ShoreZone Summary Report

Northern Haida Gwaii

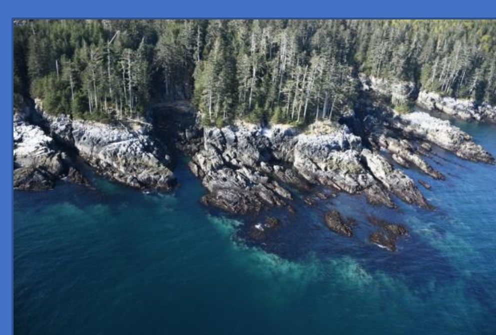
January 2025

Prepared for:

Old Massett

Village Council

ShoreZone



On the cover:

Cox Island

Dinan Bay

McPherson Point, Langara Island

SeaChange Project: 23-06 January 2025

ShoreZone Habitat Mapping Summary Report

Northern Haida Gwaii Survey Area

Village Point, Langara Island (bc23_hn_06933)

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The suggested citation for this report is:
SeaChange Marine Conservation Society. 2025. ShoreZone Habitat Mapping Summary Report: Northern Haida Gwaii Survey Area. Produced for the Old Massett Village Council, Old Massett, BC. Produced by SeaChange Marine Conservation Society, Brentwood Bay, BC. 60p.

Northern Haida Gwaii Survey Area Summary

733 km of shoreline mapped

2,114 shoreline units created

Average unit length is **347 m**

51% of the intertidal is classified as **Sediment-dominated** and **31%** is classed as **Rock and Sediment-dominated**

70% of the shoreline has a high Oil Residence Index value (residence of months to years)

2% of the shoreline has a **Shoreline Modification** of some type

13 biobands were classified in the **intertidal** with **Rockweed (80%** of units**)**, and **Green Algae (78%** of units**)** being the most common

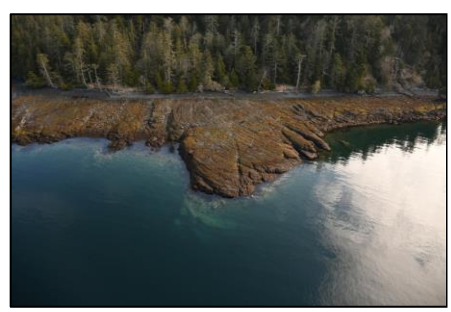
7 biobands were classified in the **supratidal** with **Black Lichen** (**53%** of units) and **Salt Marsh 35%** of units) being the most common

12 biobands were classified in the **lower intertidal/subtidal** with **Foliose and Filamentous Red Algae** (**49%** of units) being the most common

Lignite Creek

Mazzaredo Islands

Masset



Langara Island

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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 124,000 km of coastal Alaska, British Columbia, New Brunswick, Nova Scotia, Washington State and Oregon (see Figure 1 for Western North American extent). Figure 2 shows the extent of the shoreline mapped around northern Haida Gwaii and is the section of shoreline covered by this summary report.

The ShoreZone imaging surveys conducted around northern Haida Gwaii in May 2023 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 northern Haida Gwaii survey area. Please see the Acknowledgments section included in this report for the imaging and mapping funding partners in British Columbia.

The length of shoreline mapped is **733 kilometers** in **2,114 along-shore segments** (units), averaging 347 m in length. The digital shoreline used for the ShoreZone habitat mapping was the CHS_Highwaterline_BCalbers.shp.

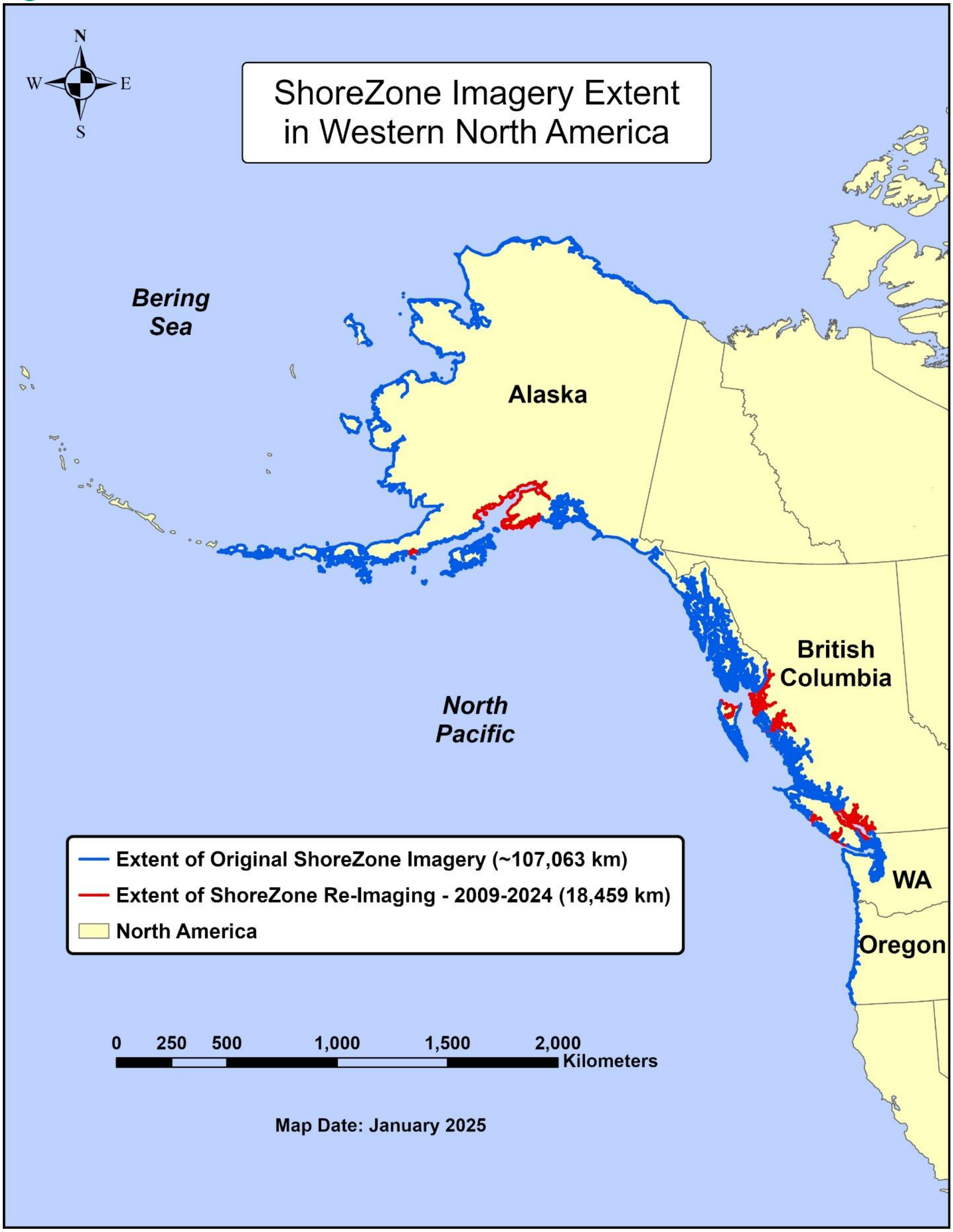

Figure 1. Extent of ShoreZone imagery in Western North America as of January 2025.

Figure 2. Extent of ShoreZone mapping for the northern Haida Gwaii survey area covered in this report.

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 (50.9%) were dominant along with Rock and sediment shorelines (31.1%) and Rock shorelines (8.9%) in the northern Haida Gwaii survey area. Riparian, Anthropogenic, and Lagoon, 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 northern Haida Gwaii survey area are found in Appendix A, Table A-1

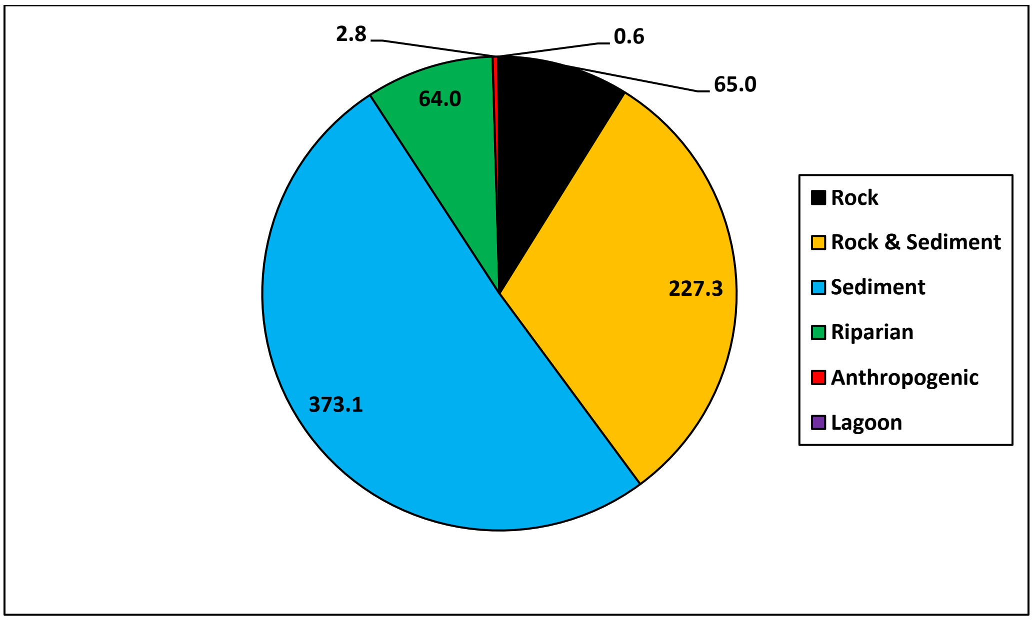

Figure 3. Grouped Coastal Class categories by shoreline length (km).

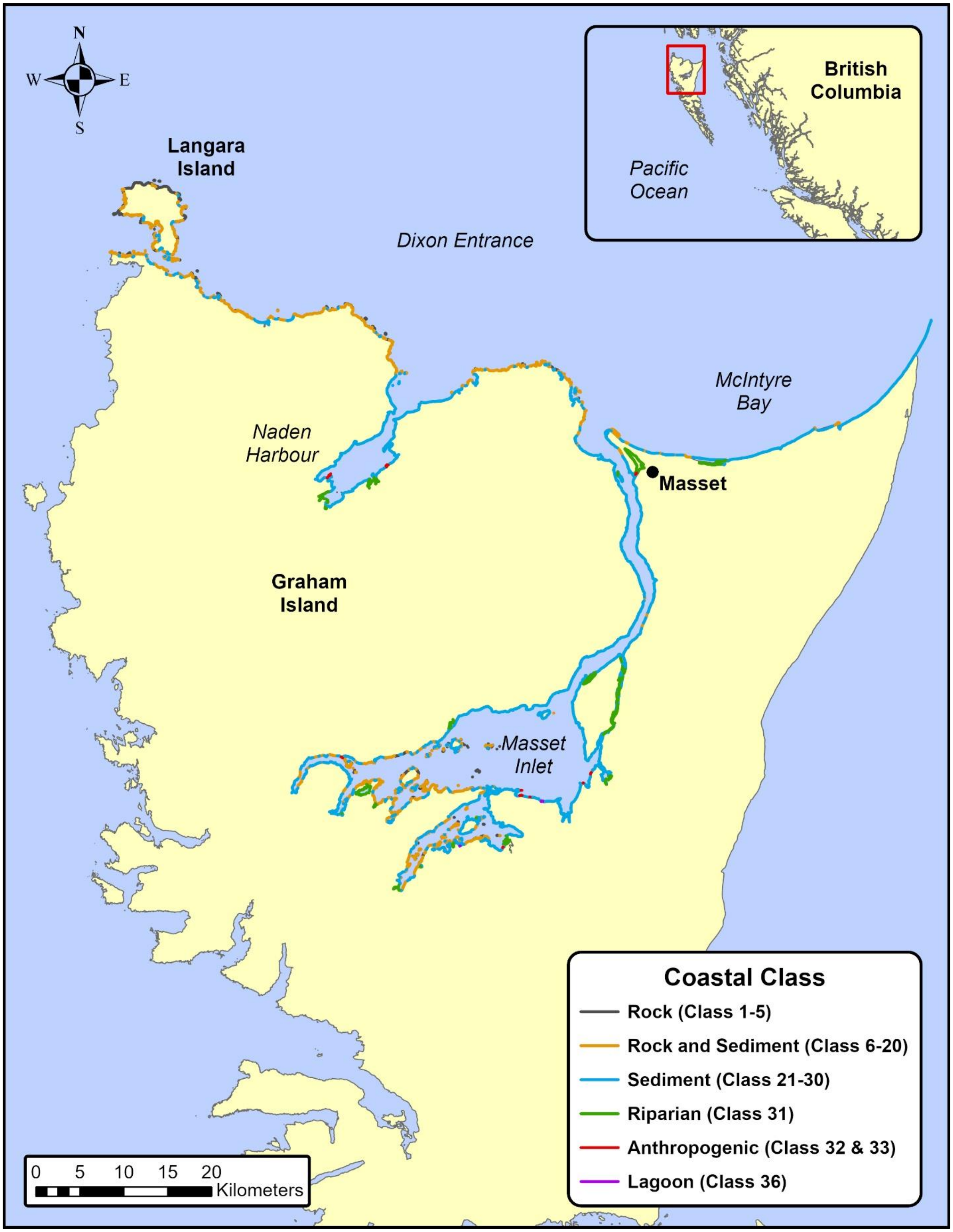

Figure 4. Map of the Coastal Class categories grouped by type (also known as Shore Type).

Table 1. Summary of Coastal Classes for the northern Haida Gwaii 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	8	33	1	**9% 65 km**
	2	Rock Platform, wide	10	37	1	
	3	Rock Cliff	31	163	4	
	4	Rock Ramp, narrow	15	84	2	
	5	Rock Platform, wide	<1	2	<1	
Rock & Sediment	6	Ramp w gravel beach,	6	22	1	**31% 227 km**
	7	Platform w gravel beach, wide	15	37	2	
	8	Cliff with gravel beach	25	94	3	
	9	Ramp with gravel beach	14	67	2	
	11	Ramp w gravel & sand beach, wide	8	34	1	
	12	Platform with G&S beach, wide	84	200	12	
	13	Cliff with gravel/sand beach	7	33	1	
	14	Ramp with gravel/sand beach	64	238	9	
	15	Platform with gravel sand beach	3	15	<1	
	16	Ramp w sand beach, wide	1	3	<1	
	17	Platform w sand beach, wide	1	3	<1	
	19	Ramp w sand beach, narrow	<1	1	<1	
Sediment	22	Gravel beach, narrow	1	4	<1	**51% 373 km**
	24	Sand & gravel flat or fan	194	438	27	
	25	Sand & gravel beach, narrow	98	382	13	
	26	Sand & gravel flat or fan	5	20	1	
	27	Sand beach	1	5	<1	
	28	Sand flat	44	40	6	
	29	Mud flat	21	46	3	
	30	Sand beach	10	29	1	
Organics	31	Organics/Estuarine	64	69	9	**9% 64 km**
Man-made	32	Man-made, permeable	3	12	<1	**<1% 3 km**
	33	Man-made, impermeable	<1	1	<1	
Lagoon	36	Lagoon	1	2	<1	**<1% 1 km**
Totals:			***733***	***2,114***	***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 northern Haida Gwaii coastline is represented by the grouped Medium to High and Very High categories (63% of shoreline length). These sections of the shoreline have a potentially high sensitivity to oil. At the other end of the spectrum, only 37% of the shoreline was mapped with a potentially low sensitivity to oil (Figures 5 and 6). The summary of Coastal Class by ESI class can be seen in Table 2.

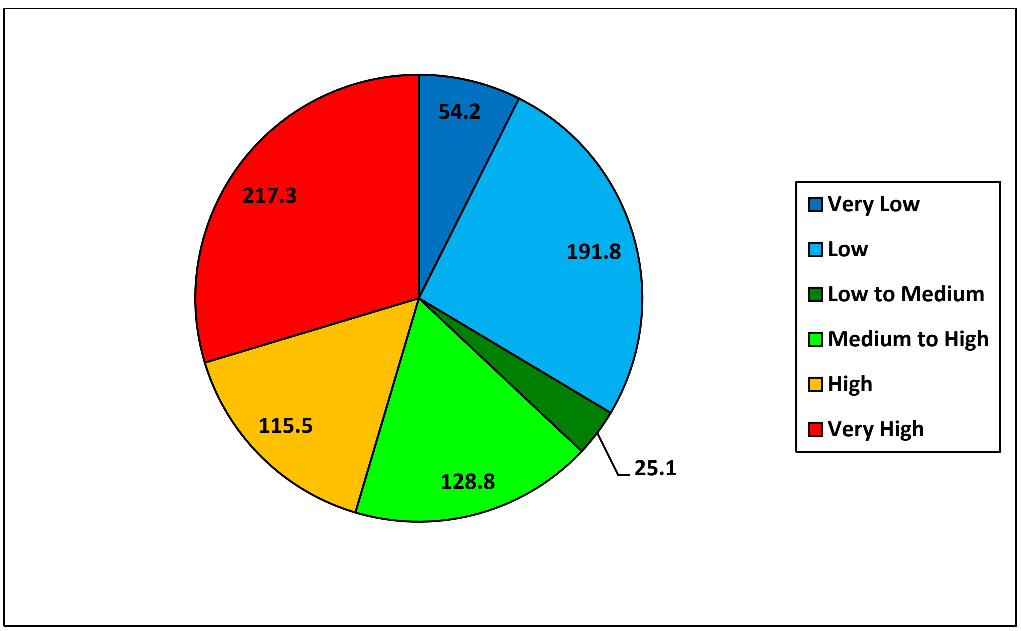

Figure 5. Grouped most sensitive ESI categories by shoreline length (km).

