

ShoreZone Habitat Mapping Summary Report

Barkley Sound Survey Area



Wizard Islet, Barkley Sound (bc21_bf_00326)

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Barkley Sound Survey Area Summary

323 km of shoreline mapped

1,678 shoreline units created

Average unit length is **193 m**

37% of the intertidal is classified as **Rock and Sediment-dominated** and **35%** is classed as **Rock**

56% of the shoreline has a low Oil Residence Index value (residence of days to months)

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

15 biobands were classified in the **intertidal** with **Green Algae (79%** of units), and **Barnacle (81%** of units) being the most common

6 biobands were classified in the **supratidal** with **Black Lichen (69%** of units) and **Salt Marsh (29%** of units) being the most common

13 biobands were classified in the **subtidal** with **Bull Kelp** being the most common (**39%** of units)



Folger Island



Sarita River



Bamfield Inlet



Ross Islets

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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 122,000 km of coastal Alaska, British Columbia, Washington State and Oregon (see Figure 1). Figure 2 shows the extent of the shoreline mapped around Barkley Sound and is the section of shoreline covered by this summary report.

The ShoreZone imaging surveys conducted around Barkley Sound in August 2021 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 Barkley Sound 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 **323 kilometers in 1,678 along-shore segments** (units), averaging 193 m in length. The digital shoreline used for the ShoreZone habitat mapping was the CHS_Highwaterline_BCalbers.shp.

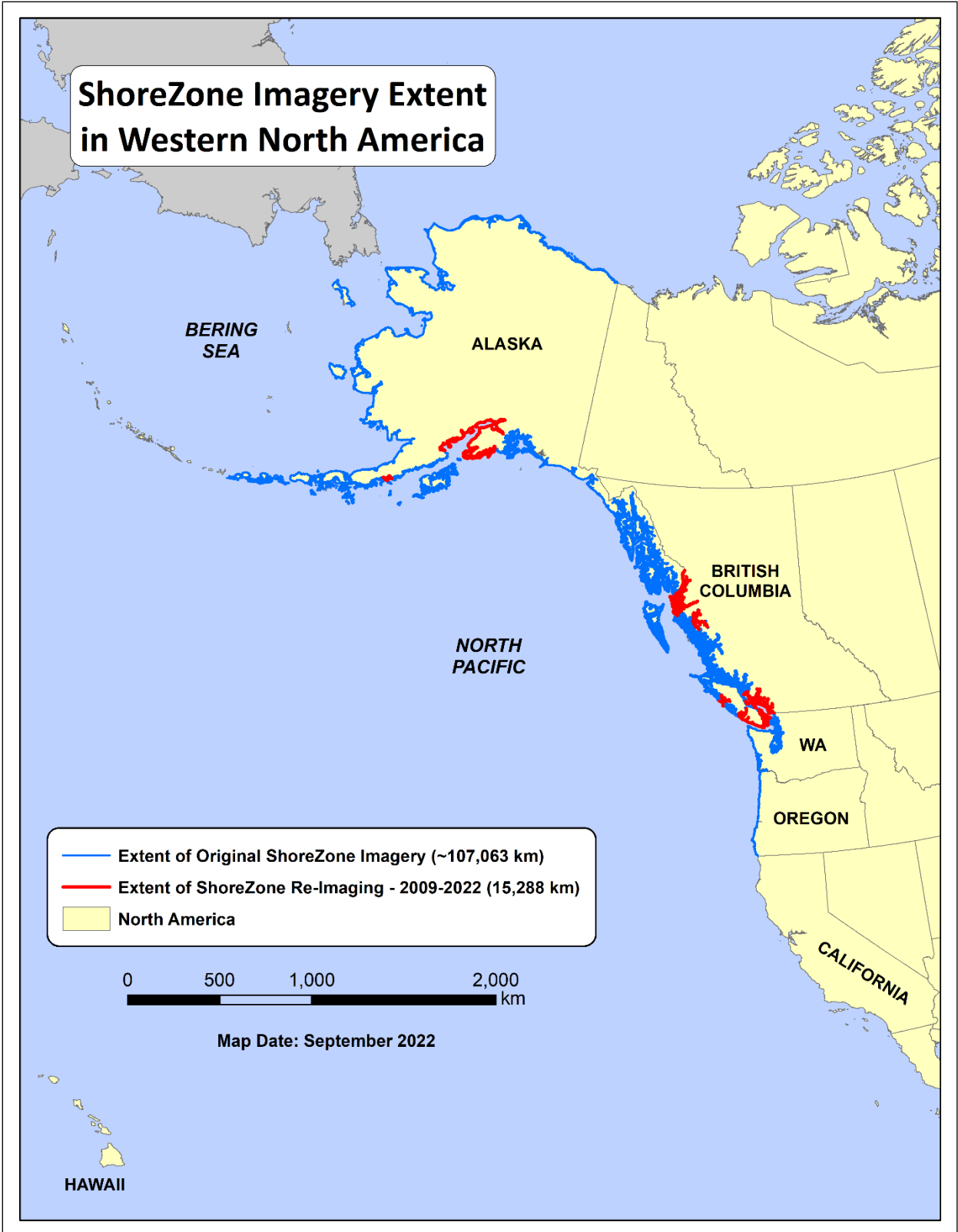


Figure 1. Extent of ShoreZone imagery in the Pacific Northwest as of October 2022.



Figure 2. Extent of ShoreZone mapping for the Barkley Sound survey area covered in this report.

2 PHYSICAL ATTRIBUTE DATA SUMMARY

2.1 Coastal Class

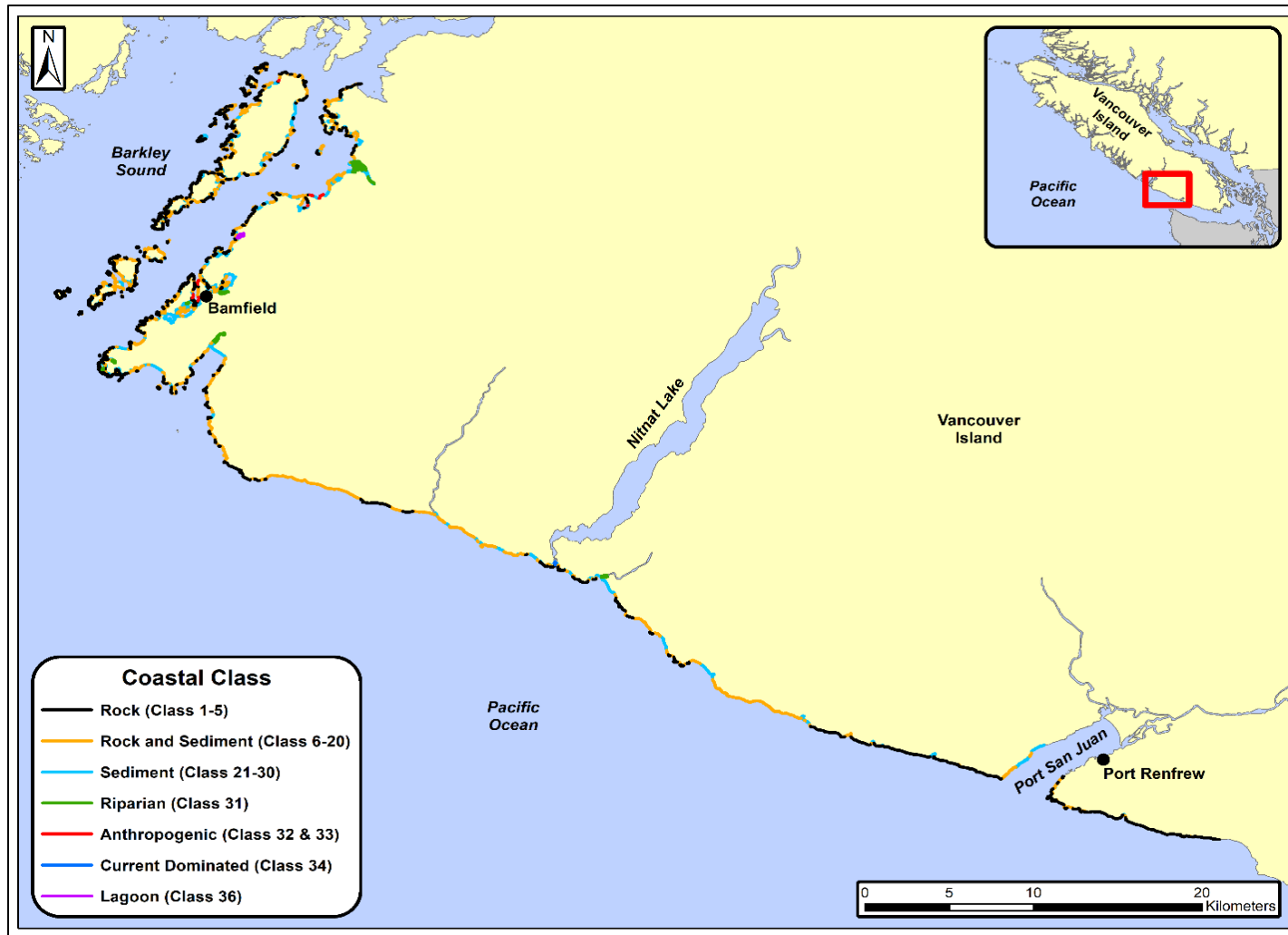


Figure 3. Map of the Coastal Class categories grouped by type (also known as Shore Type).

