ShoreZone Summary Report

Cape Breton Island

March 2025

Prepared for:

Department of Fisheries and Oceans

SEACHANGE MARINE CONSERVATION SOCIETY

ShoreZone

On the cover:

Ingonish Harbour

South Bar

Ingonish Island

SeaChange Project: 23-02 March 2025

ShoreZone Habitat Mapping Summary Report

Cape Breton Island Survey Area

Aconi Island (bc23_hn_00454)

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Cape Breton Island Survey Area Summary

1,678 km of shoreline mapped

7,440 shoreline units created

Average unit length is **226 m**

52% of the intertidal is classified as **Sediment-dominated** and **24%** is classed as **Riparian**

87% of the shoreline has a high Oil Residence Index value (residence of months to years)

10% of the shoreline has a **Shoreline Modification** of some type

6 biobands were classified in the **intertidal** with **Eelgrass (59%** of units**),** and **Rockweed (49%** of units**)** being the most common

8 biobands were classified in the **supratidal** with **Salt Marsh** (**52%** of units) and **Dune Grass (45%** of units) being the most common

5 biobands were classified in the **lower intertidal/subtidal** with **Eelgrass** (**59%** of units), and **Rockweed (49%** of units**)** being the most common

St. Peter's Canal

Bras d'Or Lake

Bird Islands

Lingan

Table of Contents

List of Figures And Tables

1 Introduction

ShoreZone is an imaging and habitat classification system for the coastal nearshore margin including the shallow subtidal, intertidal shoreline and supratidal fringe. One objective of ShoreZone is to produce a georeferenced, searchable inventory of the physical and biological attributes of coastal habitats. ShoreZone imagery and habitat mapping attributes can provide a useful baseline from which to study change over time, while the attributes mapped (such as shoreline sediments, predicted oil residence and biotic communities) provide an important resource for scientists, managers, and responders. The ShoreZone mapping system provides a decision support tool with many potential uses including community planning, facilities citing, conservation planning, research and fisheries management, emergency planning and response, search and rescue, education, and habitat modeling.

The ShoreZone system was developed in the 1980s and 1990s to map coastal habitats in British Columbia and Washington State (Howes 2001; Berry et al. 2004). In 2001 ShoreZone was implemented in Alaska, beginning with Cook Inlet, Outer Kenai, Katmai, and portions of the Kodiak Archipelago (Harper and Morris 2004). ShoreZone has since expanded to a spatially continuous database of over 125,500 km of coastal Alaska, British Columbia, New Brunswick, Nova Scotia, Washington State and Oregon (see Figure 1 for North American extent). Figure 2 shows the extent of the shoreline mapped around Cape Breton Island and is the section of shoreline covered by this summary report.

The ShoreZone imaging surveys conducted around Cape Breton Island in September 2022 acquired aerial video and digital still images of the coast during minus tides (zero-meter tide levels and lower). The imagery and associated audio commentary were used to map the physical and biological attributes of the shoreline. The entire shoreline was mapped according the most recent ShoreZone coastal habitat mapping protocol (Cook et al. 2017). The purpose of this report is to provide a summary of the physical (Section 2) and biological (Section 3) data imaged and classified in the Cape Breton Island survey area. Please see the Acknowledgments section included in this report for the imaging and mapping funding partners in Canada.

The length of shoreline mapped is **1,678 kilometers** in **7,440 along-shore segments** (units), averaging 226 m in length. The digital shoreline used for the ShoreZone habitat mapping was the National_Hydro_Network shapefile.

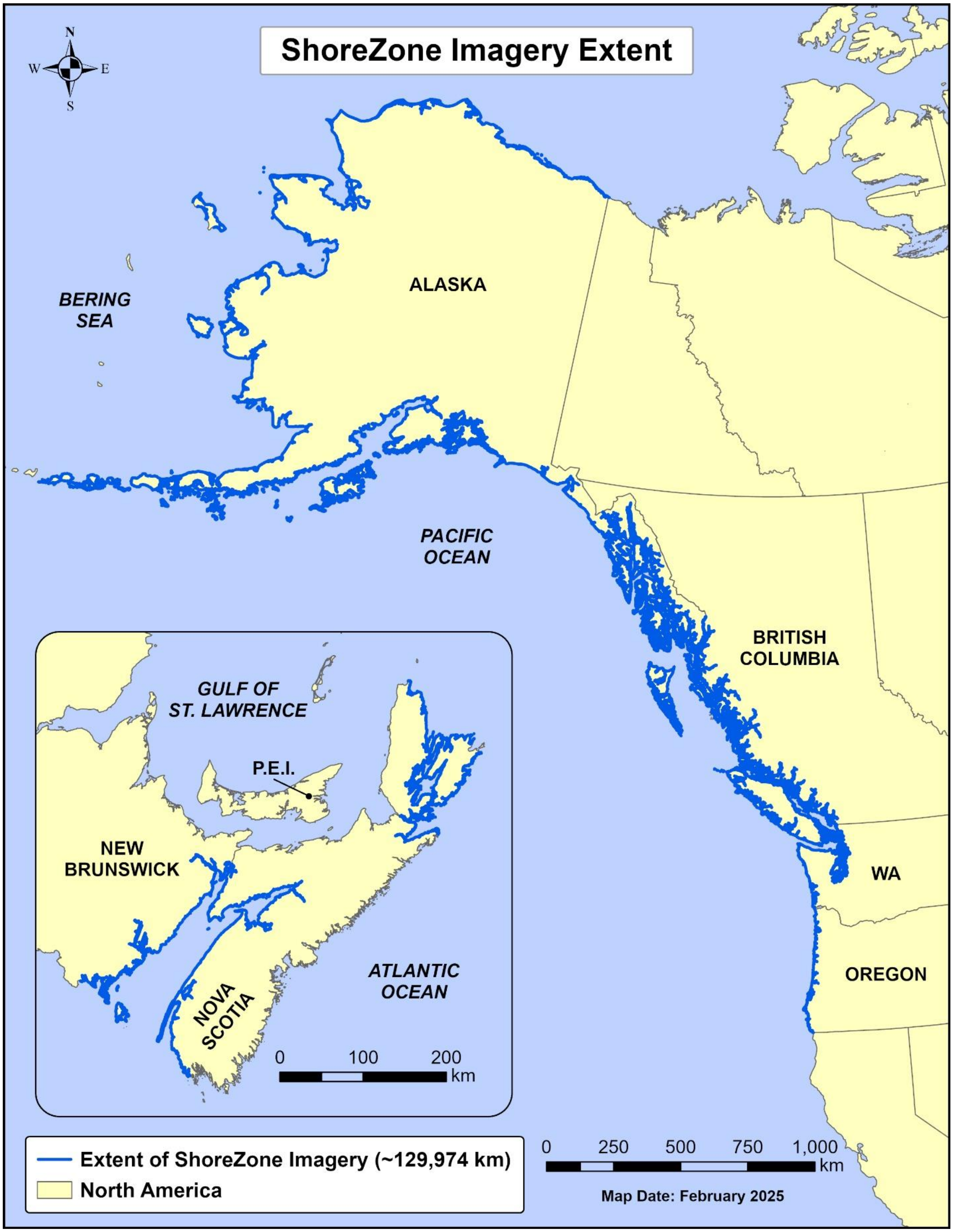

Figure 1. Extent of ShoreZone imagery in North America as of February 2025.

Figure 2. Extent of ShoreZone mapping for the Cape Breton Island survey area covered in this report.

2 Physical Attribute Data Summary

2.1 Coastal Class

The Coastal Class is used to define along-shore coastal units based on the dominant process, geomorphic features and other attributes such as substrate size, across-shore width, and slope (Cook et al. 2017 after Howes et al. 1994). The principal characteristics of each along-shore unit are used to assign one of 39 overall unit classifications. Sediment shorelines (51.8%) were dominant along with Riparian shorelines (24.0%) and Rock shorelines (6.4%) in the Cape Breton Island survey area. Anthropogenic, Rock and Sediment, Lagoon, and Current shorelines all comprised the rest of the coast respectively (see Figures 3 and 4 for summary and distribution statistics). The description for each Coastal Class category in the survey area is given in Table 1. Photographic examples of the major Coastal Classes mapped in the Cape Breton Island survey area are found in Appendix A, Table A-1

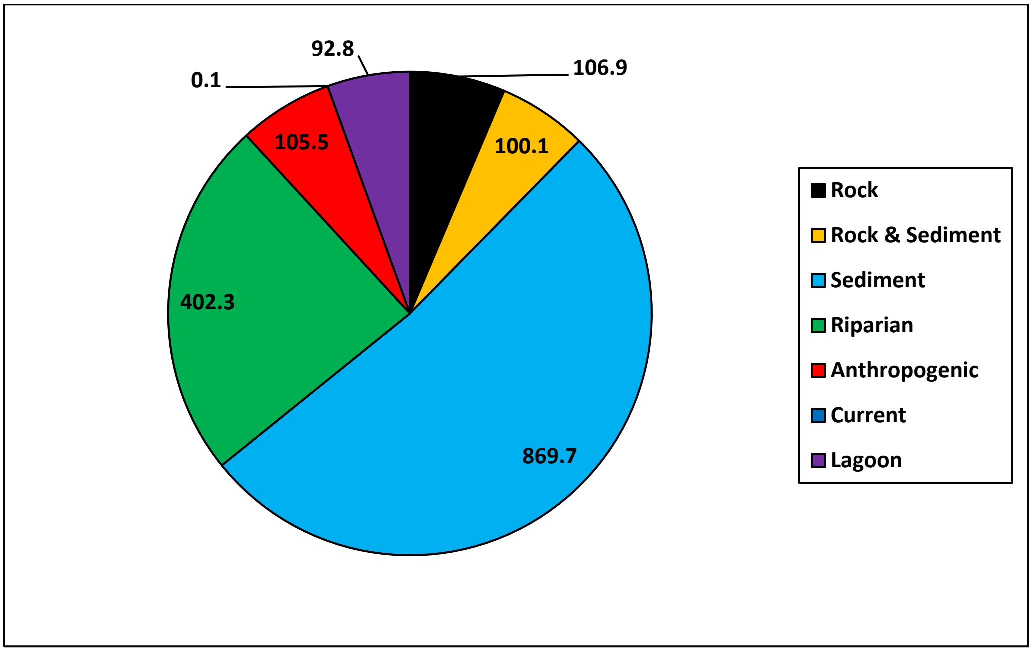

Figure 3. Grouped Coastal Class categories by shoreline length (km).

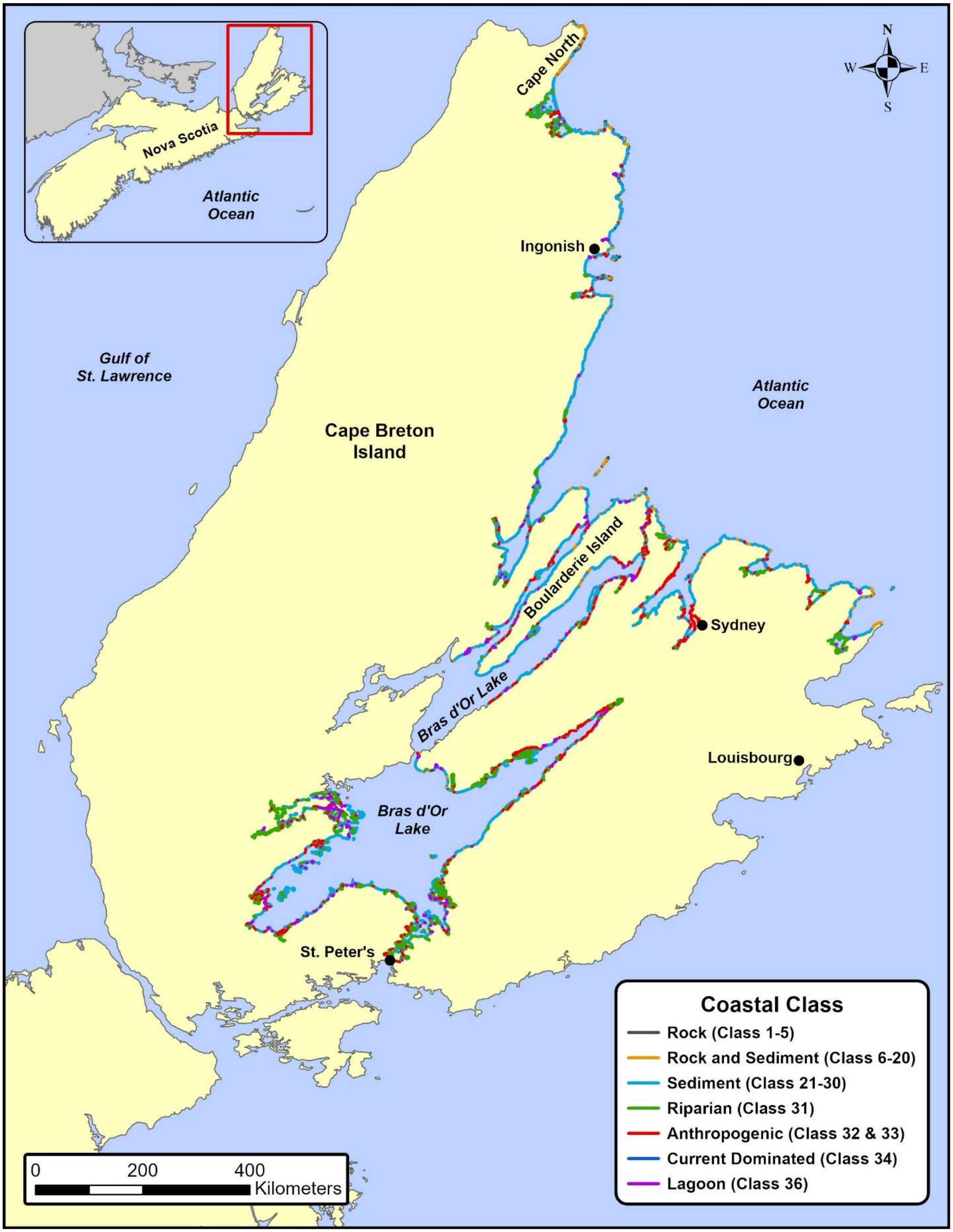

Figure 4. Map of the Coastal Class categories grouped by type (also known as Shore Type).

Table 1. Summary of Coastal Classes for the Cape Breton Island survey area.