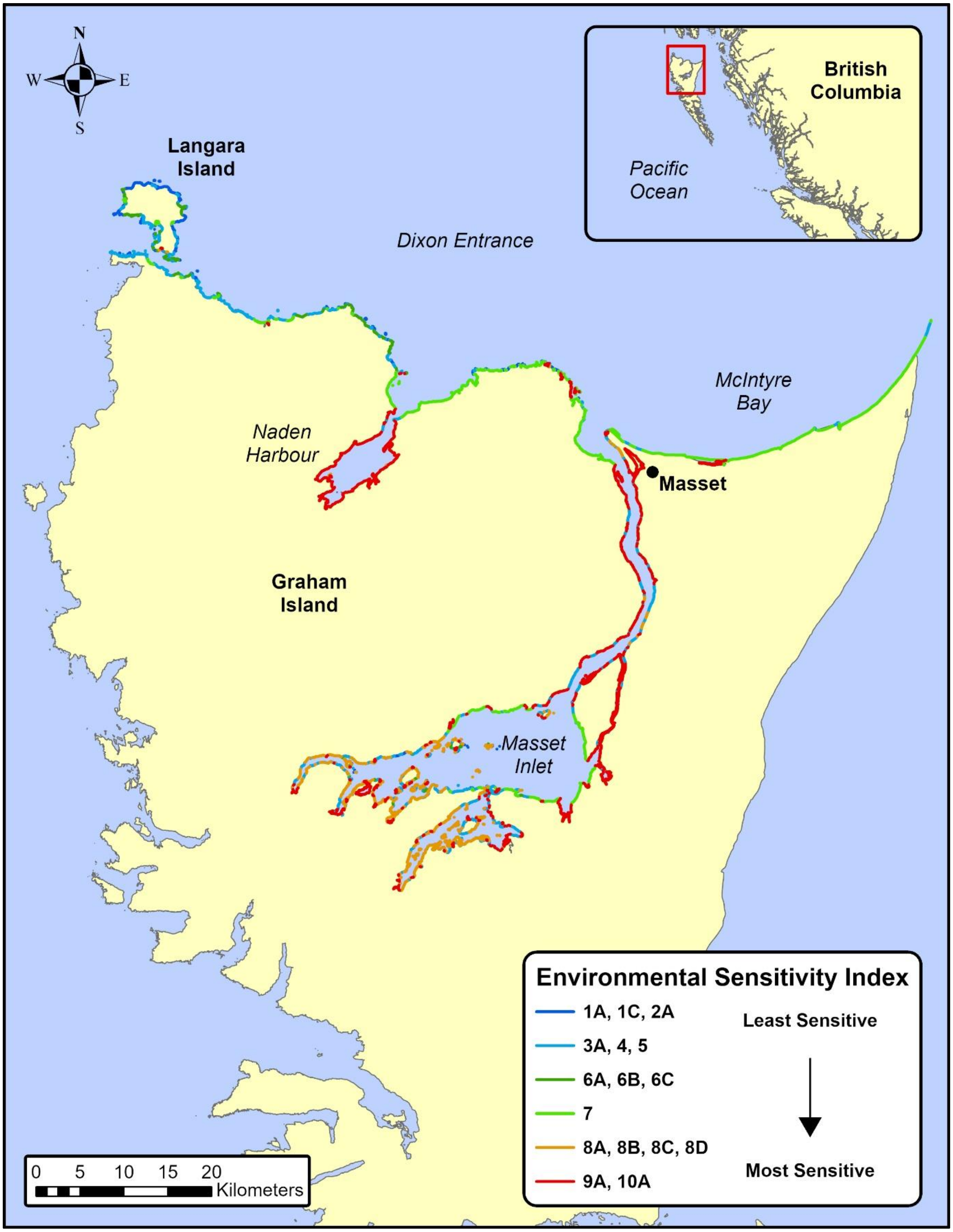

Figure 6. Distribution of the grouped ESI categories from least to most sensitive to oiling.

Table 2. Summary of Coastal Classes by ESI Class for the northern Haida Gwaii 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	16	60	2
1C	Exposed rocky cliffs with boulder talus base	2	7	<1
2A	Exposed wave-cut platforms in bedrock, mud, or clay	36	140	5
3A	Fine- to medium-grained sand beaches	10	31	1
4	Coarse-grained sand beaches	2	7	<1
5	Mixed sand and gravel beaches	180	625	25
6A	Gravel beaches (granules and pebbles)	<1	2	<1
6B	Gravel beaches (cobbles and boulders)	23	83	3
6C	Rip rap	2	9	<1
7	Exposed tidal flats	129	190	18
8A	Sheltered scarps in bedrock, mud, or clay; sheltered rocky shores (impermeable)	51	269	7
8B	Sheltered, solid, man-made structures; sheltered rocky shores (permeable)	2	9	<1
8C	Sheltered Rip Rap	2	5	<1
8D	Sheltered rocky rubble shores	61	247	8
9A	Sheltered tidal flats	102	261	14
10A	Salt- and brackish-water marshes	115	169	16
	Totals:	***733***	***2,114***	***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 70.4% of the shore segments in the northern Haida Gwaii survey area, indicating oil residence times are on the order of months to years (see Figures 7 and 8 for summary and distribution statistics).

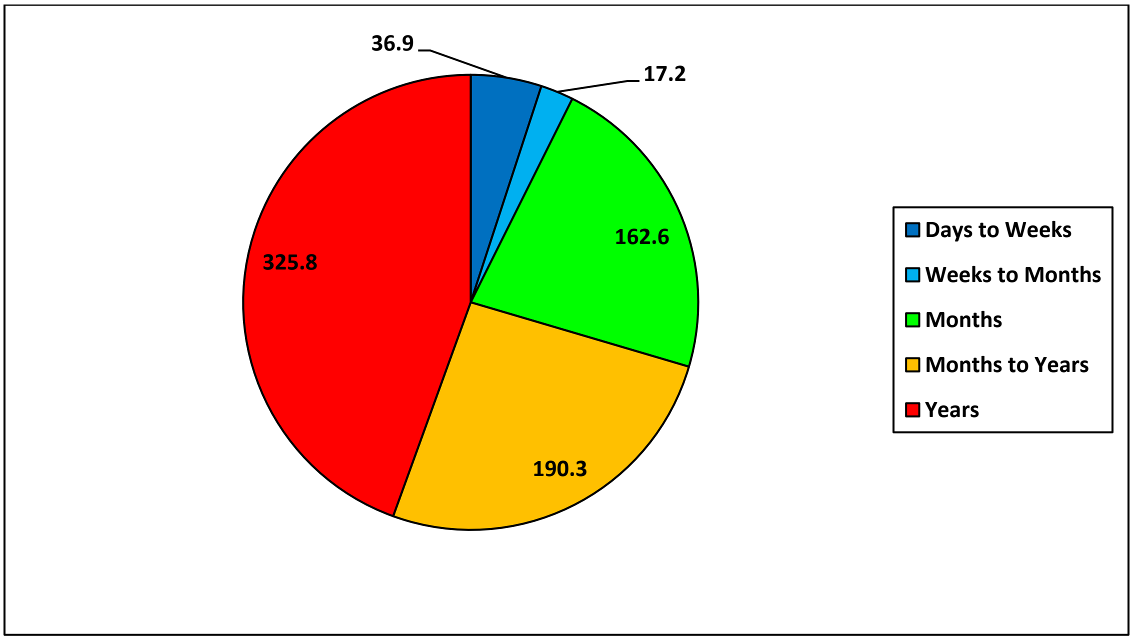

Figure 7. Oil Residence Index (ORI) categories by shoreline length (km).

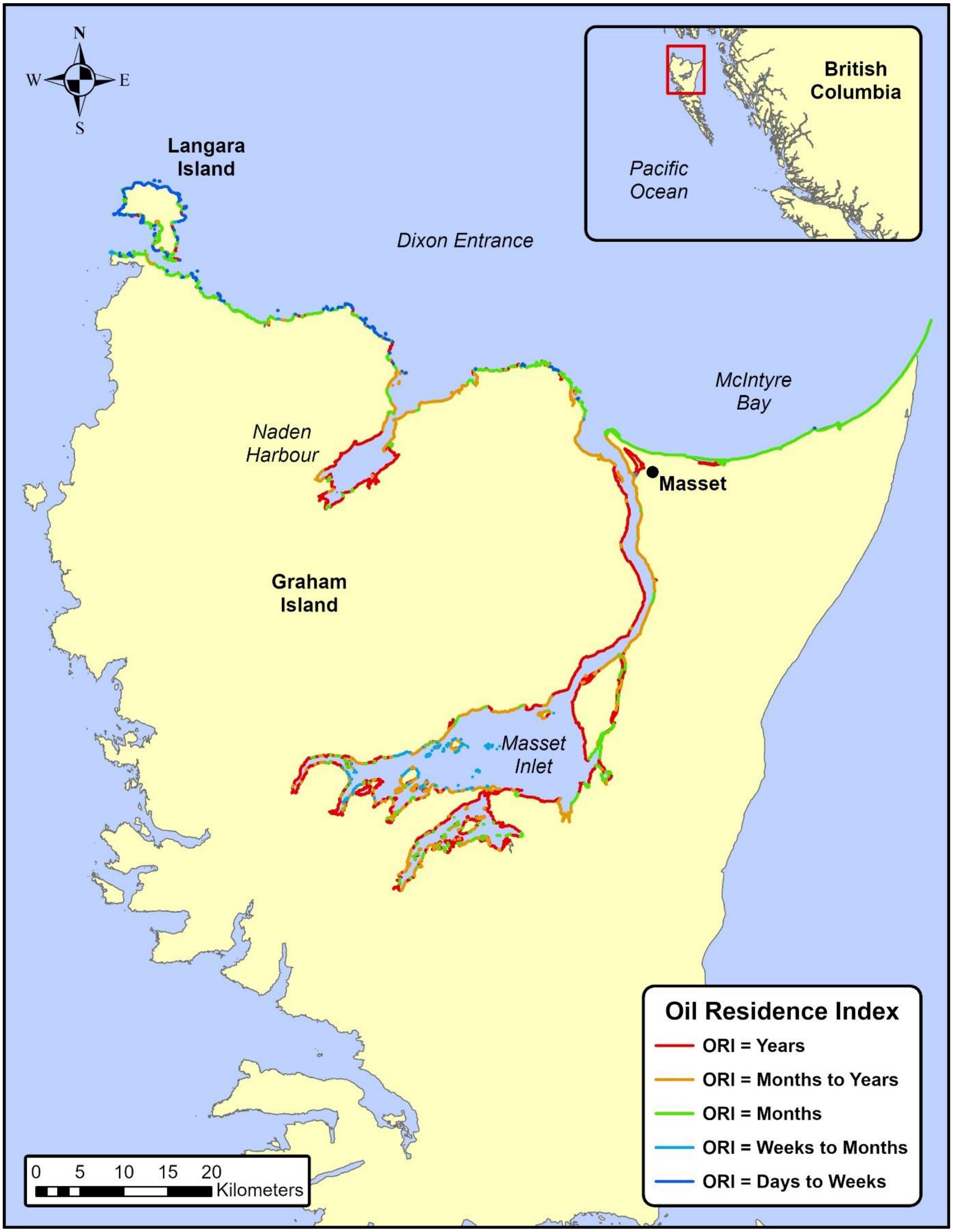

Figure 8. Distribution of the Oil Residence Index (ORI) categories.

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 northern Haida Gwaii study area, with 87.9% 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).

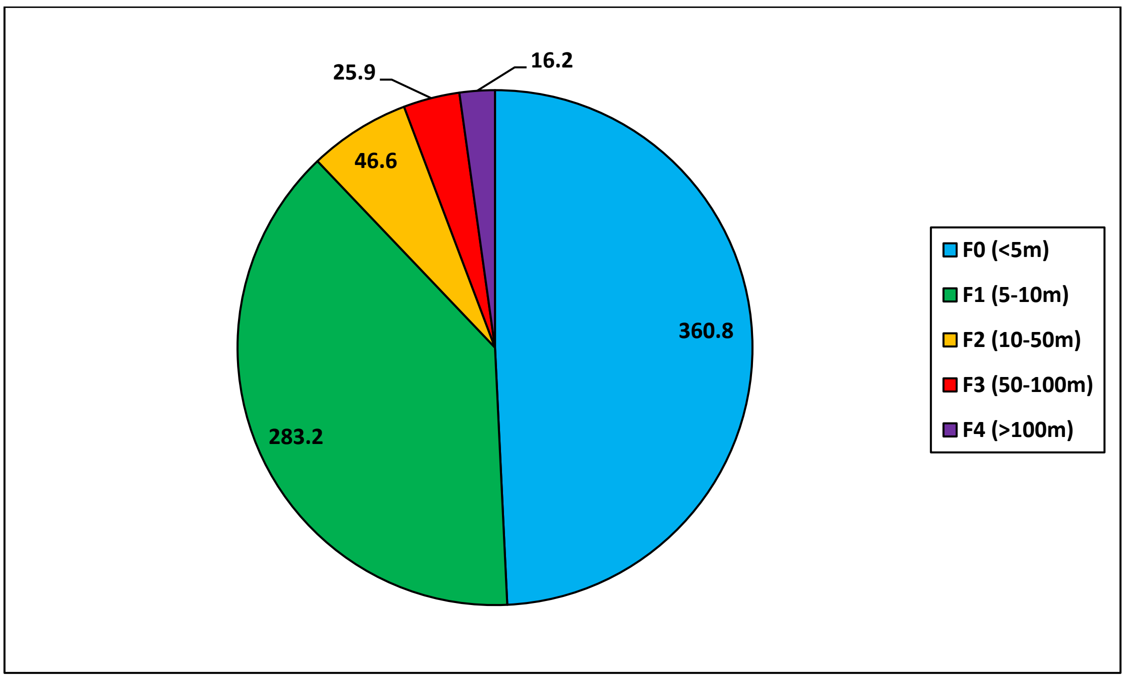

Figure 9. Flooding Class categories by shoreline length (km).

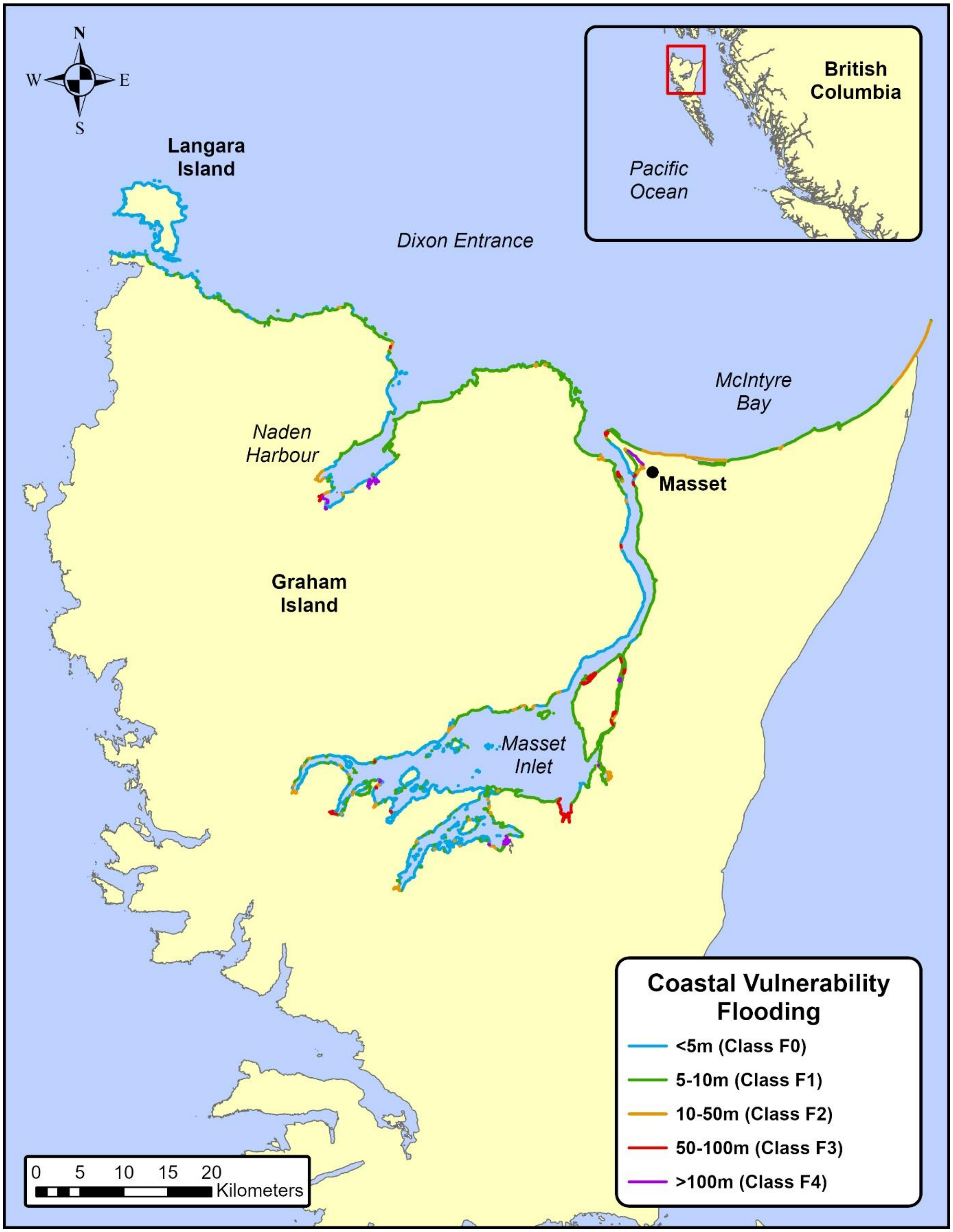

Figure 10. Distribution of the Coastal Vulnerability Flooding Class.

2.4.2 Coastal Vulnerability Observations

The Coastal Vulnerability Observations are features important for estimating the frequency and extent of coastal inundation. In the northern Haida Gwaii survey area, apart from the 'None' category, most observations were from the Wetland Deltaic complex category with 32.3 km. The subsequent category was the Anthropogenic category with 20.7 km (see Figures 11 and 12 for summary and distribution statistics). 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.

