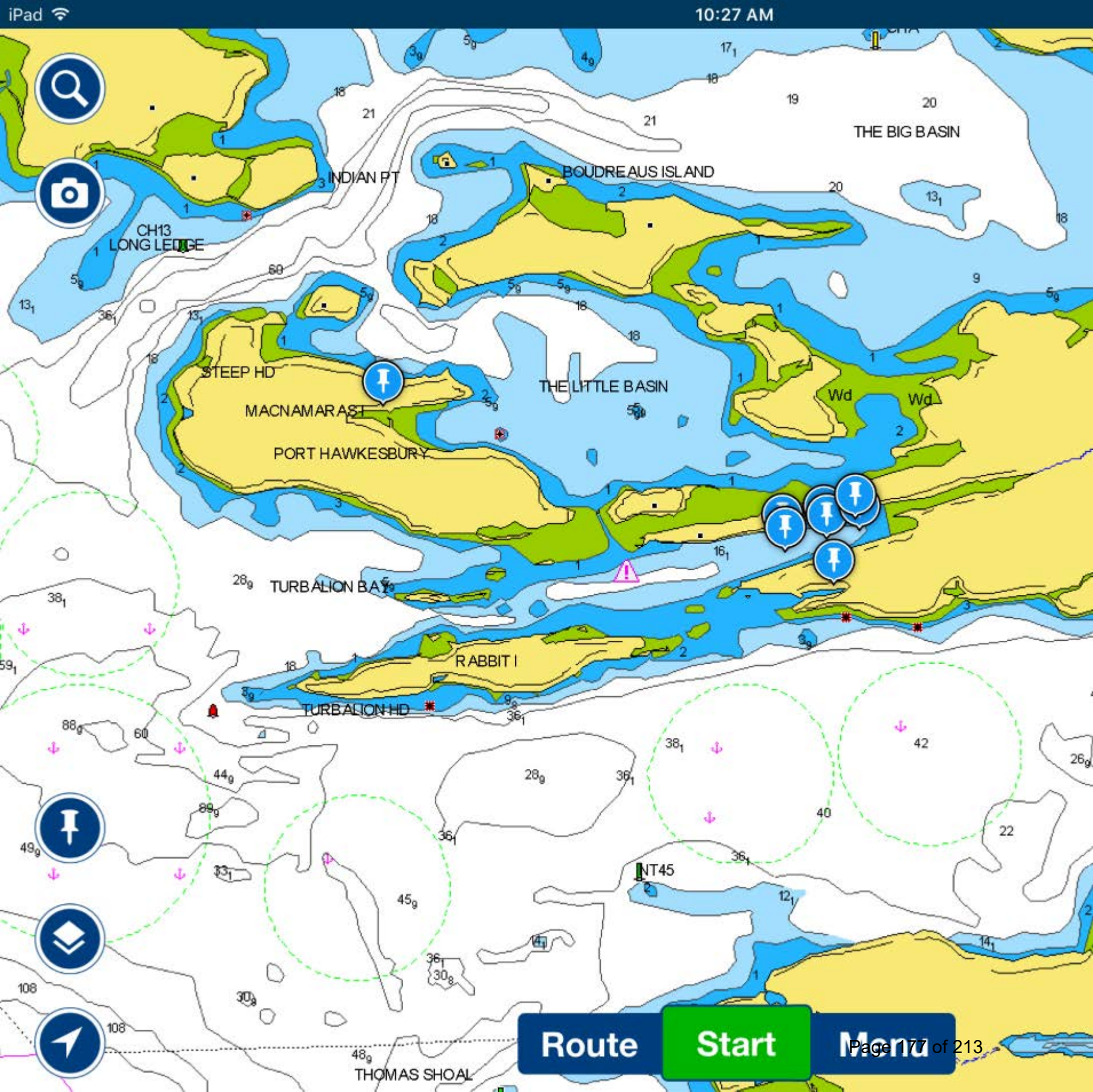
Your project information has been sent to your regional Navigation Protection Program office for review.

An NPP officer will be in contact to advise you of the next steps.

If you wish to view your submitted application, you may login to your existing External Submission Site account.

Canada


iPad
10:26 AM
69%
Route
Start
Menu
273 ft
Page 176 of 213


iPad
10:27 AM
THE BIG BASIN
INDIAN PT
BOUDREAUS ISLAND
CH13
LONG LEDGE
STEEP HD
MACNAMARA ST
THE LITTLE BASIN
PORT HAWKESBURY
TURBALION BAY
RABBIT I
TURBALION HD
NT45
THOMAS SHOAL
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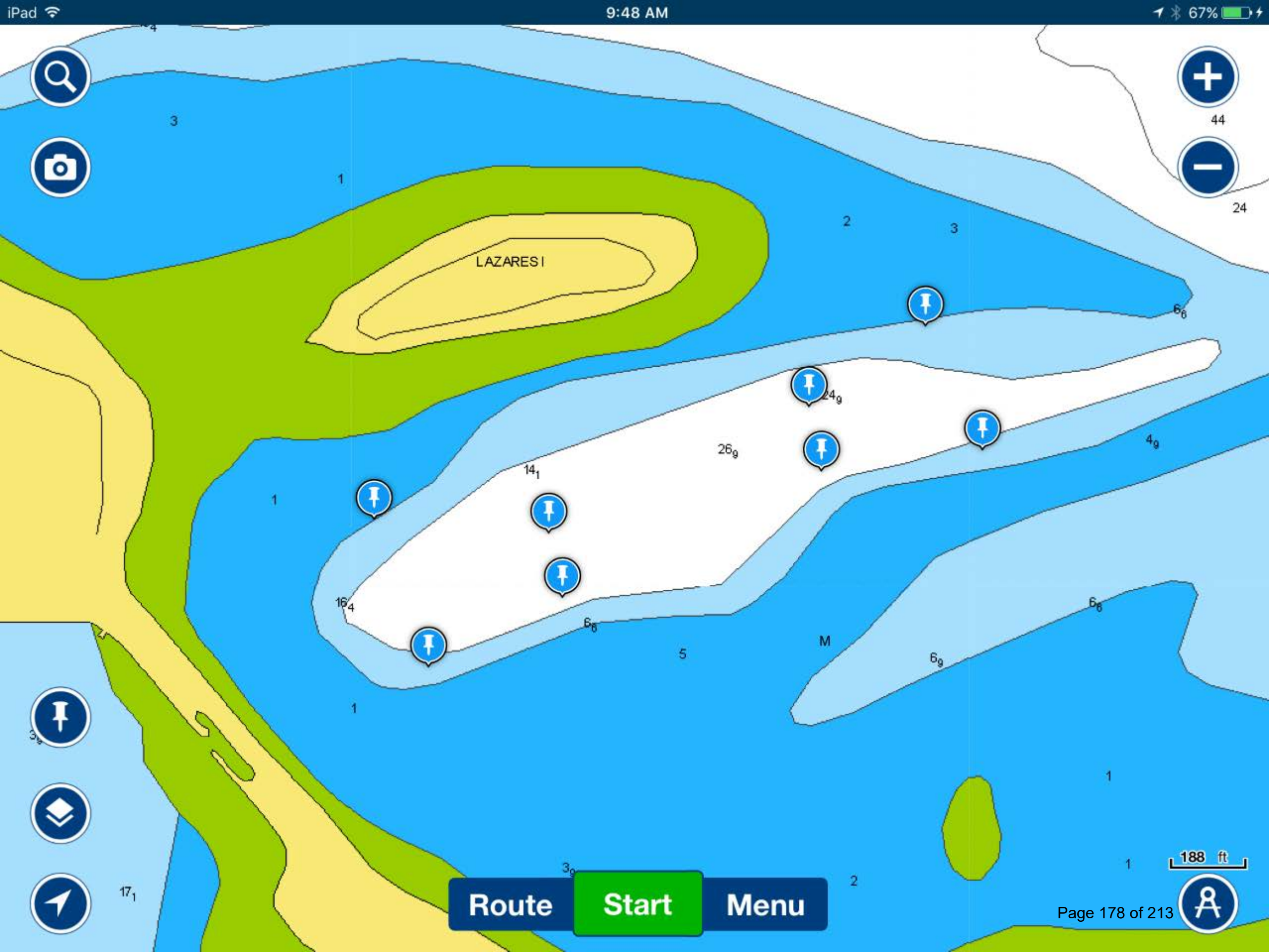
Start
Menu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67%
LAZARES I
Route
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Menu
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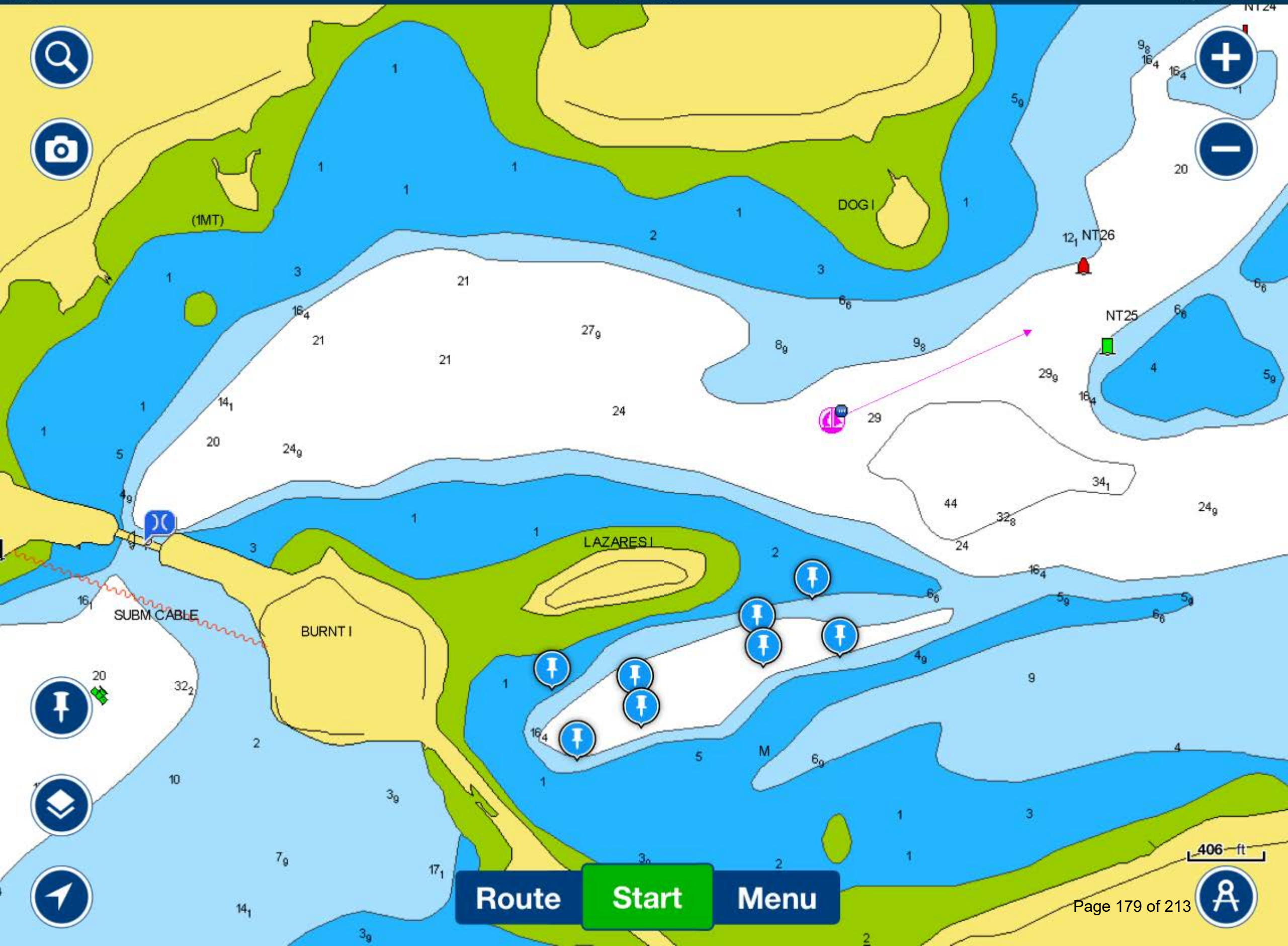
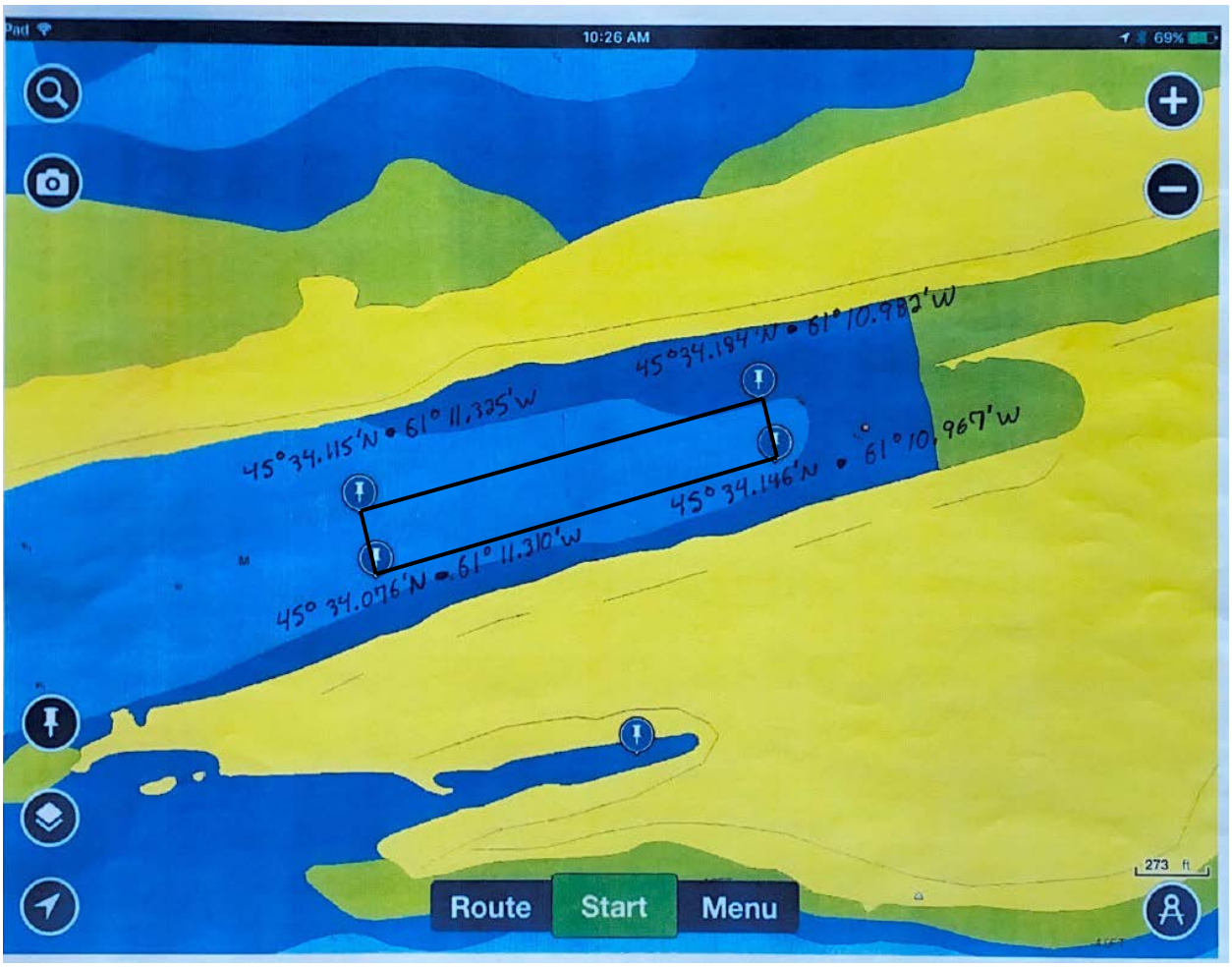