Substrate Type	Shore Type		Sum of Unit Length (km)	# of Units	% Occurrence (by length)	Cumulative Occurrence (%, km)
	No.	Description				
Rock	1	Rock Ramp, wide	<1	1	<1	**6% 107 km**
	2	Rock Platform, wide	<1	1	<1	
	3	Rock Cliff	81	355	5	
	4	Rock Ramp, narrow	21	112	1	
	5	Rock Platform, wide	5	42	<1	
Rock & Sediment	7	Platform w gravel beach, wide	<1	3	<1	**6% 100 km**
	8	Cliff with gravel beach	33	155	2	
	9	Ramp with gravel beach	9	55	1	
	10	Platform with gravel beach	6	20	<1	
	12	Platform with G&S beach, wide	1	4	<1	
	13	Cliff with gravel/sand beach	20	160	1	
	14	Ramp with gravel/sand beach	12	79	1	
	15	Platform with gravel sand beach	16	105	1	
	17	Platform w sand beach, wide	<1	4	<1	
	18	Cliff with sand beach	2	24	<1	
	19	Ramp w sand beach, narrow	1	5	<1	
	20	Platform w sand beach, narrow	<1	3	<1	
Sediment	21	Gravel flat, wide	1	2	<1	**52% 870 km**
	22	Gravel beach, narrow	44	244	3	
	23	Gravel flat or fan	1	4	<1	
	24	Sand & gravel flat or fan	17	67	1	
	25	Sand & gravel beach, narrow	649	3,017	39	
	26	Sand & gravel flat or fan	73	349	4	
	28	Sand flat	6	15	<1	
	29	Mud flat	3	13	<1	
	30	Sand beach	78	359	5	
Organics	31	Organics/Estuarine	402	1,369	24	**24% 402 km**
Man-made	32	Man-made, permeable	97	654	6	**6% 106 km**
	33	Man-made, impermeable	8	50	1	
Current	34	Current	<1	2	<1	**<1% <1 km**
Lagoon		Lagoon	93	167	6	**6% 93 km**
Totals:			***1,678***	***7,440***	***100***	***100%***

Note: This table only includes Coastal Classes observed in the survey area.

2.2 Environmental Sensitivity Index (ESI)

The NOAA Environmental Sensitivity Index (ESI) is a shoreline classification system developed to characterize coastal regions based on sensitivity to potential oil spills (Petersen et al. 2002). The ESI system uses wave exposure and principal substrate type to assign a rank of 1 to 10 (with 10 being the most sensitive to oil) to alongshore units. Up to three ESI numbers can be assigned to each ShoreZone unit (high, mid and low intertidal) if applicable. The highest ESI number for each unit, which is the most sensitive, is used in this analysis.

The majority of the Cape Breton Island coastline is represented by the grouped Very Low and Low (55.1% of shoreline length). These sections of the shoreline have a potentially low sensitivity to oil. At the other end of the spectrum, 39.9% of the shoreline was mapped with a potentially high sensitivity to oil (Figures 5 and 6). The summary of Coastal Class by ESI class can be seen in Table 2.

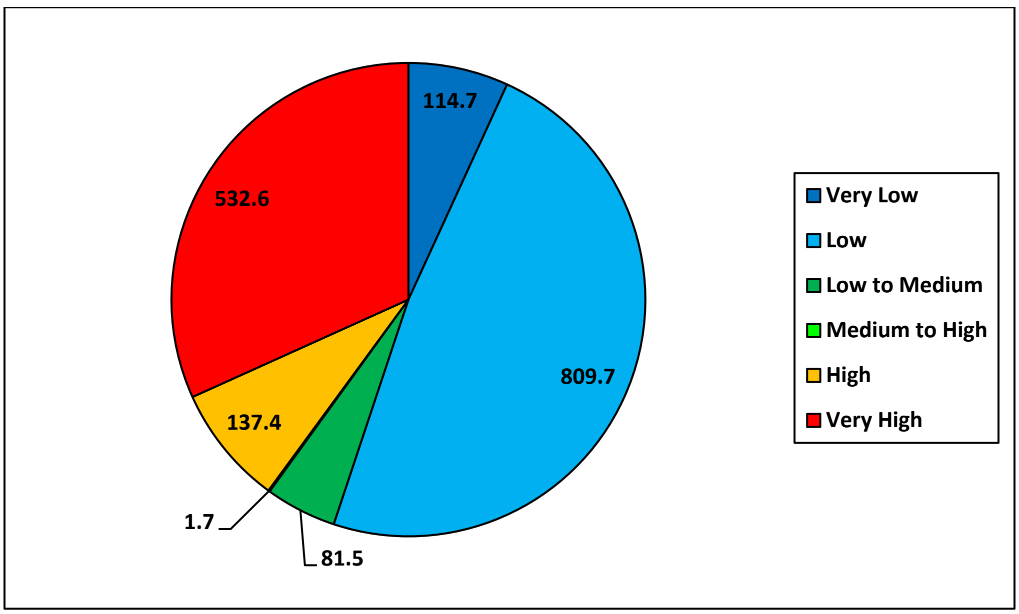

Figure 5. Grouped most sensitive ESI categories by shoreline length (km).

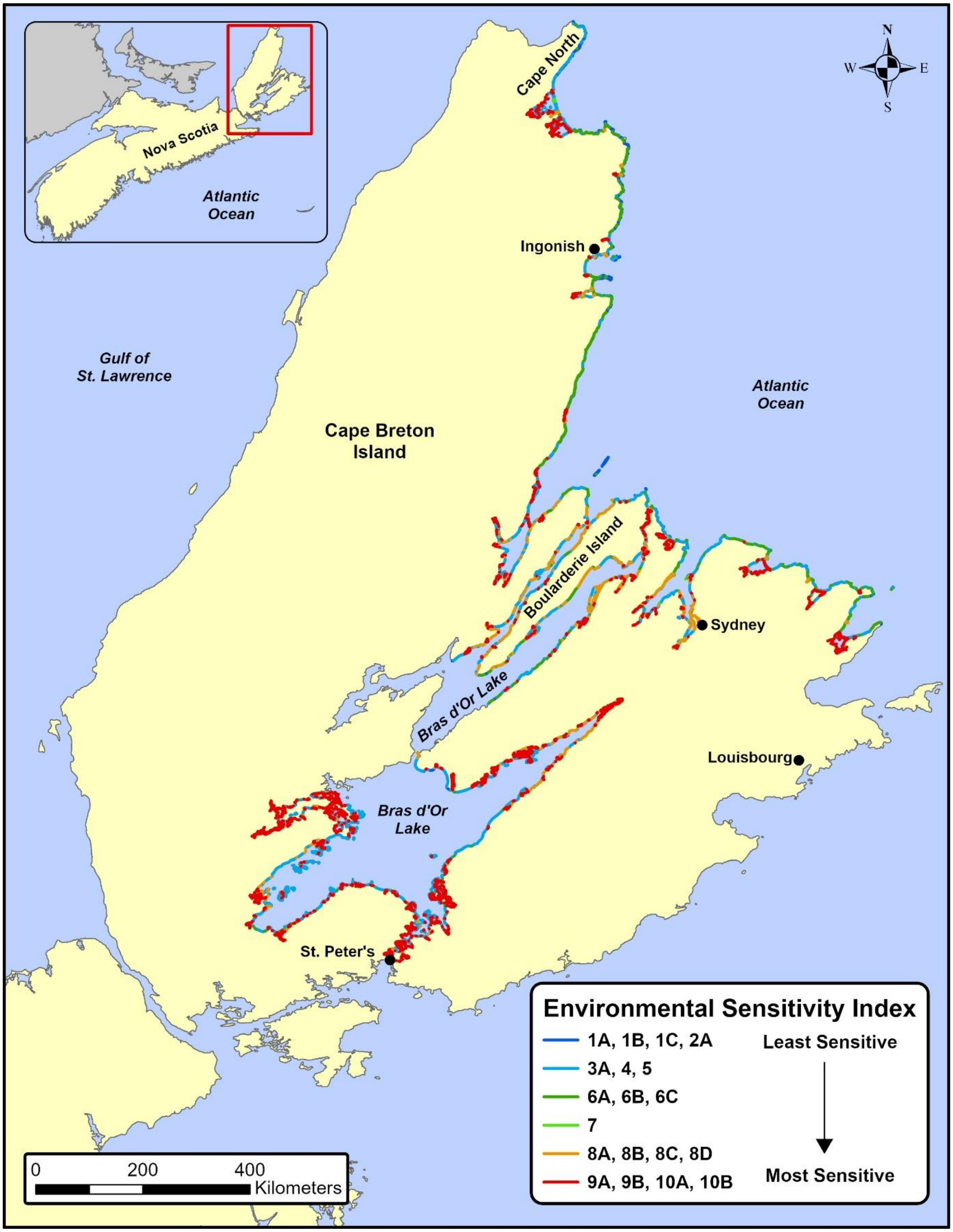

Figure 6. Distribution of the grouped ESI categories from least to most sensitive to oiling.

Table 2. Summary of Coastal Classes by ESI Class for the Cape Breton Island survey area.

Environmental Sensitivity Index (ESI)		Sum of Unit Length (km)	# of Units	% of Total Shoreline Length
No.	Description			
1A	Exposed rocky shores; Exposed rocky banks	69	272	4
1B	Exposed, solid man-made structures	<1	2	<1
1C	Exposed rocky cliffs with boulder talus base	17	84	1
2A	Exposed wave-cut platforms in bedrock, mud, or clay	28	171	2
3A	Fine- to medium-grained sand beaches	67	307	4
4	Coarse-grained sand beaches	14	77	1
5	Mixed sand and gravel beaches	729	3,419	44
6A	Gravel beaches (granules and pebbles)	3	22	<1
6B	Gravel beaches (cobbles and boulders)	62	335	4
6C	Rip rap	17	130	1
7	Exposed tidal flats	2	7	<1
8A	Sheltered scarps in bedrock, mud, or clay; sheltered rocky shores (impermeable)	21	168	1
8B	Sheltered, solid, man-made structures; sheltered rocky shores (permeable)	17	82	1
8C	Sheltered Rip Rap	81	556	5
8D	Sheltered rocky rubble shores	19	89	1
9A	Sheltered tidal flats	17	277	1
9B	Vegetated low banks	7	23	<1
10A	Salt- and brackish-water marshes	470	1,569	28
10B	Freshwater marshes	38	50	2
	Totals:	***1,678***	***7,440***	***100***

Note: ESI Classes not observed in this survey area were not included in the table.

2.3 Oil Residence Index (ORI)

The Oil Residence Index (ORI) is a rating between 1 and 5 with a value of 1 indicating a relatively short oil residence (days to weeks) while a value of 5 reflects potentially very long oil residence times (years). An ORI value is applied to each alongshore unit and to each across-shore component based on sediment texture and wave exposure (Cook et al. 2017). The ShoreZone ORI was developed by Dr. John Harper based on his many years of experience with cleaning up oiled shorelines, starting with the Exxon Valdez spill in Prince William Sound in Alaska.

Lower wave exposures and sediment shorelines lead to higher ORI values for 86.5% of the shore segments in the Cape Breton Island survey area, indicating oil residence times are on the order of months to years (see Figures 7 and 8 for summary and distribution statistics).

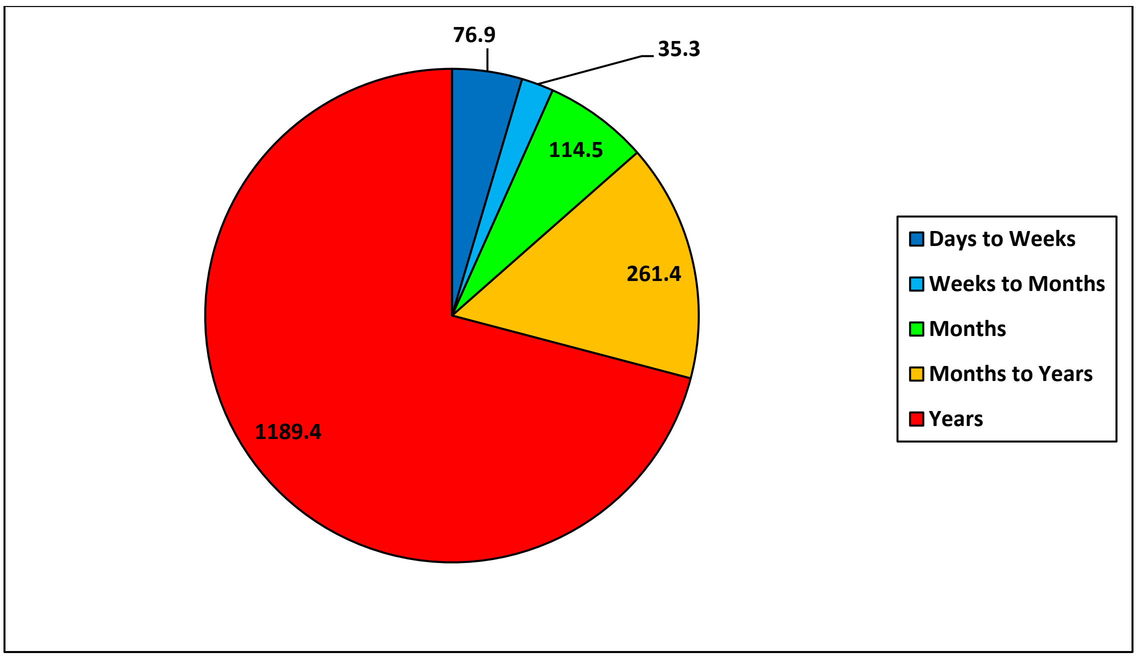

Figure 7. Oil Residence Index (ORI) categories by shoreline length (km).