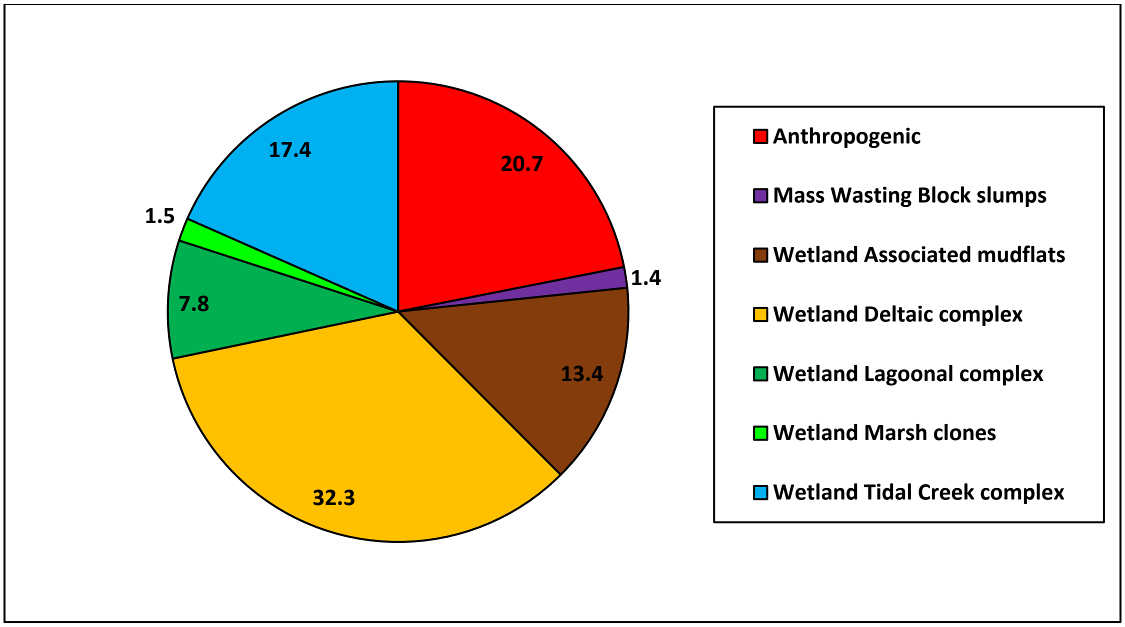

Figure 11. Coastal Vulnerability Observations categories by shoreline length (km). Category 'None' not shown.

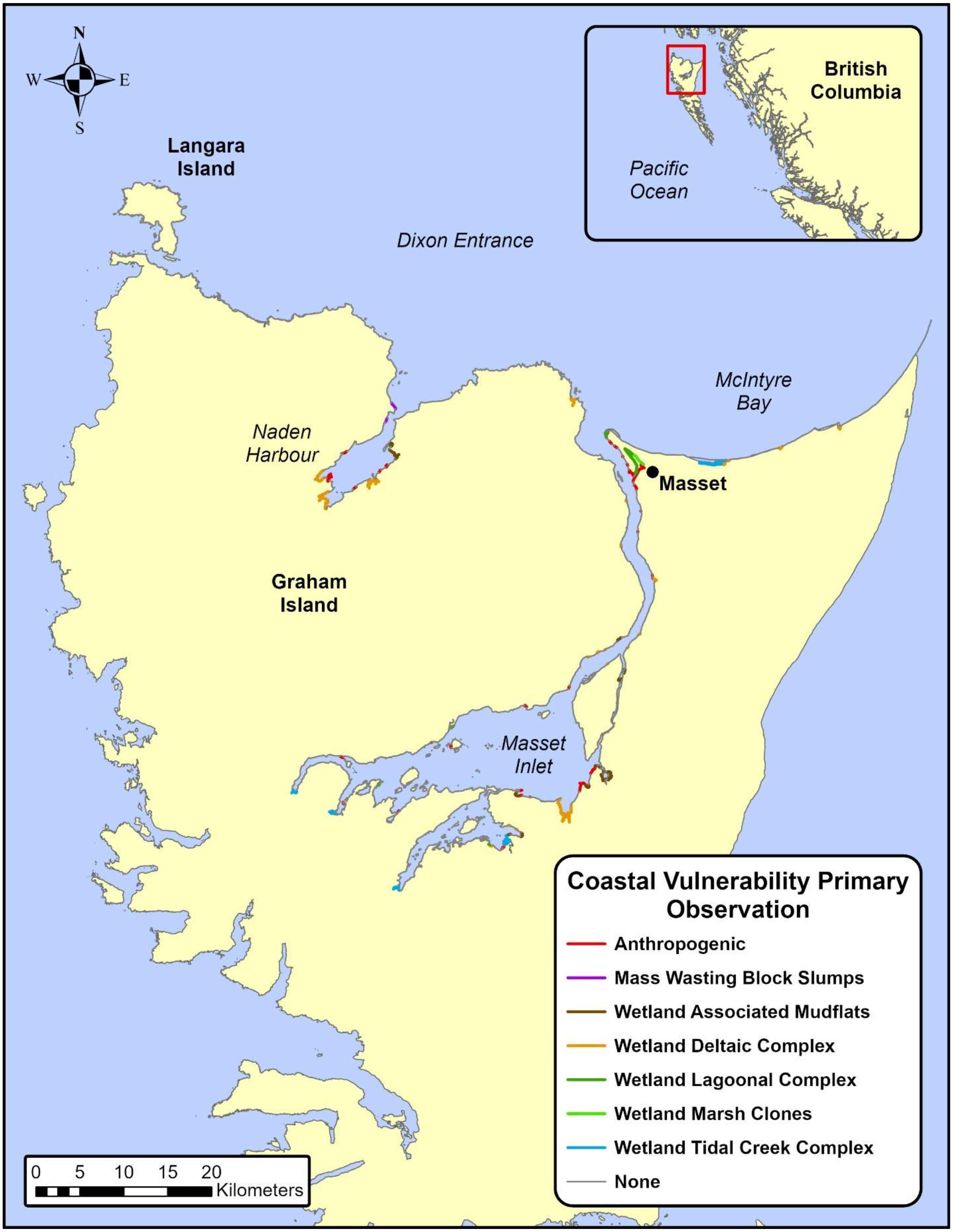

Figure 12. Distribution of the Coastal Vulnerability Observations categories.

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 protected nature most of the coastline, some units in the survey area were ranked Moderate in terms of vulnerability to sea level rise, while the rest were ranked as Low, including most of the shoreline in Masset Inlet. The Coastal Class and Wave Exposure were likely the driving factors behind the rankings in this survey area.

Figure 13. Distribution of Coastal Vulnerability index ranks in the northern Haida Gwaii 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 2.1% of the shoreline (taking the estimated length of that modification within the unit into account) exhibits shore modifications in the northern Haida Gwaii study area (Figure 14). Landfill was the most commonly recorded observation (52.4%) with Rip Rap (32.8%) and Pile-supported Wharf (4.9%) 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.

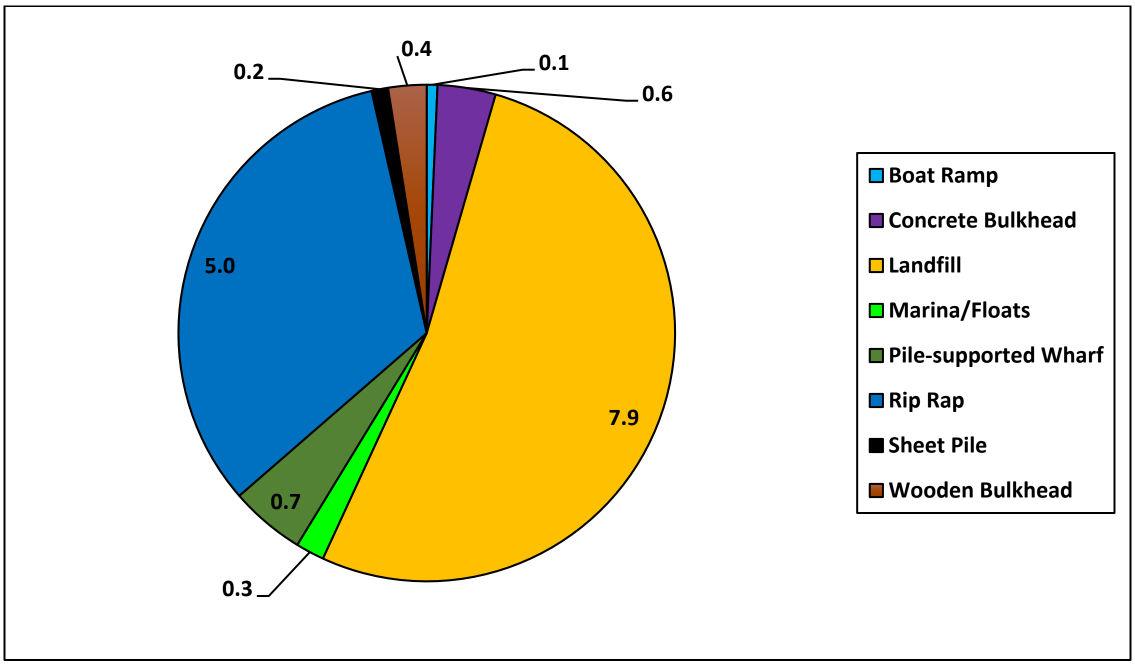

Figure 14. Shore Modifications by estimated shoreline length (km) of each modification type.

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 Haida Gwaii North 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 northern Haida Gwaii survey area are summarized in Tables 3 and 4. The most common supratidal/high intertidal biobands were Salt Marsh, occurring in 35% of the units, and Dune Grass, found in 15% of the units. The supratidal Black Lichen bioband was in 53% of the units. The most commonly occurring intertidal bioband in the survey area was Rockweed in 80% of the units. Green algae was also very common and was found in 78% of the units. The most common low intertidal/subtidal biobands were Filamentous and Foliose Red Algae (49%), Eelgrass (28%), and Brown Bladed Kelps (25%), although it should be noted that some of the Brown Bladed Kelps may include Sargassum, which would usually be classified as a Brown Non-Bladed Kelp or as the Sargassum bioband. 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 northern Haida Gwaii survey area

Bioband		Patchy		Continuous		Total (km)	% of Total Mapped
Name	Code	(km)	%	(km)	%		
Trees and Shrubs	TRSH	1	0	3	0	4	1
Dune Grass	DUGR	74	10	39	5	113	15
Salt Marsh	SAMB	146	20	110	15	256	35
Barnacle	BARN	241	33	119	16	359	49
Rockweed	ROCK	259	35	330	45	589	80
Green Algae	GRAL	464	63	106	14	570	78
Blue Mussel	BLMU	39	5	26	4	66	9
Echinoderms	ECHI	4	1	0	0	4	1
Bleached Red Algae	BRAL	14	2	0	0	15	2
Filamentous and Foliose Red Algae	FFRA	194	27	162	22	356	49
Brown Bladed Kelps	BRBA	72	10	110	15	182	25
Sargassum	SARG	23	3	4	1	27	4
Eelgrass	EELG	111	15	91	13	203	28
Surfgrass	SURF	68	9	40	6	108	15
Giant Kelp	GIKE	39	5	29	4	68	9
Bull Kelp	BUKE	43	6	4	1	48	7
Anemones	ANEM	2	0	0	0	2	0
Coralline Algae	CORA	61	8	9	1	71	10
Sponge	SPON	0	0	0	0	0	0
Urchin Barrens	URBA	19	3	29	4	49	7

Table 4. Bioband abundances for splash zone biobands mapped in the northern Haida Gwaii survey area.

Bioband		Narrow (<1m)		Medium (1-5m)		Wide (>5m)		Not Assessed		Total (km)	% of Total Mapped
Name	Code	(km)	%	(km)	%	(km)	%	(km)	%		
Black Lichen	BLLI	148	20	196	27	45	6	341	47	390	53
Splash Zone	SPZO	139	19	2	0	0	0	591	81	141	19
White Lichen	WHLI	46	6	21	3	4	1	661	90	71	10
Yellow Lichen	YELI	2	0	2	0	0	0	727	99	5	1

Salt Marsh was the most commonly occurring supratidal, non-splash zone bioband found in 35% of units while Dune Grass was in 15% of units. (see Figures 16 and17 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).

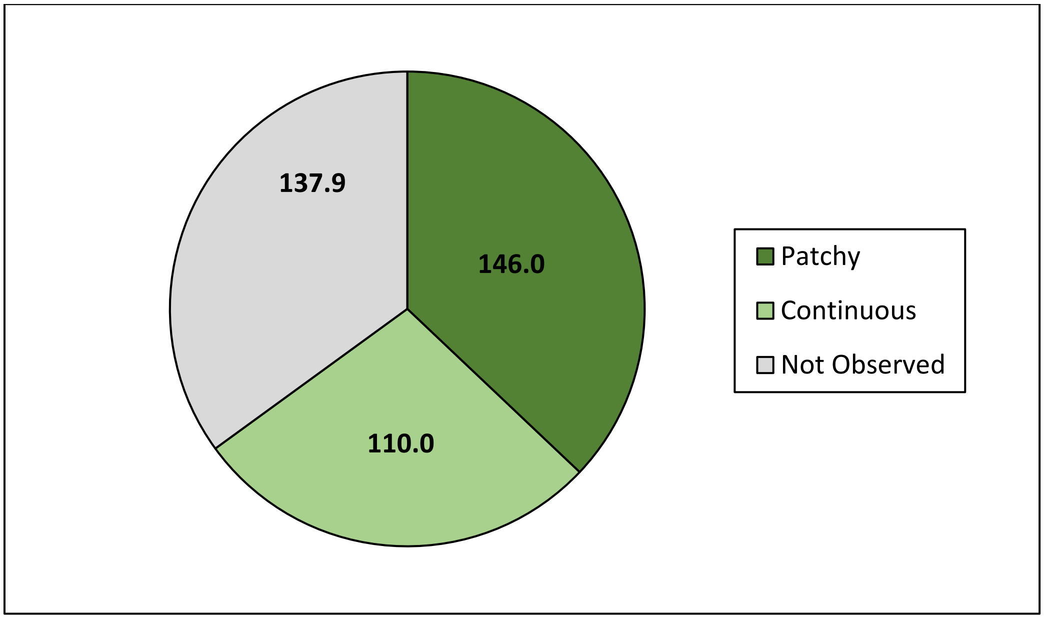

Figure 16. Distribution of the Salt Marsh (SAMB) bioband by shoreline length (km).

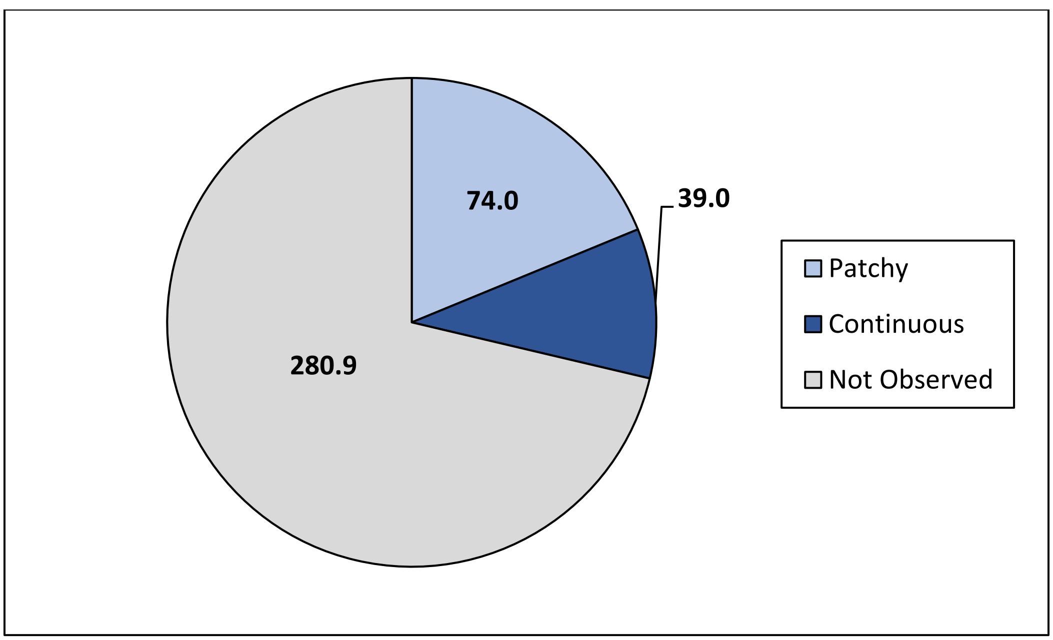

Figure 17. Distribution of the Dune Grass (DUGR) bioband by shoreline length (km).

Figure 18. Distribution of the Salt Marsh (SAMB) and Dune Grass (DUGR) biobands in the northern Haida Gwaii survey area.

Seagrasses are an important component of coastal ecosystems with Eelgrass beds forming in sandy substrates at Semi-Protected and lower exposures. In the northern Haida Gwaii survey area, both Eelgrass and Surfgrass was observed. 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 and Surfgrass biobands respectively and a distribution map of the biobands in Figure 21.

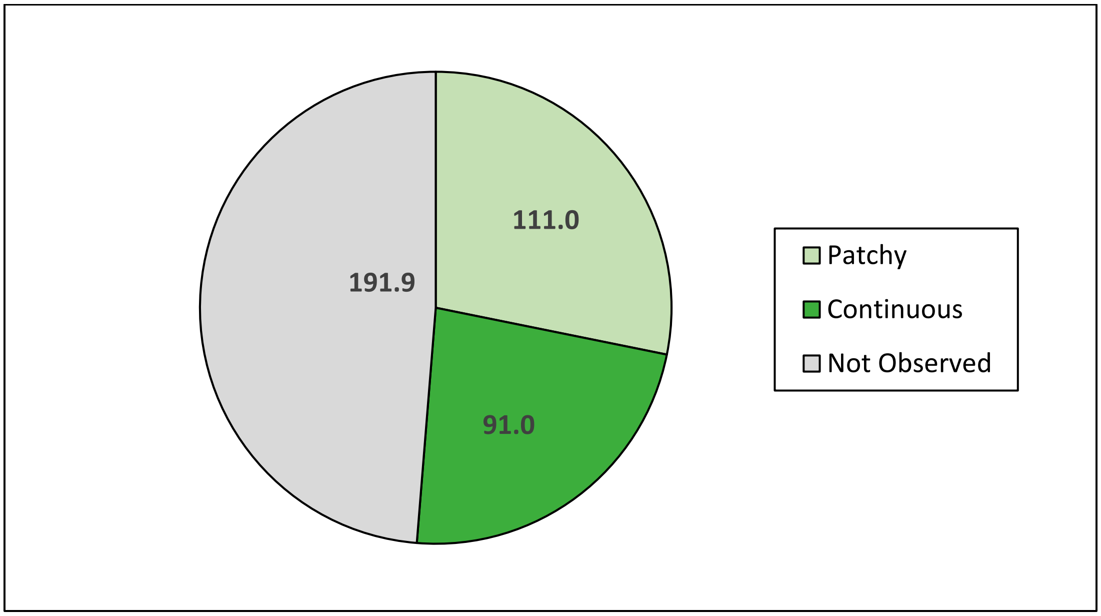

Figure 19. Distribution of the intertidal/subtidal Eelgrass (EELG) bioband by Shoreline length (km).