(1MT)
DOG I
NT26
NT25
LAZARES I
BURNT I
SUBM CABLE
406 ft
Route
Start
Menu


10:26 AM
69%
45°34.115'N • 61° 11.335'W
45°34.184'N • 61° 10.98[illegible]'W
45° 34.076'N • 61° 11.310'W
45° 34.146'N • 61° 10.967'W
273 ft
Route
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Menu


iPad
9:48 AM
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LAZARESI
45° 35.058'N • 61° 4.328'W
45° 34.986'N • 61° 4.647'W
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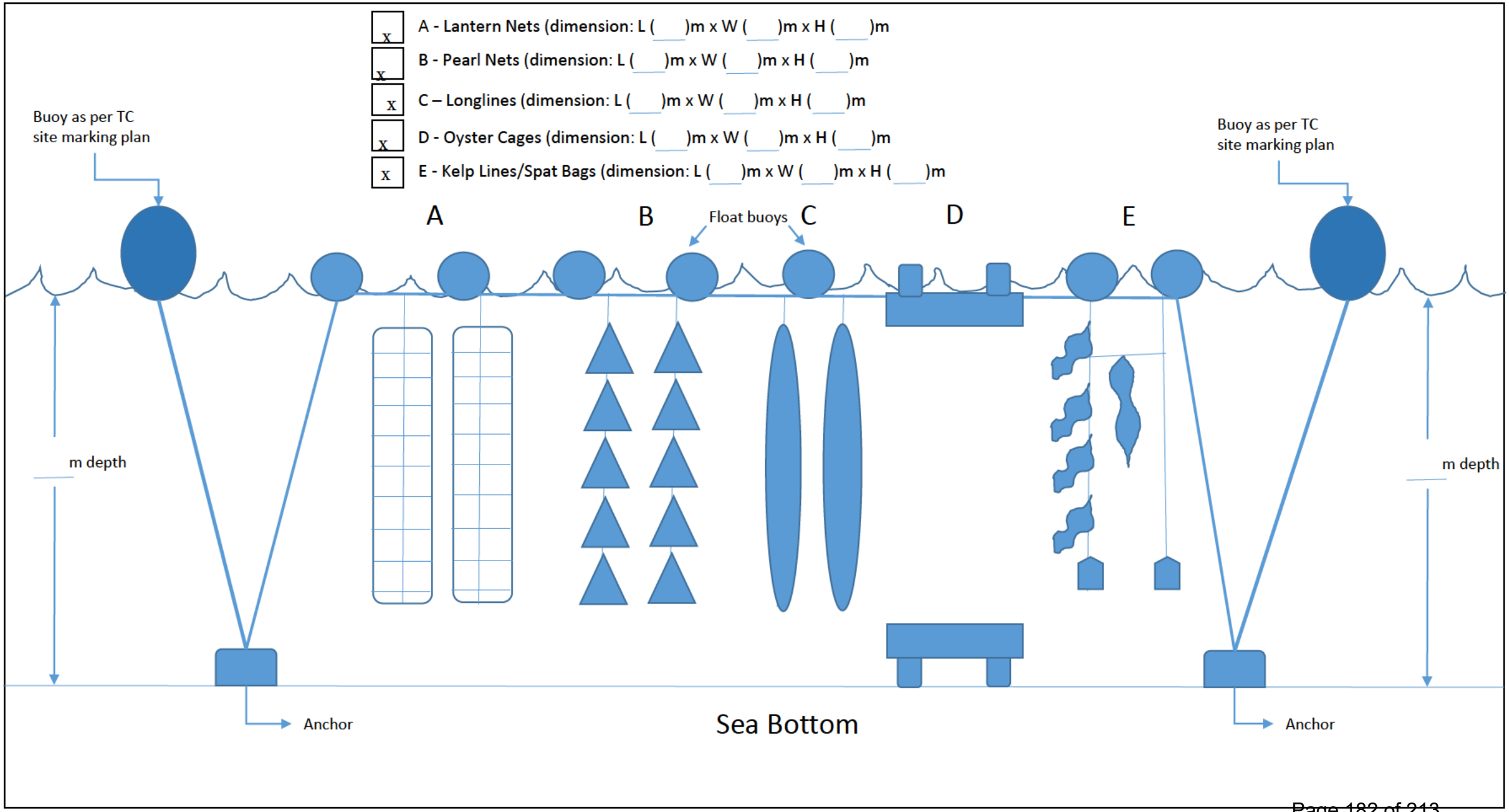
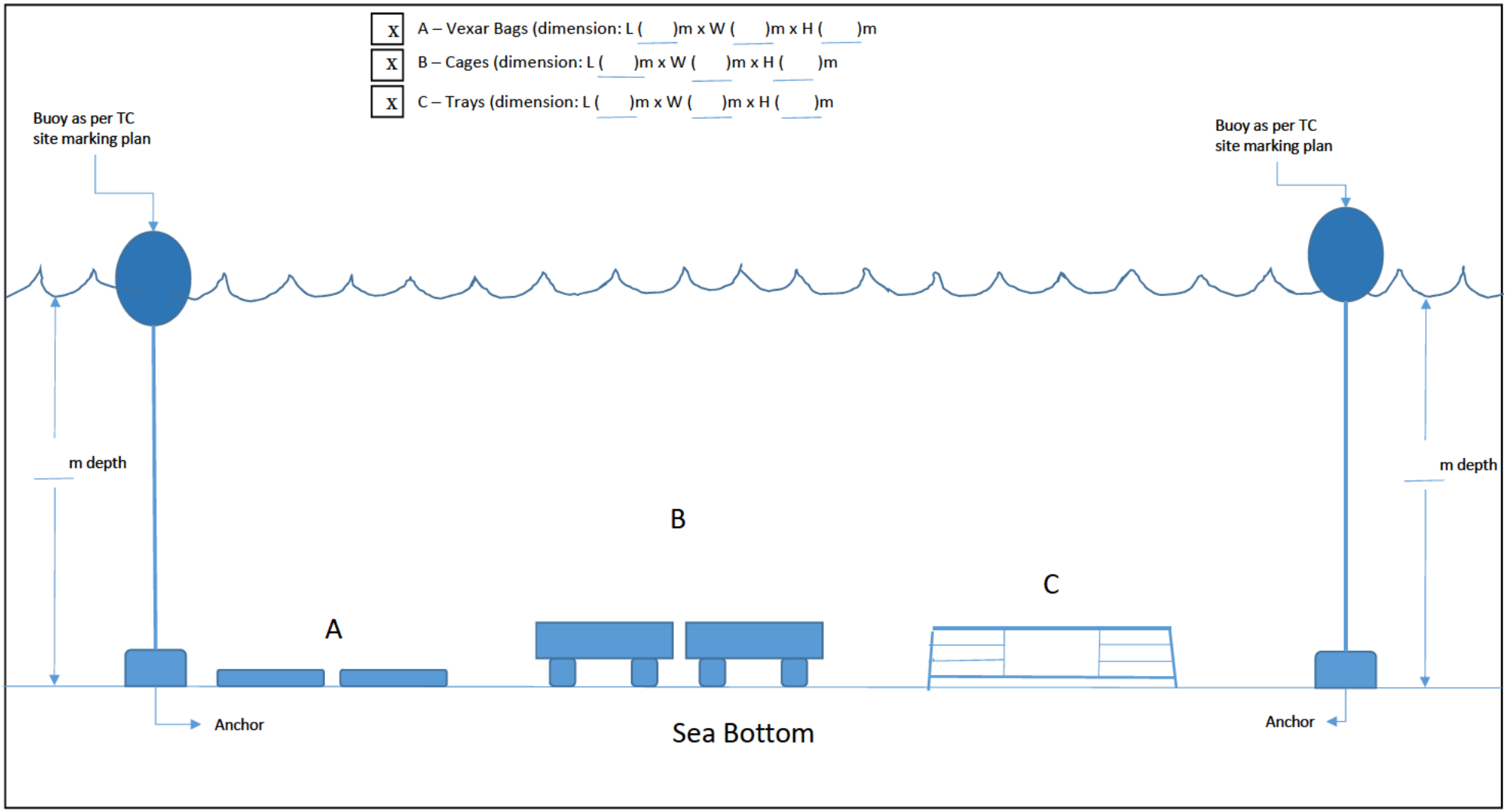
Menu


x A - Lantern Nets (dimension: L ( )m x W ( )m x H ( )m
x B - Pearl Nets (dimension: L ( )m x W ( )m x H ( )m
x C – Longlines (dimension: L ( )m x W ( )m x H ( )m
x D - Oyster Cages (dimension: L ( )m x W ( )m x H ( )m
x E - Kelp Lines/Spat Bags (dimension: L ( )m x W ( )m x H ( )m
Buoy as per TC site marking plan
Buoy as per TC site marking plan
A
B
Float buoys
C
D
E
m depth
m depth
Anchor
Anchor
Sea Bottom


X A – Vexar Bags (dimension: L ( )m x W ( )m x H ( )m
X B – Cages (dimension: L ( )m x W ( )m x H ( )m
X C – Trays (dimension: L ( )m x W ( )m x H ( )m
Buoy as per TC site marking plan
Buoy as per TC site marking plan
m depth
m depth
A
B
C
Anchor
Anchor
Sea Bottom

Appendix J

Stock Status Update

Denver Marine Ltd

Oyster Lease Application

April 2022

Appendix J

STOCK STATUS UPDATE OF ATLANTIC SALMON IN SALMON FISHING AREAS (SFAs) 19-21 and 23

Context

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) identified four large groups of Atlantic Salmon (*Salmo salar*), referred to as Designatable Units (DUs), in the Maritimes Region: Eastern Cape Breton (ECB; corresponding to Salmon Fishing Area [SFA] 19), Nova Scotia Southern Upland (SU; SFAs 20, 21 and part of 22), Outer Bay of Fundy (OBoF; corresponding to the western part of SFA 23), and Inner Bay of Fundy (IBoF; part of SFAs 22 and 23) (see Appendix).