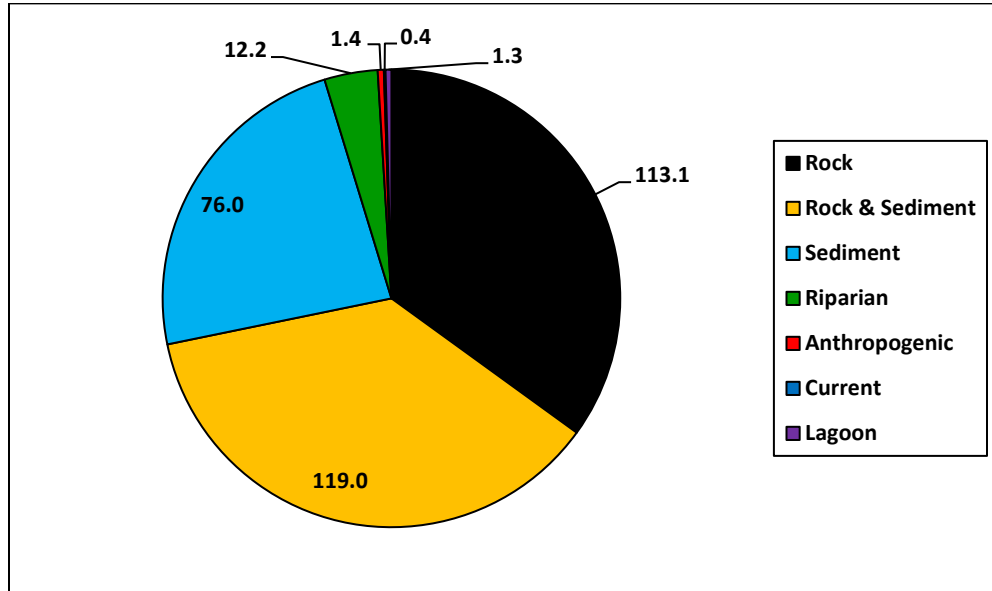


Figure 4. Grouped Coastal Class categories by shoreline length (km).

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. Rock and sediment shorelines (36.8%) were prominent along with Rock shorelines (35.0%) and Sediment shorelines (23.5%) in the Barkley Sound survey area. Riparian, Anthropogenic, Lagoon, and Current shorelines all comprised the rest of the coast respectively (see Figures 3 and 4 for distribution and summary 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 Barkley Sound survey area are found in Appendix A, Table A-1.

Table 1. Summary of Coastal Classes for the Barkley Sound 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	13	46	4	35% 113 km
	2	Rock Platform, wide	18	51	5	
	3	Rock Cliff	69	395	20	
	4	Rock Ramp, narrow	16	107	5	
	5	Rock Platform, narrow	1	3	<1	
Rock & Sediment	6	Ramp w gravel beach, narrow	8	48	3	37% 119 km
	7	Platform w gravel beach, wide	4	17	1	
	8	Cliff with gravel beach	17	101	5	
	9	Ramp with gravel beach	9	77	2	
	11	Ramp w gravel & sand beach, wide	16	96	5	
	12	Platform with G&S beach, wide	21	82	7	
	13	Cliff with gravel/sand beach	6	39	2	
	14	Ramp with gravel/sand beach	18	137	6	
	15	Platform with gravel/sand beach	<1	1	<1	
	16	Ramp w sand beach, wide	2	14	1	
	17	Platform w sand beach, wide	16	46	5	
	18	Cliff with sand beach	1	5	<1	
	Sediment	21	Gravel flat, wide	3	14	
22		Gravel beach, narrow	5	38	2	
24		Sand & gravel flat or fan	21	100	7	
25		Sand & gravel beach, narrow	31	183	10	
26		Sand & gravel flat or fan	1	3	<1	
27		Sand beach	1	7	<1	
28		Sand flat	11	32	3	
29		Mud flat	2	5	1	
30		Sand beach	1	6	<1	
Organics		31	Organics/Estuarine	12	13	4
Man-made	32	Man-made, permeable	1	9	<1	<1% 1 km
Current	34	Channel	<1	2	<1	<1% <1 km
Lagoon	36	Lagoon	1	1	<1	<1% 1 km
Totals:			323	1,678	100	100%

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

2.2 Environmental Sensitivity Index (ESI)

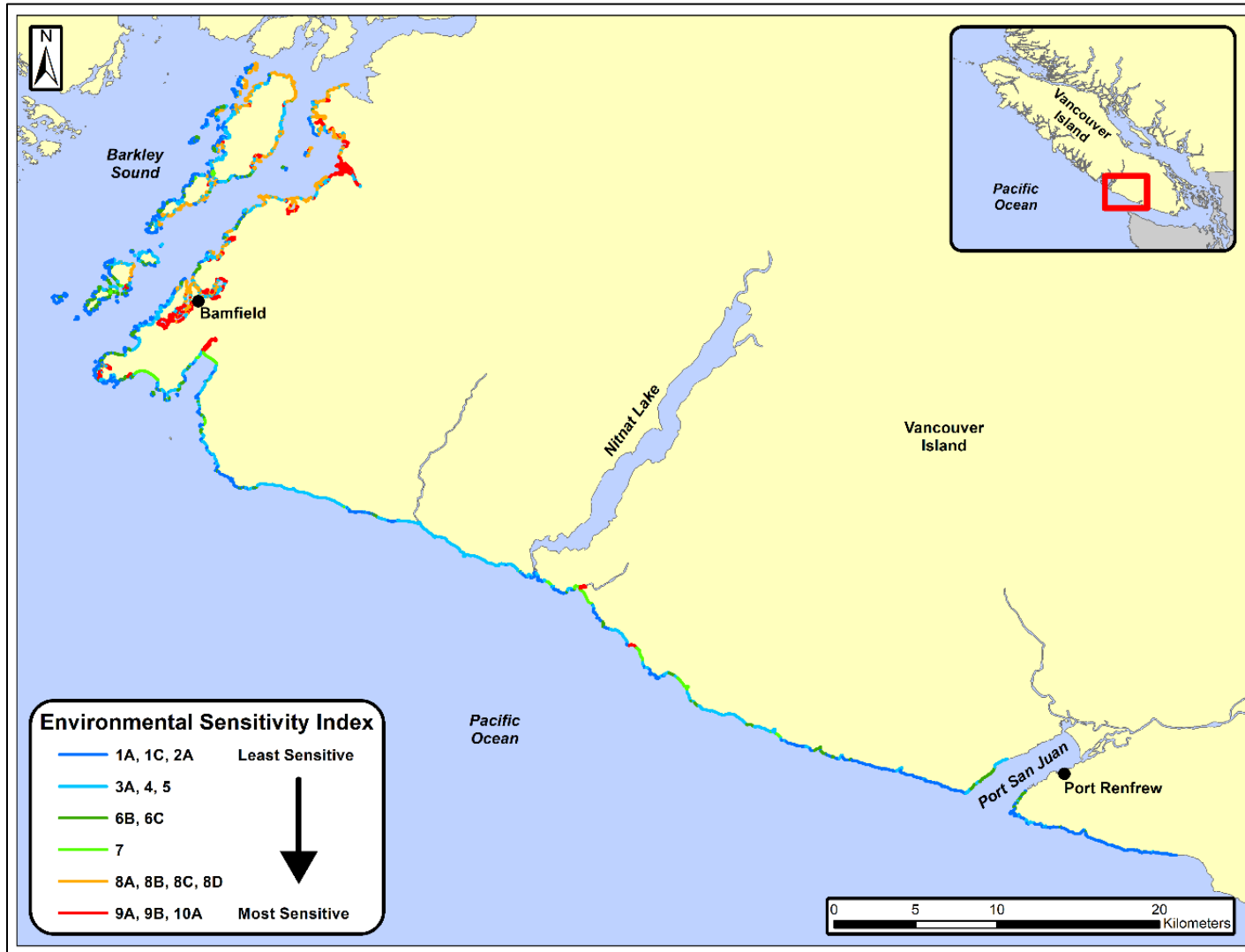


Figure 5. Distribution of the grouped ESI categories from least to most sensitive to oiling.

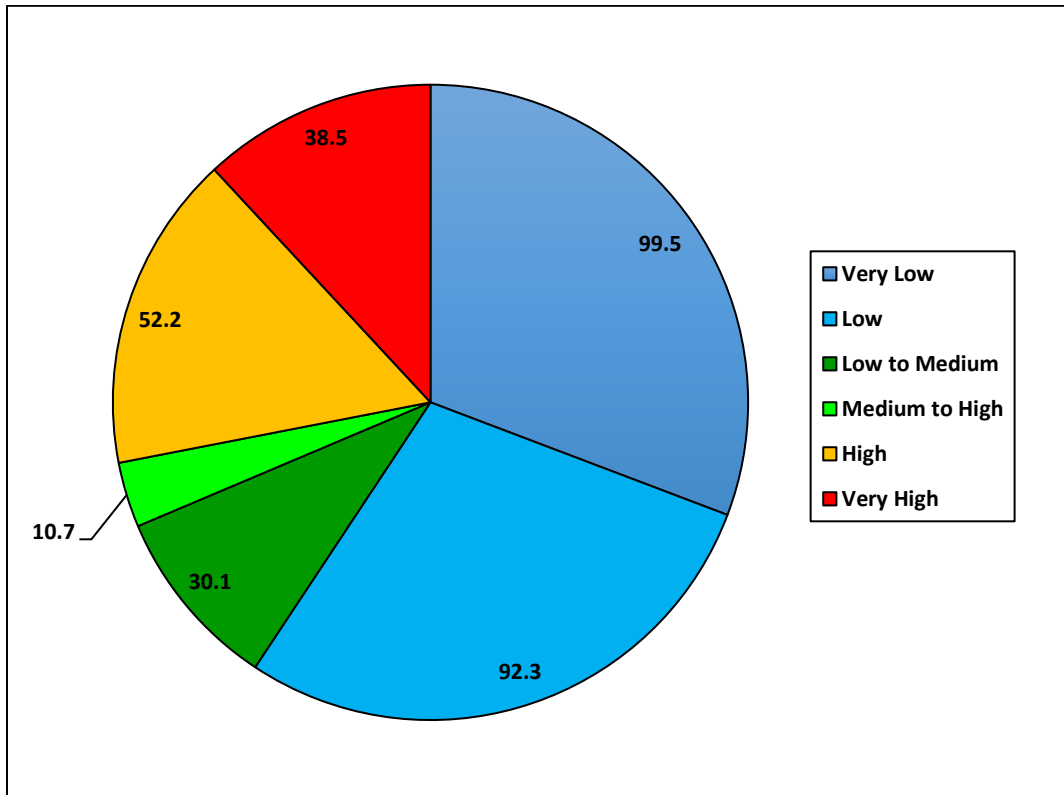


Figure 6. Grouped most sensitive ESI categories by shoreline length (km).