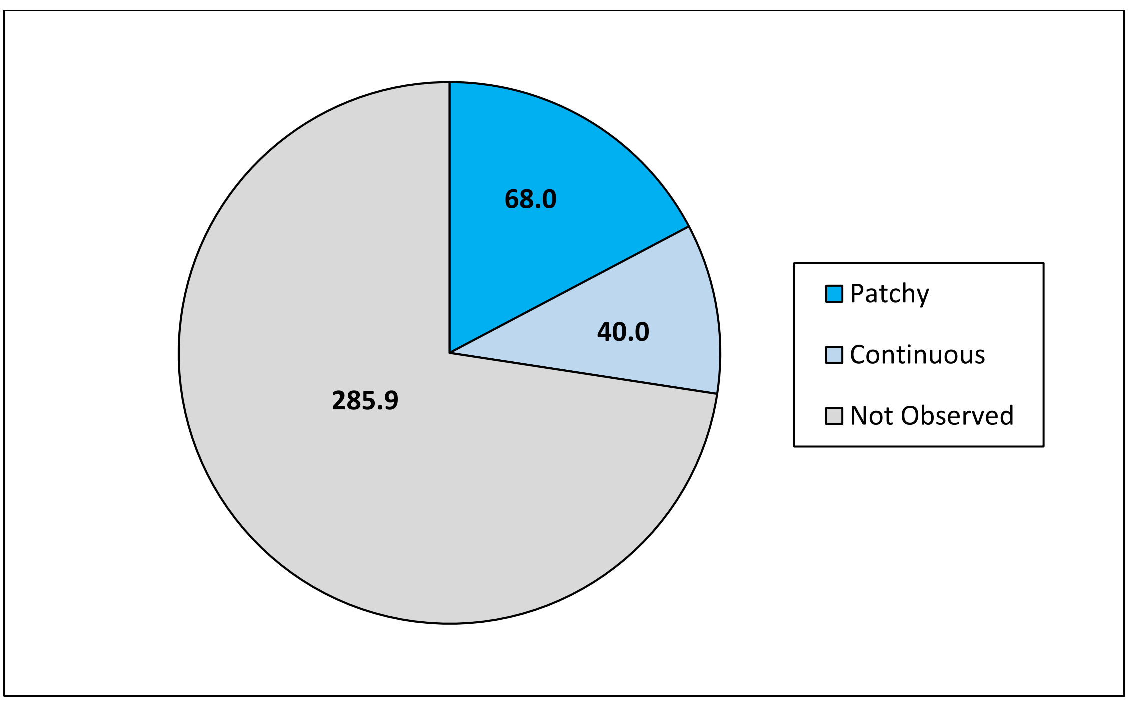

Figure 20. Distribution of the intertidal/subtidal Surfgrass (SURF) bioband by Shoreline length (km).

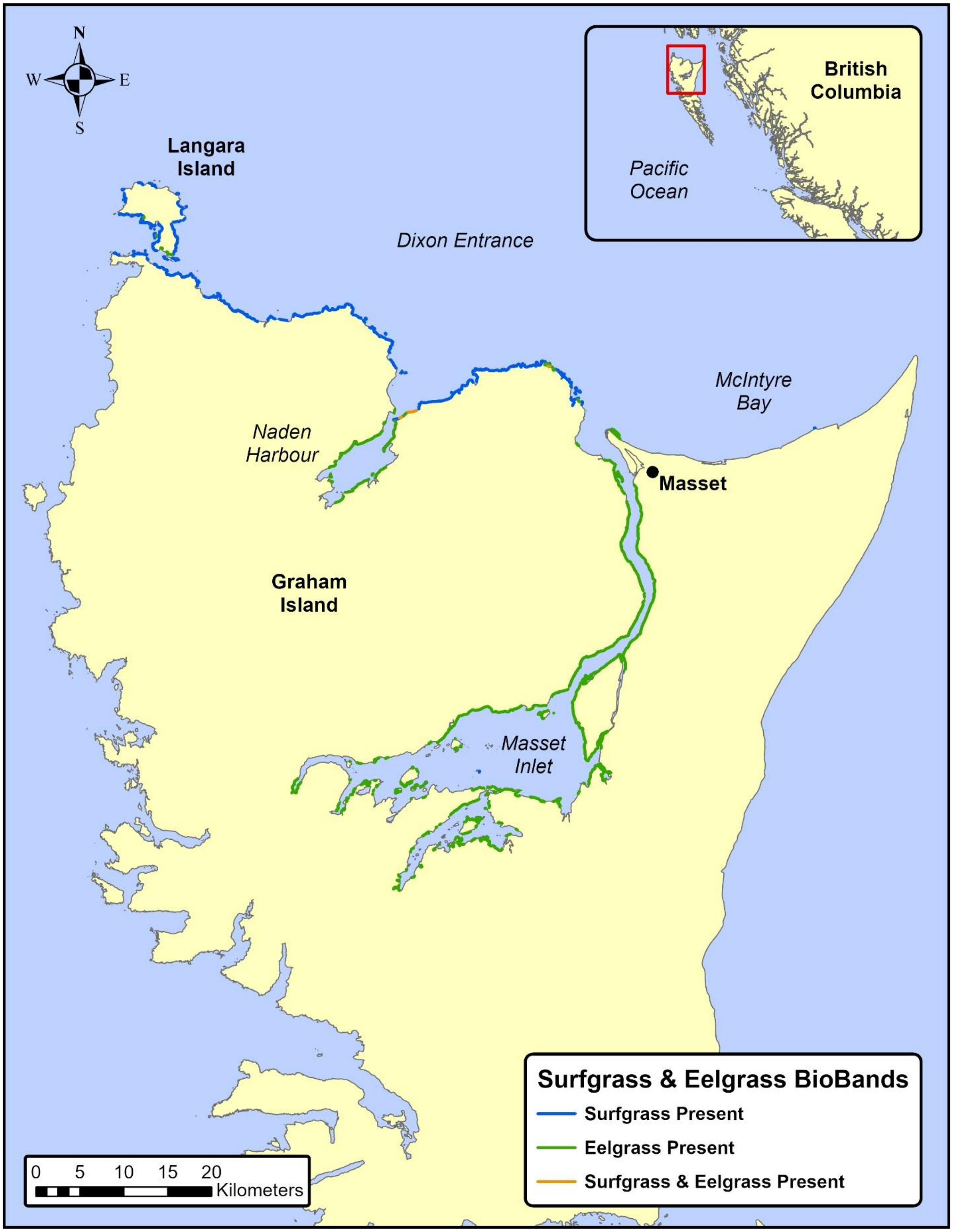

Figure 21. Distribution of the Eelgrass (EELG) and Surfgrass (SURF) biobands in the northern Haida Gwaii survey area.

Sargassum and Bladed Brown Algae were two of the kelp biobands (not including the canopy kelps discussed below) observed in the northern Haida Gwaii survey area. See Figure 22 for statistics on the distribution of Sargassum with a distribution map in Figure 23. The Sargassum bioband is defined by the presence of Japanese Wireweed (*Sargassum muticum*). The Sargassum band was observed in 4% of the units although it is possible much of the Brown Bladed Kelp that was recorded was actually Sargassum (or other kelps mixed with Sargassum) as there were areas where browns could be observed in the subtidal but not enough detail could be seen to determine if Sargassum was present. It can therefore be assumed it was more widely distributed than indicated by the ShoreZone mapping. There is significant literature available on the impacts of introduced Japanese Wireweed with somewhat conflicting conclusions, as some studies find negative impacts on native species (DeWreede and Vandermeulen, 1988; Britton-Simmons, 2004) and some finding little to no impacts (Sanchez and Fernandez, 2005; Olabarria *et al*., 2009). White (2003) studied the effects of *S. muticum* on macroalgal communities and grazing invertebrates in BC and found that the effects of introduction were both density and time dependent and were mediated through competition for light and also that the effects went in both positive and negative directions depending on the species being studied.

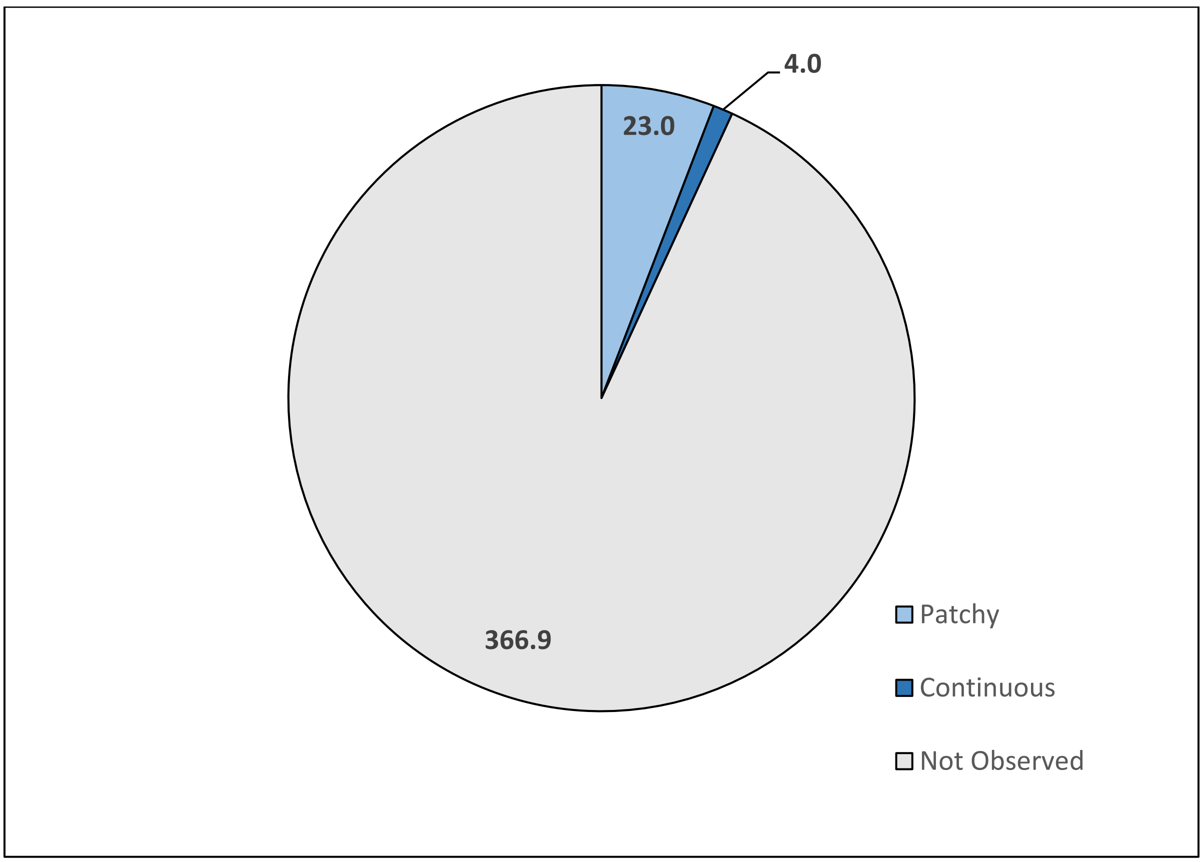

Figure 22. Proportion of shoreline length (km) of the intertidal Sargassum (SARG) bioband by category.

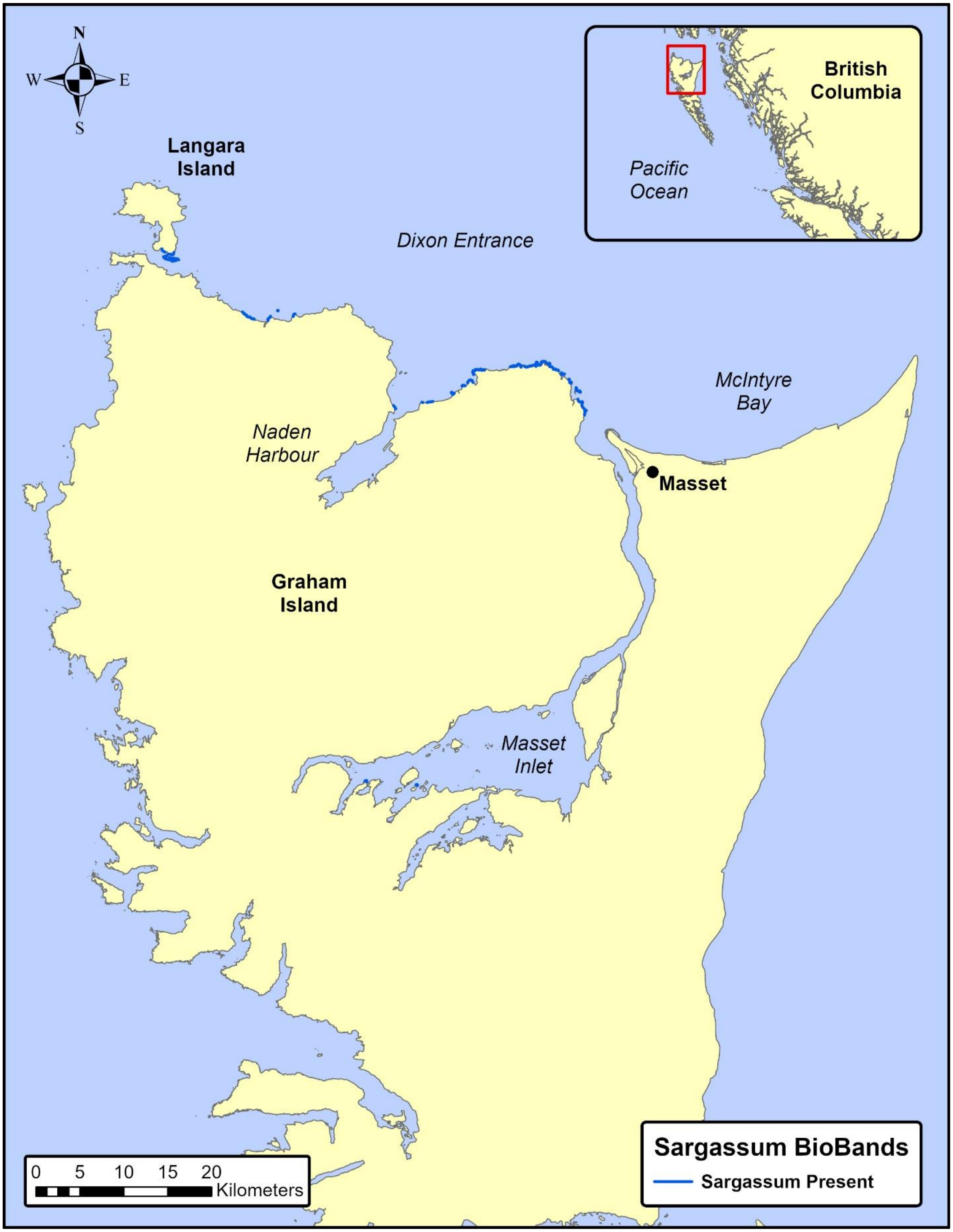

Figure 23. Distribution of the Sargassum (SARG) bioband in the northern Haida Gwaii survey area.

Canopy kelps form valuable habitat for fish, invertebrates and other algae and are an important part of a healthy coastline and healthy fisheries. Giant Kelp (*Macrocystis pyrifera*) and Bull Kelp (*Nereocystis leutkeana*) were both noted in the survey area, although they were not widespread and were generally absent from the more protected, inner coastline except where tidal currents are likely more pronounced. See Figures 24 and 25 for statistics on the distribution of the individual canopy kelp biobands and a distribution map for both in Figure 26.

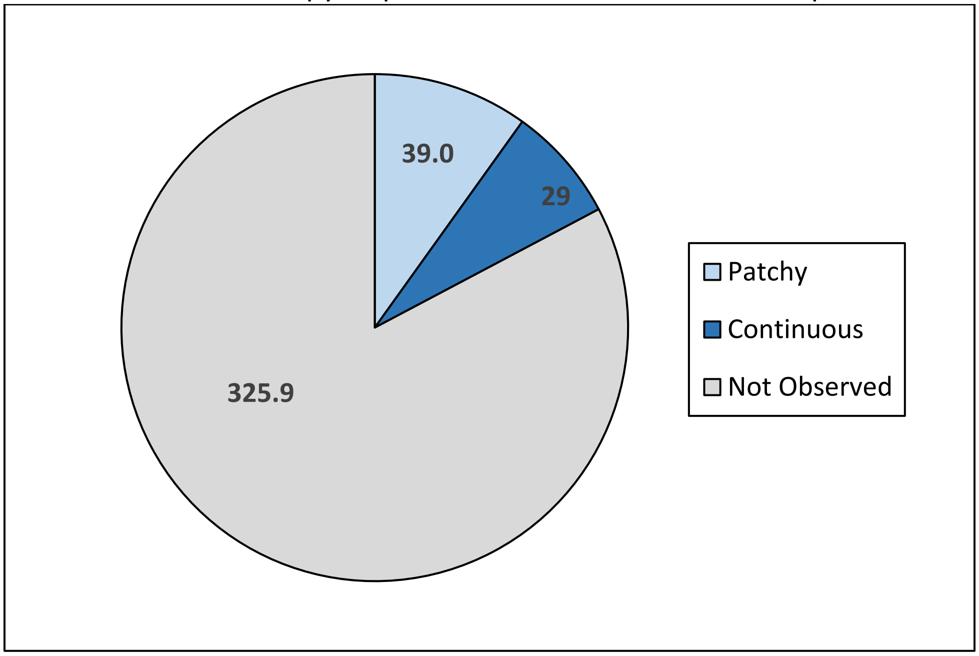

Figure 24. Distribution of the subtidal Giant Kelp (GIKE) bioband by Shoreline length (km).