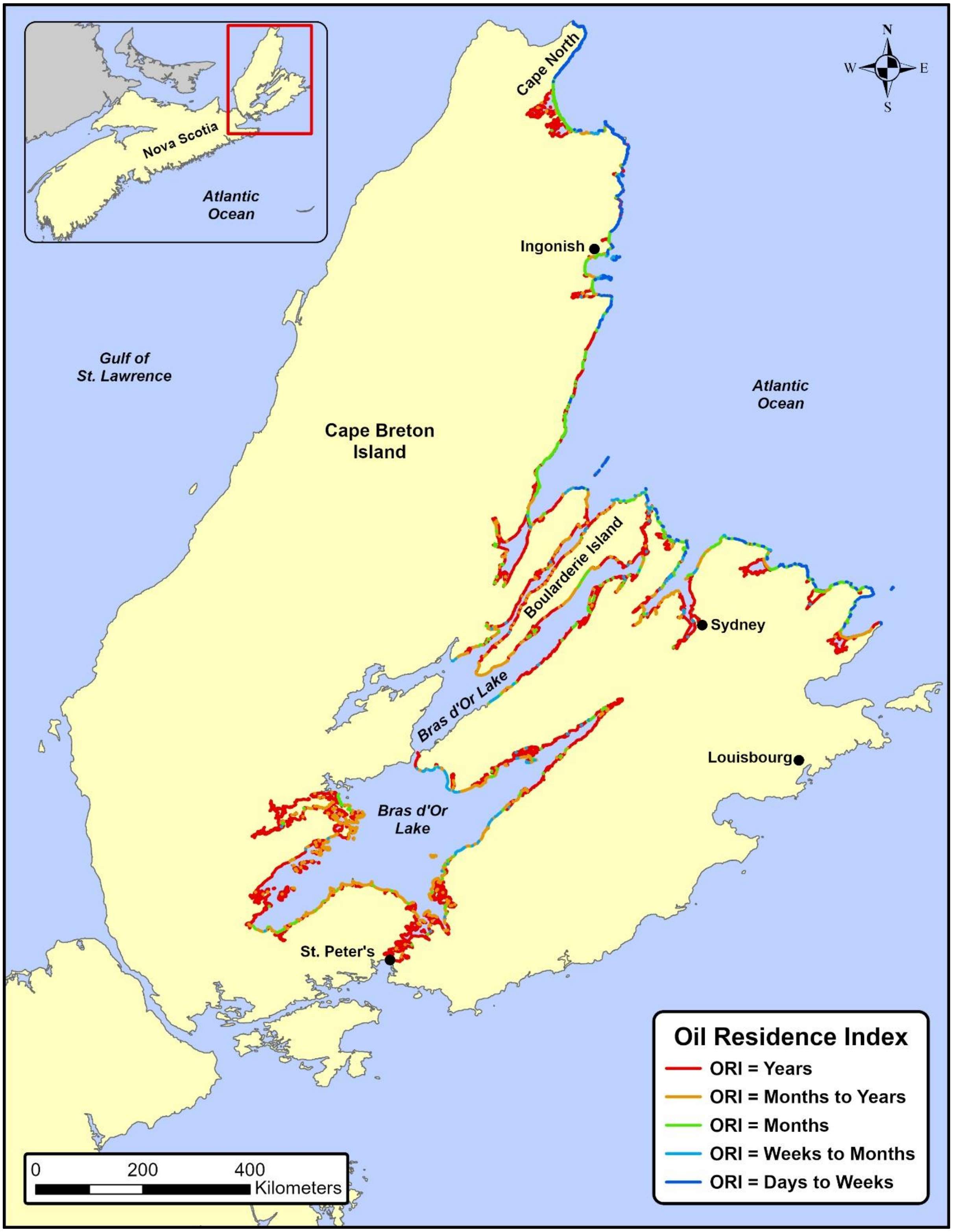

Figure 8. Distribution of the Oil Residence Index (ORI) categories.

2.4 ShoreZone Coastal Vulnerability

2.4.1 Flood Zone Width

The Coastal Vulnerability Module (CVM) includes a classification of flooding sensitivity based on the across shore profile and photographic evidence of historical flooding such as an unambiguous marine debris line. The Flooding Class is an estimate of vulnerability to inundation of the terrestrial area beyond the supratidal. The distance to the debris line is measured and used to classify the flooding potential. Flat shorelines with very low gradients that show evidence of historical flooding have a higher risk of being inundated by storm surges. Potential for damage due to flooding is generally low in the Cape Breton Island study area, with 79.9% of the shoreline at a low risk of flooding <10m from the Mean High Waterline (MHW) (see Figures 9 and 10 for summary and distribution statistics). The flooding class is a parameter of the Coastal Vulnerability Index (see Page 20).

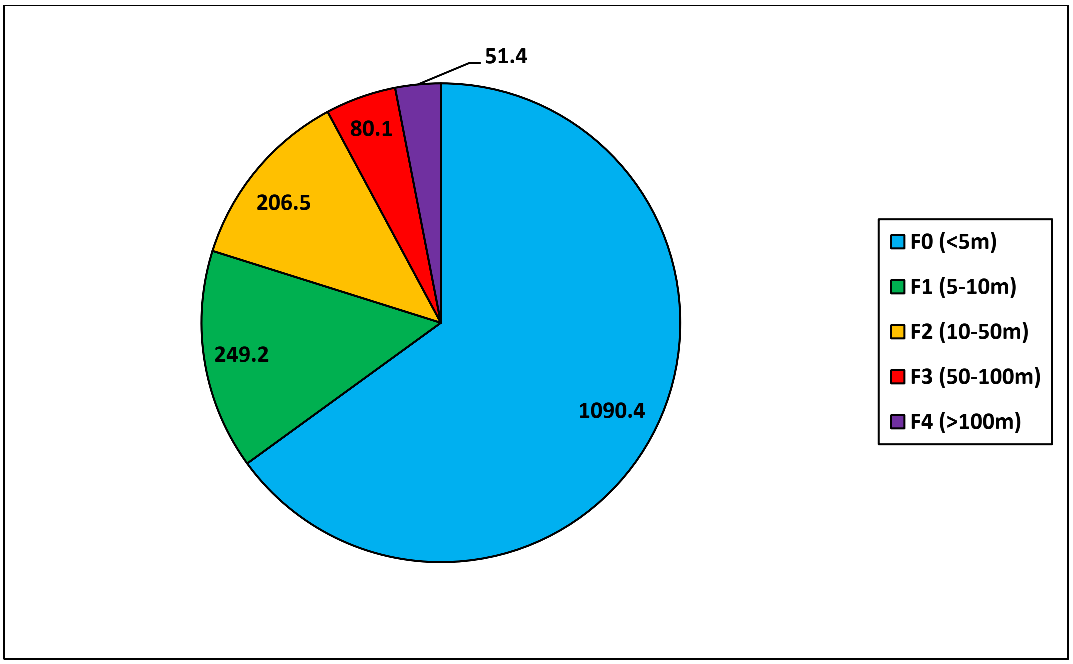

Figure 9. Flooding Class categories by shoreline length (km).

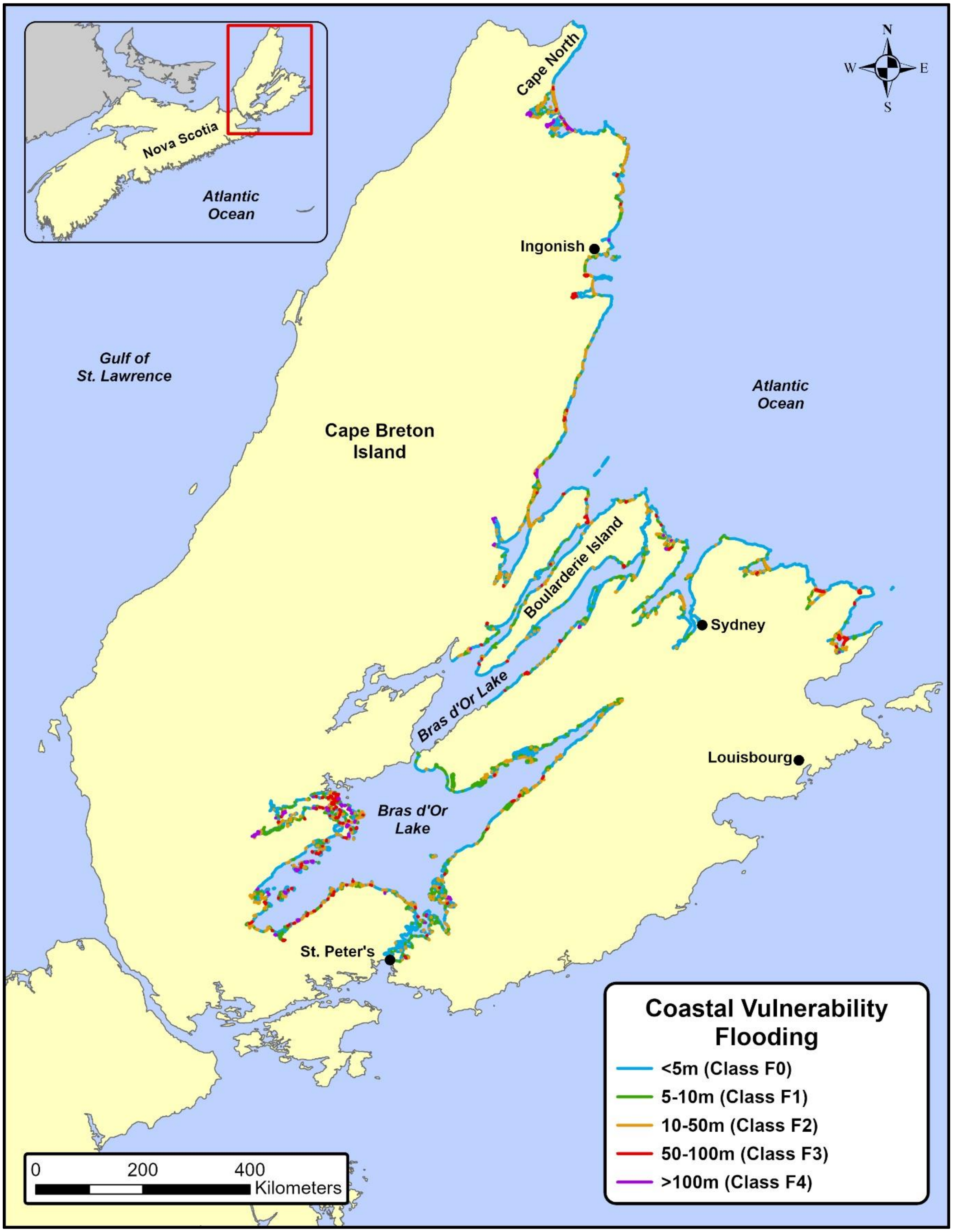

Figure 10. Distribution of the Coastal Vulnerability Flooding Class.

2.4.2 Coastal Vulnerability Observations

The Coastal Vulnerability Observations are features important for estimating the frequency and extent of coastal inundation. In the Cape Breton Island survey area, apart from the 'None' category, most observations were from the Wetland Lagoonal complex category with 306.5 km. The subsequent category was the Anthropogenic category with 29.9 km (see Figures 11 and 12 for summary and distribution statistics). The Other category describes an observation which is not found in the categories listed in the protocol. The description for that particular unit is found in the Unit table in the geodatabase, under the field 'Unit comments'. With regards to the Anthropogenic category, it is important to point out that these areas are not necessarily areas of vulnerability, but areas potentially impacted.

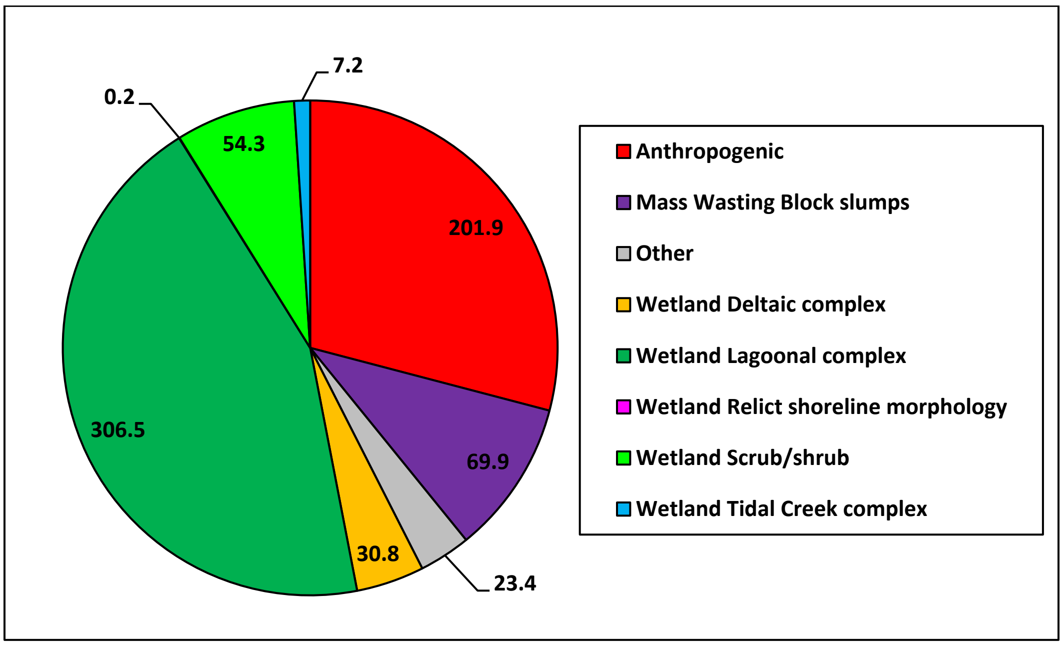

Figure 11. Coastal Vulnerability Observations categories by shoreline length (km). Category 'None' not shown.

Figure 12. Distribution of the Coastal Vulnerability Observations categories.

2.4.3 Coastal Vulnerability Index

In the 2017 ShoreZone protocol (Cook et al. 2017), the methods of Thieler and Hammer-Klose (2000) (http://woodshole.er.usgs.gov/project-pages/cvi/) were adapted to calculate a Coastal Vulnerability Index (CVI) using five ShoreZone attributes: Coastal Class, Max Tide Range, Shoreline Erosion index, Flood Zone Width, and Significant Wave Height. When we first attempted to calculate the CVI for the portion of the shoreline funded in the Eastern Aleutians by the Oil Spill Response Institute, it did not match the observations of the mappers as it appeared to rank too much of the rocky, steep shoreline as High or Very High in terms of vulnerability to sea level rise. After analysis of the data, we determined this was due to the use of a relative ranking system where the values from the study area were only compared to each other to determine the CVI rank. To resolve this issue, we calculated an absolute value for each CVI rank which is described in the latest version of the protocol (Cook et al. 2017). The distribution of ranks in the survey area is shown in Figure 13. Due to the exposed nature of Cape Breton Island's northeastern coastline, some of the shoreline units in the survey area were ranked High and Moderate in terms of vulnerability to sea level rise. The rest of the shoreline units were ranked as Low, including most of the shoreline in the Bras d'Or Lake. The Coastal Class, Wave Exposure, Flood Zone Width, and lower tidal ranges were likely the driving factors behind the rankings in the survey area.