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 Barkley Sound coastline is represented by the grouped Low and Very Low categories (59.3% of shoreline length). These sections of the shoreline have a potentially low sensitivity to oil. At the other end of the spectrum, only 28.0% 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.

Table 2. Summary of Coastal Classes by ESI Class for the Barkley Sound 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	54	287	17
1C	Exposed rocky cliffs with boulder talus base	3	22	1
2A	Exposed wave-cut platforms in bedrock, mud, or clay	42	184	13
3A	Fine- to medium-grained sand beaches	3	15	1
4	Coarse-grained sand beaches	27	95	8
5	Mixed sand and gravel beaches	62	340	19
6B	Gravel beaches (cobbles and boulders)	30	193	9
6C	Rip rap	<1	1	<1
7	Exposed tidal flats	11	34	3
8A	Sheltered scarps in bedrock, mud, or clay; sheltered rocky shores (impermeable)	34	267	11
8B	Sheltered, solid, man-made structures; sheltered rocky shores (permeable)	1	4	<1
8C	Sheltered Rip Rap	1	4	<1
8D	Sheltered rocky rubble shores	16	105	5
9A	Sheltered tidal flats	9	47	3
9B	Vegetated low banks	1	2	<1
10A	Salt- and brackish-water marshes	29	78	9
Totals:		323	1,678	100

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

2.3 Oil Residence Index (ORI)

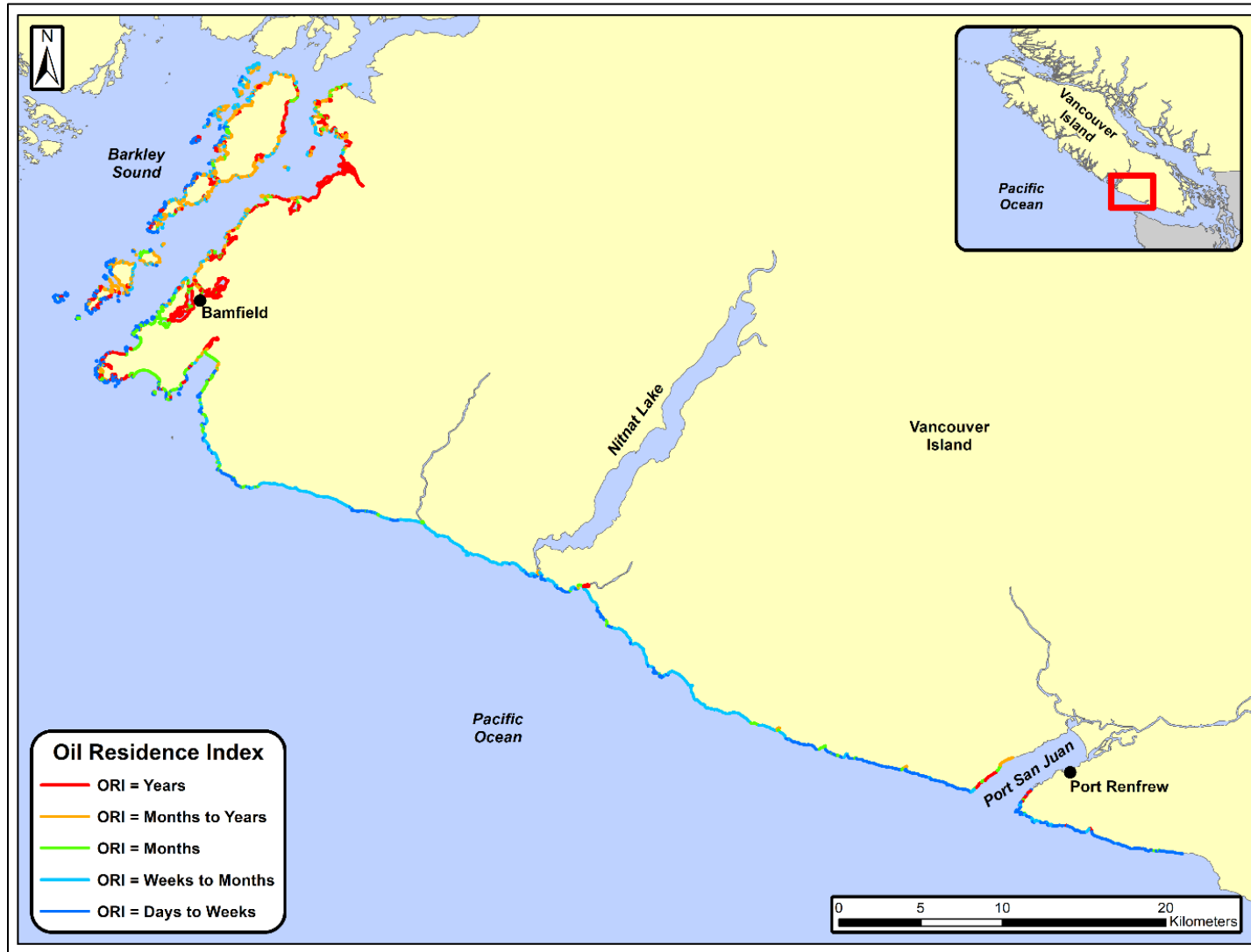


Figure 7. Distribution of the Oil Residence Index (ORI) categories.

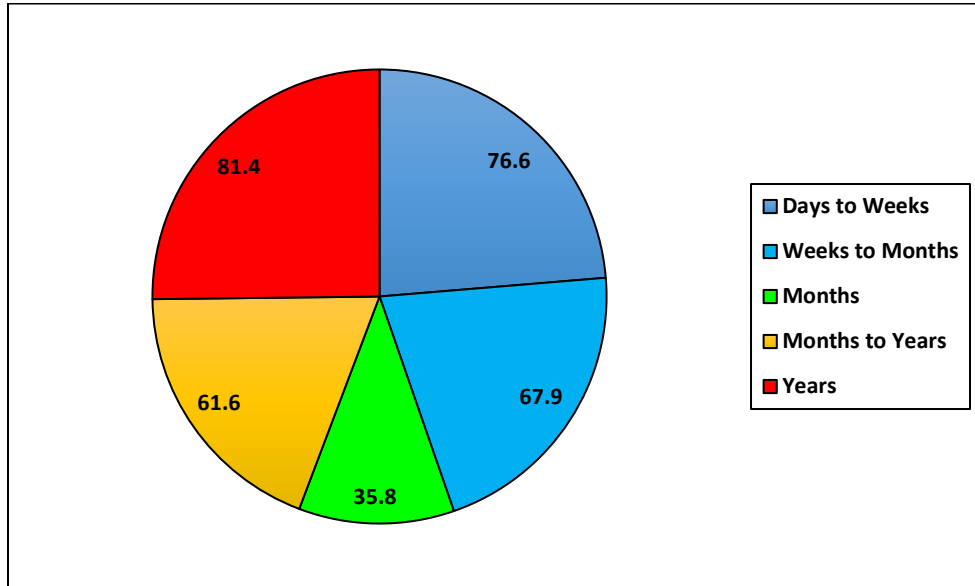


Figure 8. Oil Residence Index (ORI) categories by shoreline length (km).

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. Higher wave exposures and rock strata shorelines lead to lower ORI values for 55.8% of the shore segments in the Barkley Sound survey area, indicating oil residence times are on the order of days to months (see Figures 7 and 8 for distribution and summary statistics).