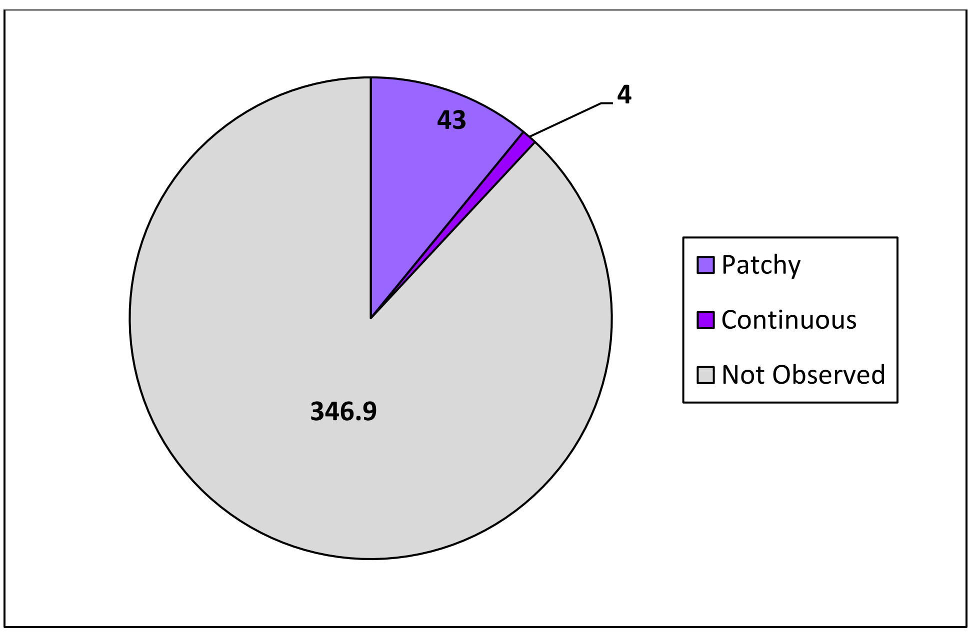

Figure 25. Distribution of the subtidal Bull kelp (BUKE) bioband by Shoreline length (km).

Figure 26. Distribution of the Giant Kelp (GIKE) and Bull Kelp (BUKE) biobands in the northern Haida Gwaii 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 northern Haida Gwaii survey area are summarized in Figure 27 and a distribution map of the categories is shown in Figure 28. The coastline throughout the northern Haida Gwaii survey area is more Protected (45.3%) with just 1.7% being Exposed.

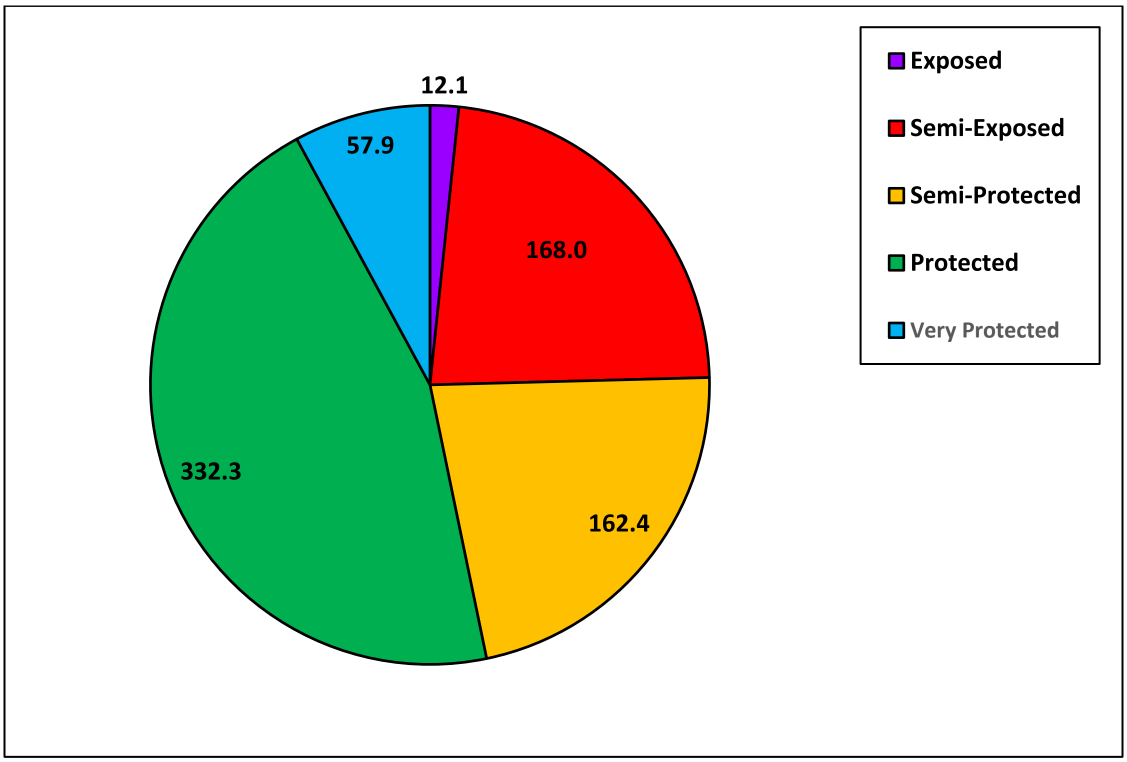

Figure 27. Distribution of Biological Wave Exposures mapped in the northern Haida Gwaii survey area by shoreline length (km).

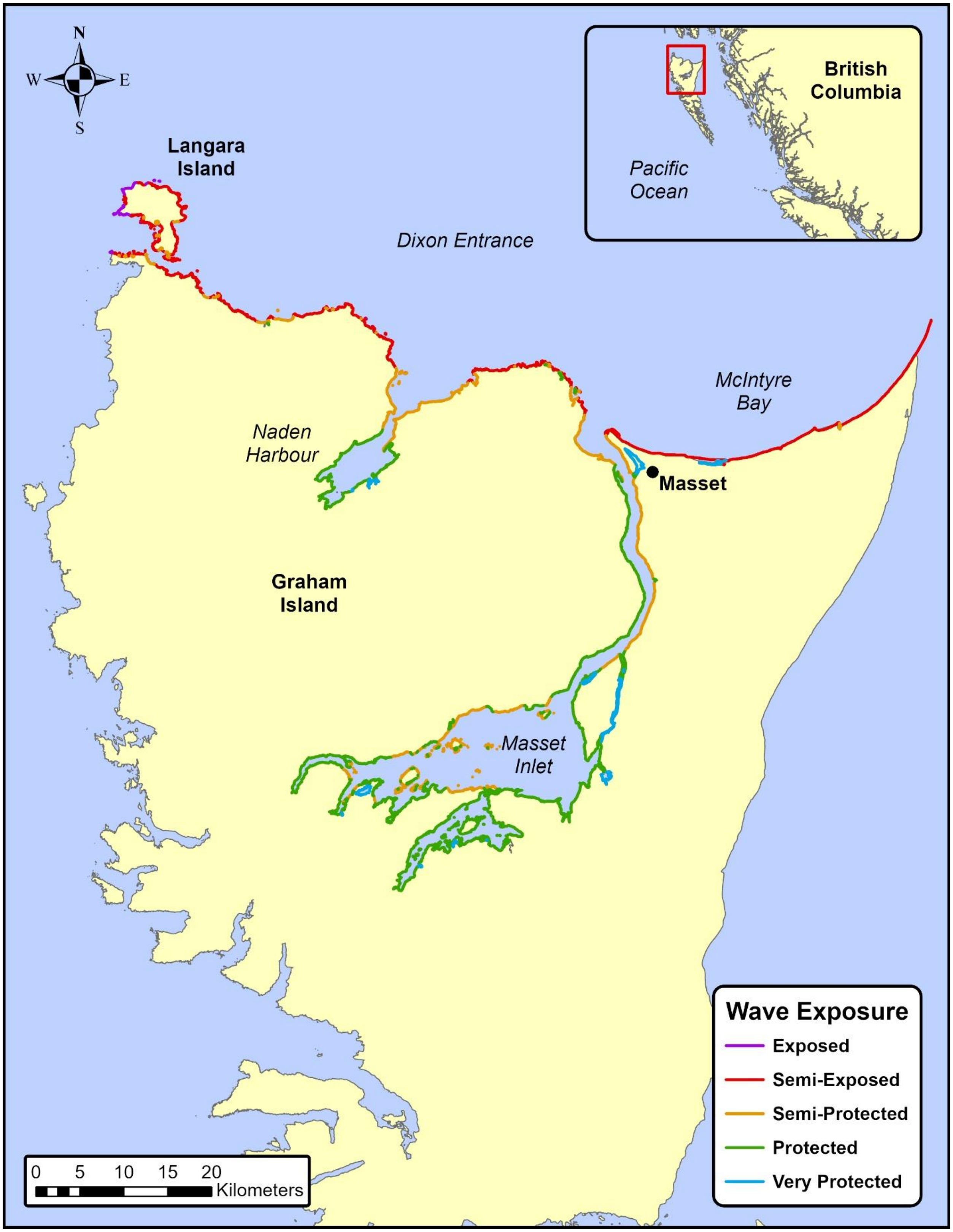

Figure 28. Distribution of the Biological Wave Exposure in the northern Haida Gwaii survey area.

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 northern Haida Gwaii 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 (77.2%). The Estuary classification is one of the least dominant, making up just 0.9% of the shoreline and is associated with spawning and nursery habitats for fish as well as breeding and foraging grounds for birds and other wildlife.

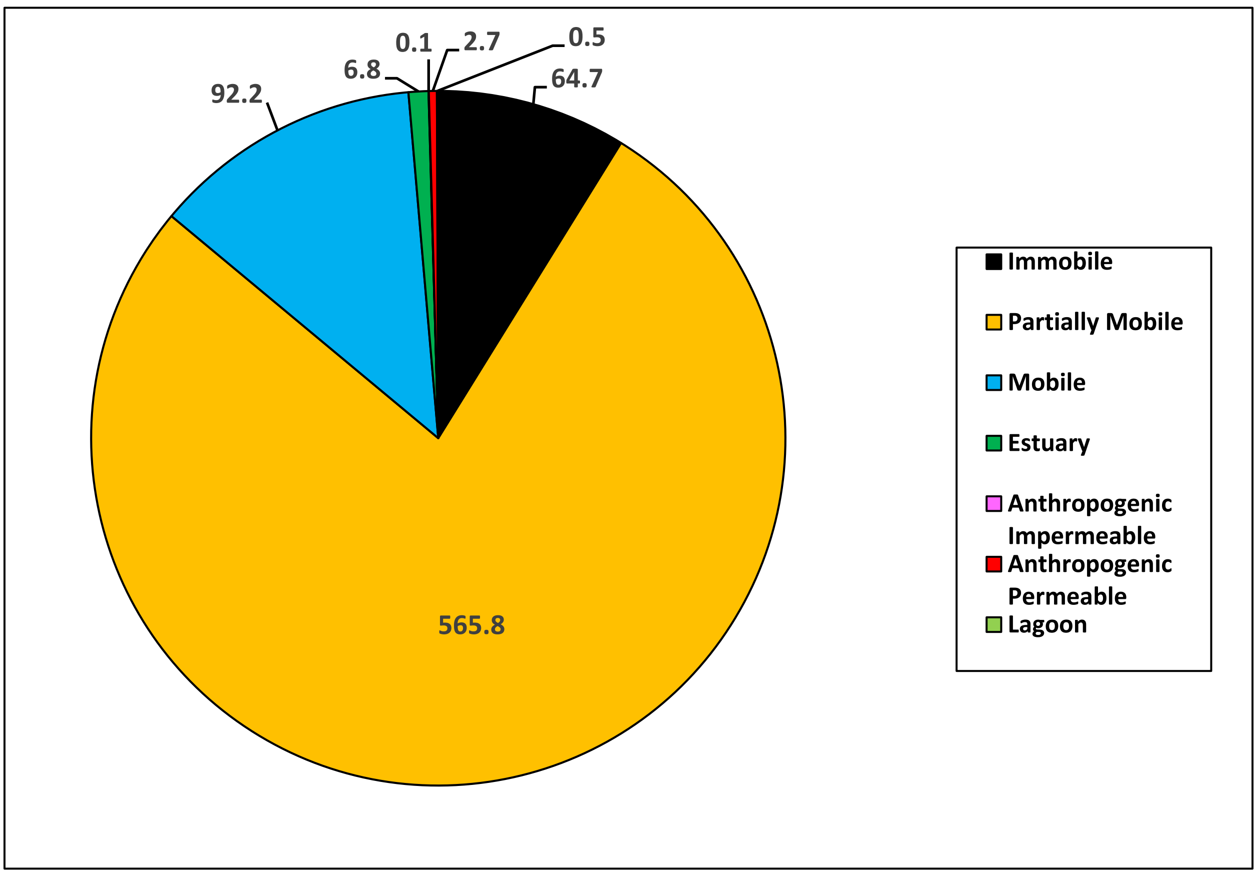

Figure 29. Distribution of Habitat Class categories in the northern Haida Gwaii survey area by shoreline length (km).

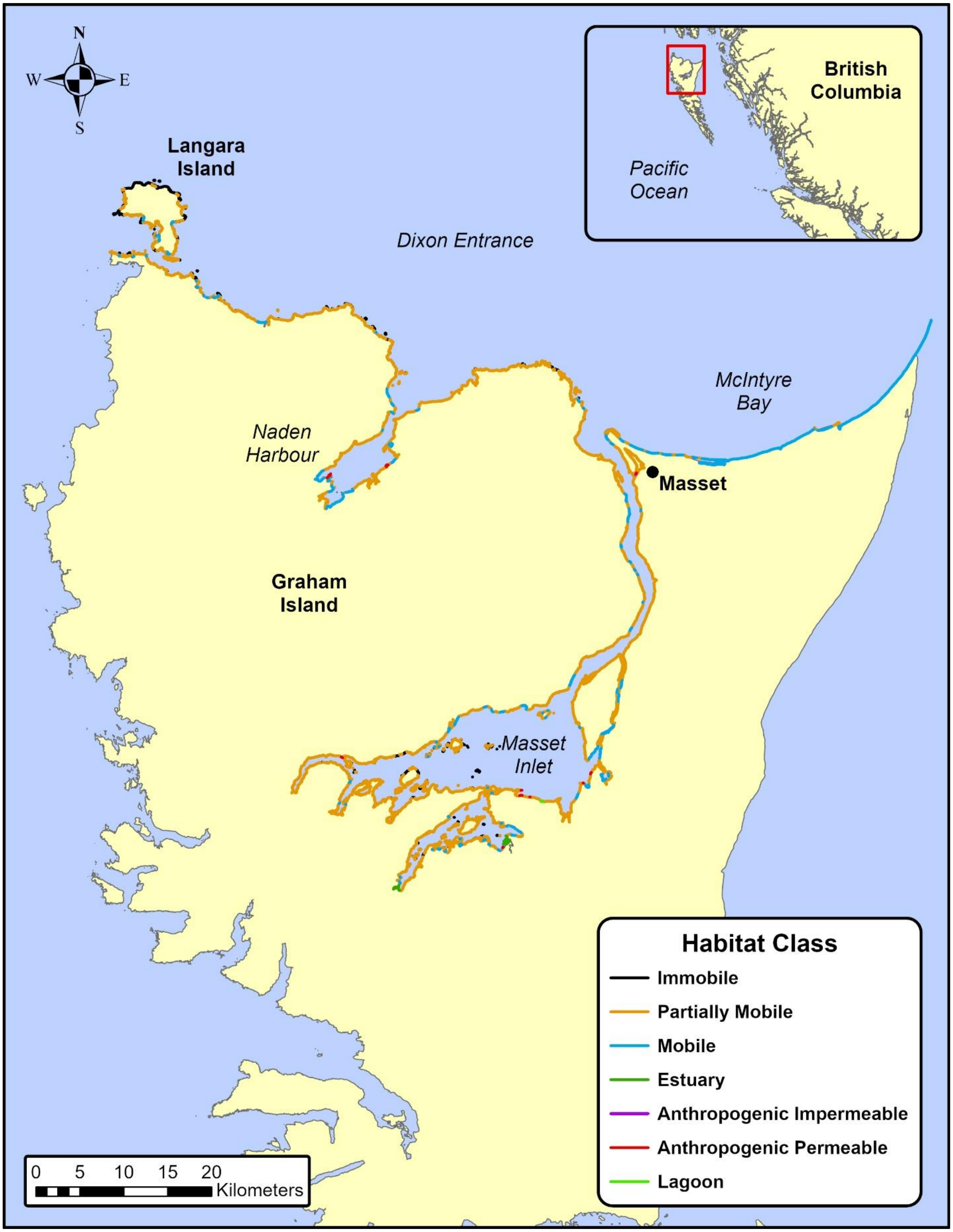

Figure 30. Distribution of Habitat Class categories in the northern Haida Gwaii survey area.

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5 Acknowledgments

We would like to acknowledge the Old Massett Village Council for funding the ShoreZone imaging and mapping represented in this summary report. The international ShoreZone program is a partnership of scientists, GIS specialists, web specialists, non-profit organizations, and governmental agencies in two countries, one Province and four States. We gratefully acknowledge the support of other organizations working in partnership for the ShoreZone effort including: the Tsleil-Waututh Nation, the Musqueam Indian Band, the Vancouver Fraser Port Authority, the Prince Rupert Port Authority, Nexxen, Pacific Northwest LNG, the Metlakatla First Nation, the Gitxaala First Nation, the Nisga'a Lisims Government, the BC Ministry of Environment, the Comox Valley Project Watershed Society, the Alaska Department of Fish and Game, the Alaska Department of Natural Resources, Archipelago Marine Research Ltd., Cook Inlet Regional Citizens' Advisory Council, Exxon Valdez Oil Spill Trustee Council, National Park Service, NOAA National Marine Fisheries Service, Prince William Sound Regional Citizens' Advisory Council, The Nature Conservancy, United States Fish and Wildlife Service, the University of Alaska and the US Forest Service.

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 the northern Haida Gwaii survey area.