Abundance of Atlantic Salmon (hereafter referred to as Salmon) in the Maritimes Region has been in decline for more than two decades. Populations in many rivers are extirpated, and IBoF Salmon are listed as Endangered under the *Species at Risk Act* (SARA). In November 2010, COSEWIC assessed the ECB, SU and OBoF population assemblages as Endangered. Fisheries and Oceans Canada (DFO) has completed scientific Recovery Potential Assessments (RPAs), socio-economic analyses, and public consultations for these DUs to inform the decision on whether or not they will be listed under SARA.

Science advice on the status of Salmon in SFAs 19-21 and 23 for 2020 was requested by Fisheries Management. This advice is used to inform Aboriginal communities, Fisheries Management, and the provinces of Nova Scotia and New Brunswick of the status of the Salmon resource in advance of developing harvest agreements and recreational fishing plans for 2021. The objective of the request was to assess the status of Salmon stocks in SFAs 19, 20, 21, and 23 up to the end of 2020 using the following indicators:

- adult abundance relative to reference levels;
- juveniles densities; and
- smolt production estimates.

Given that this request is for an update of previous advice using established methods (DFO 2020 and references therein), the Science Response Process was used.

As a result of the COVID-19 pandemic, certain fieldwork activities were restricted in 2020. Limited data are available for index rivers in SFAs 20, 21, and 23; however, assessments of Salmon stock status and trends were not able to be completed for these areas and are not contained within this report. For ECB, due to the timing of activities and the value of this information to Fisheries Management for decision-making on Indigenous Food, Social, and Ceremonial (FSC) allocations, all usual field activities were conducted and data are available to provide an update on the status of Salmon on index rivers in SFA 19.

This Science Response Report results from the Regional Science Response Process of March 4, 2021, on the Stock Status Update of Atlantic Salmon in Salmon Fishing Areas (SFAs) 19-21 and 23.

Analysis and Response

Methods

Evaluation of the status of Salmon in the Maritimes Region is based on abundance monitoring for a number of index populations. For most index populations where adult returns are available, status is evaluated using a comparison of the estimated egg deposition (calculated from the estimated abundance and biological characteristics of Salmon stocks) relative to a reference point known as the conservation egg requirement. The river-specific conservation egg requirement is based on an egg deposition of 2.4 eggs/m^2 multiplied by the amount of accessible fluvial rearing habitat that is of suitable gradient. An egg deposition of 2.4 eggs/m^2 is considered to be a Limit Reference Point (LRP) in the context of DFO's Precautionary Approach Framework (DFO 2009, DFO 2012, Gibson and Claytor 2012) for DFO's Maritimes Region. Conservation requirements for many of the rivers in the Maritimes Region are reported in O'Connell et al. (1997).

Within a recent working paper to update information on ECB Atlantic Salmon populations of relevance to a COSEWIC status report, a review of all available data and abundance estimates was conducted for ECB (Taylor et al. unpublished manuscript[1]). This process resulted in some updates to escapement estimates in the North River time series. Updates include adjustments to annual dive-survey counts based on the mean observation efficiency calculated from mark recapture experiments from 1994–2020. In addition, a scaling factor was applied to data from 2004–2012 to account for an expansion to the dive count survey beginning in 2013 (McLeans Pool to West Confluence Pool). The scaling factor was calculated based on the mean counts in the additional reach from 2013–2020, and an expected increase of 24% was applied to all dive counts from 2004–2012. No scaling factor was applied for years prior to 2004, as the extent of the dive-count survey is not well documented. Recreational catch data are presented without a catch-rate scaling factor applied as they were found to be highly variable and unlikely to provide an accurate measure of abundance. These changes to the time series are reflected in updated visualization for North River within this document; however, the annual estimate for North River presented in this update is unchanged from the methodology as described within Levy and Gibson (2014).

In this report, Salmon less than 63 cm in fork length are referred to as small, which are typically 1-Sea-Winter (1SW) Salmon that return to spawn following a single winter at sea (also termed grilse); Salmon greater than or equal to 63 cm in fork length are referred to as large, which are typically Multi-Sea-Winter (MSW) Salmon that return following two or more winters at sea and repeat spawners.

Eastern Cape Breton (Salmon Fishing Area 19)

Salmon population monitoring by DFO in ECB is currently focused on three river systems: the Middle, Baddeck, and North rivers (Table 1, Appendix). Parks Canada (PC) monitors adult Salmon abundance on Clyburn Brook (Table 1) using dive surveys similar to those conducted by DFO. Details on the assessment methods for ECB Salmon populations are provided in Levy

[1] Taylor, A.D., D. Raab, D.C. Hardie, and E.B. Brunsdon. In prep. Updated Information on Atlantic Salmon (*Salmo salar*) Eastern Cape Breton Populations (ECB; SFA 19) of Relevance to the Development of a 2nd COSEWIC Status Report. DFO Can. Sci. Advis. Sec. Res. Doc.

and Gibson (2014), DFO (2013), Gibson and Bowlby (2009), and Robichaud-LeBlanc and Amiro (2004).

In 2020, all rivers within SFA 19, with the exception of the Middle, Baddeck, and North rivers, were closed to Salmon fishing all year. The Middle and Baddeck rivers were open to catch-and-release angling from October 1st to October 31st, and North River (downstream from the area known as “The Benches”) was open to catch-and-release angling from June 1st to July 14th and September 1st to October 31st (Table 1). A provincial stocking program exists on Middle and Baddeck rivers, which aims to numerically offset anticipated catch-and-release mortalities on these rivers (DFO 2010). Food, Social, and Ceremonial (FSC) allocations were available to First Nations on these three rivers in 2020; however, the 2020–2021 Atlantic Salmon, Plamu, Conservation Harvesting Plan discouraged FSC harvest where rivers are not expected to exceed their conservation egg requirement, and no harvest of returning Salmon was reported by Indigenous communities in ECB.

Indicators of Stock Status

In 2020, the ECB index populations of Middle and Baddeck rivers were assessed to be below conservation egg requirements (Table 1), with estimated values of 70 and 64 percent of the requirements, respectively. North River was assessed to be above the conservation egg requirement, estimated at 102 percent. The Salmon abundance in Clyburn Brook continues to remain low, with 13 Salmon counted in 2020. A summary of the 2020 assessment results is provided in Table 1, and time series showing the status of adult Salmon populations for the Middle and Baddeck, North, and Clyburn rivers are provided in Figures 1, 2, and 3, respectively.

Table 1. Atlantic Salmon assessment information for index rivers in Salmon Fishing Area 19 during 2020, including catch-and-release angling seasons, conservation egg requirements, preliminary recreational catch and effort estimates, catch and release mortality estimates, dive count results, escapement estimates, percent conservation egg requirement attained, and Provincial stocking information.

	Middle River	Baddeck River	North River	Clyburn Brook
2019 Angling Season	October 1st–31st	October 1st–31st	June 1st–July 14th; September 1st–October 31st	Closed
Assessment Information	- Recreational Catch Estimates - Dive Counts - Mark Recapture Data (historical) - Electrofishing Data (historical)	- Recreational Catch Estimates - Dive Counts - Mark Recapture Data (historical) - Electrofishing Data (historical)	- Recreational Catch Estimates - Dive Counts - Mark Recapture Data	- Dive Counts
Conservation Egg Requirement (millions of eggs)	2.07	2.01	0.92	0.28
Preliminary Recreational Catch Estimates:*				
Small Salmon	18	4	12	Not Applicable
Large Salmon	64	48	25	Not Applicable
Effort (rod-days)	231	123	118	Not Applicable
Total Catch and Release Mortality Estimates**	4	2	1	Not Applicable
Dive Counts:***				
Small Salmon	35	19	15	4
Large Salmon	390	154	106	9
Marks / Recaptures‡	Not Applicable	Not Applicable	30 / 9	Not Applicable
Estimated Escapement:				
Small Salmon	49	22	32	Not Applicable
Large Salmon	407	247	226	Not Applicable
% Conservation Egg Requirement (Bayesian 90% credible interval)	**70 (54–93)**	**64 (49–85)**	**102**	**Not Applicable**
Provincial Stocking:				
Broodstock Collections	8 large (October)	5 large; 3 small (October)	Not Applicable	Not Applicable
Juvenile Releases	21,090 fin clipped 0+ parr (October)	14,042 fin clipped 0+ parr (October)	Not Applicable	Not Applicable

*Salmo-NS Database queried on Feb. 18, 2021. River specific mean scaling factors for small Salmon, large Salmon, and effort were used to estimate catch and effort in 2020 (see Sources of Uncertainty).
**An assumed 4% mortality rate is applied to estimate catch-and-release mortalities (DFO 2013).
***Middle River dive count was conducted November 5, 2020. North River dive count was conducted October 22, 2020, and Baddeck River dive count was conducted November 6, 2020. Parks Canada conducted the Clyburn Brook dive count on Nov 5, 2020.
‡Marking was conducted October 13–14, 2020 on North River.

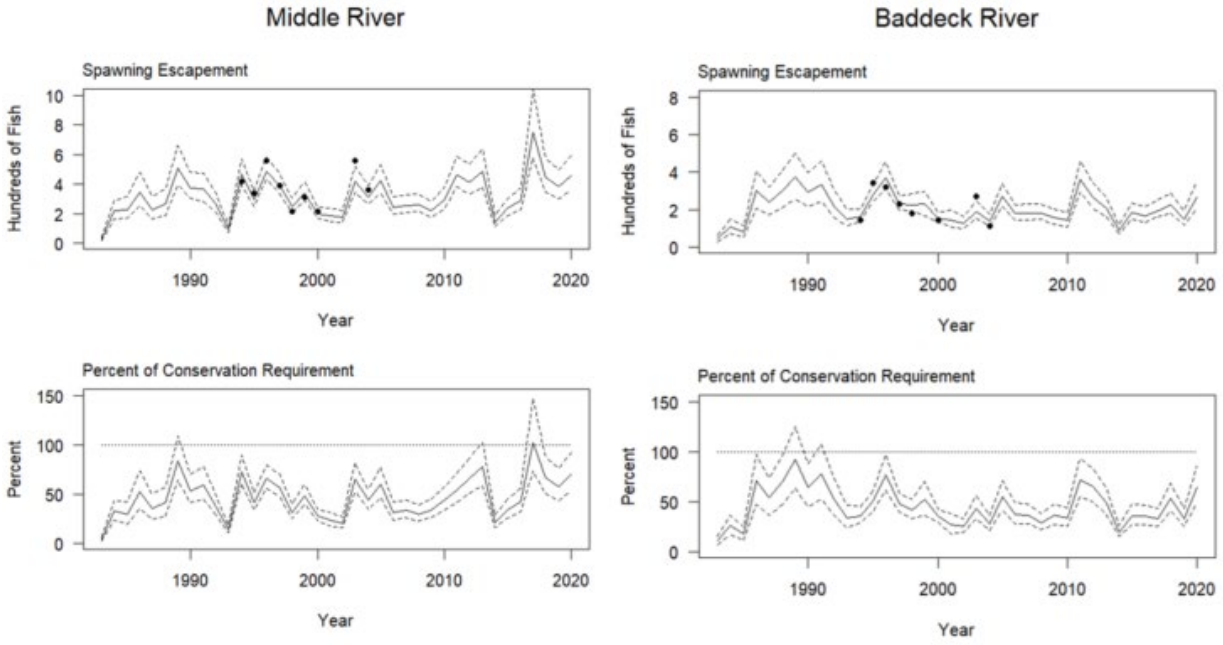


Figure 1. Estimated total number of spawners (top graph) and the percent of the conservation egg requirement attained (bottom graph) for Middle River (left panel) and Baddeck River (right panel), NS, from 1983 to 2020. Model fits derived from two methods are shown. The solid lines show the maximum likelihood estimates of annual abundance. The dashed lines show the Bayesian 90% credible interval for the annual abundance estimates. The points in the top graphs are the population estimates obtained by mark recapture during the dive surveys. The horizontal dashed line in the bottom graphs indicates 100% of the conservation egg requirement for each river.