2.4 ShoreZone Coastal Vulnerability

2.4.1 Flood Zone Width

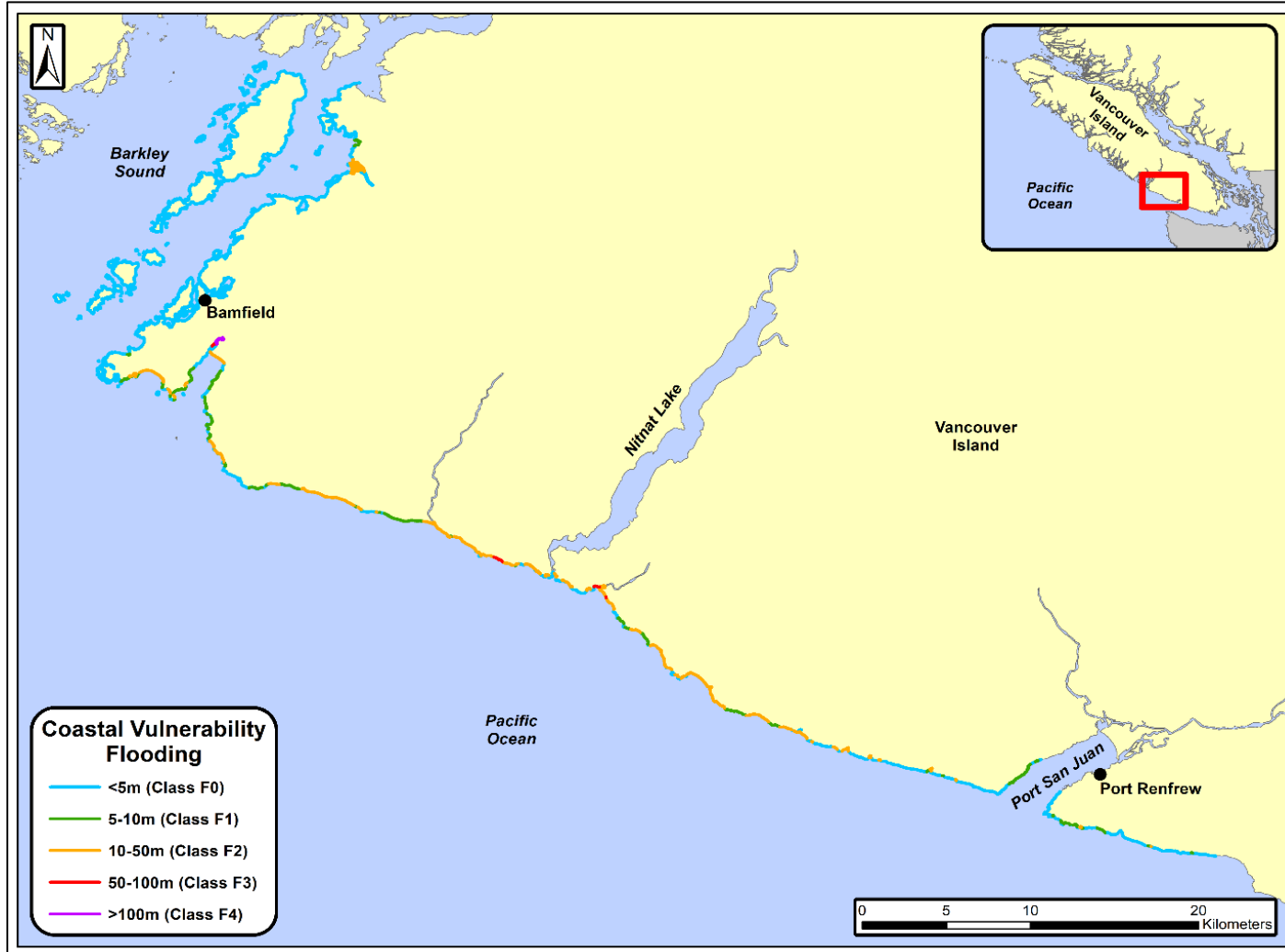


Figure 9. Distribution of the Coastal Vulnerability Flooding Class.

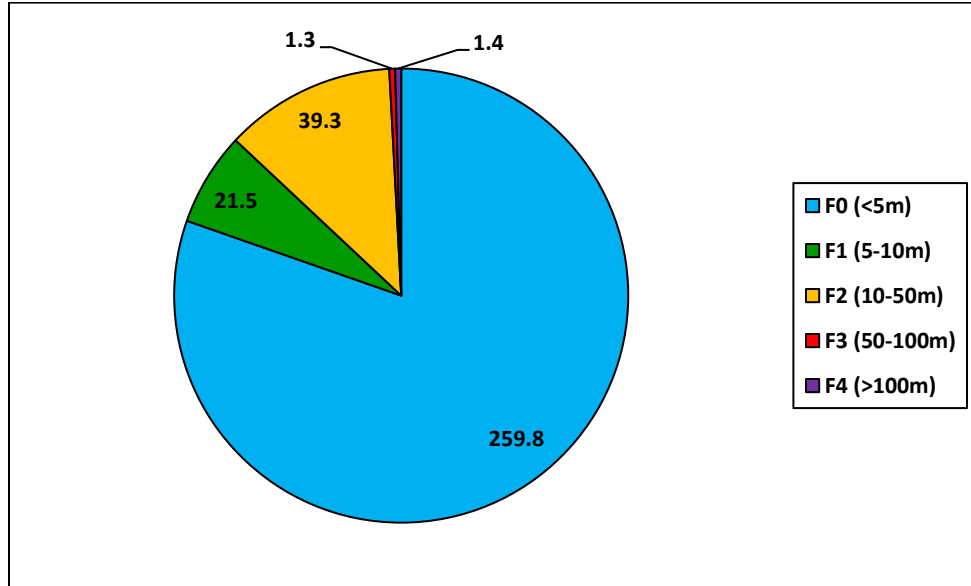


Figure 10. Flooding Class categories by shoreline length (km).

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 Barkley Sound study area, with 80.3% of the shoreline at a low risk of flooding <5m from the Mean High Waterline (MHW) (see Figures 9 and 10 for distribution and summary statistics). The flooding class is a parameter of the Coastal Vulnerability Index (see Page 16).

2.4.2 Coastal Vulnerability Observations

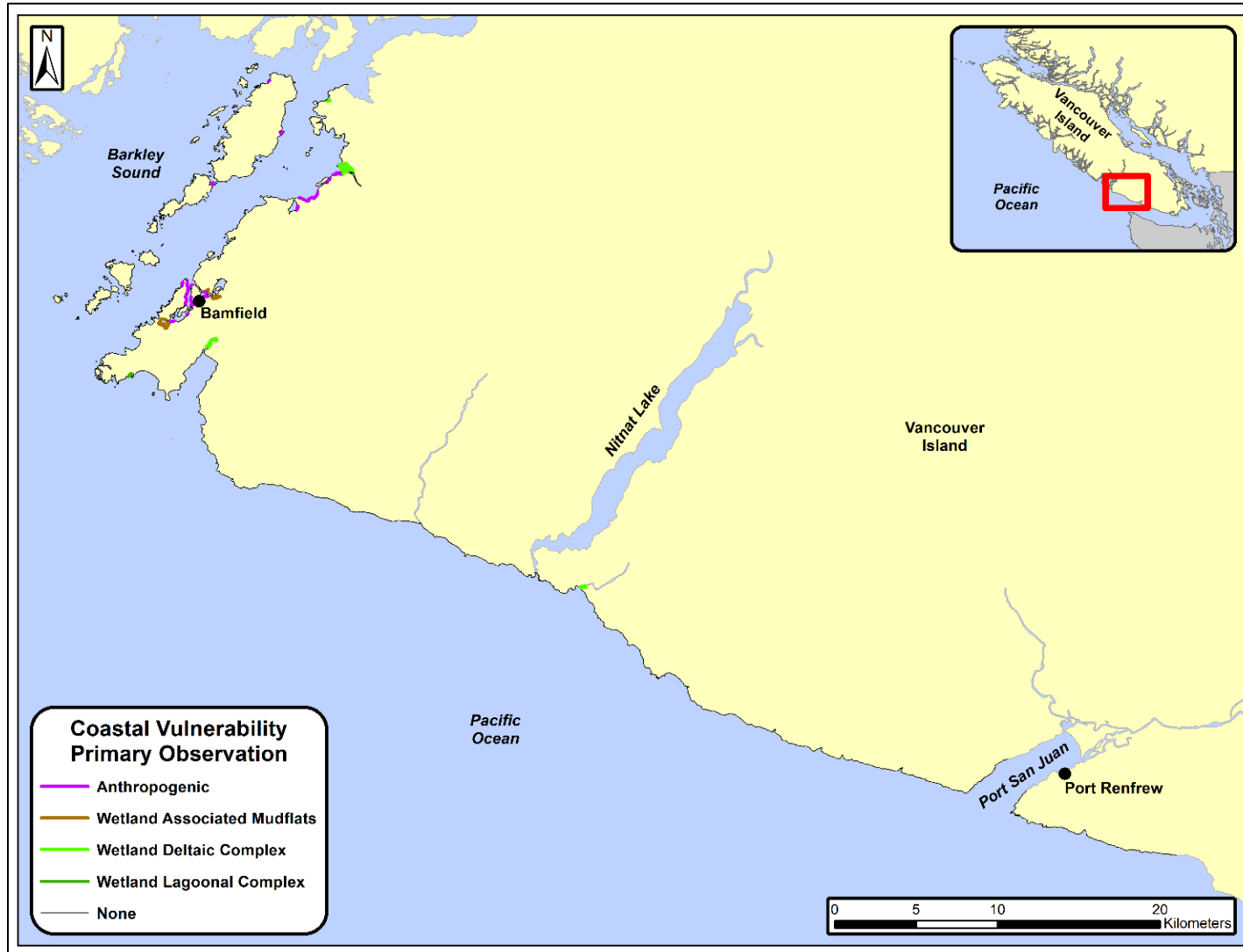


Figure 11. Distribution of the Coastal Vulnerability Observations categories.