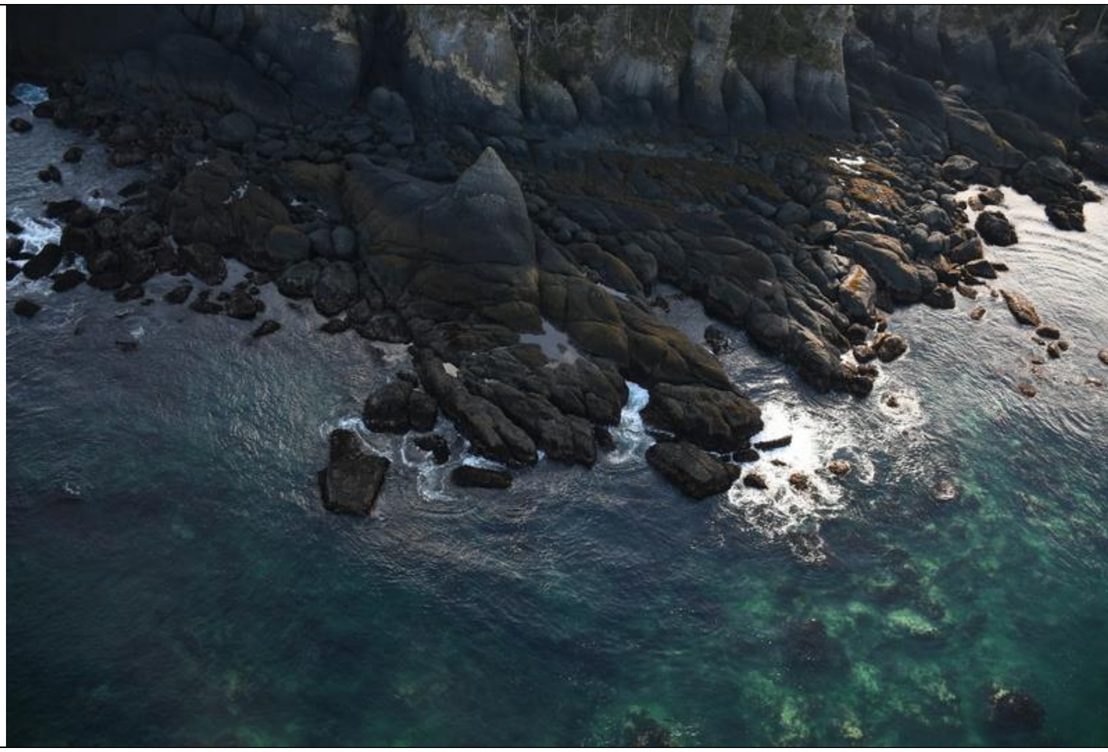


Photo bc23_hn_06827: Example of Coastal Class 2; Rock Platform, wide.
Cox Island.

Photo bc23_hn_06713: Example of Coastal Class 3; Rock Cliff.
Lacy Island.

Photo bc23_hn_06866: Example of Coastal Class 4; Rock Ramp.
Village Point, Langara Island.

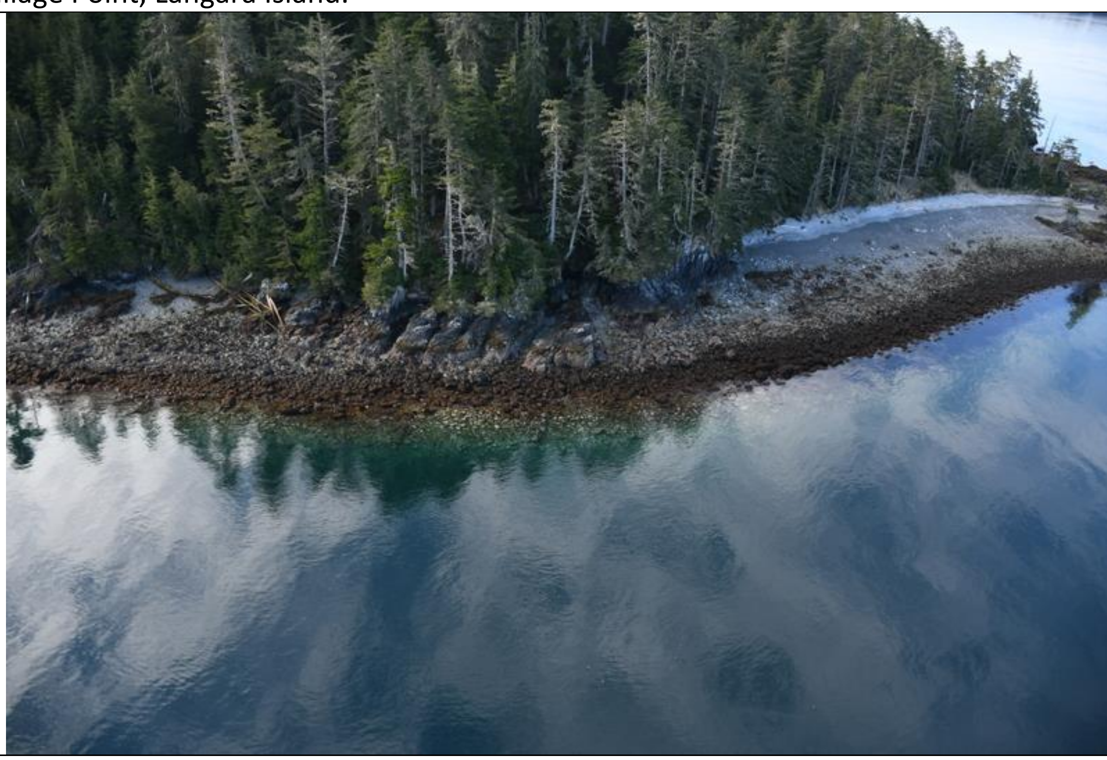


Photo bc23_hn_06876: Example of Coastal Class 8; Cliff with gravel beach.
Lucy Island.

Photo bc23_hn_02385: Example of Coastal Class 9; Ramp with gravel beach.
Yestalton Bay.

Photo bc23_hn_06896: Example of Coastal Class 11; Ramp with gravel & sand beach, wide.
Lucy Island.

Photo bc23_hn_06936: Example of Coastal Class 12; Platform with gravel & sand beach, wide.
Solide Passage.

Photo bc23_hn_04233: Example of Coastal Class 13; Cliff with gravel & sand beach.
Ship Kieta Island.

Photo bc23_hn_06873: Example of Coastal Class 14; Ramp with gravel & sand beach.
Lucy Island.

Photo bc23_hn_04363: Example of Coastal Class 24; Sand & gravel flat or fan.
Masset Inlet.

Photo bc23_hn_01225: Example of Coastal Class 25; Sand & gravel beach, narrow.
Masset Inlet.

Photo bc23_hn_00569: Example of Coastal Class 28; Sand flat.
Graham Island.

Photo bc23_hn_01108: Example of Coastal Class 31; Organics/Fines.
Delkatla Inlet.

Photo bc23_hn_05922: Example of Coastal Class 32; Permeable man-made structures.
Craft Bay.

Table A-2. Examples of the Biobands in the northern Haida Gwaii survey area.

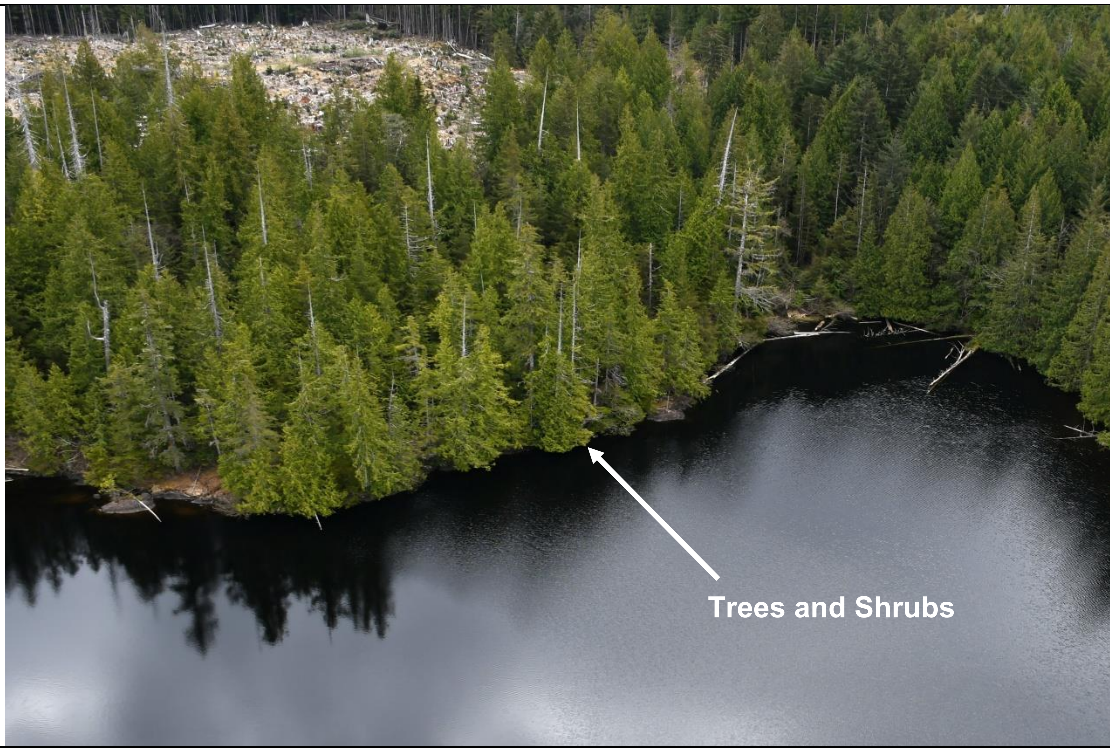


Photo bc23_hn_03127: Good example of Trees and Shrubs (TRSH) bioband in the supratidal zone.
Masset Island, west of Awun Bay.

Photo bc23_hn_06775: Example of the Splash Zone (SPZO) bioband which is an erosional or active A Zone without attached vegetation.
Cloak Bay, Langara Island.

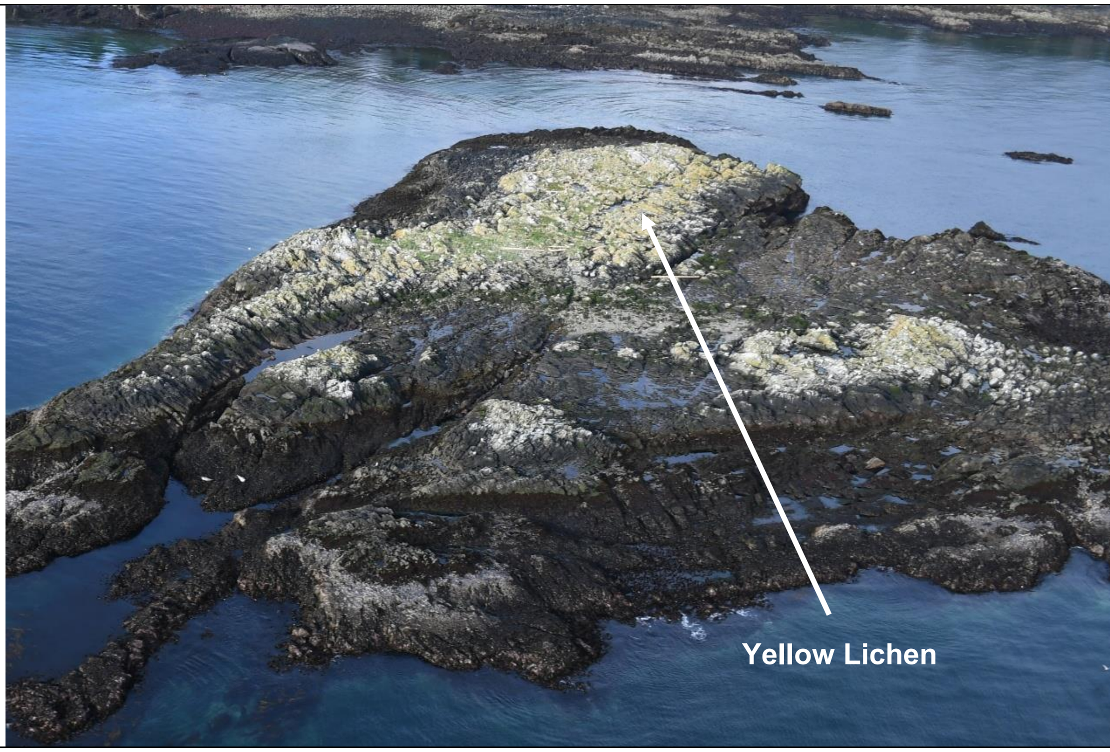


Photo bc23_hn_06405: Example of the Yellow Lichen (YELI) bioband in the supratidal zone. Klashwun Point.

Photo bc23_hn_07045: Good example of White Lichen (WHLI) bioband in the supratidal zone, above the Black Lichen band.
McPherson Point, Langara Island.

Photo bc23_hn_00786: Good example of the Black Lichen (BLLI) bioband which is a black band in the supratidal zone, usually caused by the lichen *Verrucaria* sp.
West of Wiah Point.

Photo bc23_hn_00604: Good example of blue-green Dune Grass (DUGR) bioband in the supratidal zone.
Striae Islands.

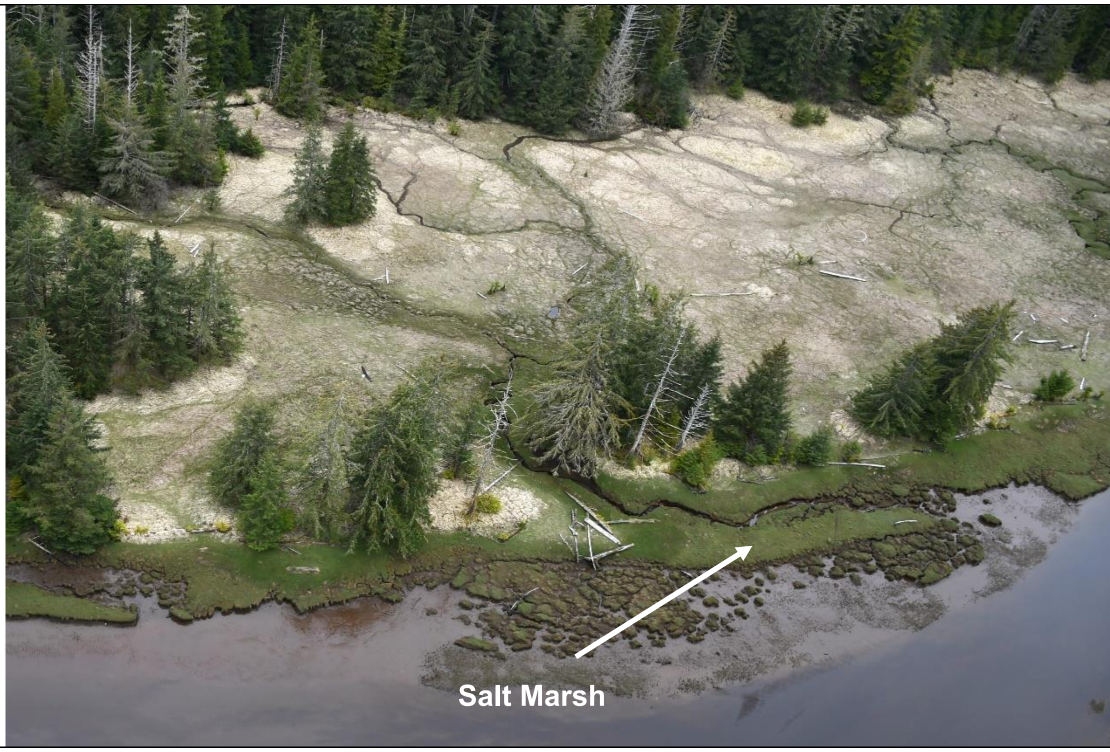


Photo bc23_hn_01683: Good example of Salt Marsh (SAMB) bioband in the supratidal/intertidal zone.
Kumdis Island.

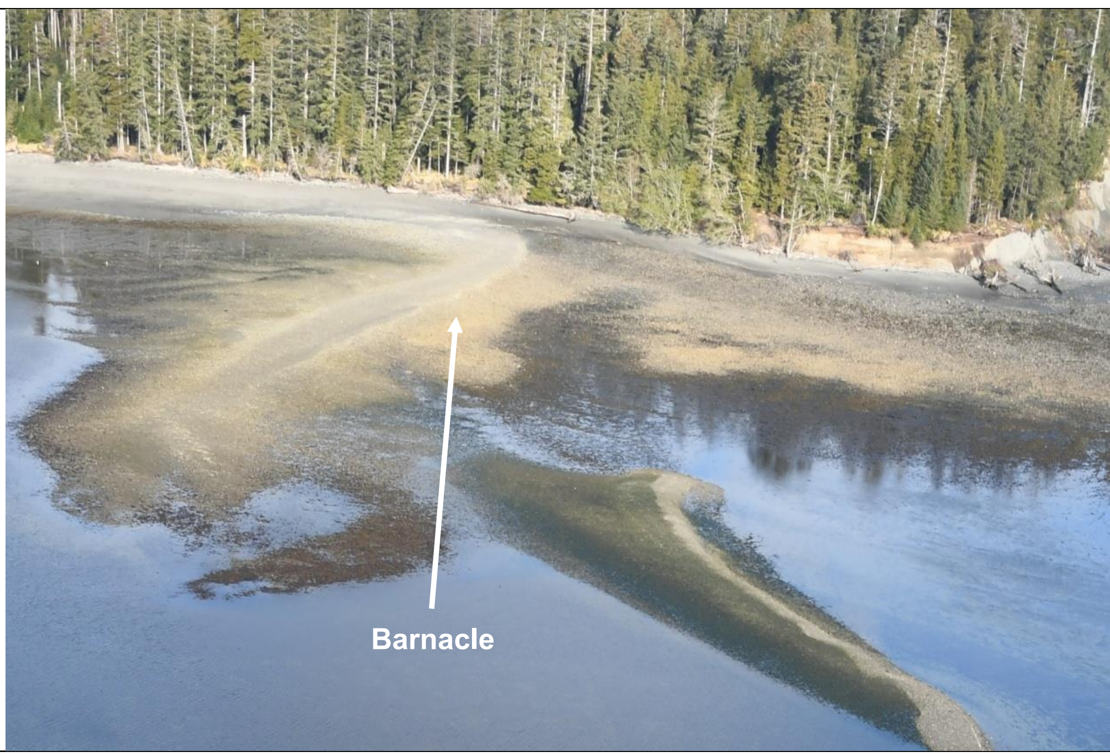


Photo bc23_hn_06284: Good example of the Barnacle (BARN) bioband in the intertidal zone.
South Hussan Bay, Virago Sound.