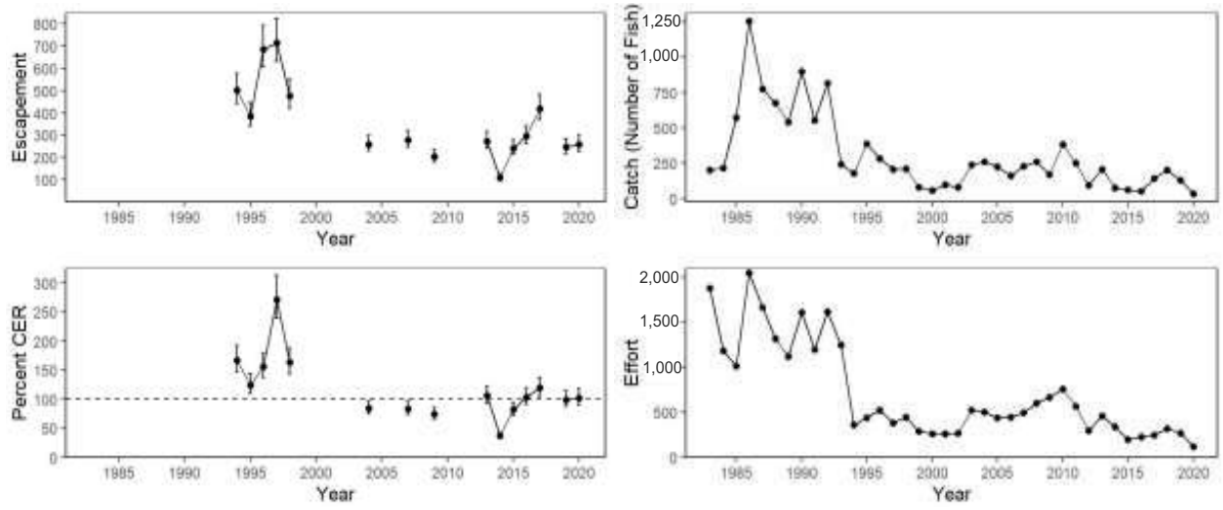


Figure 2. Estimated spawning escapement (top left) and percent of the conservation egg requirement (bottom left) of Atlantic Salmon returning to North River, NS, as derived from dive-survey counts and catch (top right) and effort (bottom right) adjusted for non-returned stubs from the license stub return program (see Sources of Uncertainty). The horizontal dashed line in the bottom left indicates 100% of the conservation egg requirement. Error bars represent 95% confidence intervals.

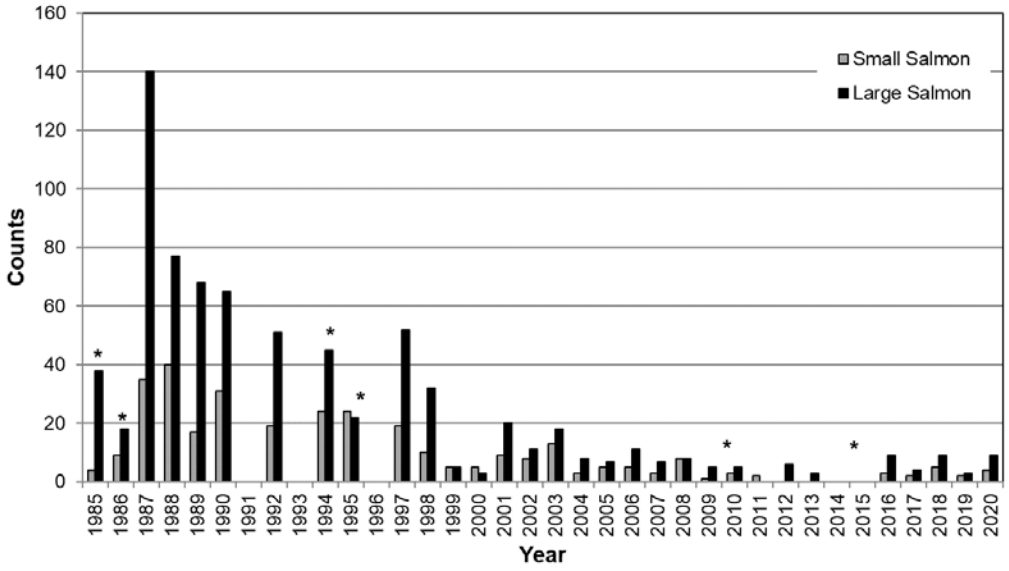


Figure 3. Counts of small and large Atlantic Salmon in Clyburn Brook, NS, from 1985 to 2020. Years where only the lower section of the river was surveyed (partial counts) are identified with an asterisk (*). No count was conducted in 1991, 1993, 1996, and 2015. Source: Parks Canada.

Outer Bay of Fundy (Outer Portion of Salmon Fishing Area 23)

Although COVID-19 restrictions prevented the completion of many annual assessment activities in SFA 23, essential services and priority activities were conducted. The Mactaquac Fishlift was operated throughout the 2020 season, providing adult return information for the Saint John River above the Mactaquac Dam. The fall pre-smolt assessment and collection on the Tobique River was also completed in 2020.

Sources of Uncertainty

There are on-going informal reports of illegal fishing activities (e.g., fishing in closed areas and poaching), but the combined contribution of these activities to the depressed status of populations is not known.

Further details on the uncertainty associated with these assessment methods can be found in DFO (2013).

Eastern Cape Breton

The number of small and large Salmon caught and released, fishing effort, and catch-and-release mortality within SFA 19 are estimated from licence-stub returns from the recreational Salmon fishery. Catch and effort values are adjusted for non-returned stubs using a relationship based on the reported catch as a function of the number of reminder letters sent to licensed anglers. For recreational catch data, under- or over-reporting of numbers of Salmon caught and fishing effort would impact assessment results based on these data. Estimates for 2020 are considered to be preliminary at the time of this status update since licence-sale information and licence stubs are still being returned. In recent years, catch and effort estimates prior to sending reminder letters to anglers have generally been systematically higher than catch and effort estimates after reminder letters have been sent. In an attempt to reduce this bias in years where reminder letters were not sent to anglers (i.e., 2004, 2008–2010, and 2018), individual river mean scaling factors (i.e., estimate after reminder letter information divided by reported value

prior to reminder letter information) for small Salmon, large Salmon, and effort have been applied to reported values to estimate catch and effort.

A pool count of Salmon returns was conducted on North River on August 19, 2020, where 108 large and 48 small Salmon were counted. Water levels were low and the visibility was considered to be moderate to good during this count; however, high summer water temperatures preclude a mark-recapture approach to determine observation efficiency; therefore, it was not used for population assessment purposes.

Although some populations in ECB have been closer to their conservation egg requirements than those in the OBoF and SU regions, substantial declines are evident in other ECB populations (e.g., Grand River and Clyburn Brook). There is uncertainty in the status of populations in non-index rivers, which has been inferred from recreational catch data and limited electrofishing data (Levy and Gibson 2014).

Conclusions

In SFA 19, two index populations in ECB had estimated egg depositions below conservation egg requirements and one index population had estimated egg depositions above conservation egg requirements, with values ranging between 64–102% of these requirements in 2020. Although limited data were collected on index rivers in SFAs 20, 21, and 23, Salmon assessments were not completed and information concerning stock status and trends of these SFAs are not contained within this report.

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Sources of Information

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Appendix

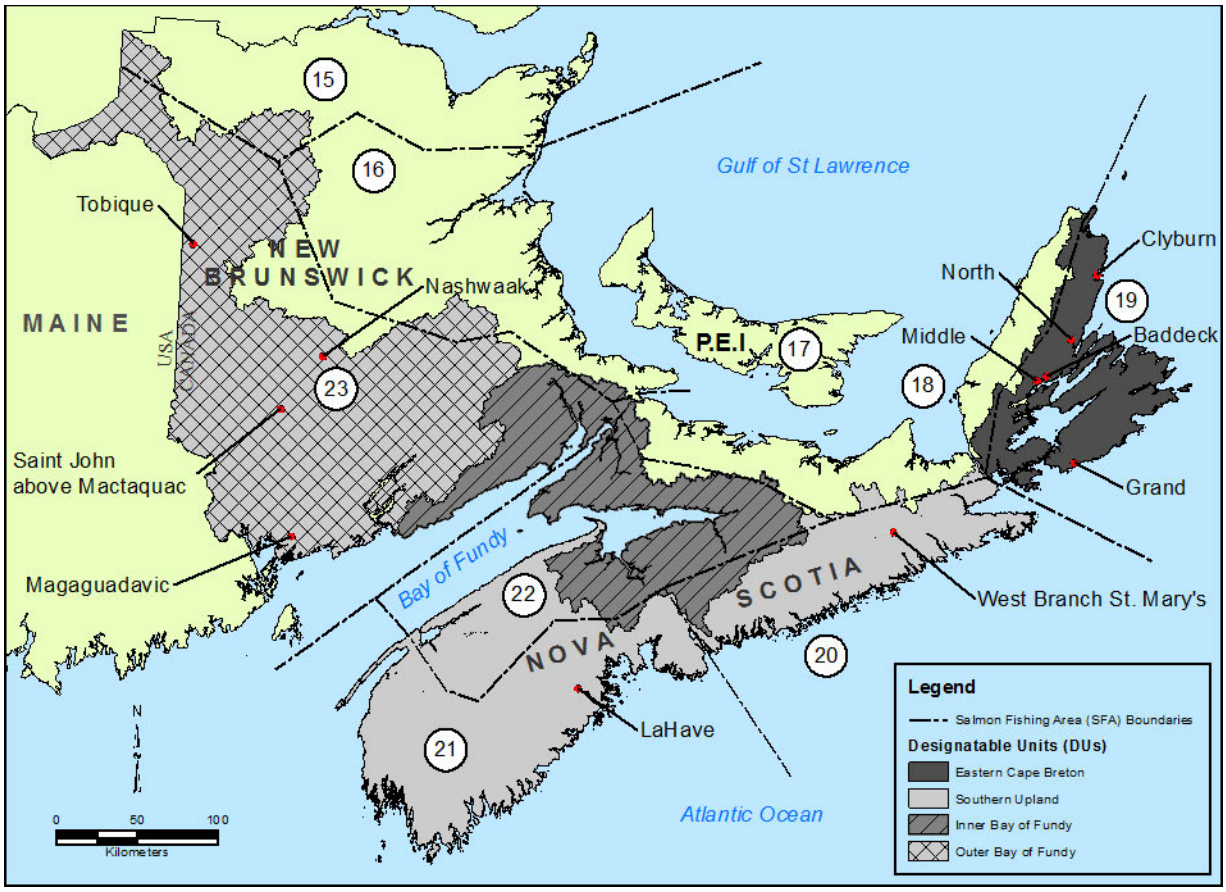

Figure A1. Map showing the locations of Salmon rivers where monitoring predominately occurred, Salmon Fishing Areas (SFAs), and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Designatable Units (DUs) mentioned in this update. SFA numbers are labeled inside the white circles. Data Source for DUs derived from NS Secondary Watershed Layer (NS Dept. of Environment) and NB Watershed Level 1 Layer (NB Dept. of Natural Resources).