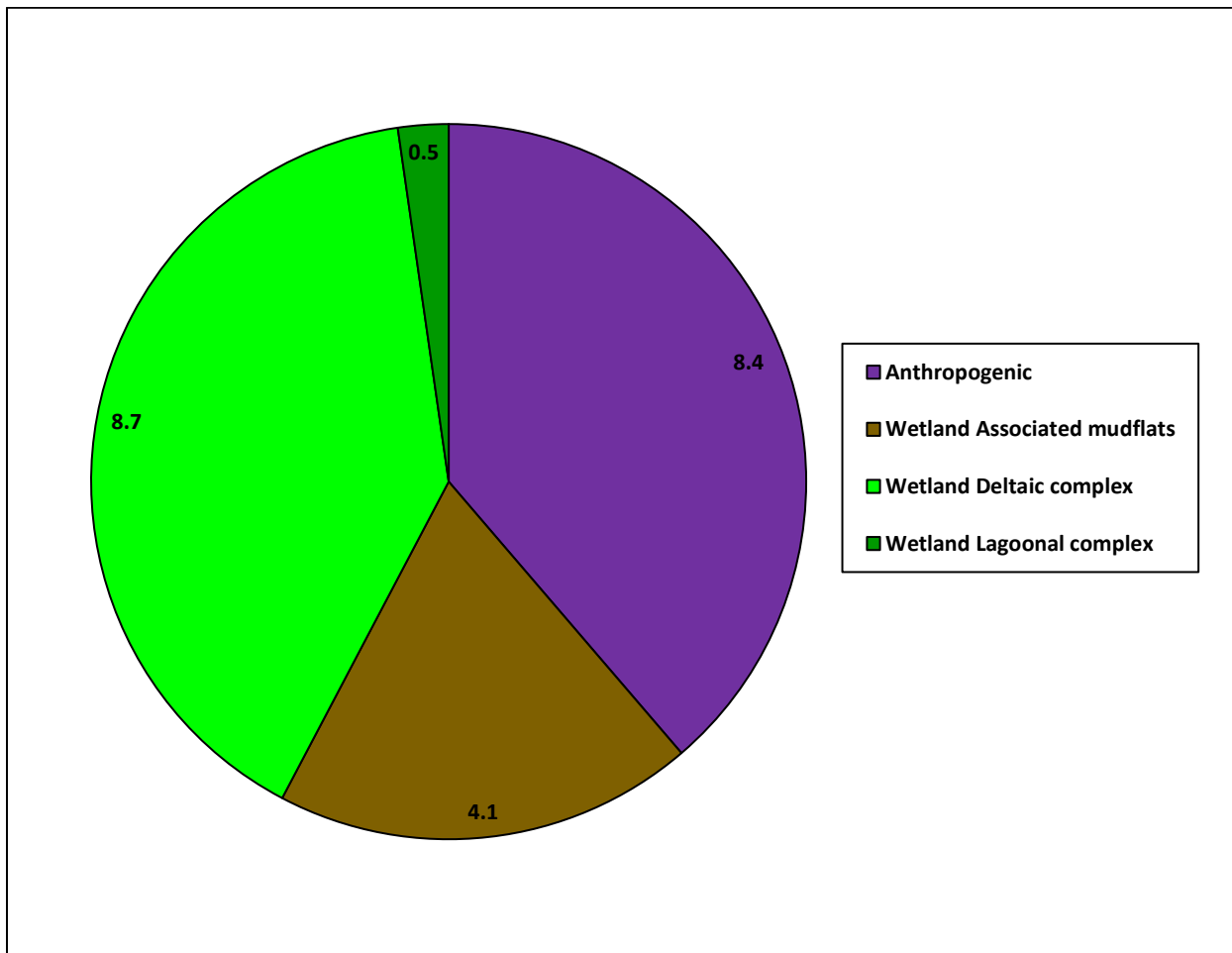


Figure 12. Coastal Vulnerability Observations categories by shoreline length (km). Category ‘None’ not shown.

The Coastal Vulnerability Observations are features important for estimating the frequency and extent of coastal inundation. In the Barkley Sound survey area, apart from the ‘None’ category, the majority of observations were from the Wetland Deltaic complex category with 8.7 km. The subsequent category was the Anthropogenic category with 8.4 km (see Figures 11 and 12 for distribution and summary 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.

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 this survey area is shown in Figure 13. A number of units came out as Moderate or High along the more exposed part of the coast in the Juan de Fuca Strait. These units were generally Exposed, soft sediment beaches with a low, sloping backshore. That combination means the chance of storm surge or other sea level rise flooding the backshore is higher than other parts of the coast.

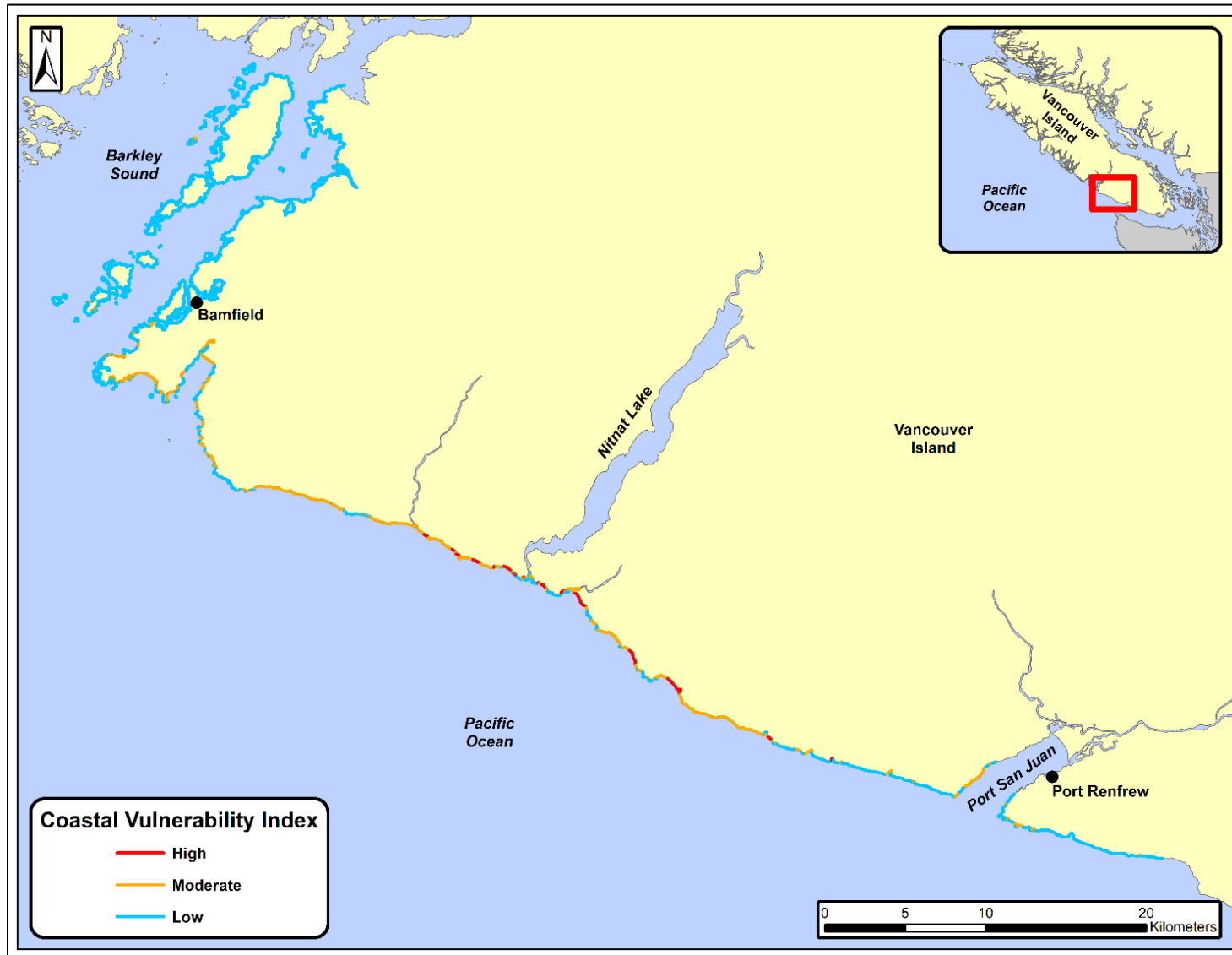


Figure 13. Distribution of Coastal Vulnerability index ranks in the Barkley Sound survey area.