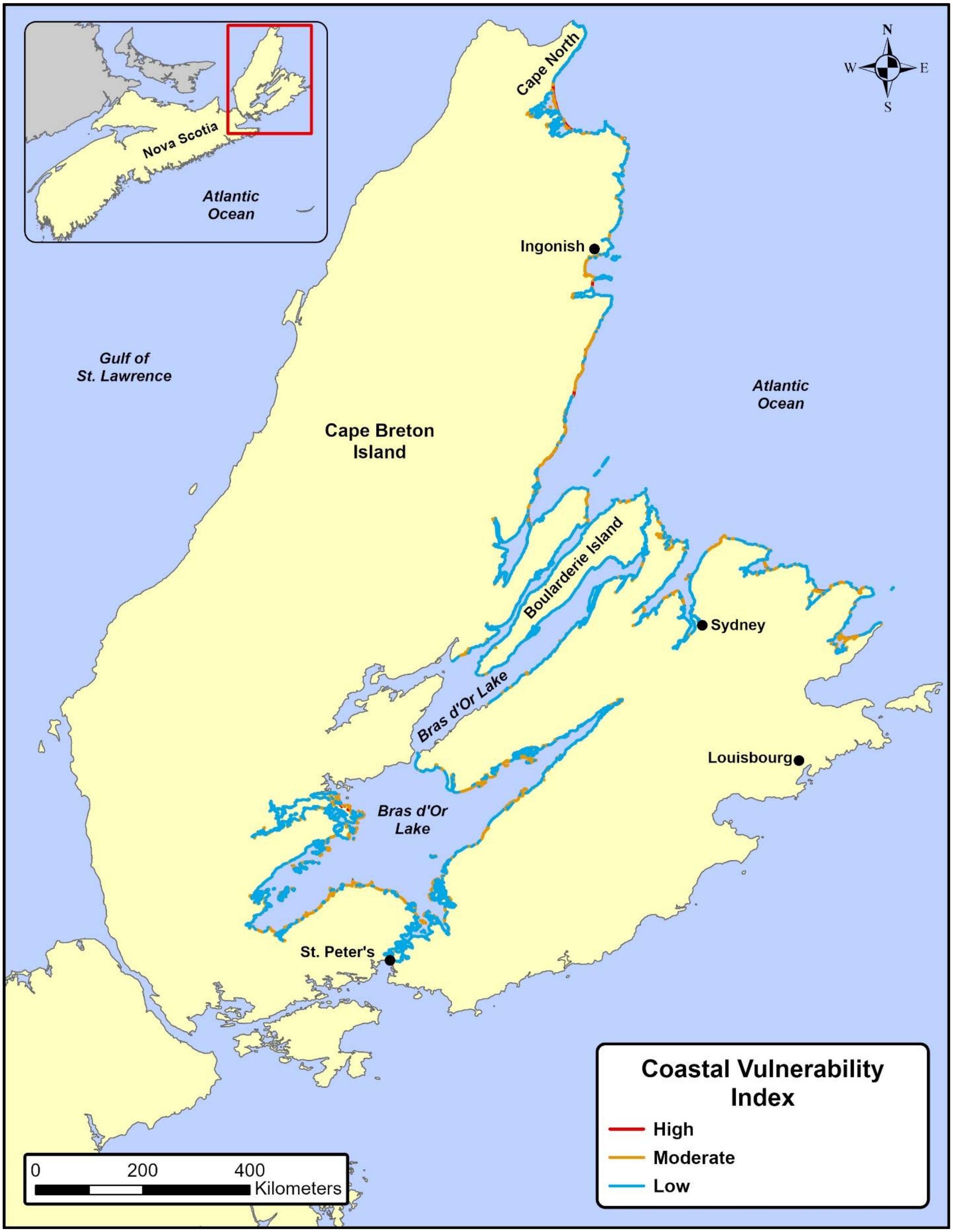

Figure 13. Distribution of Coastal Vulnerability index ranks in the Cape Breton Island survey area.

2.5 Anthropogenic Shore Modifications

The Shoreline Modification attribute provides a thorough catalogue of the specific types of anthropogenic modification in each unit (Cook et al. 2017). This includes many modifications within a given unit. For example, if both riprap and a pile-supported wharf occur, both are catalogued in the appropriate zone of that unit with an estimate of the alongshore length of the unit that modification covers. A total of 10.5% of the shoreline (taking the estimated length of that modification within the unit into account) exhibits shore modifications in the Cape Breton Island study area (Figure 14). Rip Rap was the most commonly recorded observation (63.5%) with Landfill (18.7%) and Concrete Bulkhead (6.1%) rounding out the top three shoreline modifications along the coast. The associated map (Figure 15) shows the distribution of primary shore modifications, though it should be noted that any given modification is possible along the entire length of the indicated shore unit. The Geodatabase delivered with this report displays each shore modification with a specific length category (meters) along the shoreline pertaining to each unit as well as the specific zone (supratidal or intertidal) the modification occurs in.

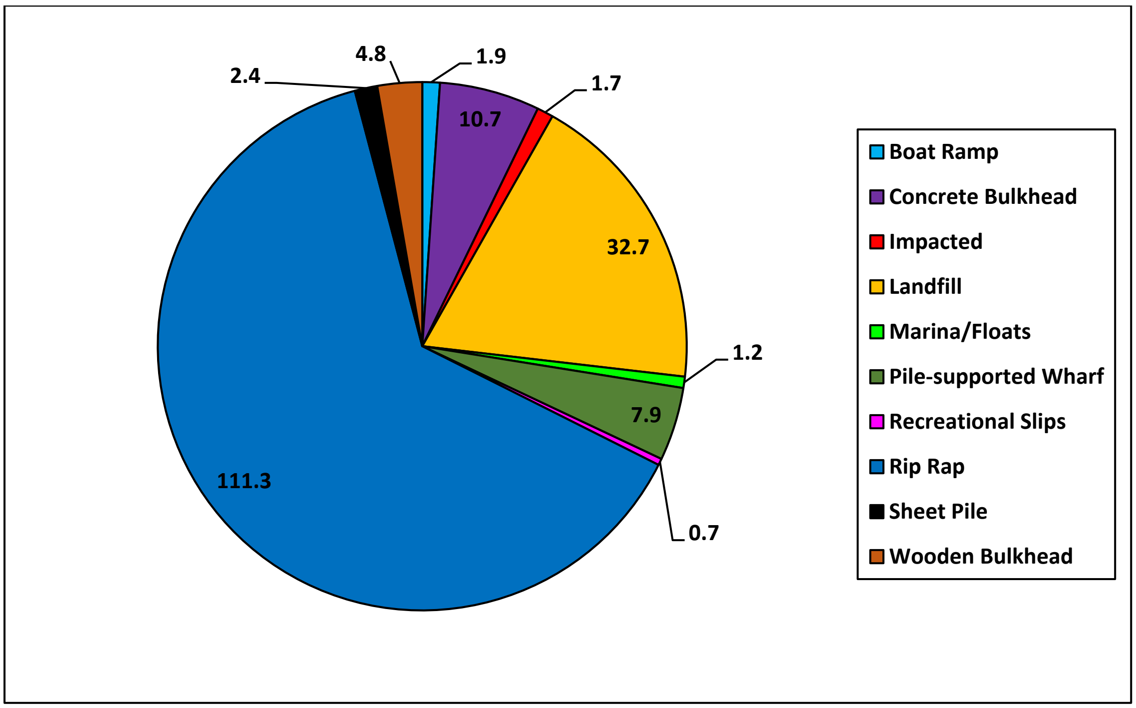

Figure 14. Shore Modifications by estimated shoreline length (km) of each modification type.

Figure 15. Distribution of types of the primary Shore Modifications.

There may be other shore modifications in any given unit. That data would be found in the Shore Modifications table in the geodatabase.

3.3 Biobands

Biobands represent assemblages of coastal biota found on the shoreline at characteristic wave exposures, substrate conditions and typical across-shore elevations. Biobands are spatially distinct, with alongshore and across-shore patterns of color and texture that are visible in aerial imagery (see Appendix A, Table A-2 for photographic examples of the common biobands from the Cape Breton Island survey area). Full descriptions of all biobands, including indicator and associated species, can be found in the ShoreZone protocol (Cook et al. 2017).

There are several metrics used for the biobands within each unit. All biobands are classified as Patchy (in <50% of the length of the unit) or Continuous (in >50% of the length of the unit). The zone in which a bioband was observed determines how the bioband is further described. For example, biobands found in the supratidal (A Zone) and subtidal (C Zone) are described by percent of alongshore length of unit and a width category. The intertidal (B zone) biobands are described by percent of alongshore length of the unit and percent cover of the zone. All metrics are described in the 2017 ShoreZone protocol (Cook et al. 2017). The data presented in this report uses Patchy and Continuous as metrics as that is consistent across all biobands.

Biobands mapped in the Cape Breton survey area are summarized in Tables 3 and 4. The most common supratidal/high intertidal biobands were Salt Marsh, occurring in 52% of the units, and Dune Grass, found in 45% of the units. The most commonly occurring biobands in the survey area in the low intertidal/subtidal were Eelgrass in 59% of the units, and Rockweed in 49% of the units. it should be noted that some of the Brown Bladed Kelps may also include Rockweed. Distribution maps, statistics, and observations about some specific biobands are found in the following pages.

Table 3. Bioband abundances for non-splash zone biobands mapped in the Cape Breton Island survey area.

Bioband		Patchy		Continuous		Total (km)	% of Total Mapped
Name	Code	(km)	%	(km)	%		
Terrestrial Vegetation	TEVE	40	2	6	0	45	3
Trees and Shrubs	TRSH	166	10	113	7	279	17
Dune Grass	DUGR	555	33	201	12	755	45
Salt Marsh	SAMB	422	25	456	27	878	52
Barnacle	BARN	137	8	72	4	209	12
Rockweed	ROCK	347	21	474	28	820	49
Green Algae	GRAL	498	30	56	3	554	33
Filamentous and Foliose Red Algae	FFRA	29	2	35	2	64	4
Brown Bladed Kelps	BRBA	40	2	98	6	138	8
Eelgrass	EELG	390	23	599	36	989	59

Table 4. Bioband abundances for splash zone biobands mapped in the Cape Breton Island survey area.

Bioband		Narrow (<1m)		Medium (1-5m)		Wide (>5m)		Not Assessed		Total (km)	% of Total Mapped
Name	Code	(km)	%	(km)	%	(km)	%	(km)	%		
Splash Zone	SPZO	64	4	34	2	7	0	0	0	106	6
Black Lichen	BLLI	131	8	40	2	5	0	0	0	176	10
White Lichen	WHLI	16	1	3	0	0	0	0	0	19	1
Yellow Lichen	YELI	3	0	2	0	0	0	0	0	5	0

Salt Marsh was the most commonly occurring supratidal, non-splash zone bioband found in 52% of units while Dune Grass was in 45% of units. (see Figures 16 and 17 for a graph of proportion of the shoreline with the Salt Marsh and Dune Grass biobands and Figure 18 for a distribution map). Salt Marsh can occur either in the lower supratidal or upper intertidal, while this map shows the width of the band at the top of the beach. This is an important habitat for many shoreline species and can provide important ecological services, such as filtering land-based nutrients which can help maintain the balance of other habitats such as eelgrass meadows (Valiela et al. 2000). Both Salt Marsh and Dune Grass in the Cape Breton Island survey area were challenging to identify in our aerial imagery. What has been described as the Dune Grass bioband in this report is often a complex that includes multiple species of grasses such as prairie cordgrass, American dune grass, and marsh hay cordgrass along with plants such as goldenrod, searocket, and plantains. The Salt Marsh bioband was at times, also a complex of various vegetation. For consistency throughout the survey area, we considered the Salt Marsh bioband to be at the wrack line indicating more constant seawater inundation while the Dune Grass bioband was higher in the supratidal with more occasional seawater influence (see Appendix 2, Table A-2 for photographic examples).

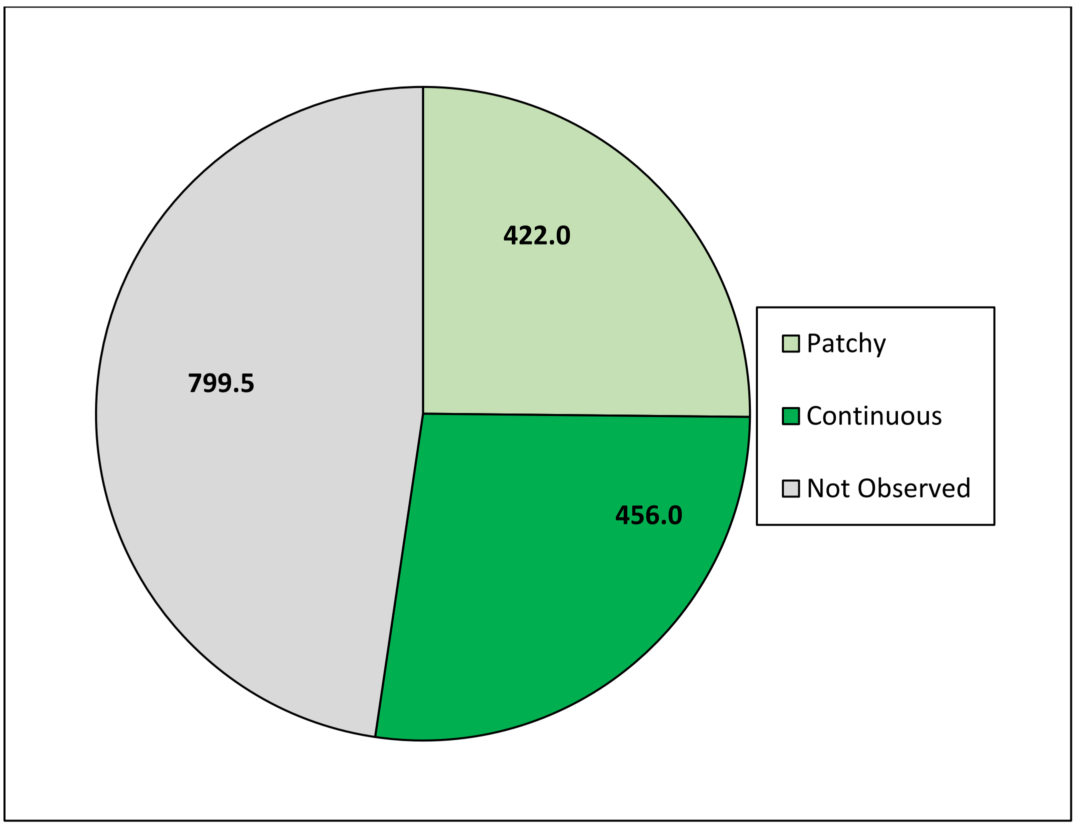

Figure 16. Distribution of the Salt Marsh (SAMB) bioband by shoreline length (km).

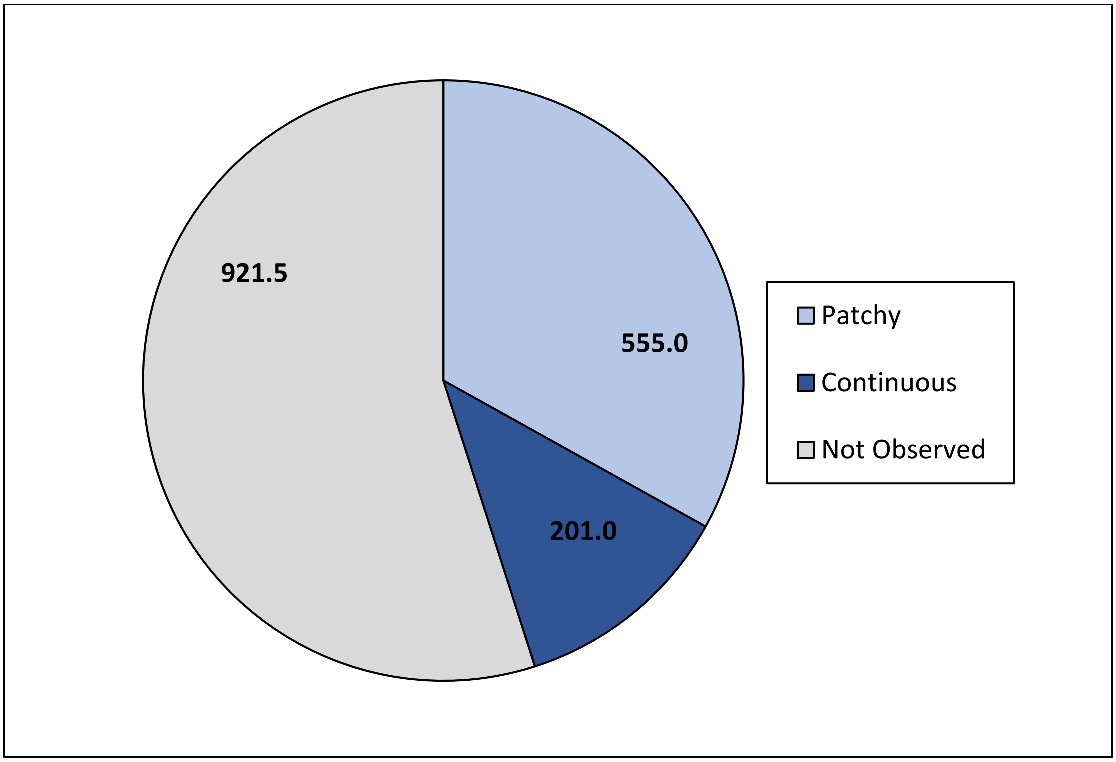

Figure 17. Distribution of the Dune Grass (DUGR) bioband by shoreline length (km).