This Report is Available from the:

Center for Science Advice (CSA)
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ISSN 1919-3769
ISBN 978-0-660-39357-5 Cat. No. Fs70-7/2021-032E-PDF

Correct Citation for this Publication:

DFO. 2021. Stock Status Update of Atlantic Salmon in Salmon Fishing Areas (SFAs) 19–21 and 23. DFO Can. Sci. Advis. Sec. Sci. Resp. 2021/032.

Aussi disponible en français :

MPO. 2021. Mise à jour de l'état du stock de saumon Atlantique dans les zones de pêche du saumon (ZPS) 19 à 21 et 23. Secr. can. de consult. sci. du MPO. Rép. des Sci. 2021/032.

Appendix K

Salmon Study - Survey

Denver Marine Ltd

Oyster Lease Application

April 2022

Fisheries and Oceans Canada | Pêches et Océans Canada
Science | Sciences

Canadian Science Advisory Secretariat (CSAS)

Research Document 2014/099

Maritimes Region

Recovery Potential Assessment for Eastern Cape Breton Atlantic Salmon (*Salmo salar*): Status, Past and Present Abundance, Life History, and Trends

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Identifying and Grouping Genetic Variation

Analysis of seven Atlantic Salmon populations distributed throughout eastern Cape Breton was conducted to identify genetic variation and patterns of present-day genetic structuring within the ECB DU (refer to O'Reilly et al. 2013). One objective of this analysis was to prioritize populations for conservation measures based on genetic information. Examining patterns of genetic variation can be useful to help identify and prioritize remaining within-species biodiversity for conservation actions; more specifically:

> "[text omitted] analyses of mitochondrial DNA, can help identify major ancestral lineages not otherwise apparent (Utter et al., 1993; Verspoor et al., 2002). Additionally, analyses of patterns and extent of genetic structuring among samples from different locations can provide information on amounts of recent and ongoing gene flow. This information is important in inferring the potential for adaptive differences to have developed between salmon from different rivers or regions, since genetically based adaptive differentiation can only accrue in the absence of large amounts of gene flow (Waples, 1991). Assessments of levels of within-population genetic variation have also been used to prioritize populations for conservation efforts (Petit et al., 1998) with, all else being equal, more weight given to populations exhibiting higher levels of genetic variation. This increased importance of more genetically diverse populations reflects both a) potentially increased likelihood of persistence of a given population over more genetically depauperate populations (Saccheri et al., 1998) and, hence, the ability of a population to contribute demographically to the species through time, and b) the potential contribution to the adaptability of the species in the face of future environmental change." (O'Reilly et al. 2012)

As noted by O'Reilly et al. (2012), all salmon populations from a given region can potentially contribute genetically or demographically to the long-term persistence of a DU, and possibly to the species itself. Different approaches suggested for prioritizing species conservation applicable to Atlantic Salmon have been recently summarized by O'Reilly et al. (2012):

> "A number of different approaches have been suggested for prioritizing species for conservation, recently discussed in O'Reilly and Doyle (2007). Ultimately, decisions would ideally be based on many criteria, including a) molecular genetic and genetically

based phenotypic differences in quantitative traits (Crandall et al., 2000), and b) ecological and life history information (Utter et al., 1993). [text omitted]. Petit et al. (1998) suggest an approach that prioritizes populations based on within-population genetic variation (specifically, AR) and divergence among populations, and, hence, what each contributes most to the total diversity of a given group of populations."

It is recognized that the analysis of neutral molecular genetic data only represents part of the picture when prioritizing species conservation. As noted by O'Reilly et al. (2013), recommendations with regard to the prioritization and conservation of Atlantic Salmon populations in eastern Cape Breton would depend on many criteria, including the number of populations that could be conserved and the consideration of all relevant and available information, including phenotypic and ecological factors in addition to insight from molecular genetic data.

Even though the genetics analyses only included seven of the 46 rivers known to harbour, or have historically supported Atlantic Salmon populations in eastern Cape Breton, the results of the analyses identified four (and possibly five) "groupings" that could be prioritized for conservation based on levels of within and among (though primarily the latter) population genetic variation (refer O'Reilly et al. 2013). All pairwise estimates of F_{ST} (measure of genetic structuring among populations) between samples from eastern Cape Breton populations were significantly different from zero, consistent with the presence of genetic structuring within the DU. Samples from the Baddeck River and Middle River populations, which empty into a common bay, were the least differentiated and clustered closely together in both phylogenetic and factorial correspondence analyses. This pair of populations next clustered together with samples from the North Aspy population in the most obvious grouping of multiple eastern Cape Breton populations in the study, before joining the somewhat more divergent North River and the western Cape Breton Margaree population. The Indian Brook (Eskasoni) population was clearly divergent from the other populations included in the analysis, and constitutes a second major grouping of these populations. River Inhabitants and Grand River were moderately differentiated from each other and the other eastern Cape Breton populations that were analyzed, though the former grouped with Mabou from western Cape Breton and the latter with the St. Mary's River population of the neighbouring SU DU. If considering only eastern Cape Breton populations, River Inhabitants and Grand River can be considered sole representatives of two additional groupings in the seven populations analyzed. Possible indications of within-population structuring was observed in North River, suggesting the presence of a fifth group of eastern Cape Breton Atlantic Salmon, although additional analyses of further samples from this location are required to substantiate these latter findings. Although unknown, it is important to consider that sampling additional populations within eastern Cape Breton may provide additional evidence for a greater number of divergent populations or clusters within the ECB DU and may provide further insight into clustering within major drainage basins and bays of the Bras d'Or Lakes and along the Atlantic coast.

On the whole, the results may suggest that genetic variation has developed on small spatial scales in eastern Cape Breton, and that geography as partial barriers to gene flow may be important to consider when prioritizing populations for recovery of ECB DU Atlantic Salmon (see below).

Setting Recovery Targets for Distribution

As noted during the SU RPA (Bowlby et al. 2013), distribution targets are harder to quantitatively define than abundance targets because the amount of population-level variation and contribution from straying, necessary to ensure long-term persistence of Atlantic Salmon, have not been quantified. Recent scientific advice with regard to distribution targets for SU Atlantic Salmon stated:

> "The distribution target should encompass the range of genetic and phenotypic variability among populations and environmental variability among rivers, and should include rivers distributed throughout the DU to allow for gene flow between the rivers/populations. There is the expectation that including a wide variety of populations in the distribution target will enhance persistence as well as facilitate recovery in the longer term." (DFO 2013)

This advice is also applicable to Atlantic Salmon populations in eastern Cape Breton. As shown in Figure 4.2.1, there are seven ecodistricts in eastern Cape Breton and watersheds known to contain/have historically contained Atlantic Salmon populations encompass all seven of these ecodistricts to varying degrees (Table 4.2.3). As environmental heterogeneity may lead to local adaptations among populations, all seven of these ecodistricts should be considered when establishing the distribution target for ECB DU Atlantic Salmon. In addition, gene flow in eastern Cape Breton salmon populations may also be limited by the connectivity among rivers and local adaptation within the region. Therefore, selecting populations in areas that are potentially "geographically isolated" is also an important consideration in addition to selecting populations with representative life histories and that represent all seven ecodistricts. "Groupings" identified in the genetics analysis appears to lend support to the importance of this isolation (e.g., close grouping of Middle and Baddeck rivers that both flow into Nyanza Bay, distinctiveness of Indian Brook (Eskasoni) which was the most geographically isolated population, lack of clustering among River Inhabitants and Grand River, which both drain into the Atlantic Ocean). Although there is limited genetic information to help partition the DU precisely and a greater degree of uncertainty in the distinctiveness of Grand River and River Inhabitants populations, consideration of geographic isolation when establishing distribution targets could include selecting representative populations of the major basins and bays of the Bras d'Or Lakes (Figure 4.3.1), populations representative of those found along each of the south, central and northern regions of the southeast Atlantic coast, and representation of Atlantic coast rivers flowing off the Cape Breton highlands. Although other schemes are possible, a proposed geographic grouping (Figure 4.3.1) includes: rivers flowing into the Atlantic Ocean between the Canso Causeway and St. Peters (group 1), rivers flowing southeast into the Atlantic that are northeast of St. Peters (group 2), rivers flowing northeast into the Atlantic to the east of the Great Bras d'Or (group 2.1), Highland rivers northwest of White Point (group 3), Highland rivers between White Point and the Great Bras d'Or (group 4), rivers flowing in the Bras d'Or Lakes via St. Patrick's Channel (group 5), and other rivers flowing into the Bras d'Or Lakes (group 6). Other than direction of flow, there is no information for splitting between groups 2 and 2.1.

The six divisions of geographic isolation presented (Figure 4.3.1) take into consideration the major basins and bays within the DU and roughly correspond with ecodistricts (Section 4.2). Group 1 is comprised of the three watersheds that drain into Chedabucto Bay and St. Peters Bay within the Bras d'Or Lowlands and Cape Breton Hills ecodistrists. Group 2 is comprised of the six watersheds that drain south into the Atlantic Ocean, east of St. Peters Bay and are predominately within the Cape Breton Coastal and Bras D'Or Lowlands ecodistricts. Group 2.1 is comprised of eight watersheds (potentially a subset of group 2) predominantly within the Bras d'Or Lowlands and Cape Breton Hills ecodistricts that drain in a generally northeast direction to the Atlantic Ocean along the eastern coast of Cape Breton, north of Scaterie Island and southeast of the Great Bras d'Or Channel. Group 3 is comprised of four watersheds on the north tip of Cape Breton ranging in size from approximately 12 km^2 to 142 km^2. These watersheds drain into Aspy Bay and Bay St. Lawrence and are a combination of Cape Breton Taiga, Cape Breton Highlands, and Victoria Lowlands. Group 4 is comprised of six watersheds that drain into the Gulf of St. Lawrence and St. Ann's Bay, ranging in size from approximately 23 km^2 to approximately 267 km^2. These watersheds are almost entirely within the Cape Breton Highlands ecodistrict with small portions of Cape Breton Taiga, and Victoria Lowlands and Bras D'Or Lowlands. Group 5 is comprised of eight watersheds ranging in size from approximately

Table 4.2.3. Proportions of the seven eastern Cape Breton ecodistricts within each of the 46 watersheds thought to support or to have supported Atlantic Salmon within eastern Cape Breton. Percentages are based on the total area of each ecodistrict found in this set of 46 watersheds. A "-" represents 0%.

River No.	River Name	CB Taiga	CB Highlands	Victoria Lowlands	CB Hills	Inverness Lowlands	Bras D'Or Lowlands	CB Coastal
1	Salmon R. (Vic Co)	-	3.6%	-	-	-	-	-
2	Wilkie Bk.	-	0.8%	2.0%	-	-	-	-
3	North Aspy R.	39.1%	5.0%	43.1%	-	-	-	-
4	Middle, South Aspy R.	29.4%	0.8%	39.0%	-	-	-	-
5	Clyburn Bk.	10.5%	4.0%	6.1%	-	-	-	-
6	Ingonish R.	7.0%	6.1%	1.9%	-	-	-	-
7	Indian Bk. (Vic Co)	14.0%	18.4%	1.6%	-	-	-	-
8	Barachois R.	-	8.0%	1.6%	-	-	0.3%	-
9	River Bennett	-	1.5%	4.8%	-	-	0.0%	-
10	North R.	-	15.0%	-	0.6%	-	1.1%	-
11	Baddeck R.	-	10.8%	-	6.6%	-	3.8%	-
12	Middle R.	-	22.0%	-	-	77.8%	0.4%	-
13	Hume R.	-	3.6%	-	-	-	-	-
14	MacPhersons (Lewis) Bk.	-	0.4%	-	0.8%	-	-	-
15	Skye R.	-	-	-	10.1%	22.2%	0.2%	-
16	Blues Bk.	-	-	-	1.7%	-	0.3%	-
17	Washabuck R.	-	-	-	1.5%	-	0.6%	-
18	McKinnons Bk.	-	-	-	0.6%	-	0.4%	-
19	River Denys	-	-	-	14.3%	-	4.8%	-
20	Scott Bk.	-	-	-	0.6%	-	1.3%	-
21	River Tillard	-	-	-	2.5%	-	2.7%	0.4%
22	False Bay Bk.	-	-	-	0.5%	-	1.0%	0.1%
23	Black R.	-	-	-	0.6%	-	2.7%	-
24	River Inhabitants	-	-	-	19.3%	-	10.1%	0.1%
25	Grand R.	-	-	-	3.2%	-	10.0%	12.4%
26	St. Esprit (Taylors) Bk.	-	-	-	-	-	0.3%	2.3%
27	Marie Joseph Bk.	-	-	-	-	-	1.4%	9.9%
28	Framboise R.	-	-	-	-	-	4.5%	17.3%
29	Gerratt Bk./Lorraine Bk.	-	-	-	-	-	-	18.4%
30	Little Lorraine Bk.	-	-	-	-	-	-	9.8%
31	Catalone R.	-	-	-	-	-	3.1%	11.5%
32	Mira R.	-	-	-	7.4%	-	28.8%	17.9%
33	MacAskills Bk.	-	-	-	-	-	3.4%	-
34	Northwest Bk.	-	-	-	-	-	3.4%	-
35	Sydney R.	-	-	-	5.5%	-	8.2%	-
36	Grantmire Bk.	-	-	-	1.2%	-	0.7%	-
37	Frenchvale Bk.	-	-	-	3.4%	-	1.1%	-
38	Georges R.	-	-	-	1.0%	-	0.5%	-
39	Aconi Bk.	-	-	-	-	-	2.8%	-
40	Benacadie Bk.	-	-	-	3.7%	-	0.5%	-
41	Indian Bk. (CB Co)	-	-	-	4.4%	-	-	-
42	MacIntosh Bk.	-	-	-	3.3%	-	-	-
43	Gillies Bk.	-	-	-	3.0%	-	-	-
44	Breac Bk.	-	-	-	3.5%	-	-	-
45	River Tom	-	-	-	0.8%	-	0.8%	-
46	MacNabs Bk.	-	-	-	-	-	0.9%	-
Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