2.5 Anthropogenic Shore Modifications

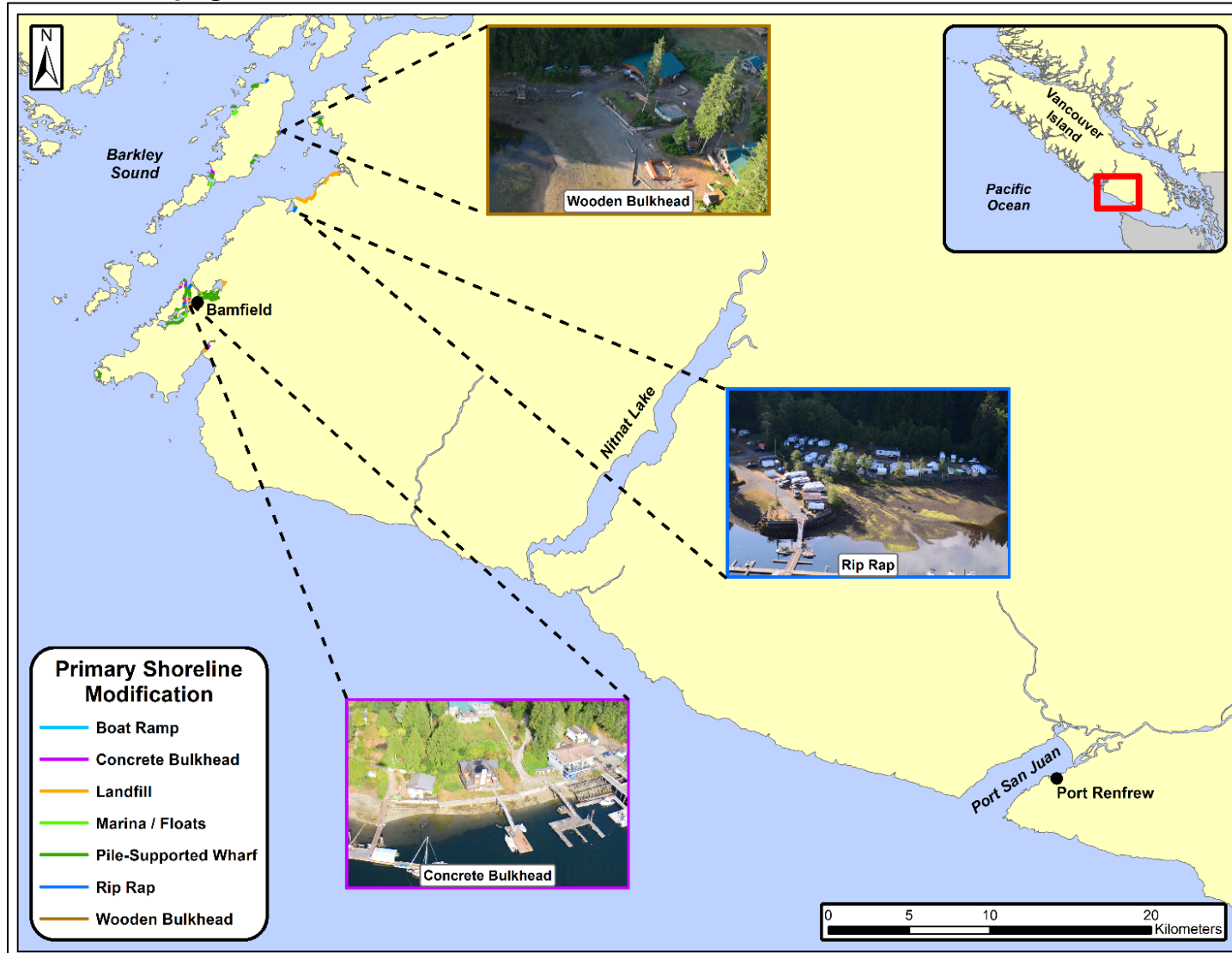


Figure 14. Distribution of types of the primary Shore Modifications. There may be other shore modifications in any given unit. That data would be found in the Shore Modifications table in the geodatabase.

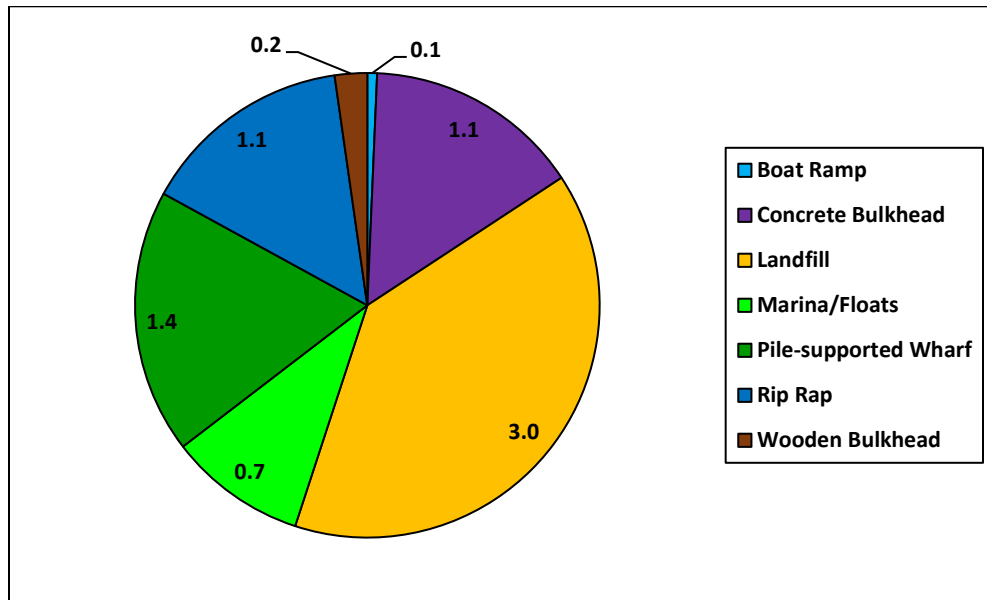


Figure 15. Shore Modifications by estimated shoreline length (km) of each modification type.

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 2.3% of the shoreline (taking the estimated length of that modification within the unit into account) exhibits shore modifications in the Barkley Sound study area (Figure 15). Landfill was the most commonly recorded observation (39.3%) with Pile-supported Wharf (18.4%) and Concrete Bulkhead (15.1%) rounding out the top three shoreline modifications along the coast. The associated map (Figure 14) 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.

3 BIOLOGICAL ATTRIBUTE DATA SUMMARY

3.1 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 Barkley Sound 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 Barkley Sound survey area are summarized in Tables 3 and 4. The most commonly occurring intertidal bioband in the survey area was Barnacle in 81% of the units. Green Algae was also very common and was found in 79% of the units. The most common supratidal bioband was Black Lichen, occurring in 69% of the units, while the supratidal/high intertidal Salt Marsh bioband was found in only 30% of units. The most common low intertidal/subtidal biobands were Bull Kelp (40%), Filamentous and Foliose Red Algae (40%) and Brown Bladed Kelps (including Dark Brown Kelps) (62%), 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 Barkley Sound survey area.

Bioband		Patchy		Continuous		Total (km)	% of Total Mapped
Name	Code	(km)	%	(km)	%		
Dune Grass	DUGR	53	17	15	5	68	21
Salt Marsh	SAMB	58	18	37	12	96	30
Barnacle	BARN	32	10	229	71	261	81
Rockweed	ROCK	83	26	15	5	98	30
Green Algae	GRAL	104	32	150	46	254	79
Oysters	OYST	1	0	2	0	3	1
Blue Mussel	BLMU	38	12	85	26	122	38
Echinoderms	ECHI	18	5	0	0	18	5
Bleached Red Algae	BRAL	12	4	2	1	14	4
Filamentous and Foliose Red Algae	FFRA	50	16	80	25	130	40
Coralline Red Algae	CORA	59	18	7	2	66	20
Brown Bladed Kelps	BRBA	17	5	71	22	88	27
Dark Brown Kelps	DABK	15	5	99	31	114	35
Soft Brown Kelps	SOBK	0.13	0	0	0	.13	0
Sargassum	SARG	6	2	12	4	18	6
Surfgrass	SURF	73	23	37	12	110	34
Eelgrass	EELG	28	9	22	7	50	15
Bull Kelp	BUKE	45	14	85	26	130	40
Giant Kelp	GIKE	17	5	23	7	40	12
Mixed Canopy Kelp	BRCA	1	0	1	0	1	0
Urchin Barrens	URBA	1	0	0	0	1	0

Table 4. Bioband abundances for splash zone biobands mapped in the Barkley Sound survey area.

Bioband		Narrow (<1m)		Medium (1-5m)		Wide (>5m)		Total (km)	% of Total Mapped
Name	Code	(km)	%	(km)	%	(km)	%		
Black Lichen	BLLI	66	20	118	37	39	12	224	69
Splash Zone	SPZO	20	6	13	4	4	1	38	12
White Lichen	WHLI	5	2	17	5	7	2	30	9
Yellow Lichen	YELI	2	1	2	1	0	0	4	1

Blue Mussels are a bivalve-dominated bioband that occurs throughout the Barkley Sound survey area. The Blue Mussel bioband was found on higher exposure bedrock and boulder across the survey area. It is likely that some of the Blue Mussel bioband in this survey area, and particularly in the Juan de Fuca Strait area, is actually California Mussel (*Mytilus californianus*). This bioband tends to be more blue-grey and occur in the higher exposure areas and there are records of California Mussels occurring in the Juan de Fuca Strait; however, it can be challenging to consistently identify the California Mussel bioband from the area and distinguish it from Blue Mussel. Figure 16 gives statistics on the distribution of the individual biobands and a distribution map for both Mussels and Sea palm, discussed below, is in Figure 18.

Sea palm (*Postelsia palmaeformis*) occurs in the mid to lower intertidal on higher exposure outer shorelines, commonly co-occurring with mussel beds. This kelp is part of the Dark Brown Kelps bioband but is one of the few species of kelp that can easily be identified from the aerial imagery and is an indicator species for the Exposed Biological Wave Exposure category. The biomappers therefore noted the presence of this species in the comments and allowed us to map its distribution along with other biobands. Figure 17 shows an example of sea palm and how easily distinguishable it is from other kelp species from the aerial imagery.

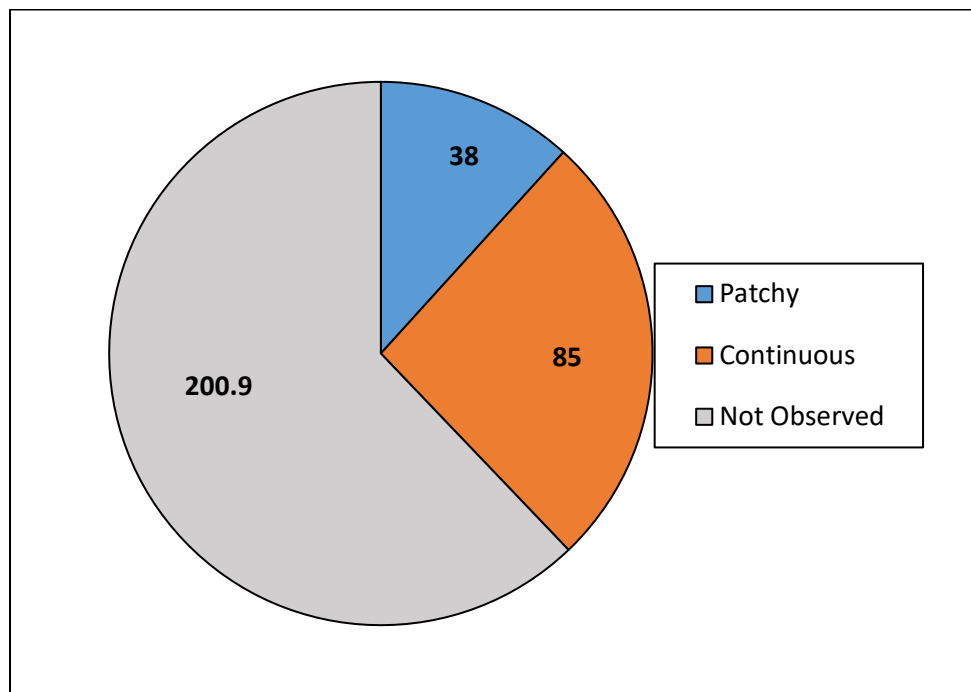


Figure 16. Proportion of shoreline length (km) of the intertidal Blue Mussel (BLMU) bioband by category.