Figure 18. Distribution of the Salt Marsh (SAMB) and Dune Grass (DUGR) biobands in the Cape Breton Island survey area.

Seagrasses are an important component of coastal ecosystems with Eelgrass beds forming in sandy substrates at Semi-Protected and lower exposures. Eelgrass beds are nursery habitats for juvenile fish and sequester and store atmospheric carbon (called 'Blue Carbon') in addition to other valuable ecosystem services. See Figures 19 and 20 for statistics on the distribution of the Eelgrass bioband and a distribution map of the bioband in Figure 21. Eelgrass in the Cape Breton Island survey area was challenging at times to observe in the imagery as it takes on a variety of different colours from green to brown and often, was covered in epiphytes (see Appendix 2, Table A-2 for photographic examples).

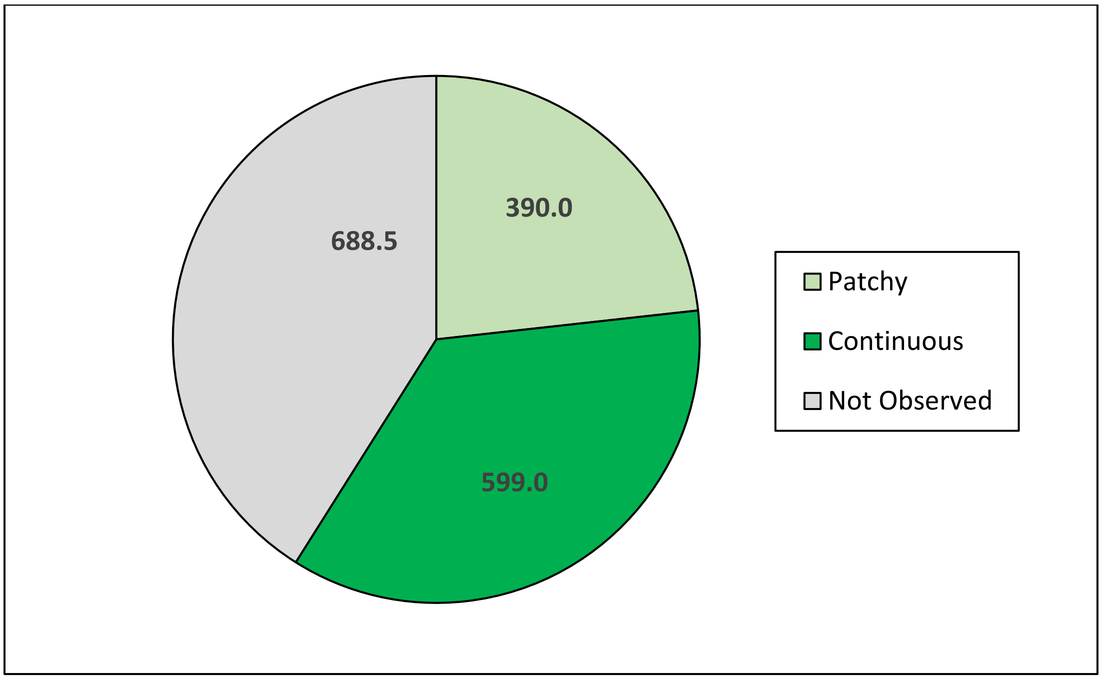

Figure 19. Distribution of the intertidal/subtidal Eelgrass (EELG) bioband by Shoreline length (km).

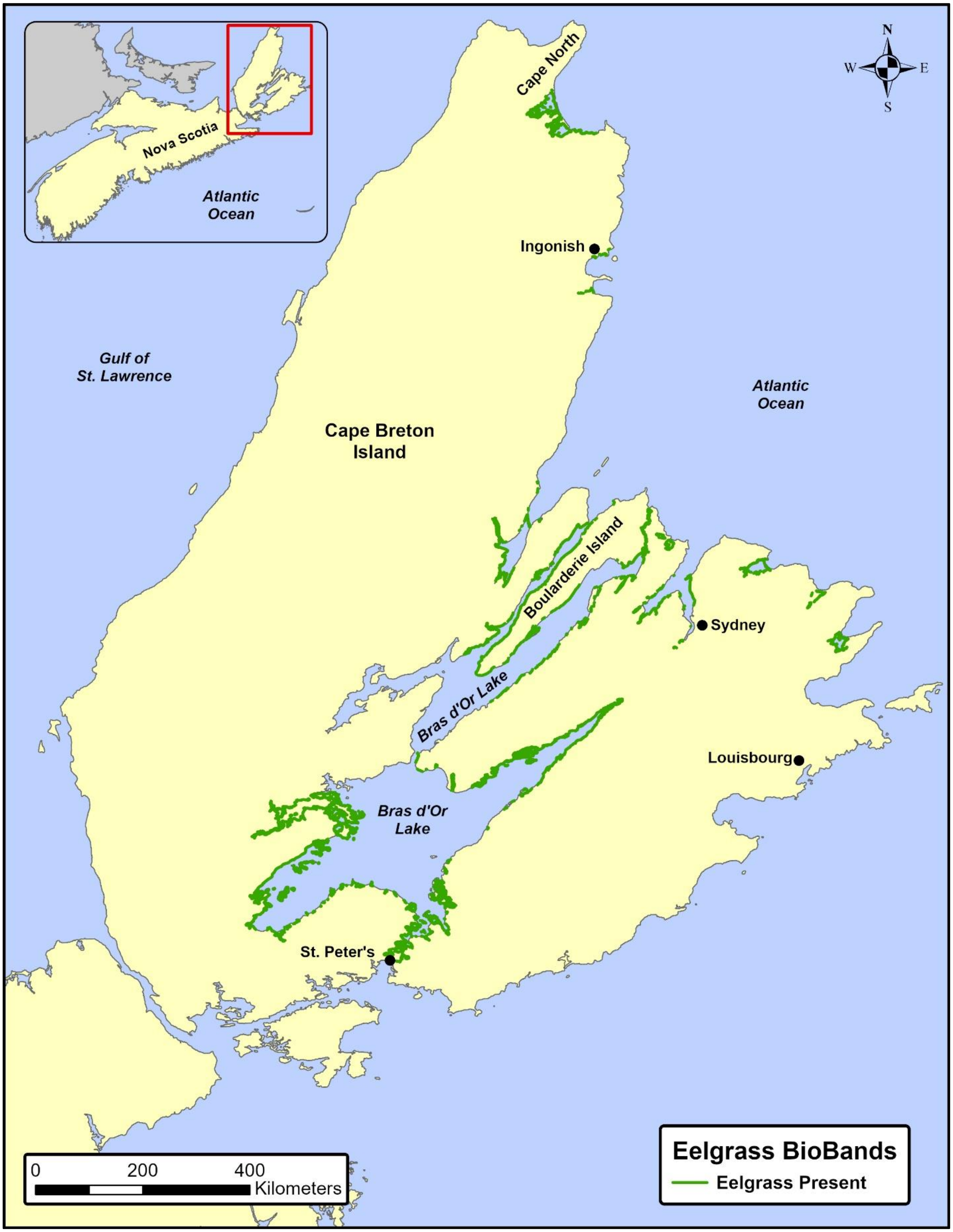

Figure 20. Distribution of the Eelgrass (EELG) bioband in the Cape Breton Island survey area.

Rockweed was one of the main biobands in the Cape Breton Island survey area. See Figure 22 for statistics on the distribution of Rockweed with a distribution map in Figure 23. The Rockweed bioband in the Cape Breton Island survey area is defined by the presence of three different Fucoids: *Ascophyllum nodosum* (Knotted Wrack), *Fucus vesiculosus* (Bladder Wrack) and *Fucus serratus* (Saw Wrack). Rockweed provides habitat and food for plant and animal communities throughout the intertidal, and in the North Atlantic, Knotted Wrack is economically important as it is commercially harvested (Kay et al. 2016).

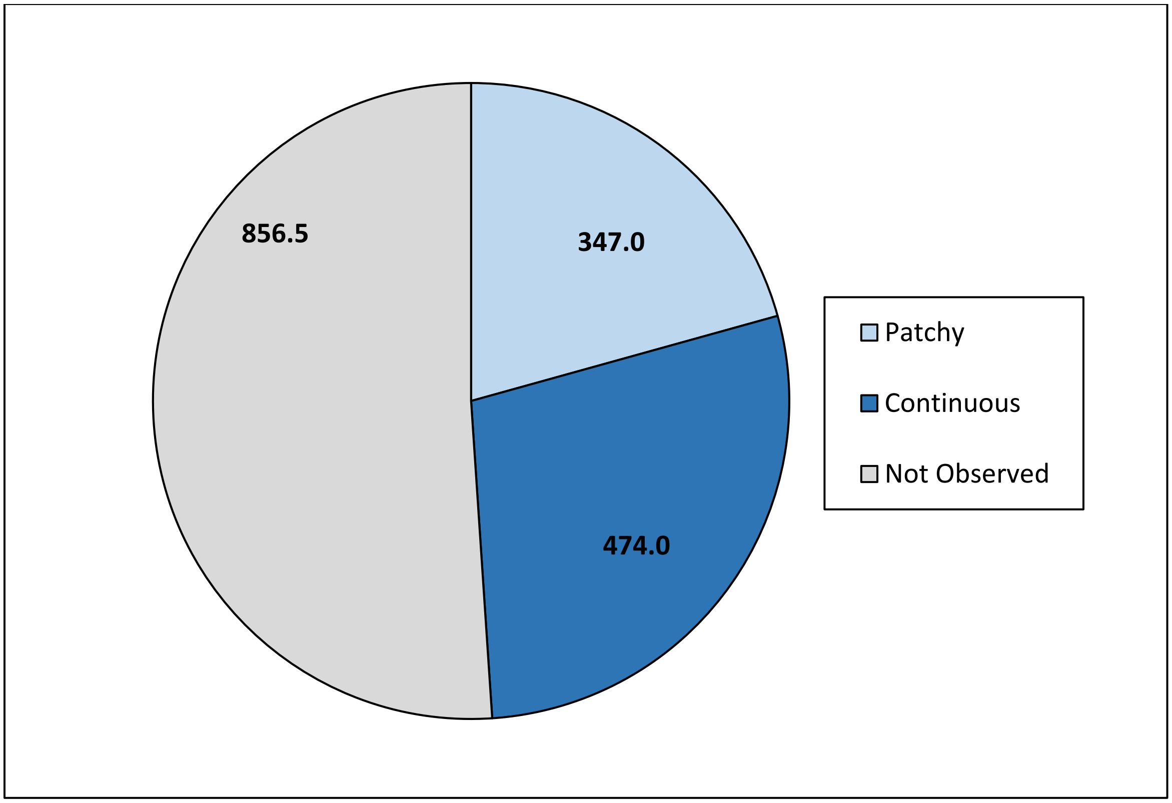

Figure 21. Proportion of shoreline length (km) of the intertidal Rockweed (ROCK) bioband by category.

Figure 22. Distribution of the Rockweed (ROCK) bioband in the Cape Breton Island survey area.

3.2 Biological Wave Exposure

Biological wave exposure categories range from Very Protected (VP) to Very Exposed (VE) and are usually defined in ShoreZone based on a typical set of biobands. When present, the relative abundance of biota in each alongshore unit is used as a proxy to determine the wave exposure at that site. For definitions of the Biological Wave Exposures and the exposure ranges of the biobands see the most recent ShoreZone protocol (Cook et al. 2017).

The distribution of the wave exposure categories mapped in the Cape Breton Island survey area are summarized in Figure 27 and a distribution map of the categories is shown in Figure 28. The coastline throughout the Cape Breton Island survey area is predominately Protected (56.9%) with just 2.6% being Exposed.

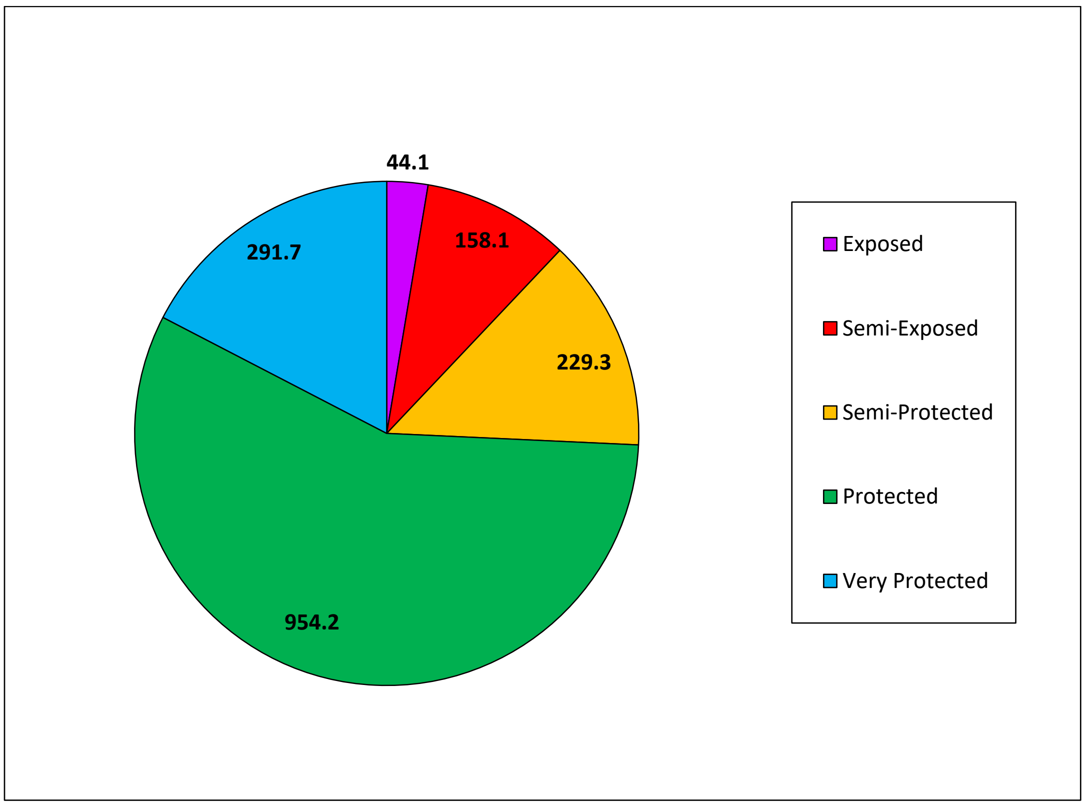

Figure 23. Distribution of Biological Wave Exposures mapped in the Cape Breton Island survey area by shoreline length (km).