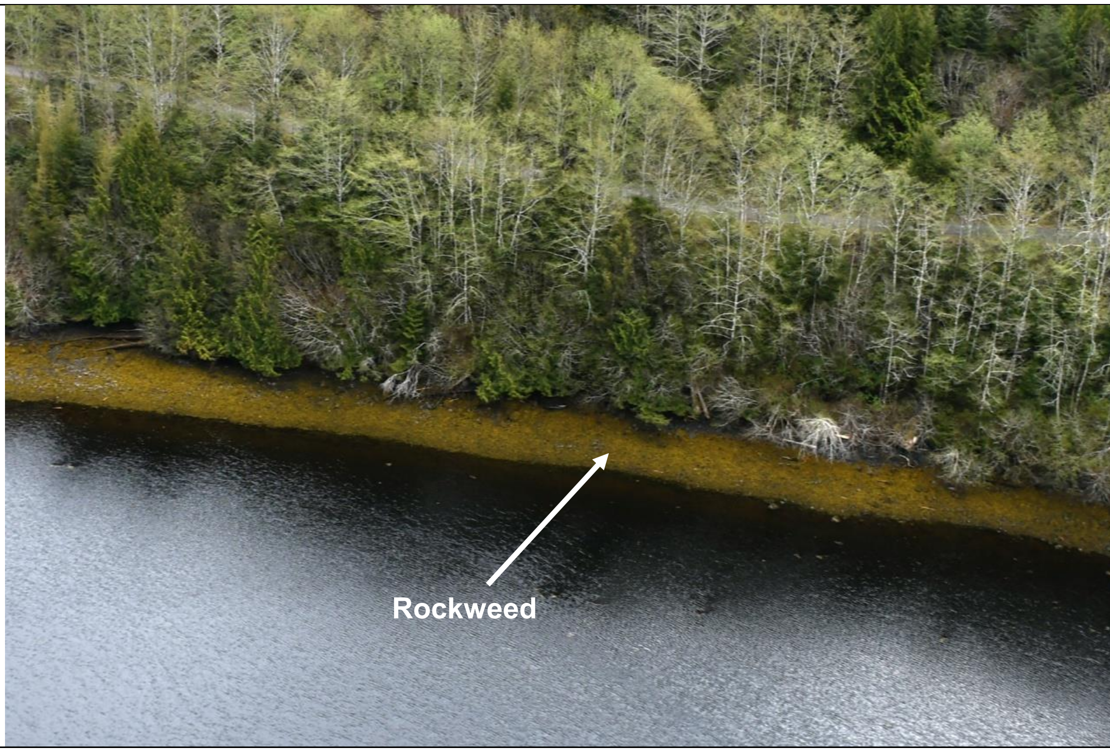


Photo bc23_hn_03314: Good example of the golden-brown Rockweed (ROCK) bioband. McClinton Bay.

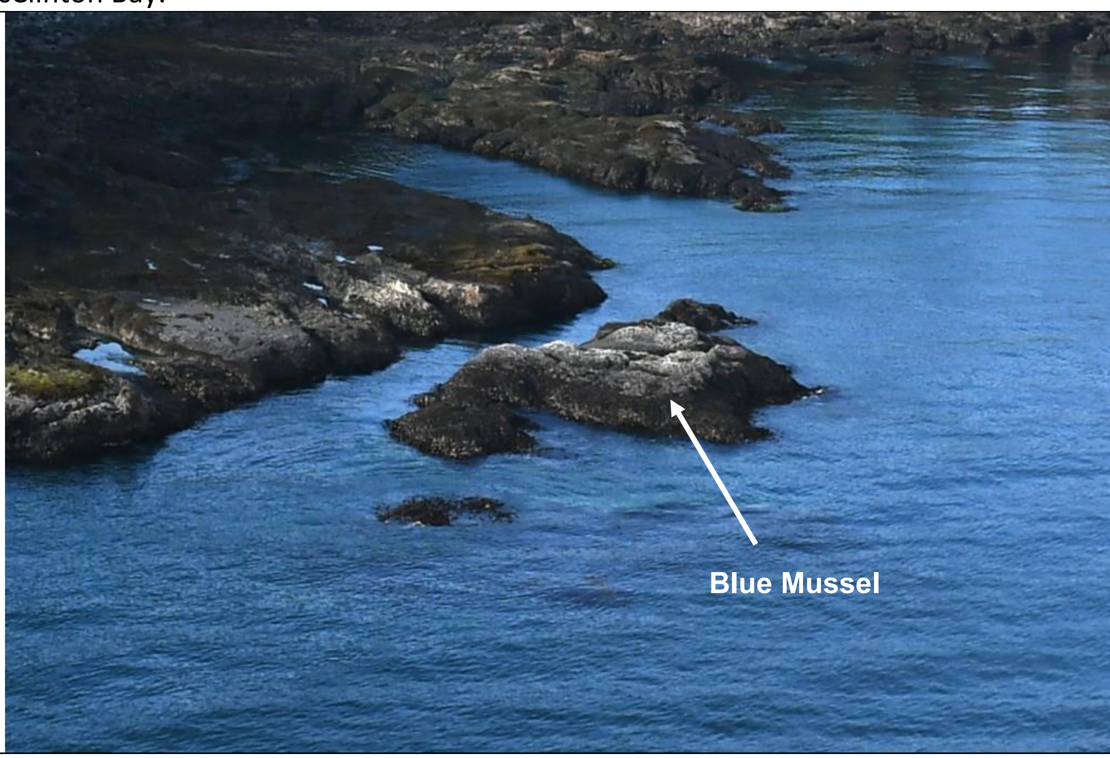


Photo bc23_hn_06396: Good example of the black Blue Mussel (BLMU) bioband in the mid-intertidal. Klashwun Point.

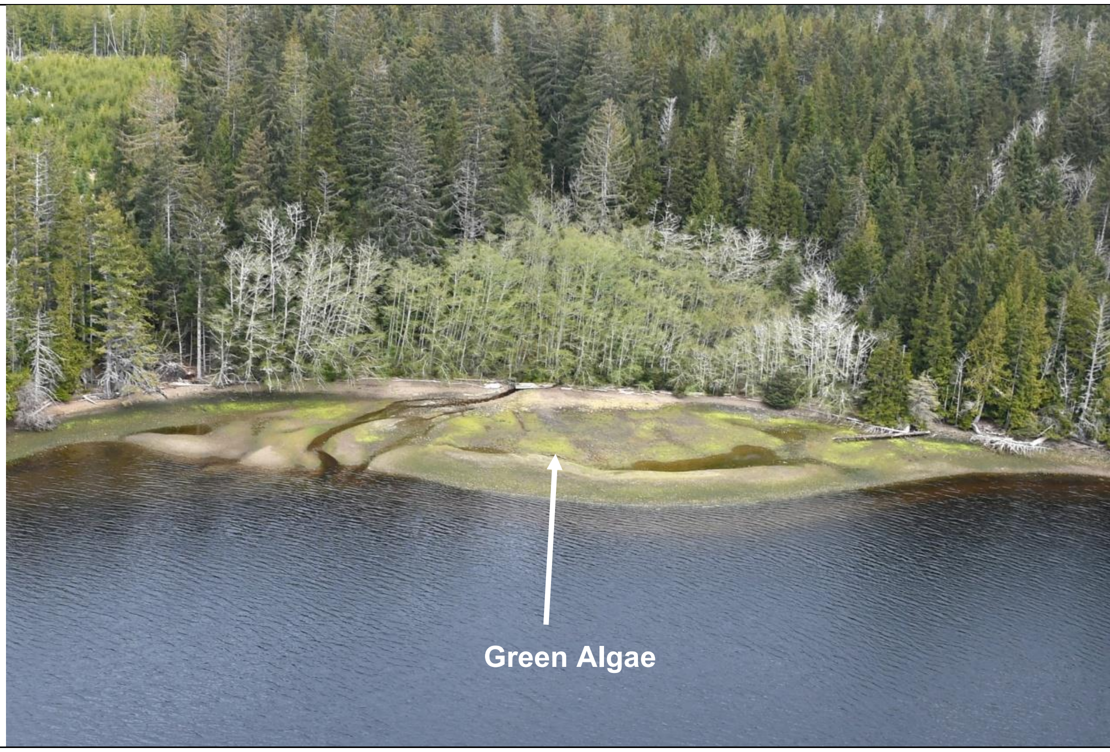


Photo bc23_hn_04732: Good example of the Green Algae (GRAL) bioband in the lower intertidal.
Cowhoe Bay.

Photo bc23_hn_00832: Example of the Echinoderm (ECHI) bioband in this study area.
East of Cape Edensaw.

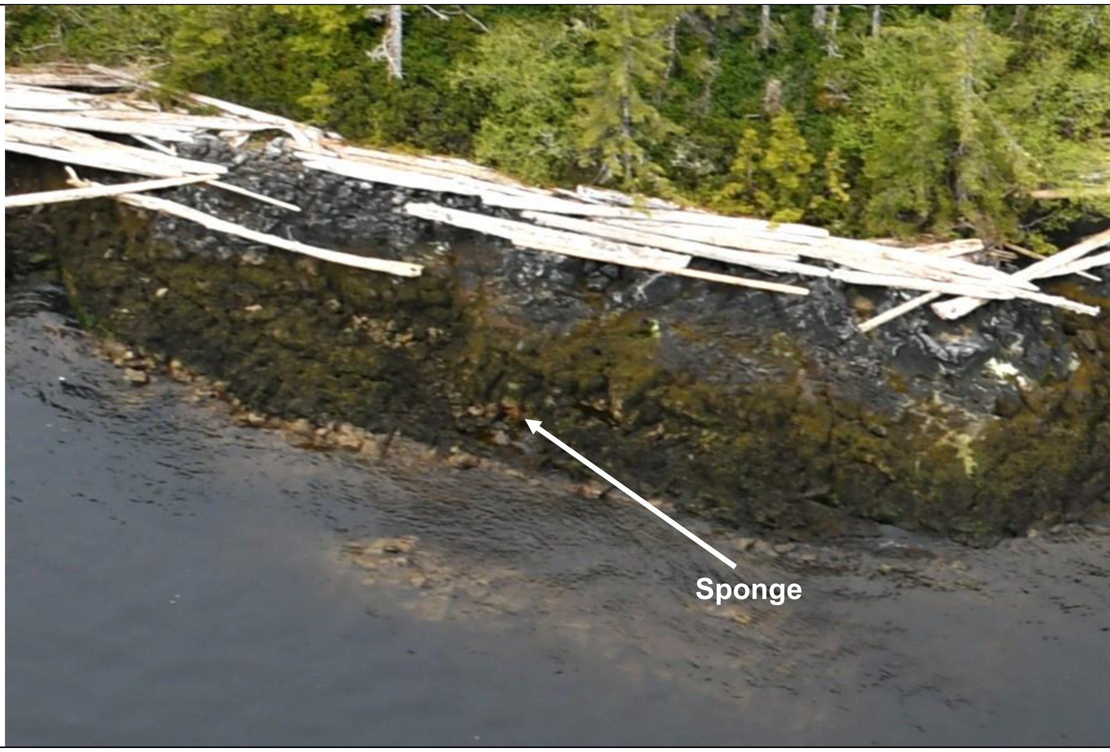


Photo bc23_hn_02279: Example of the Sponge (SPON) bioband in the mid-intertidal. Cowley Islands.

Photo bc23_hn_00747: Good example of the golden Bleached Red Algae (BRAL) bioband in the lower intertidal.
East of Wiah Point.

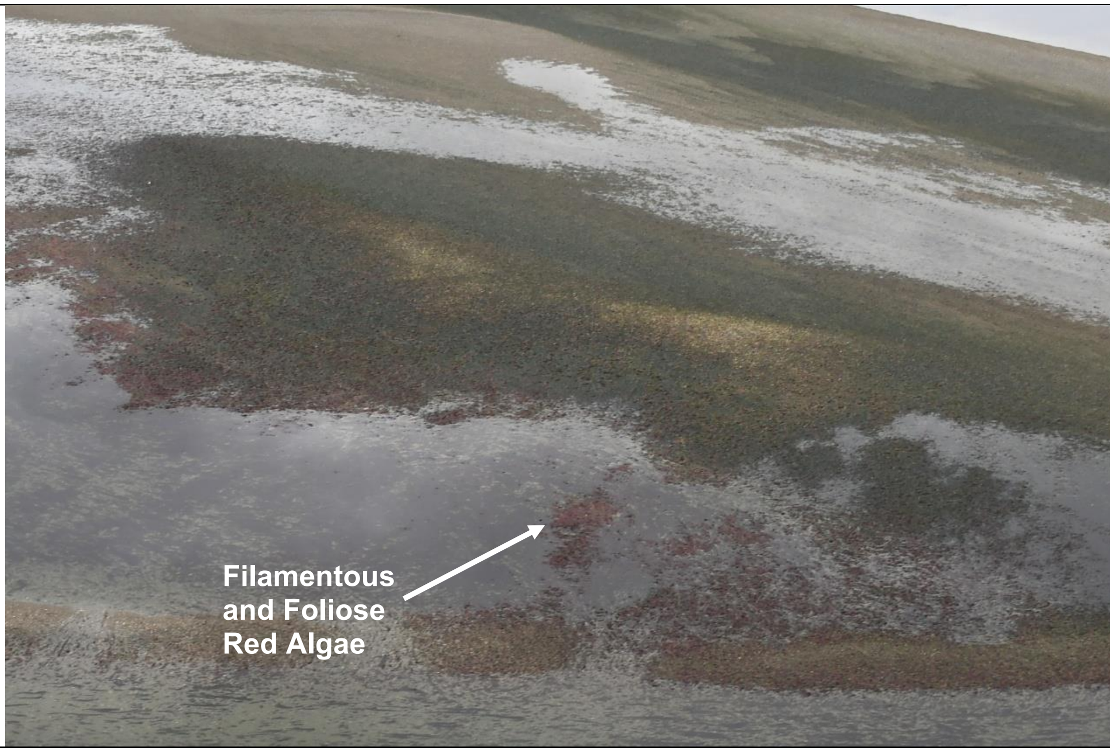
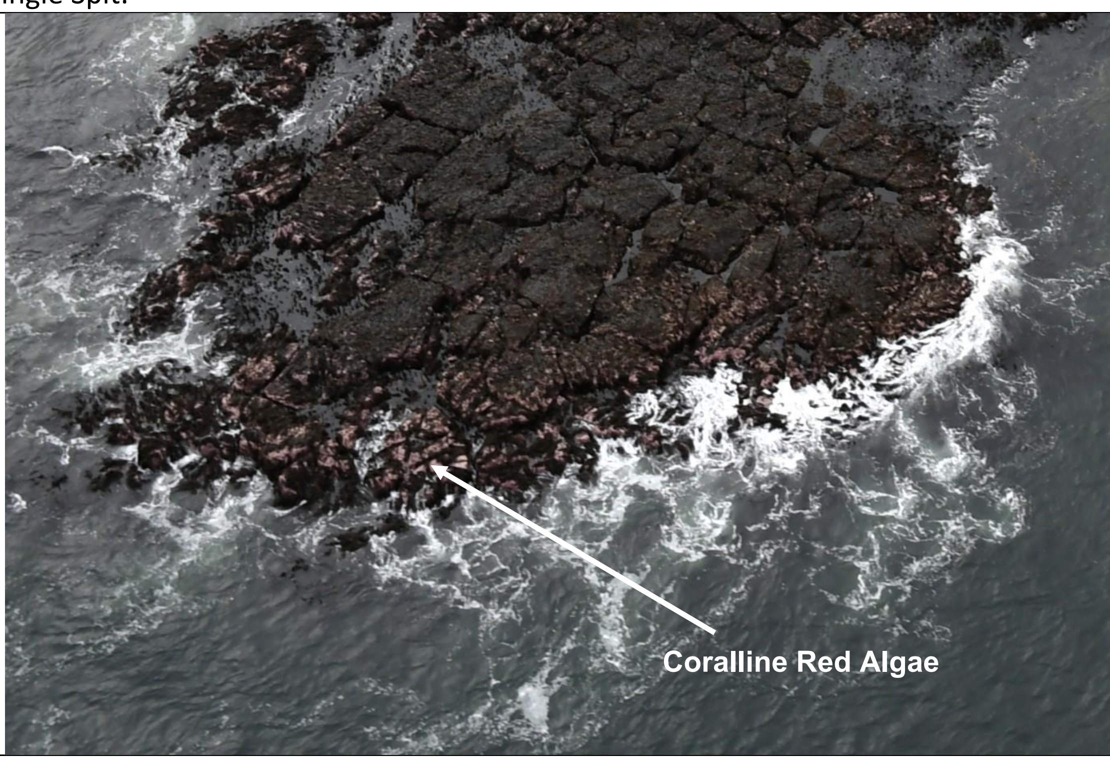


Photo bc23_hn_00349: Good example of the Filamentous and Foliose Red Algae (FFRA) bioband in the lower intertidal.
Shingle Spit.



bc23_hn_00845: Good example of the Coralline Red Algae (CORA) bioband in the lower intertidal.
East of Cape Edensaw.