FIGURES

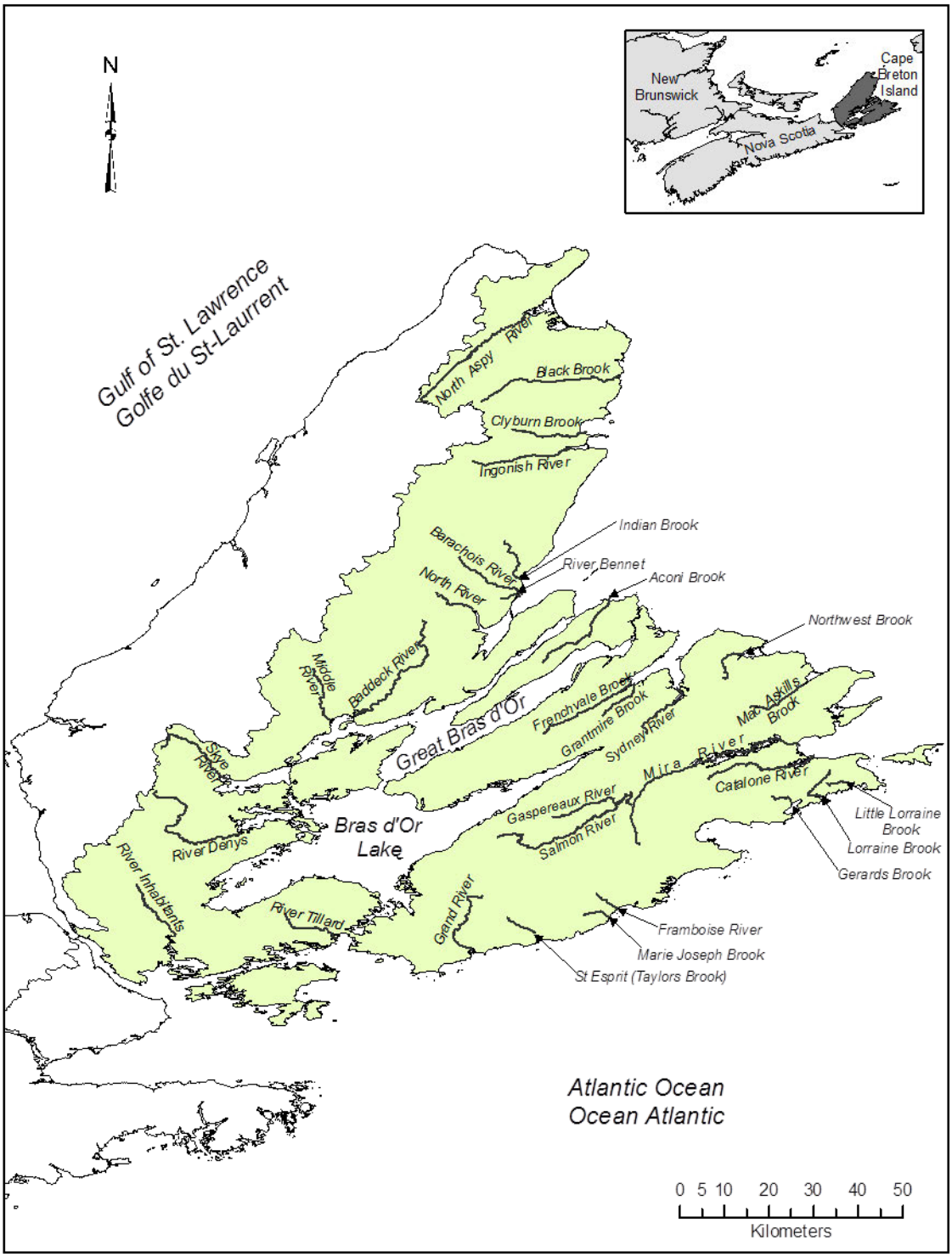


Figure 2.1. Rivers in the ECB DU with a reported recreational catch. The ECB DU is highlighted in green.

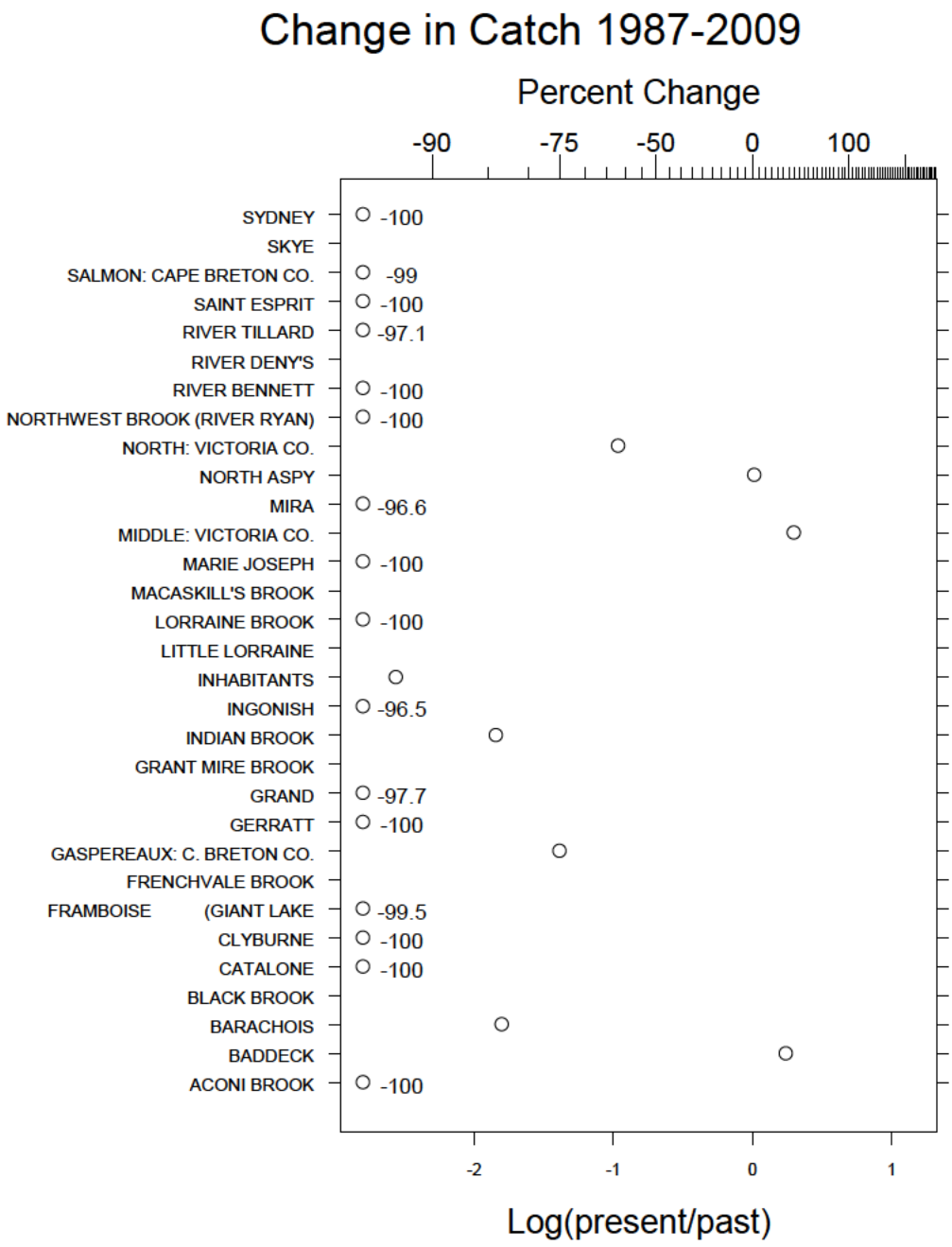


Figure 3.7.2. Change in the average estimated reported catch, of large and small salmon combined, between the five-year time periods ending in 1987 (years: 1983-1987; "past") and 2009 (years: 2005-2009; "present"). Points with value labels are outside the range of the graph. When extended to include data up to and including 2011, the percent change in catch for five-year time periods (i.e., 1983-1987 vs. 2007-2011) for Baddeck, Middle, North and North Aspy rivers are 85.9%,73.8%,-51.8%, and 37.0%, respectively.

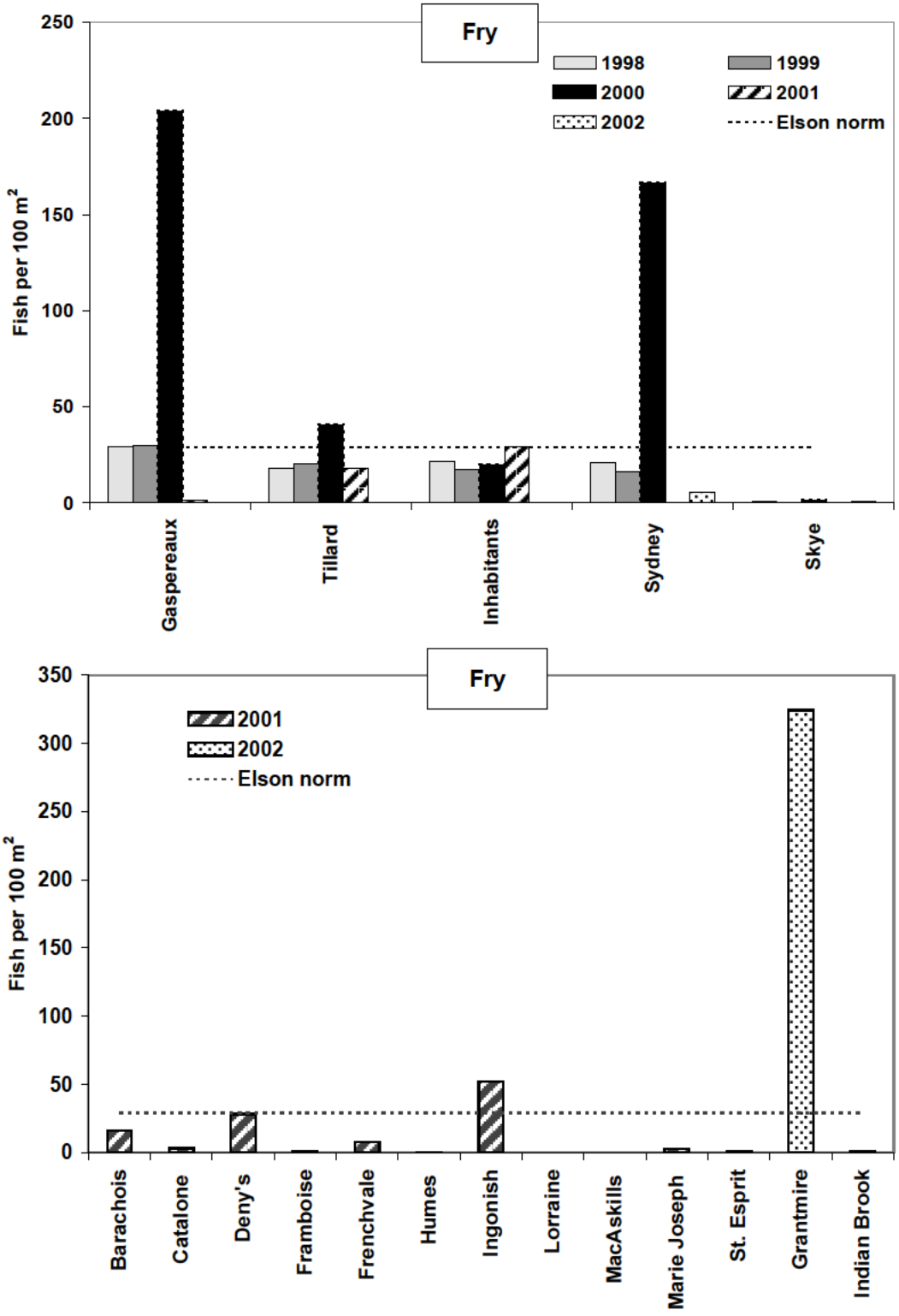


Figure 3.8.1. Mean densities of age 0 juvenile Atlantic Salmon (fry) sampled at a single site on 'other' ECB rivers from 1998-2002 (Source: Robichaud-LeBlanc and Amiro 2004).