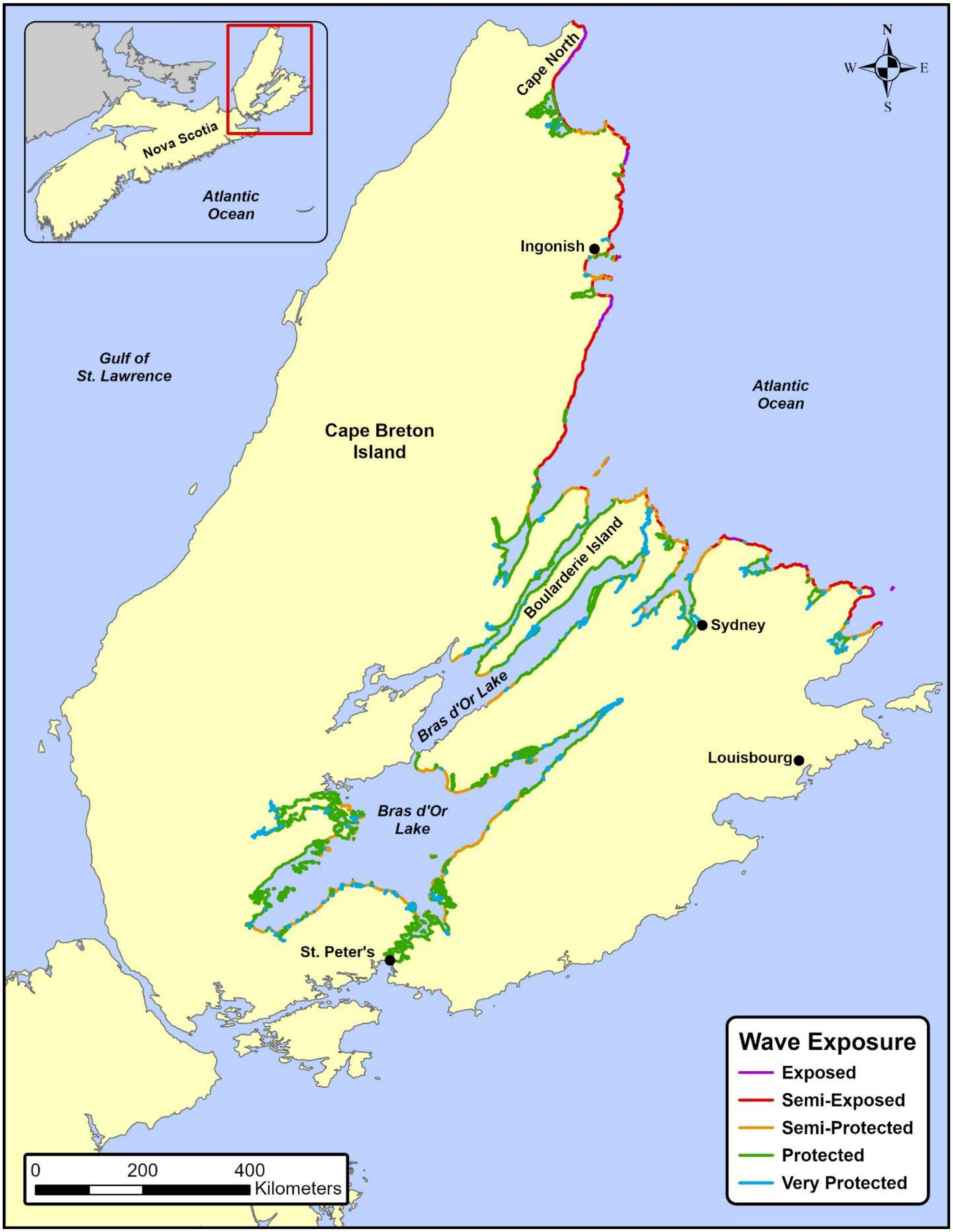

Figure 24. Distribution of the Biological Wave Exposure in the Cape Breton Island survey area.

3.4 Habitat Class

Habitat Class is a classification based on wave exposure and geomorphic characteristics observed in an alongshore unit. The habitat class is intended to provide a single attribute to characterize the biophysical features of each unit. The habitat class is assigned by the biological mapper and weighted according to the dominant structuring process. Wave action is the most common structuring process with less commonly observed habitats being those structured by current, estuarine/fluvial processes, and anthropogenic structures. For habitat classes structured by wave action substrate mobility determines the presence of epibenthic biota. Where the substrate is highly mobile, biota is sparse or absent, and where the substrate is stable, biota can be abundant. For further definitions and explanations of Habitat Class codes please see the most recent ShoreZone protocol (Cook et al. 2017).

The distribution of the Habitat Class categories mapped in the Cape Breton Island survey area are summarized in Figure 29 and a distribution map of the categories is shown in Figure 30. Partially mobile substrate is the dominant shoreline type (56.2%). The current dominated classification is the least dominant, making up just 0.009% of the shoreline.

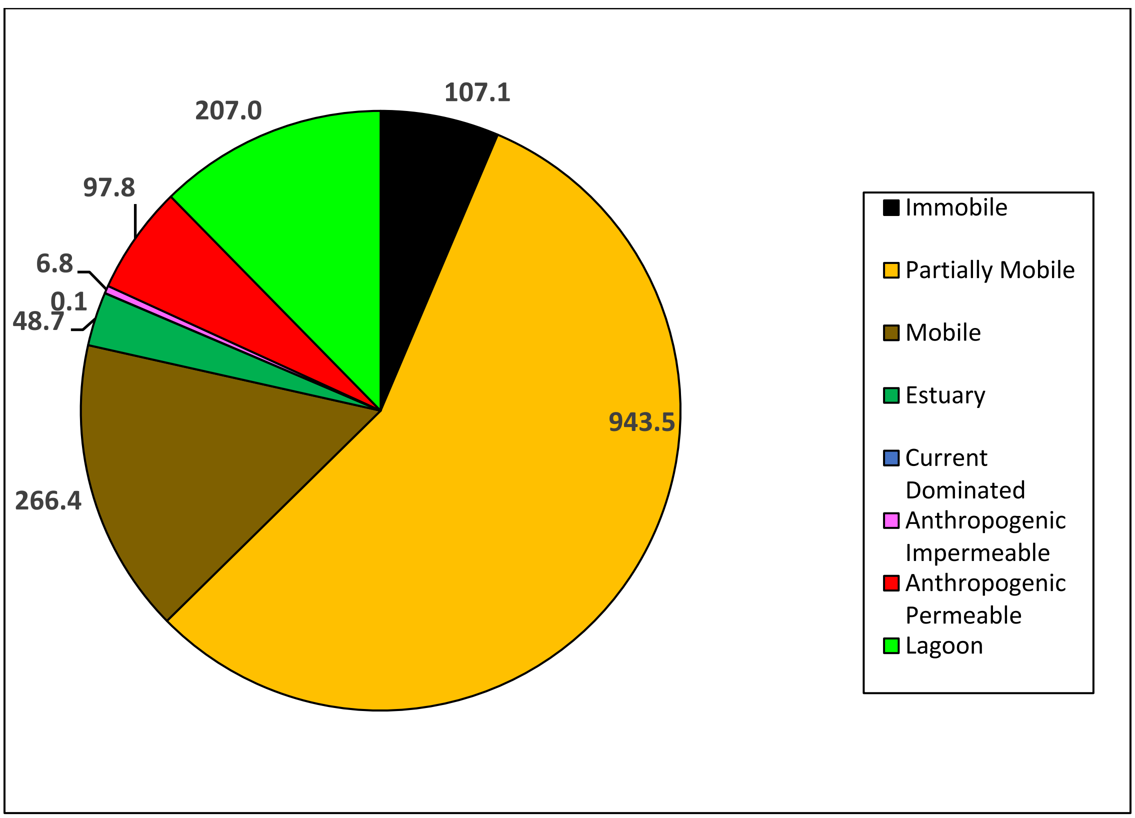

Figure 25. Distribution of Habitat Class categories in the Cape Breton Island survey area by shoreline length (km).

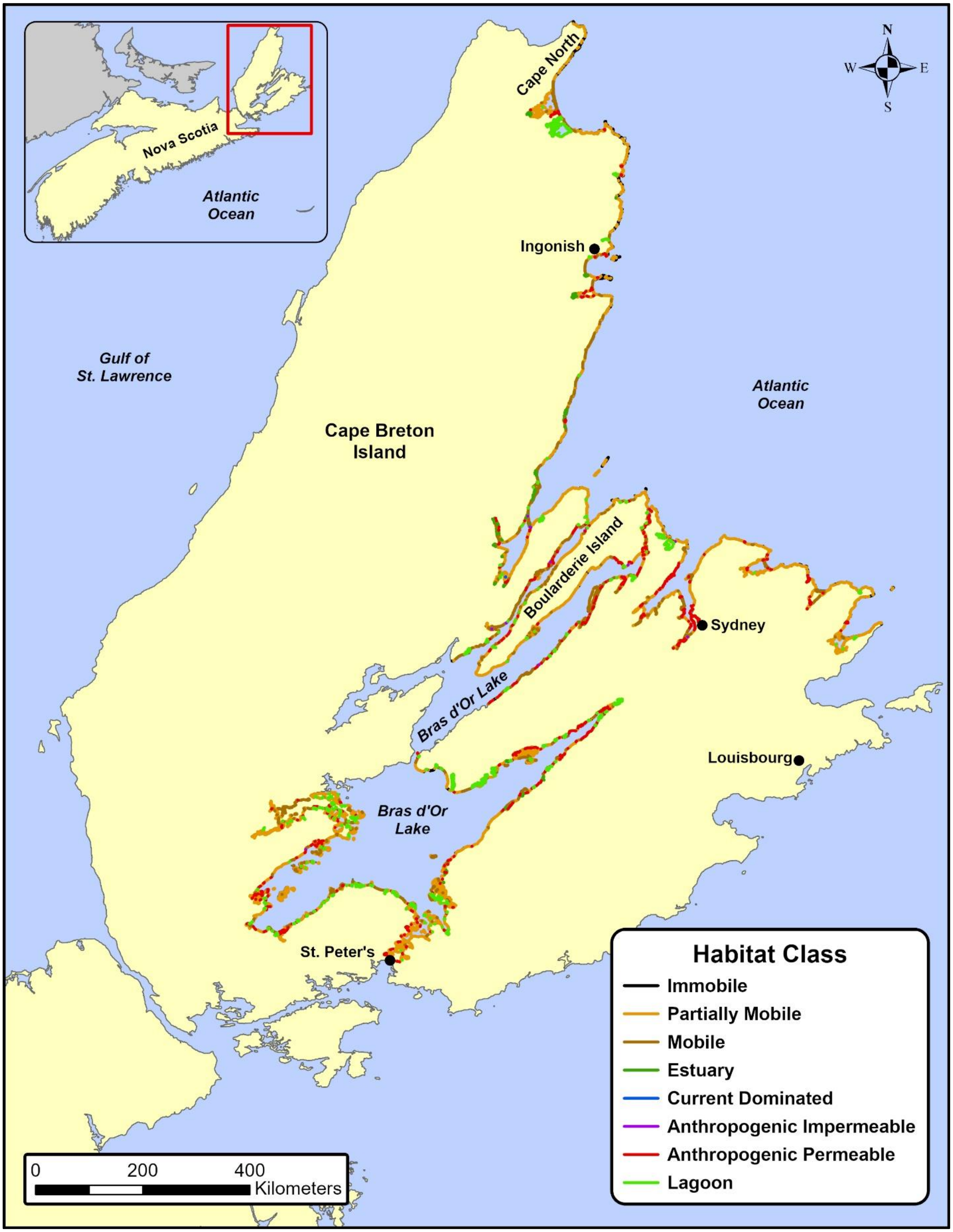

Figure 26. Distribution of Habitat Class categories in the Cape Breton Island survey area.

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5 Acknowledgments

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Protocols for data access and distribution are established by the program partner agencies. Please see www.ShoreZone.org for a list of partner agencies and related web sites. Imagery, reports, geodatabases and shapefiles for the ShoreZone dataset can be downloaded online at www.ShoreZone.org or through the links on that site.

Any hardcopies or published data sets utilizing ShoreZone products should clearly indicate their source. For questions regarding the protocols or information in this report, please contact SeaChange Marine Conservation Society at connect@seachangesociety.com.

Appendix A

Photographic Examples of Coastal Classes and Biobands

Table A-1. Examples of the Coastal Classes in the Cape Breton Island survey area (Page 40).
Table A-2. Examples of the Biobands in the Cape Breton Island survey area (Page 48).

Table A-1. Examples of the Coastal Classes the Cape Breton Island survey area.