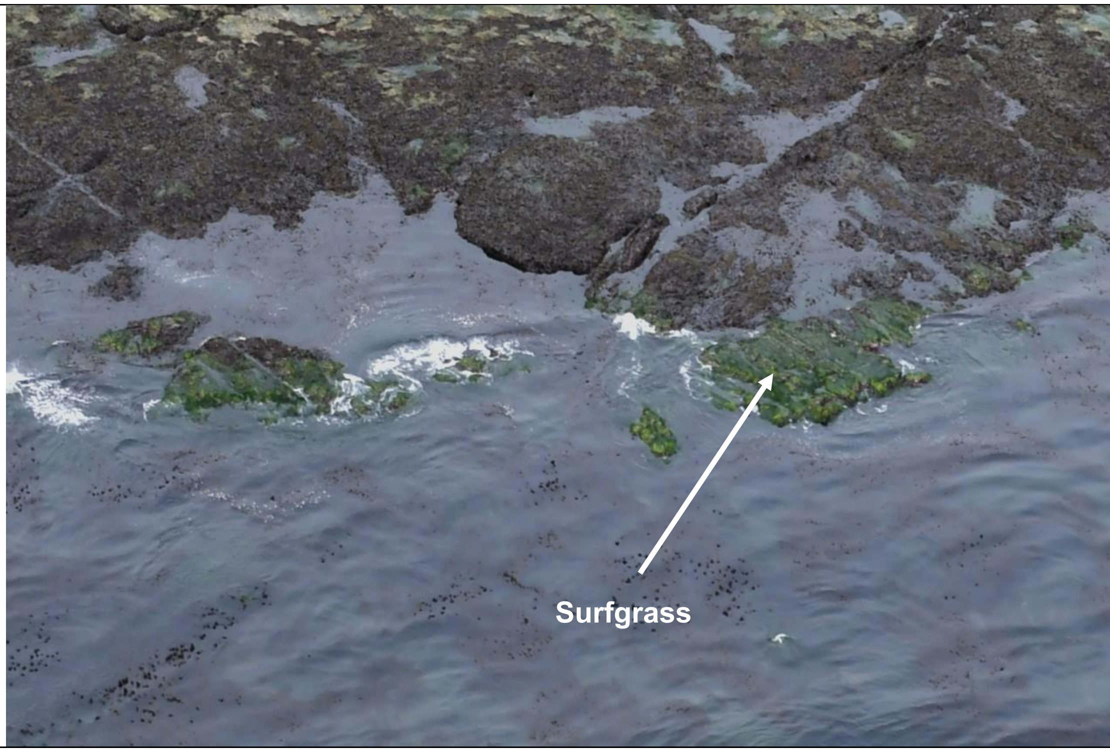


Photo bc23_hn_00702: Good example of the Surfgrass (SURF) bioband in the lower intertidal.
Southeast of Wiah Point.

Photo bc23_hn_06878: Example of the Sargassum (SARG) bioband in the lower intertidal.
West Lucy Island.

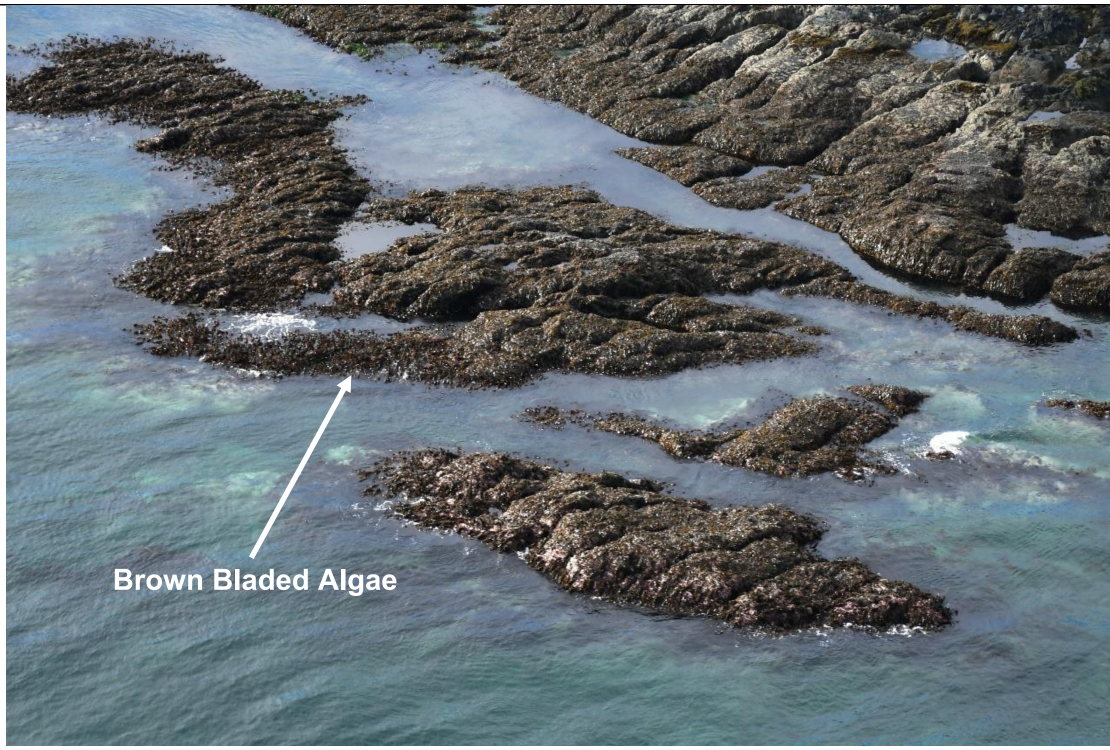


Photo bc23_hn_06459: Example of the Brown Bladed Algae (BRBA) bioband in the lower intertidal/subtidal.
West of Klashwun Point.

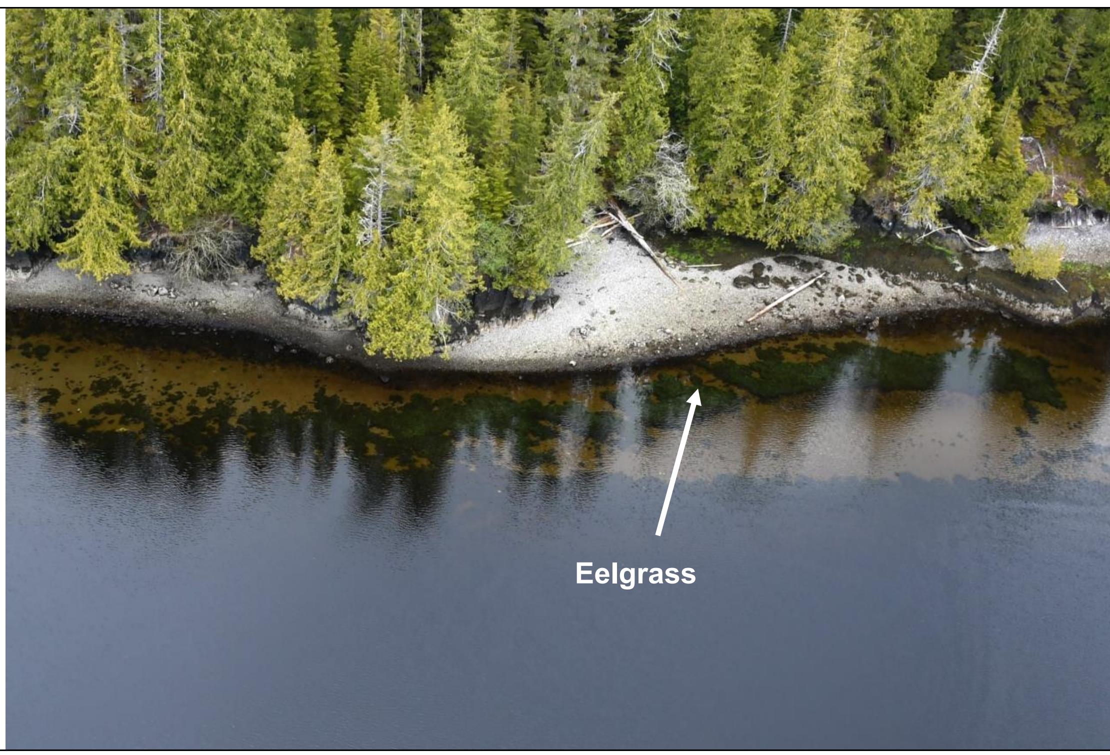


Photo bc23_hn_04041: Good example of the Eelgrass (EELG) bioband in the subtidal.
South of Ain River.

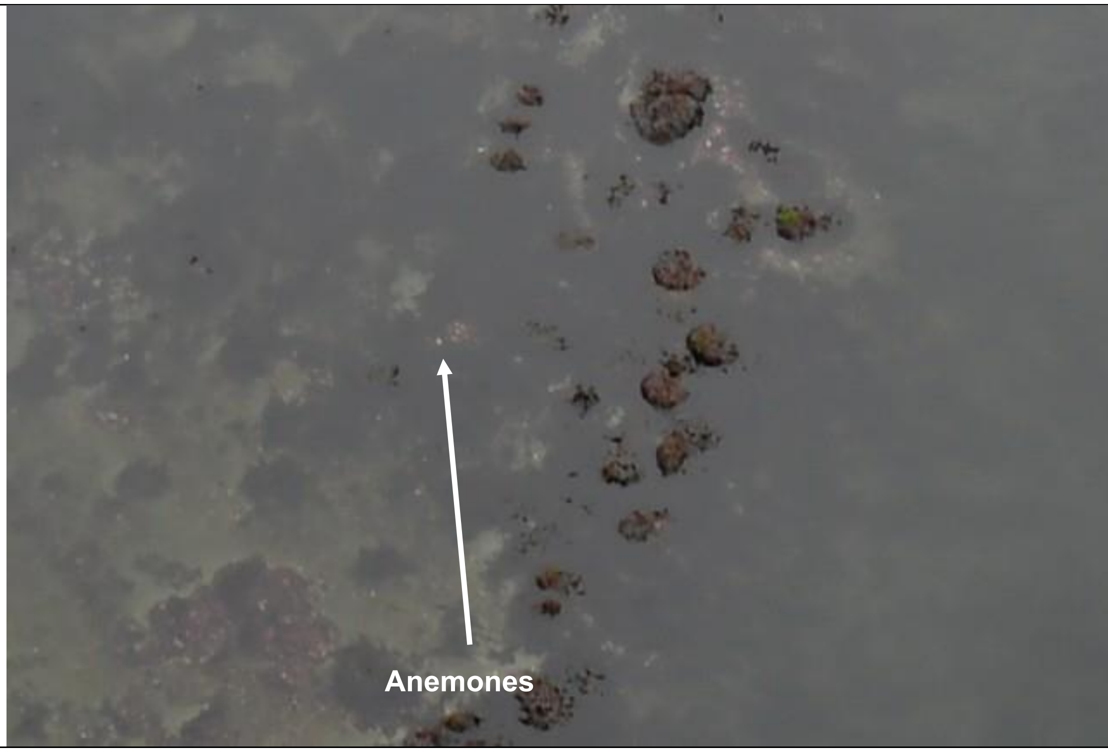


Photo bc23_hn_00495: Example of the Anemones (ANEM) bioband in the subtidal. Masset Harbour.

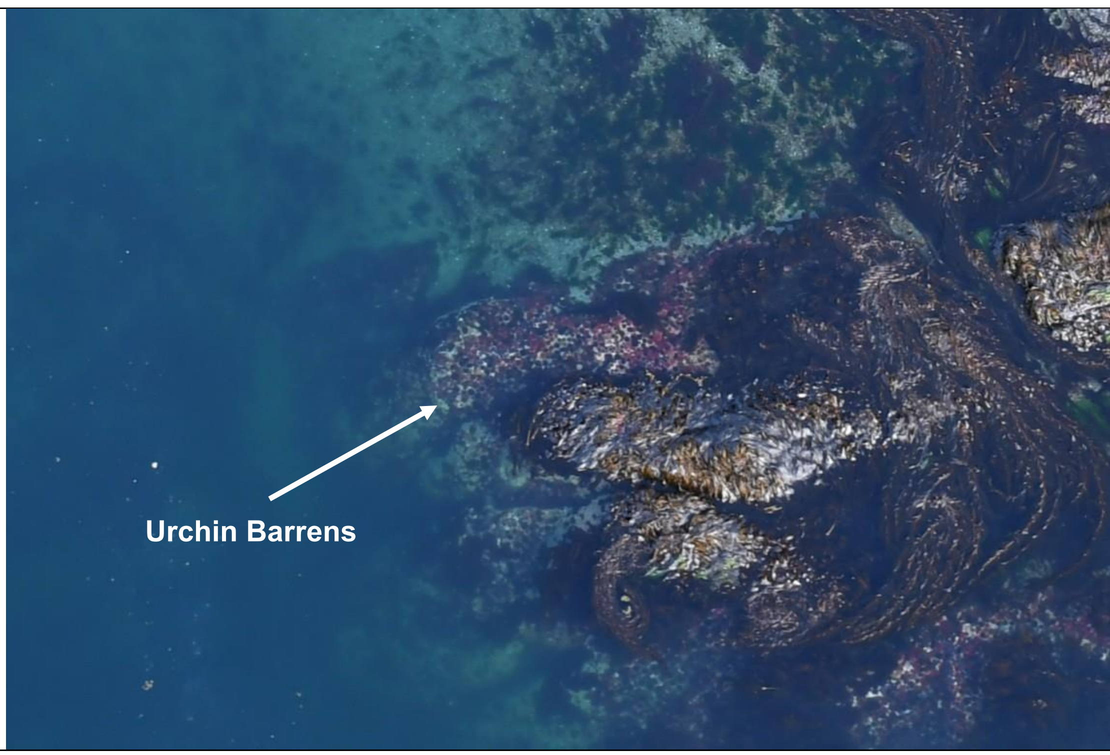


Photo bc23_hn_06868: Example of the Urchin Barrens (URBA) bioband in the subtidal. Village Point, Solide Passage, Langara Island.

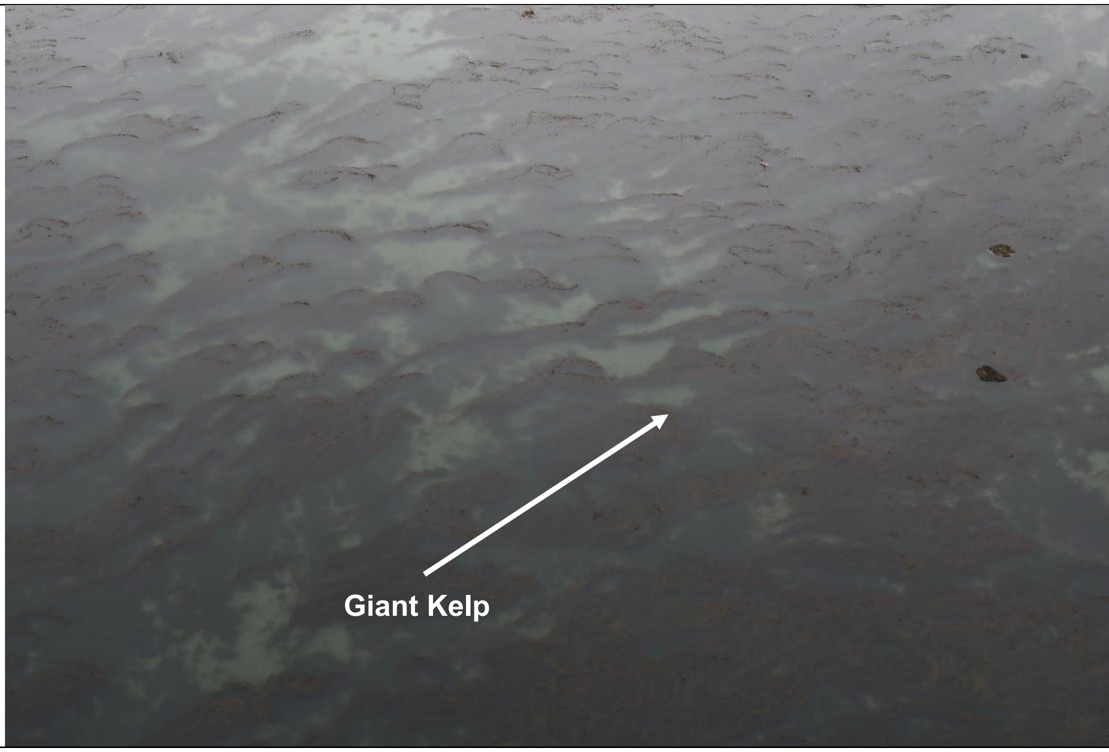


Photo bc23_hn_00296: Good example of the Giant Kelp (GIKE) bioband in the nearshore. McIntyre Bay.

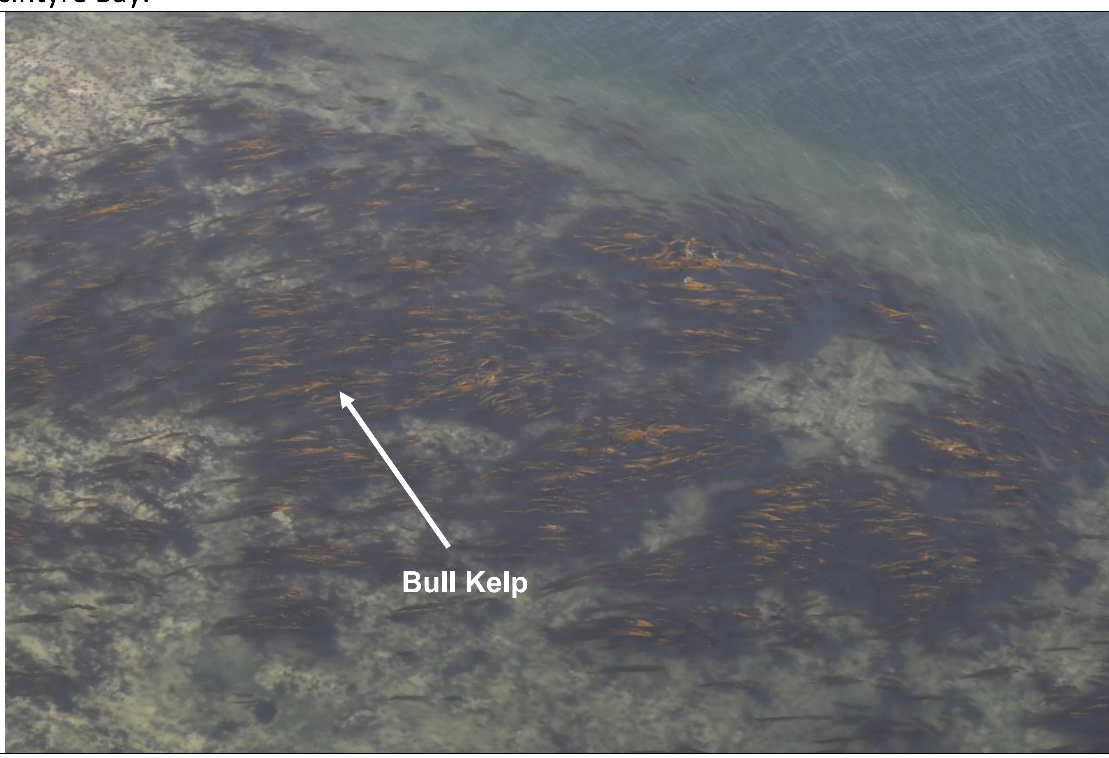


Photo bc23_hn_00651: Good example of the Bull Kelp (BUKE) bioband in the nearshore. Hidden Island.