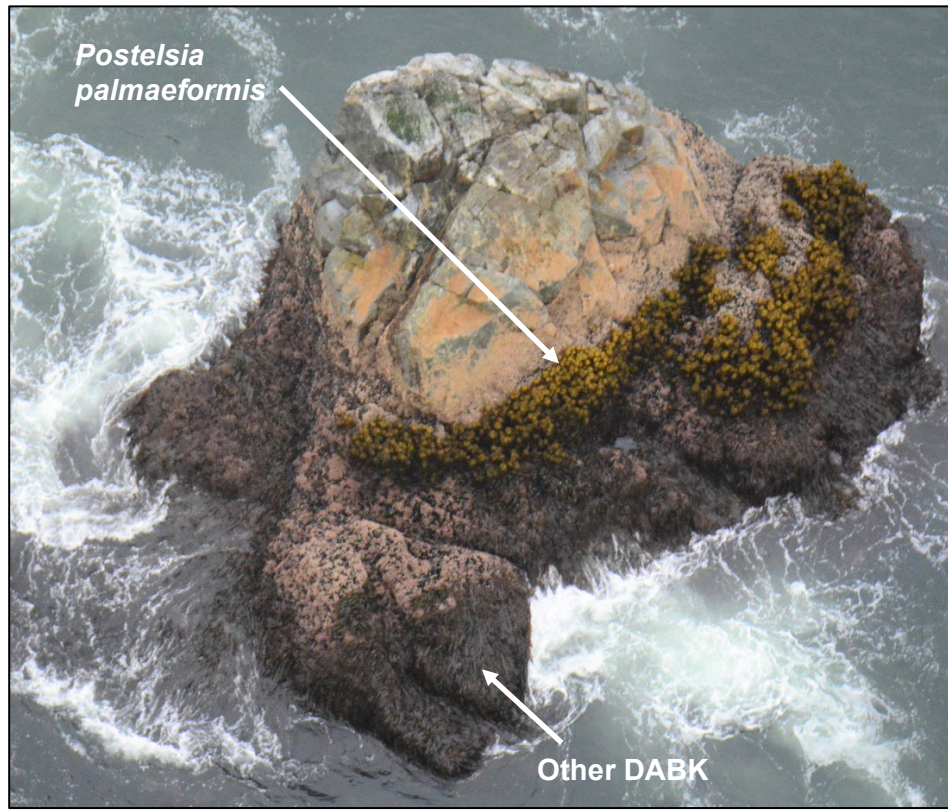


Figure 17. Example of *Postelsia palmaeformis* showing the distinction of the species from others in the Dark Brown (DABK) Kelp bioband.

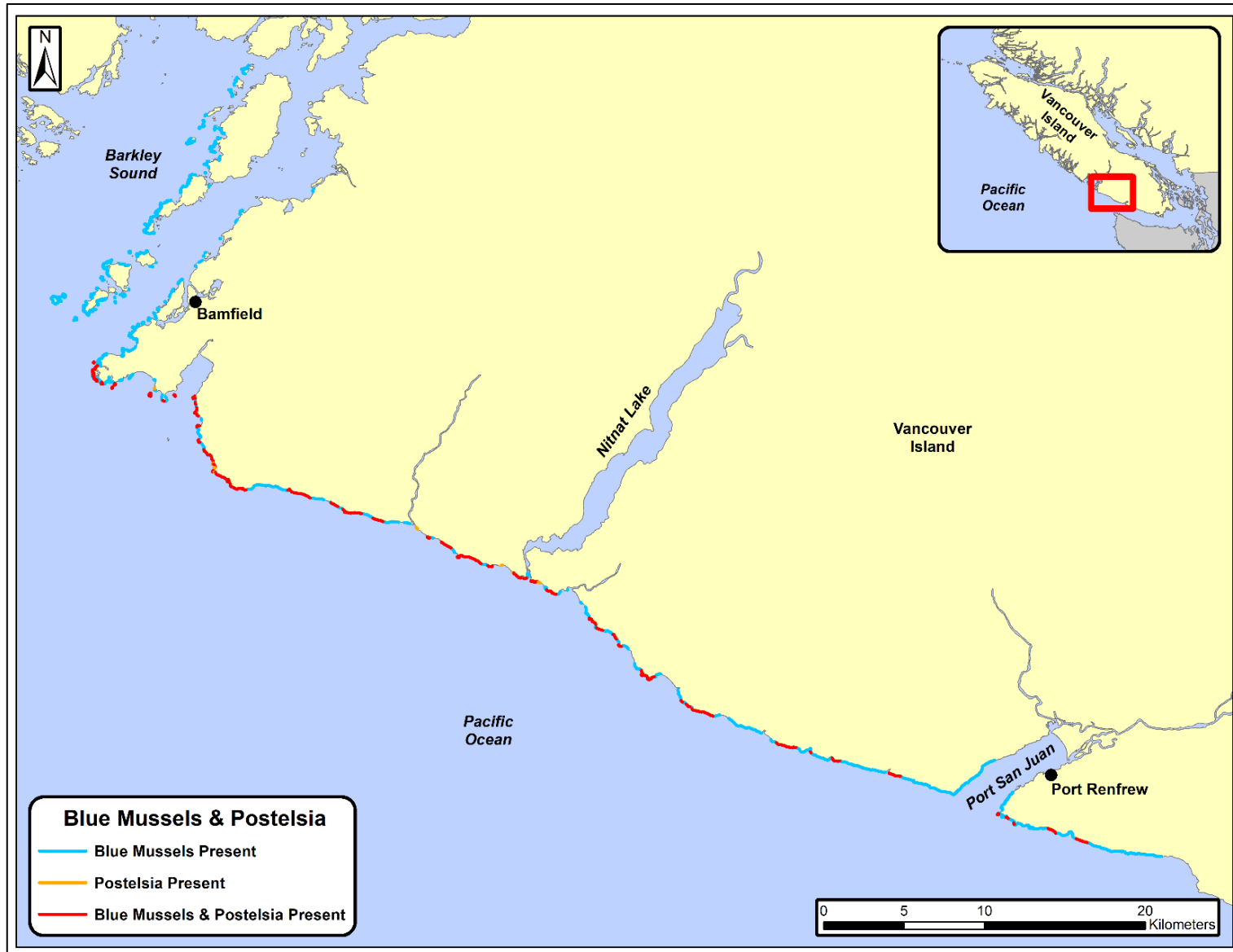


Figure 18. Distribution of the Blue Mussel (BLMU) bioband and *Postelsia palmaeformis* kelp in the Barkley Sound survey area.

Seagrasses are an important component of coastal ecosystems with Eelgrass beds forming in sandy substrate at Semi-Protected and lower exposures while Surfgrass generally attaches to hard substrate on Semi-Protected or Semi-Exposed beaches. In the Barkley Sound survey area, both Eelgrass and Surfgrass were observed. Eelgrass beds are nursery habitats for juvenile fish and also 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 individual biobands and a distribution map for both in Figure 21.

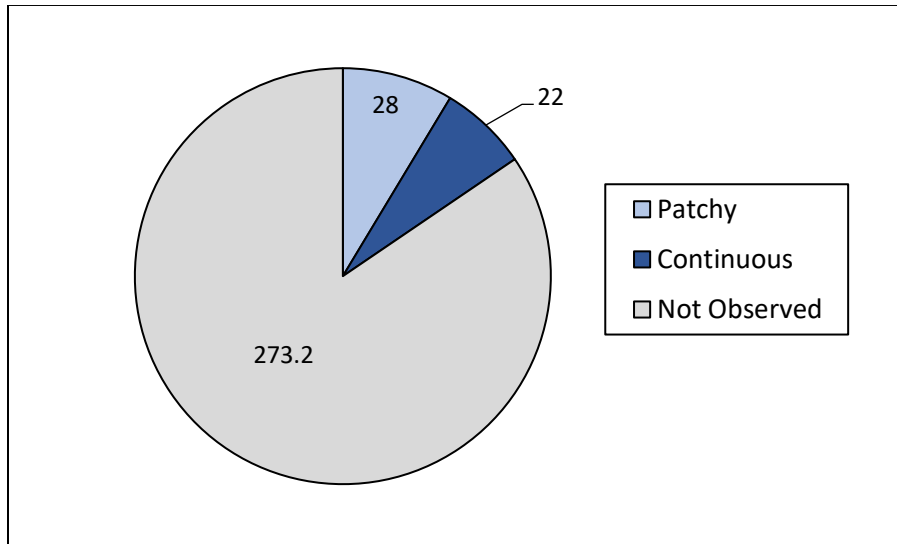


Figure 19. Distribution of the intertidal/subtidal Eelgrass (EELG) bioband by shoreline length (km).