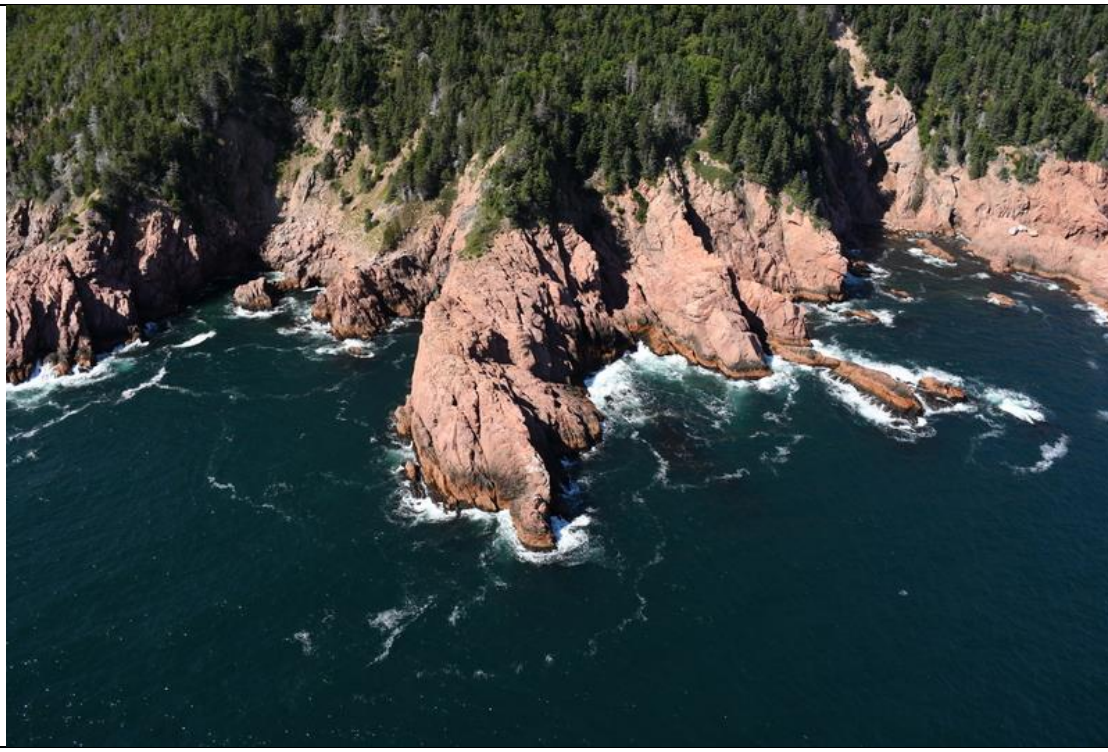


Photo ns22_sd_06171: Example of Coastal Class 3; Rock Cliff.
Blue Point.

Photo ns22_sd_06200: Example of Coastal Class 4; Rock Ramp.
Cape North.

Photo ns22_sd_00869: Example of Coastal Class 8; Cliff with gravel beach.
Bird Islands.

Photo ns22_sd_05007: Example of Coastal Class 9; Ramp with gravel beach.
Lakies Head.

Photo ns22_sd_01001: Example of Coastal Class 13; Cliff with gravel & sand beach.
St. Ann's Bay.

Photo ns22_sd_00269: Example of Coastal Class 15; Platform with gravel & sand beach.
Spanish Bay.

Photo ns22_sd_06124: Example of Coastal Class 18; Cliff with sand beach.
Aspy Bay.

Photo ns22_sd_00905_04233: Example of Coastal Class 22; Gravel beach, narrow.
Cape Dauphin.

Photo ns22_sd_00751: Example of Coastal Class 24; Sand & gravel flat or fan.
Cape Dauphin.

Photo ns22_sd_04830: Example of Coastal Class 25; Sand & gravel beach, narrow.
North Bay, Ingonish.

Photo ns22_sd_06105: Example of Coastal Class 30; Sand beach.
North Harbour Beach.

Photo ns22_sd_05600: Example of Coastal Class 31; Organics/Fines.
Middle Harbour.

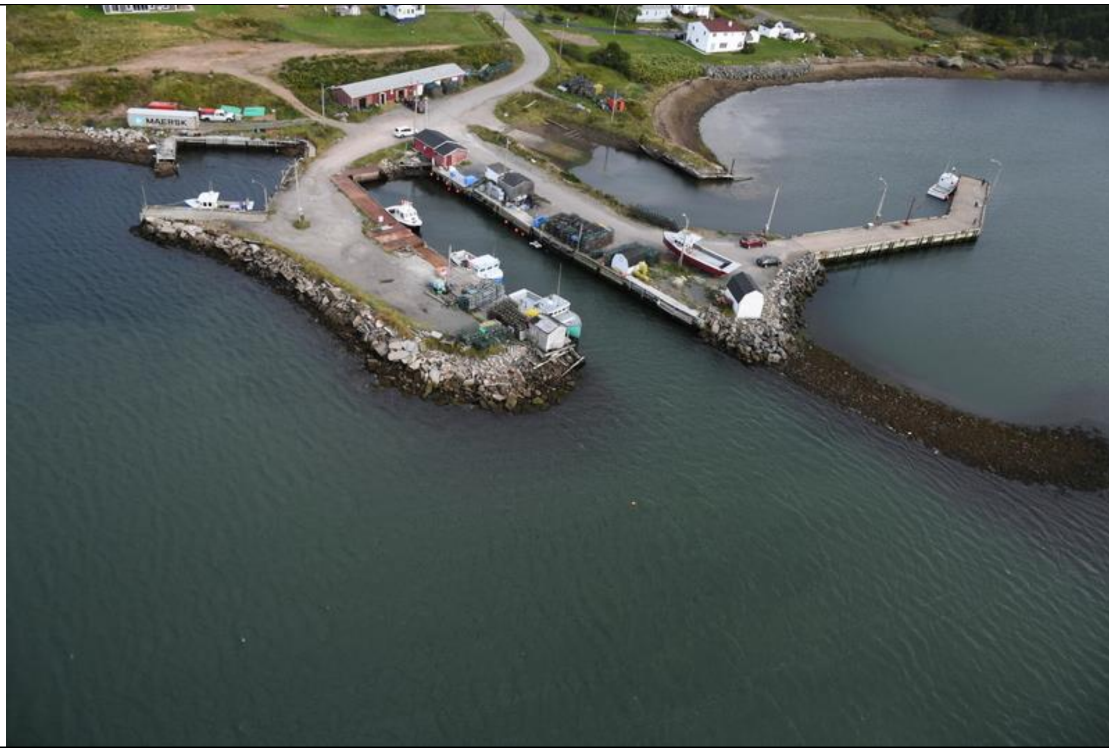


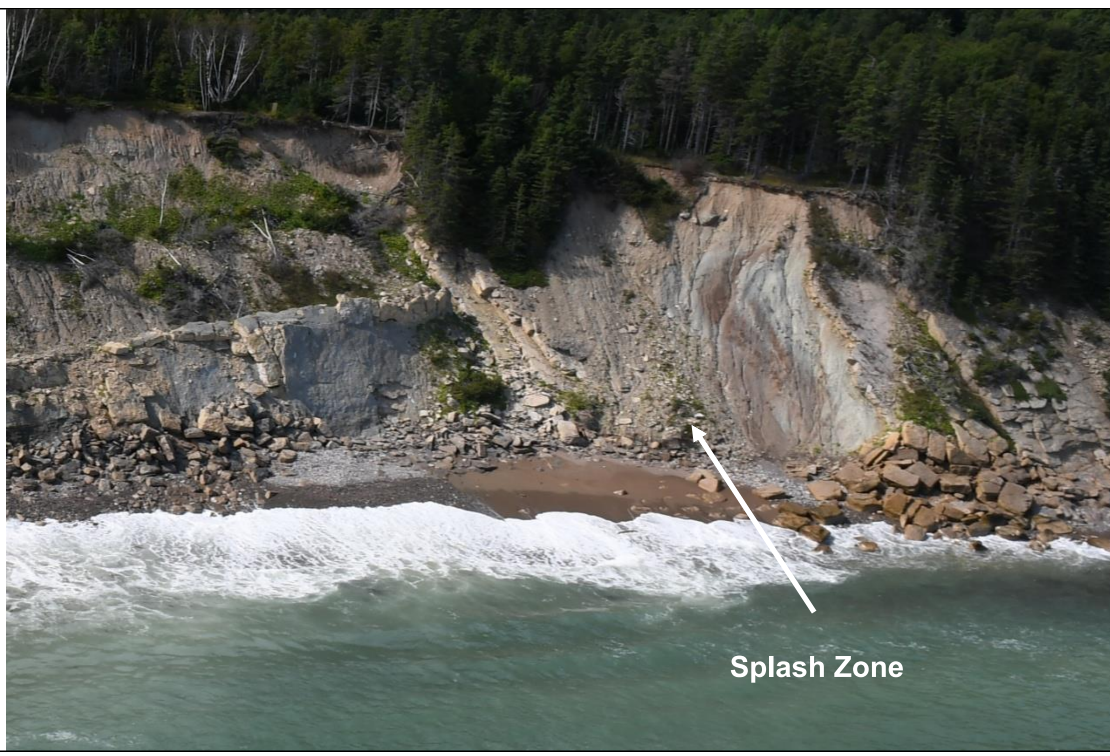
Photo ns22_sd_15726: Example of Coastal Class 32; Permeable man-made structures. South Bar.

Photo ns22_sd_16668: Example of Coastal Class 33; Impermeable man-made structures. North Sydney.

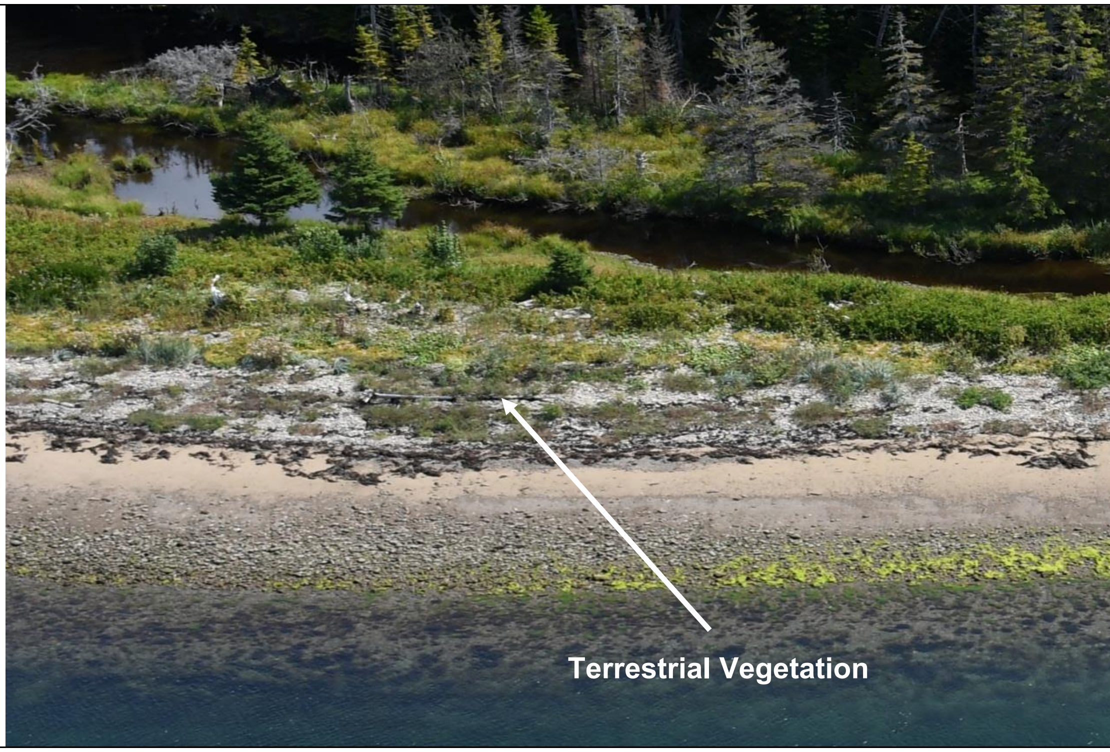
Photo ns22_sd_07978: Example of Coastal Class 36; Lagoon.
Barra Strait.

Table A-2. Examples of the Biobands in the Cape Breton Island survey area.

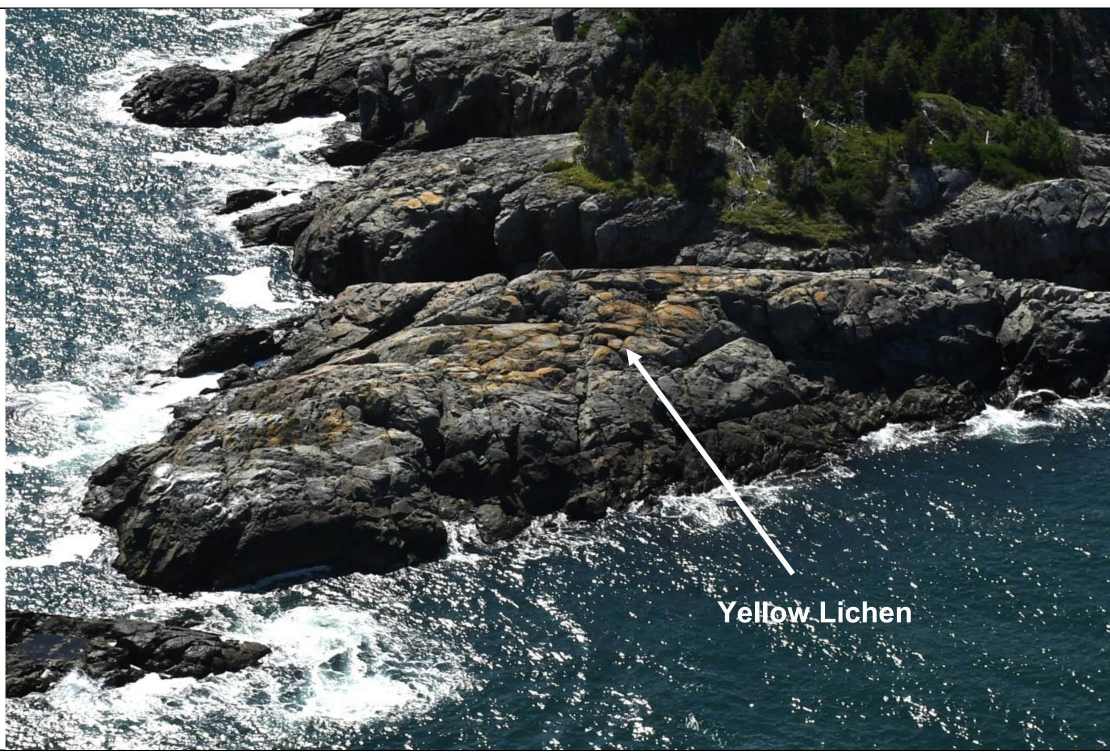
Adapted Photo ns22_sd_11298: Good example of Trees and Shrubs (TRSH) bioband in the supratidal zone.
MacNabs Cove.



Adapted Photo ns22_sd_02759: Example of the Splash Zone (SPZO) bioband which is an erosional or active A Zone without attached vegetation.
French River.