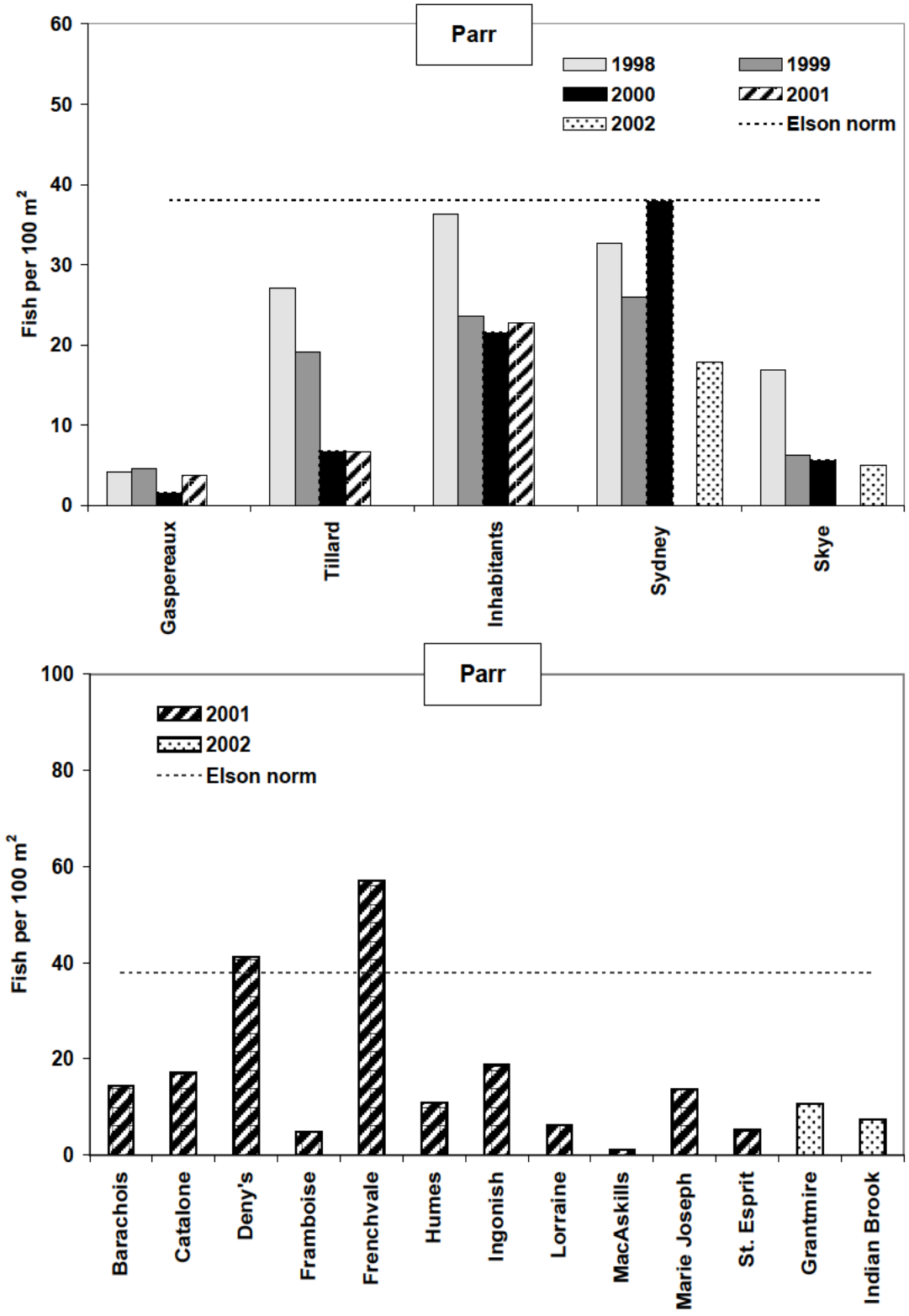
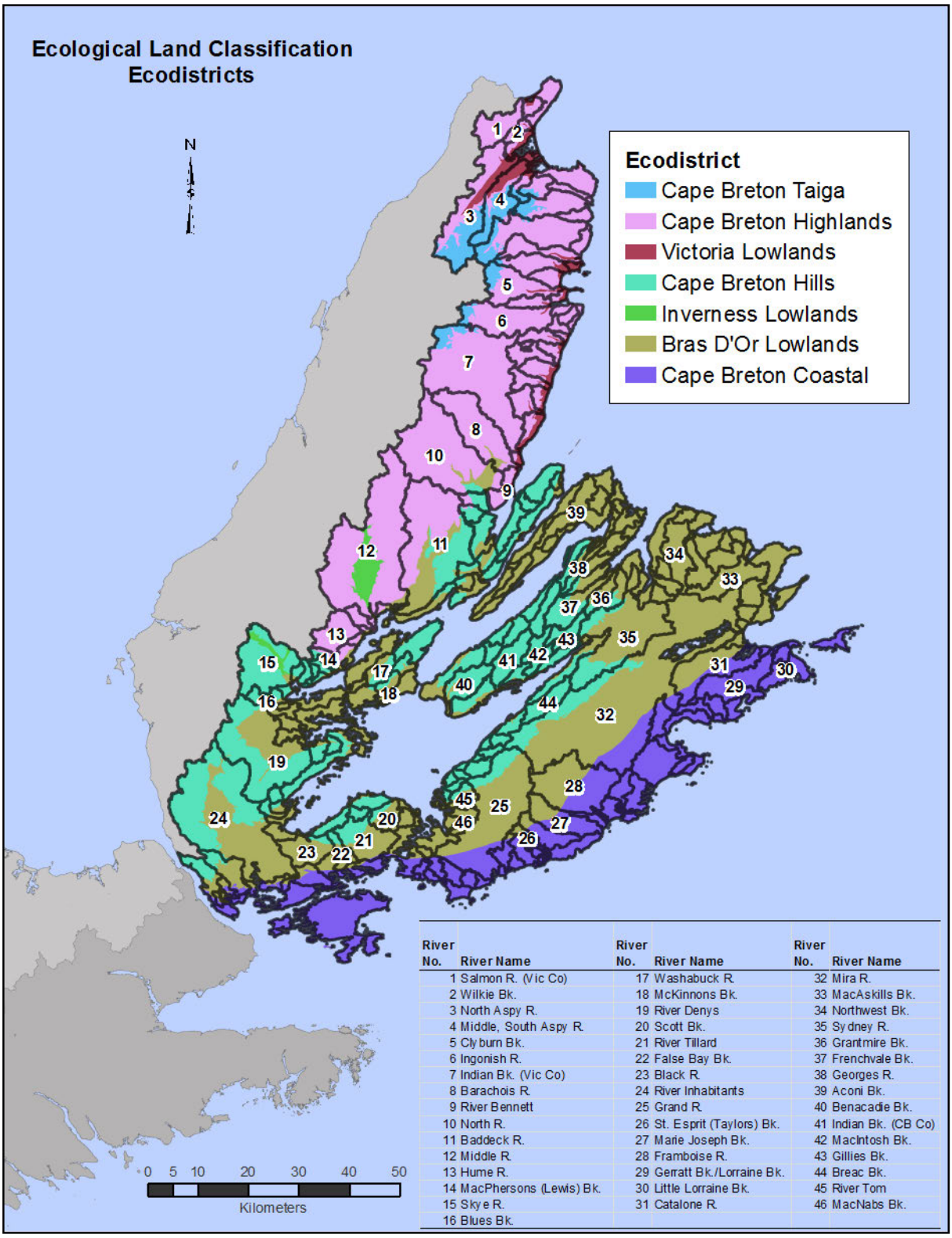


Figure 3.8.2. Mean densities of age 1 and older juvenile Atlantic Salmon (parr) sampled at a single site on 'other' ECB rivers from 1998-2002 (Source: Robichaud-LeBlanc and Amiro 2004).



River No.	River Name	River No.	River Name	River No.	River Name
1	Salmon R. (Vic Co)	17	Washabuck R.	32	Mira R.
2	Wilkie Bk.	18	McKinnons Bk.	33	MacAskills Bk.
3	North Aspy R.	19	River Denys	34	Northwest Bk.
4	Middle, South Aspy R.	20	Scott Bk.	35	Sydney R.
5	Clyburn Bk.	21	River Tillard	36	Grantmire Bk.
6	Ingonish R.	22	False Bay Bk.	37	Frenchvale Bk.
7	Indian Bk. (Vic Co)	23	Black R.	38	Georges R.
8	Barachois R.	24	River Inhabitants	39	Aconi Bk.
9	River Bennett	25	Grand R.	40	Benacadie Bk.
10	North R.	26	St. Esprit (Taylors) Bk.	41	Indian Bk. (CB Co)
11	Baddeck R.	27	Marie Joseph Bk.	42	MacIntosh Bk.
12	Middle R.	28	Framboise R.	43	Gillies Bk.
13	Hume R.	29	Gerratt Bk./Lorraine Bk.	44	Breac Bk.
14	MacPhersons (Lewis) Bk.	30	Little Lorraine Bk.	45	River Tom
15	Skye R.	31	Catalone R.	46	MacNabs Bk.
16	Blues Bk.				

Figure 4.2.1. Map of ecodistricts and the major watersheds associated with known Atlantic Salmon rivers in eastern Cape Breton.

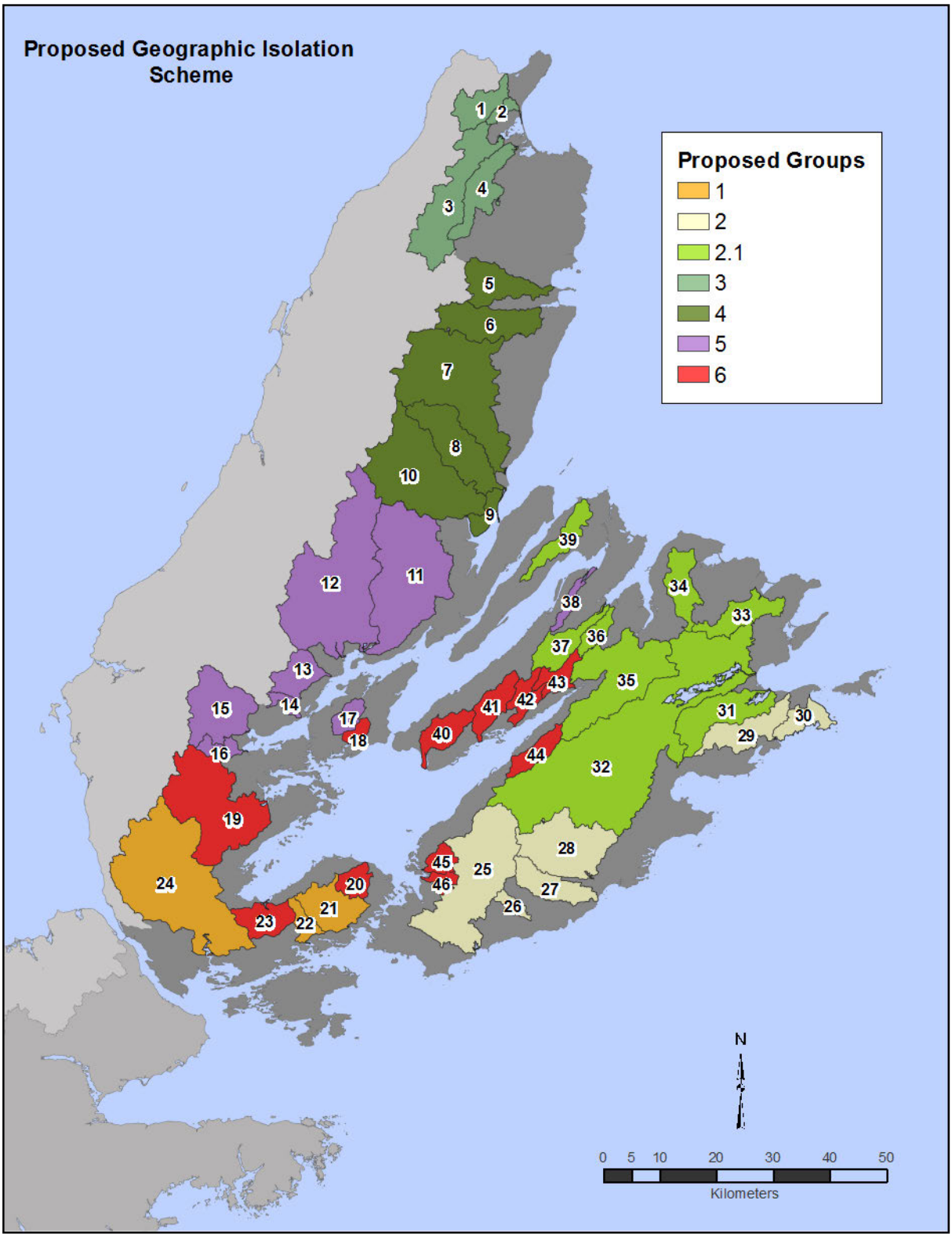


Figure 4.3.1. Map of proposed divisions of geographic isolation for major watersheds associated with known Atlantic Salmon rivers in eastern Cape Breton. Watershed numbers (in white) correspond with Figure 4.2.1.

River	Catch Description	Years																													
		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
GASPEREAUX: C. BRETON CO.	C S	0	1	0	1	0	0	3	2	1	0	0	0	0	0	0	8	1	0	0	0	0	0	0	0	0	0	0	-	-
	C L	4	2	0	0	0	1	0	0	1	0	0	0	0	9	7	1	0	0	0	0	0	0	0	2	0	0	0	-	-
	R S	0	1	0	1	0	0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	R L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	Effort	62	42	5	12	35	7	30	16	52	12	8	17	0	16	29	44	2	1	5	3	0	0	1	5	0	0	0	-	-
GERRATT	C S	1	4	7	2	7	0	4	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	C L	0	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	R S	1	2	4	0	3	0	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	R L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	Effort	22	33	19	15	43	6	14	36	37	5	7	4	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
GRAND	C S	228	404	542	356	334	324	334	419	128	166	136	75	6	94	31	75	17	20	1	31	16	7	20	15	6	7	3	-	-
	C L	69	34	132	192	104	101	80	102	18	46	24	21	16	26	6	12	3	1	0	0	3	2	0	0	2	0	3	-	-
	R S	194	350	471	294	301	303	311	339	115	155	115	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	R L	31	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	Effort	4212	2989	3073	2997	2059	3334	2709	2857	1981	1939	1469	416	49	294	173	246	47	81	9	84	63	35	13	28	34	31	27	-	-
GRANT MIRE BROOK	C S	-	-	-	-	-	-	-	-	-	0	6	0	0	8	0	1	4	0	0	0	0	14	4	6	0	0	0	-	0
	C L	-	-	-	-	-	-	-	-	-	4	7	0	0	11	3	1	13	1	0	0	4	3	7	0	3	2	3	-	0
	R S	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0
	R L	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0
	Effort	-	-	-	-	-	-	-	-	-	8	15	0	0	21	9	7	17	4	3	0	9	16	9	14	4	17	5	-	5
INDIAN BROOK	C S	1	10	0	11	6	5	1	2	12	0	4	0	3	5	0	3	1	0	0	0	0	0	5	0	0	5	-	0	0
	C L	2	10	0	14	25	16	1	8	30	0	1	1	4	5	0	1	0	0	0	0	3	2	0	0	0	0	-	0	2
	R S	0	9	0	6	4	2	1	1	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0
	R L	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0
	Effort	28	40	0	43	41	40	12	40	89	20	43	10	19	27	17	25	7	5	5	11	9	11	9	13	3	19	-	2	13
INGONISH	C S	1	11	0	0	9	11	7	11	12	2	22	2	4	4	5	3	0	0	0	0	0	2	1	0	0	0	0	-	0
	C L	3	6	0	0	27	23	25	15	4	2	22	7	11	5	8	9	1	0	0	0	0	7	1	0	0	0	0	-	0
	R S	1	6	0	0	5	5	7	11	10	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0
	R L	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0
	Effort	18	31	0	0	47	42	145	51	103	46	125	48	45	83	21	11	8	5	1	3	3	4	4	5	0	0	0	-	2
INHABITANTS	C S	4	31	33	22	43	55	25	46	42	30	25	25	4	23	3	9	1	14	0	4	2	2	5	6	6	2	0	-	-
	C L	40	66	104	255	155	209	74	102	131	148	79	68	19	65	5	14	4	24	0	1	1	2	4	15	18	2	0	-	-
	R S	4	27	28	21	41	45	24	36	36	30	25	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	R L	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	Effort	315	228	325	321	295	354	396	489	366	437	305	157	44	119	25	36	29	42	9	13	12	7	7	47	25	9	0	-	-
LITTLE LORRAINE	C S	-	-	-	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	C L	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	R S	-	-	-	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	R L	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	Effort	-	-	-	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
LORRAINE BROOK	C S	13	30	55	25	29	36	17	19	3	16	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	C L	1	0	2	2	6	10	8	3	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	R S	10	30	53	24	28	35	14	17	0	13	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	R L	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	Effort	72	183	293	279	204	260	145	199	58	63	37	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	-	-

Denver Marine Limited

AQ#1454

BN [redacted]

Walsh's Deep Cove

ADDITIONAL INFORMATION REQUIRED

October 13, 2022

Section 2.1: Production Plan

The following is a five-year production plan for site #1454. Production will commence in **Walsh's Deep Cove** the first year moving forward.

Year 1

Will introduce 200,000 spat in April which will require 32 cages, 192 bags. During the months of July/August oysters will be divided into 70 cages and 420 bags and will be sunk prior to the winter months. The following gear will be required to fulfill the above production plan which will consist of three lines (330' long):

- 4 yellow spar buoys
- 2 coils of 1/2" rope (1200'/coil)
- 2 coils of 3/8" rope (1200'/coil)
- 10 screw anchors

Additional equipment required:

- Tumbler (3 screen)
- 25x10 pontoon work platform

Year 2

Year 1 oysters will be separated into 168 cages, 1008 bags and will require two additional lines (330' long).

- 1 coil ½" rope (1200'/coil)
- 1.5 coils of 3/8" rope (1200'/coil)
- 4 screw anchors
- 1 shaker (3 screen)
- 1 hopper conveyor

Year 3

Will introduce 200,000 spat in April which will require 32 cages, 192 bags. During the months of July/August oysters will be divided into 70 cages and 420 bags and will be sunk prior to the winter months. The following gear will be required to fulfill the above production plan which will consist of three lines (330' long):

- 1 coils of 1/2" rope (1200'/coil)

- 1.5 coils of 3/8" rope (1200'/coil)
- 6 screw anchors

Year 4

Year 3 oysters will be separated into 168 cages, 1008 bags and will require two additional lines (330' long).

- 1 coil ½" rope (1200'/coil)
- 1.5 coils of 3/8" rope (1200'/coil)
- 4 screw anchors

First year oysters will be harvested if not ready for harvest after the third season. Cages and bags will be reused for Lazares Island's 300,000 oyster lot.

Year 5

Will introduce 300,000 spat in April which will require 48 cages, 288 bags. During the months of July/August oysters will be divided into 105 cages and 630 bags and will be sunk prior to the winter months. The following gear will be required to fulfill the above production plan which will consist of four lines (330' long):

This 300,000 lot will reuse lines from first year oysters (with one line to spare). Second year oyster's cages and bags from Lazares Island will be reused in this lot.

Section 2.2: Instructure

- There will be a floating dock on the property adjacent to the site #1454 as I own 10 acres of land parallel to site #1454 and will have a laydown area for material for the site.
- Walsh's Deep Cove site will have use of the D'Escousse wharf. The wharf is utilized for members of the Yacht Club along with a few lobster fishermen. Deploying and harvesting of oysters will take place before and after the lobster fishing season; therefore, there should be no cross contamination of product.

- The Janvrin Island fishermen reserve will also be used to access this site to load and unload equipment.

Section 4.1 : Oceanographic Environment

- Site #1454 Walsh's Deep Cove – is in a red zone. I have applied to NSSWB (Nova Scotia Shellfish Working Group) & CSSP (Canadian Shellfish Sanitation Program) to have this site reclassified. I am currently waiting on a decision to allow testing to begin. The last time the water was tested was in 2011. I had the water tested in Summer 2021 and it tested clean. The water was classified as restricted due to the lack of use and funding for testing, not because of the water quality.

Section 8.2: Interactions with other Aquaculture Operation

- There will be no shared infrastructure with other aquaculture organizations. The closest aquaculture farm is approximately 7 kms away.

Denver Marine Limited

AQ#1455

BN [redacted]

Lazares Island

ADDITIONAL INFORMATION REQUIRED

October 13, 2022

Section 2.1: Production Plan

The following is a five-year production plan for site#1455. Production will commence in Lazares Island on the second year moving forward.

Lazares Island – Site#1455

Year 2

Will introduce 200,000 spat in April which will require 32 cages, 192 bags. During the months of July/August oysters will be divided into 70 cages and 420 bags and will be sunk prior to the winter months. The following gear will be required to fulfill the above production plan which will consist of three lines (330' long):

- 4 yellow spar bouys
- 2 coils of 1/2" rope (1200'/coil)
- 3 coils of 3/8" rope (1200'/coil)
- 10 screw anchors

Year 3

Year 2 oysters will be separated into 168 cages, 1008 bags and will require two additional lines (330' long).

YEAR 3 OYSTERS:

- 1 coil of 1/2" rope (1200'/coil)
- 1.5 coils of 3/8" rope (1200'/coil)
- 4 screw anchors

Year 4

Will introduce 300,000 spat in April which will require 48 cages, 288 bags. During the months of July/August oysters will be divided into 105 cages and 630 bags and will be sunk prior to the winter months. The following gear will be required to fulfill the above production plan which will consist of four lines (330' long):

- 2 coils of 1/2" rope (1200'/coil)
- 3 coils of 3/8" rope (1200'/coil)
- 8 screw anchors

This 300,000 lot will reuse cages and bags from first year oysters from Walsh's Deep Cove.

Year 5

Year 4 oysters will be separated into 252 cages, 1512 bags and will require five additional lines (330' long).

- 1.5 coils of 1/2" rope (1200'/coil)
- 2.5 coils of 3/8" rope (1200'/coil)
- 10 screw anchors

Second year oysters will be harvested if not ready for harvest after third season. Cages and bags will be reused for Walsh's Deep Cove 300,000 lot.

Section 2.2: Instructure

- There will be a floating work platform on site.
- Lazares Island site will have use of the D'Escousse wharf. The wharf is utilized for members of the Yacht Club along with a few lobster fishermen. Deploying and harvesting of oysters will take place before and after the lobster fishing season; therefore, there should be no cross contamination of product.
- The Janvrin Island fishermen reserve will also be used to access the site to load and unload equipment.

Section 4.1 : Oceanographic Environment

- Site #1455 Lazares Island – is in a green zone approved for aquaculture

Section 8.2: Interactions with other Aquaculture Operation

- There will be no shared infrastructure with other aquaculture organizations. The closest aquaculture farm is approximately 7 kms away.