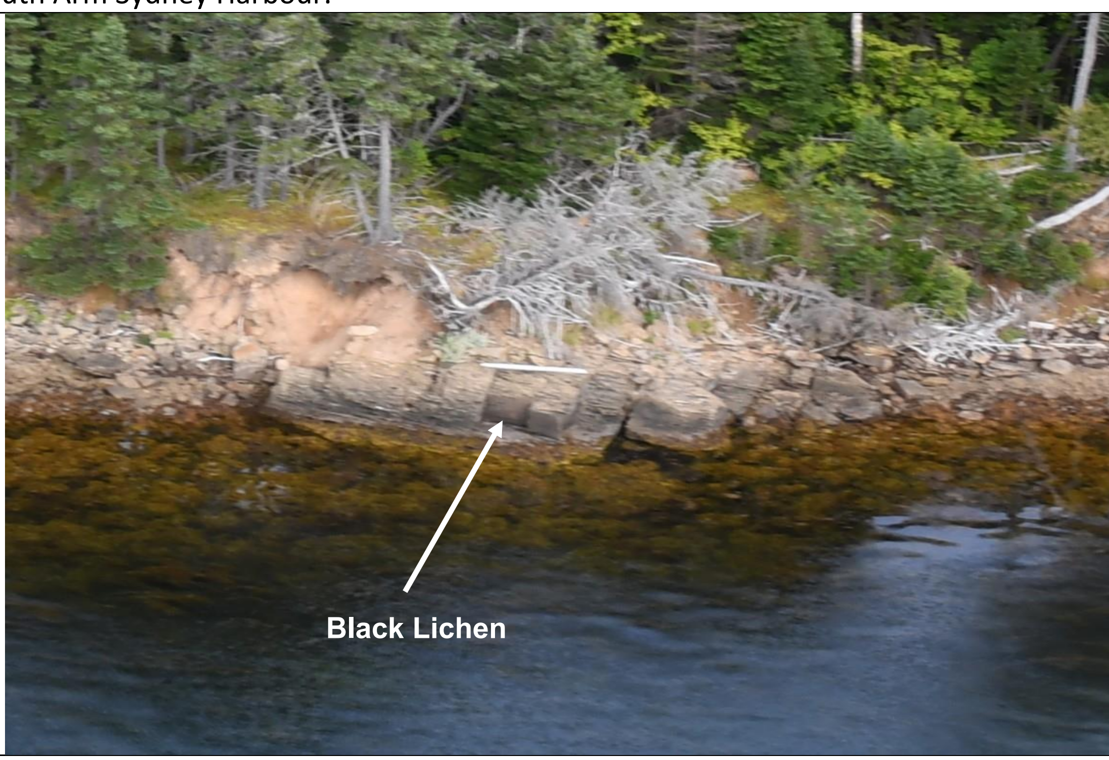


Adapted Photo ns22_sd_00677: Example of the Terrestrial Vegetation (TEVE) bioband which is a non-specific vegetation existing in the supratidal zone that does not fit into any other more specific supratidal bioband.
Boularderie Island.



Adapted Photo ns22_sd_04772: Example of the Yellow Lichen (YELI) bioband in the supratidal zone.
North Bay Ingonish.

Adapted Photo ns22_sd_15885: Good example of White Lichen (WHLI) bioband in the supratidal zone, above the Black Lichen band.
South Arm Sydney Harbour.



Adapted Photo ns22_sd_03148: Good example of the Black Lichen (BLLI) bioband which is a black band in the supratidal zone, usually caused by the lichen *Verrucaria* sp.
South Head.

Adapted Photo ns22_sd_02179: Good example of blue-green Dune Grass (DUGR) bioband in the supratidal zone.
Jersey Cove, St. Anns Harbour

Adapted Photo ns22_sd_00703: Good example of Dune Grass Complex (DUGR) bioband in the supratidal zone.
Cape Daupin.

Adapted Photo ns22_sd_07419: Good example of Salt Marsh (SAMB) bioband in the supratidal/intertidal zone.
Big Harbour, Bras d'Or Lake.

Adapted Photo ns22_sd_11350: Good example of Salt Marsh Complex (SAMB) bioband as described by proximity to wrack line in the supratidal/intertidal zone.
Bras d'Or Lake.

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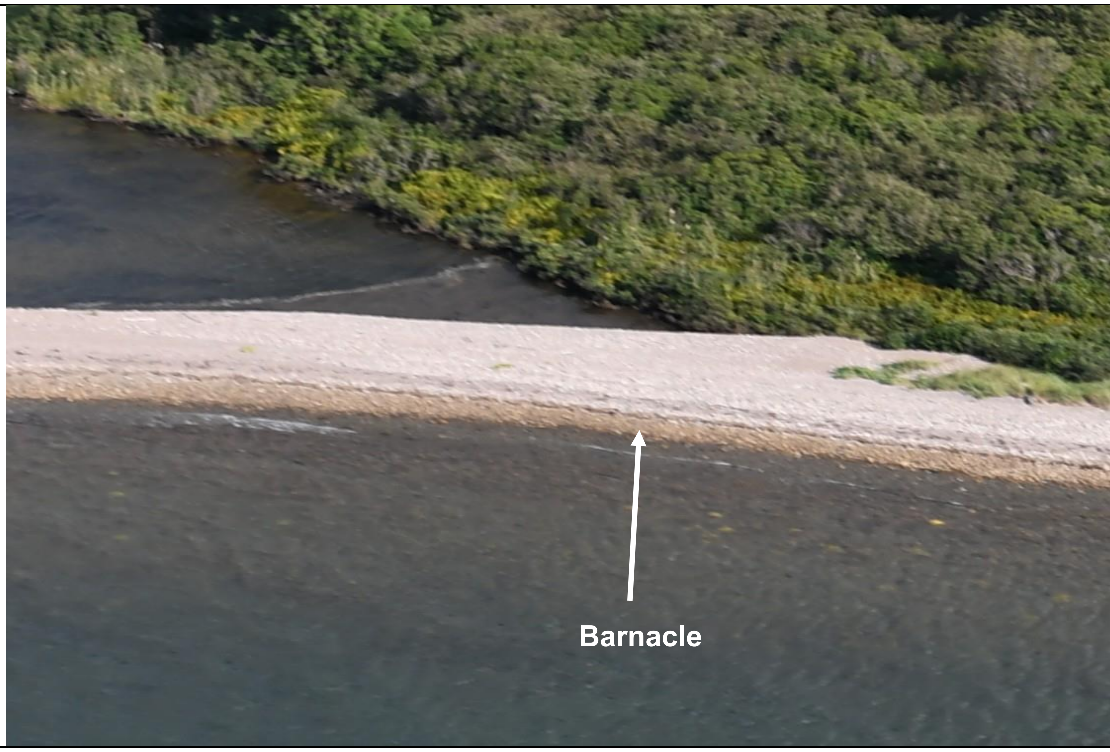
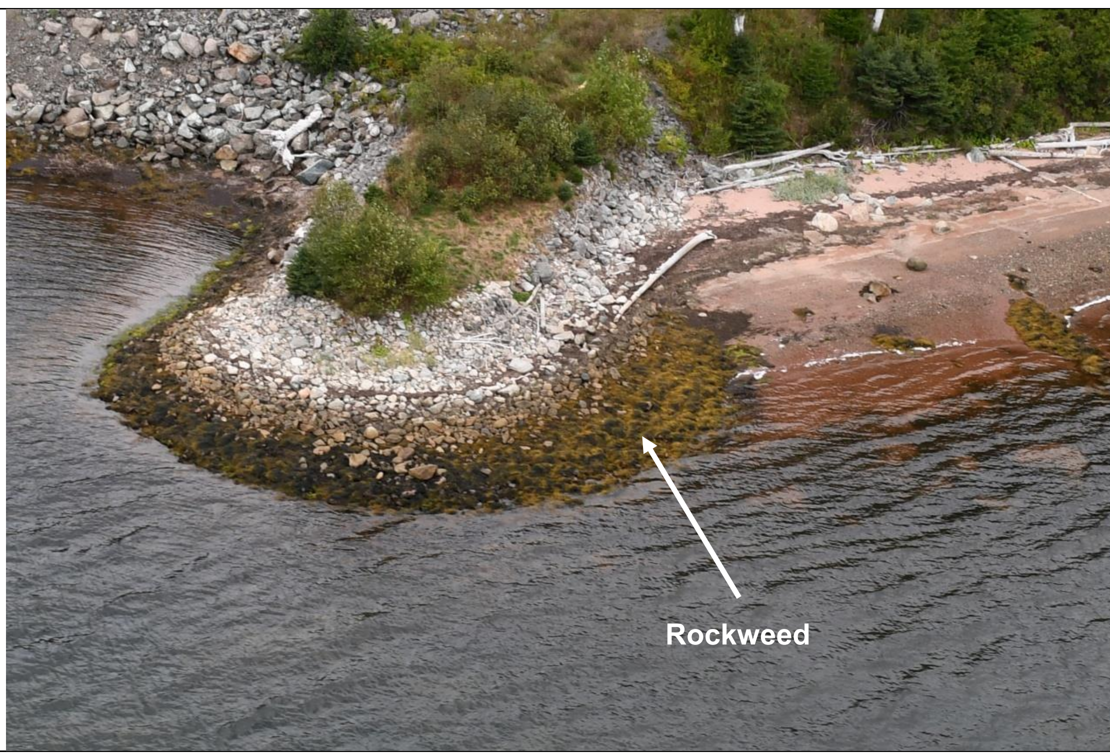
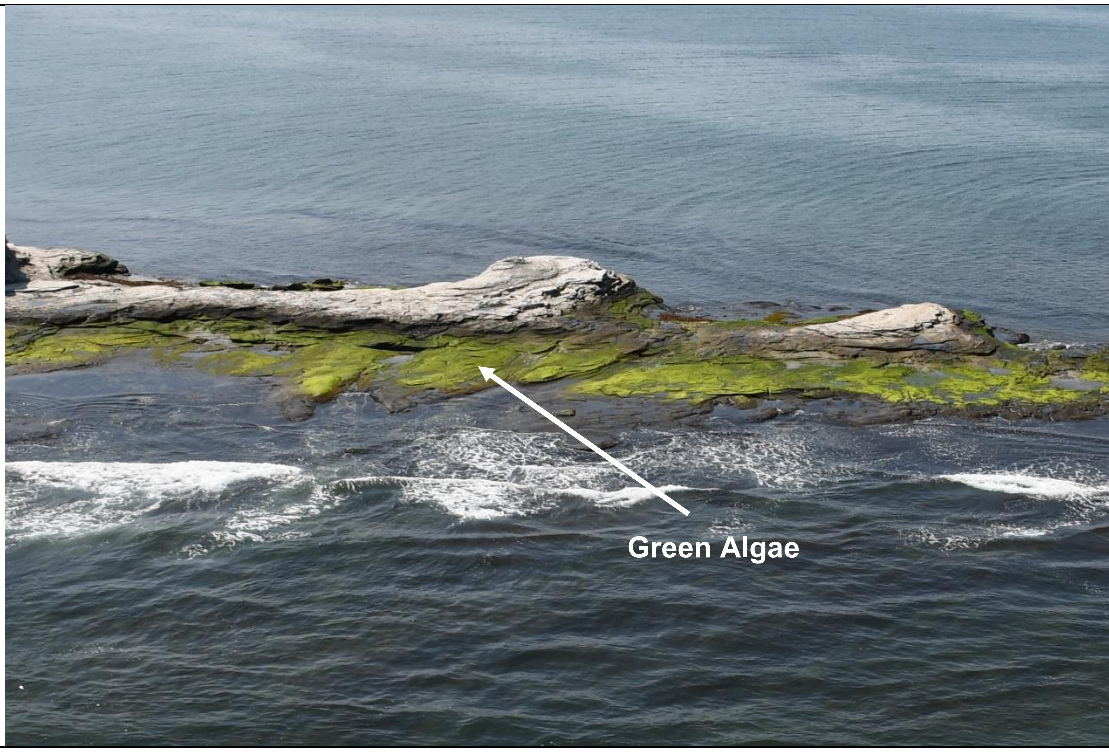


Adapted Photo ns22_sd_07321: Good example of the Barnacle (BARN) bioband in the intertidal zone.
Shenacadie.



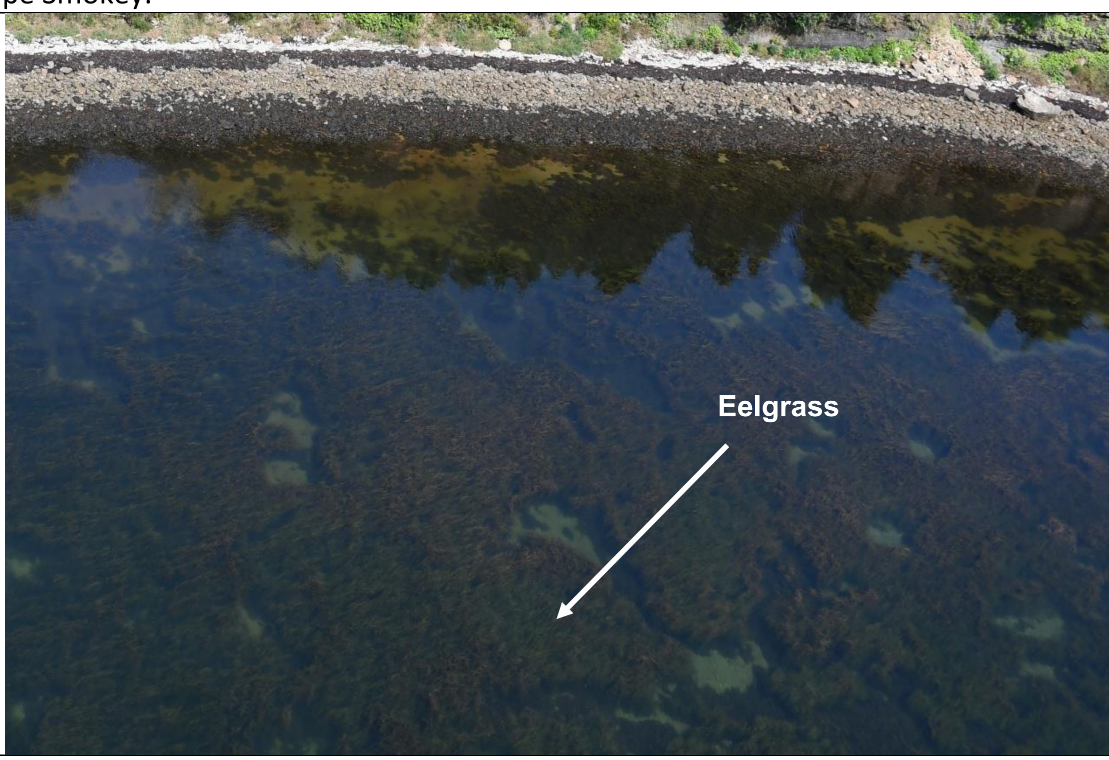
Adapted Photo ns22_sd_01895: Good example of the golden-brown Rockweed (ROCK) bioband.
Seymour Pt., St. Anns Harbour.



Adapted Photo ns22_sd_04164: Good example of the Green Algae (GRAL) bioband in the lower intertidal.
Aconi Island.

Adapted Photo ns22_sd_00953: Good example of the Filamentous and Foliose Red Algae (FFRA) bioband in the lower intertidal.
Cape Dauphin.

Adapted Photo ns22_sd_02925: Example of the Brown Bladed Algae (BRBA) bioband in the lower intertidal/subtidal.
Cape Smokey.



Adapted Photo ns22_sd_00583: Good example of the Eelgrass (EELG) bioband in the subtidal.
Boularderie Island.

Adapted Photo ns22_sd_07321: Good example of the Eelgrass (EELG) bioband covered in epiphytes in the subtidal.
Bras d'Or Lake.