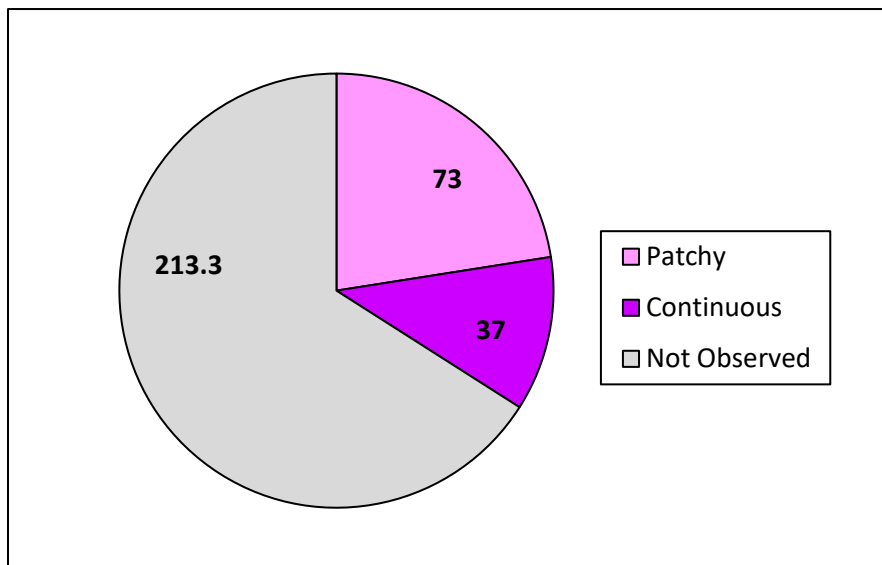


Figure 20. Distribution of the intertidal/subtidal Surfgrass (SURF) bioband by shoreline length (km).

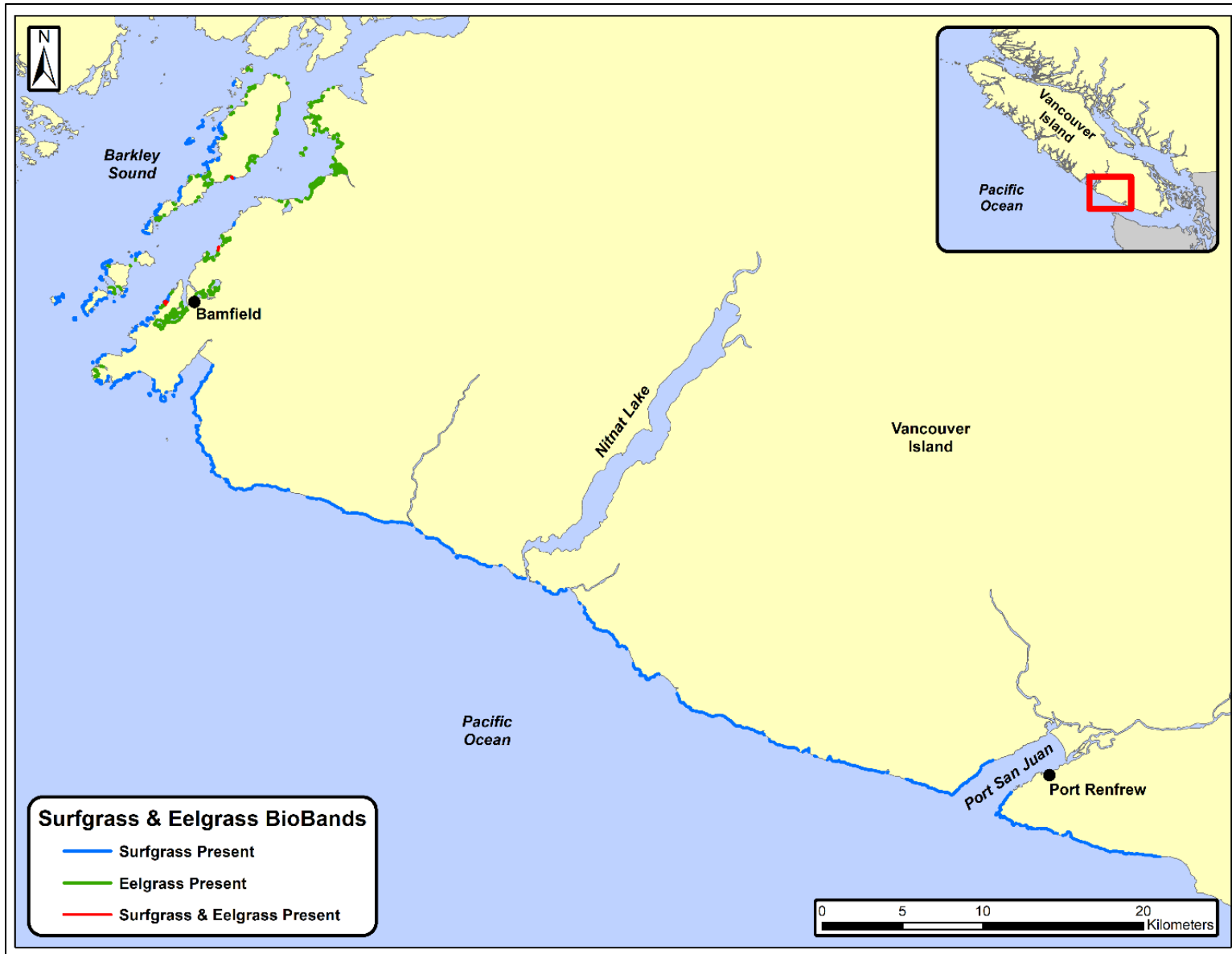


Figure 21. Distribution of the Eelgrass (EELG) and Surfgrass (SURF) biobands in the Barkley Sound survey area.

Canopy kelps form valuable habitat for fish, invertebrates and other algae and are an important part of a healthy coastline and healthy fisheries. Bull Kelp (*Nereocystis leutkeana*) and Giant Kelp (*Macrocystis pyrifera*) were the two canopy kelps noted in the survey area. See Figures 22 and 23 for statistics on the distribution of the individual biobands and a distribution map for both in Figure 24.

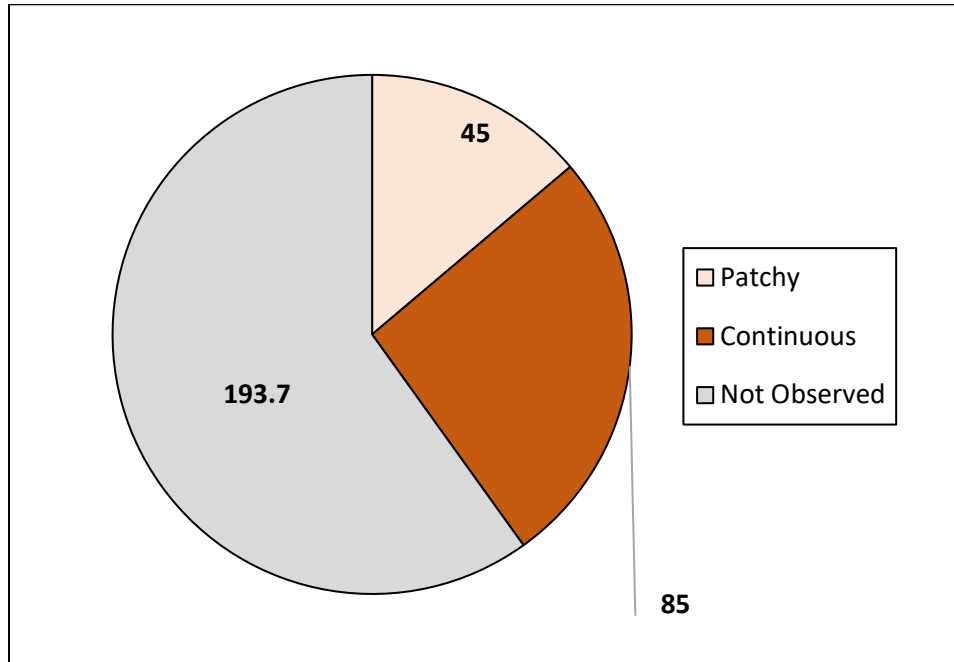


Figure 22. Distribution of the Bull Kelp (BUKE) bioband by shoreline length (km).

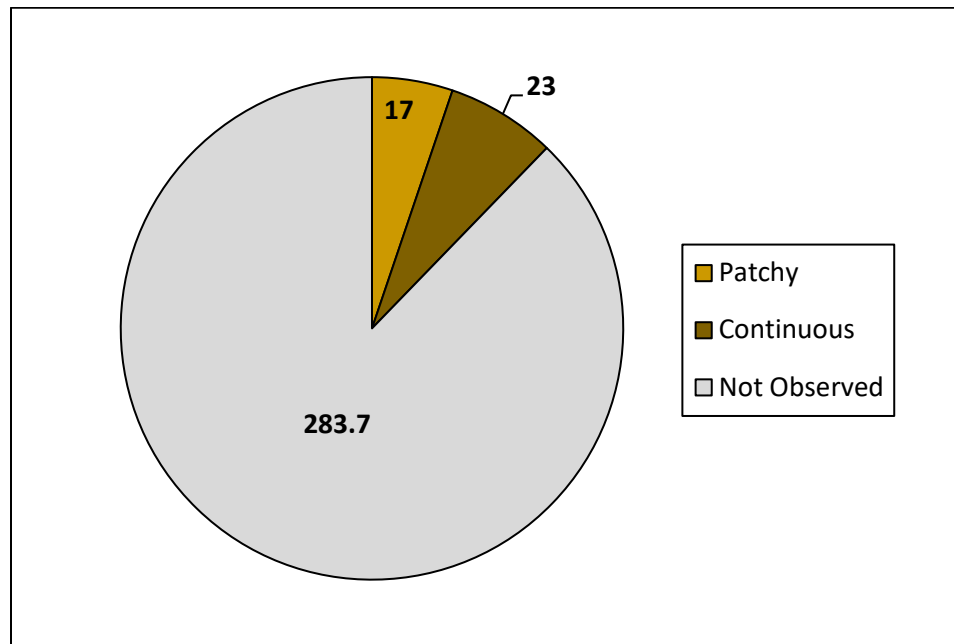


Figure 23. Distribution of the Giant Kelp (GIKE) bioband by shoreline length (km).

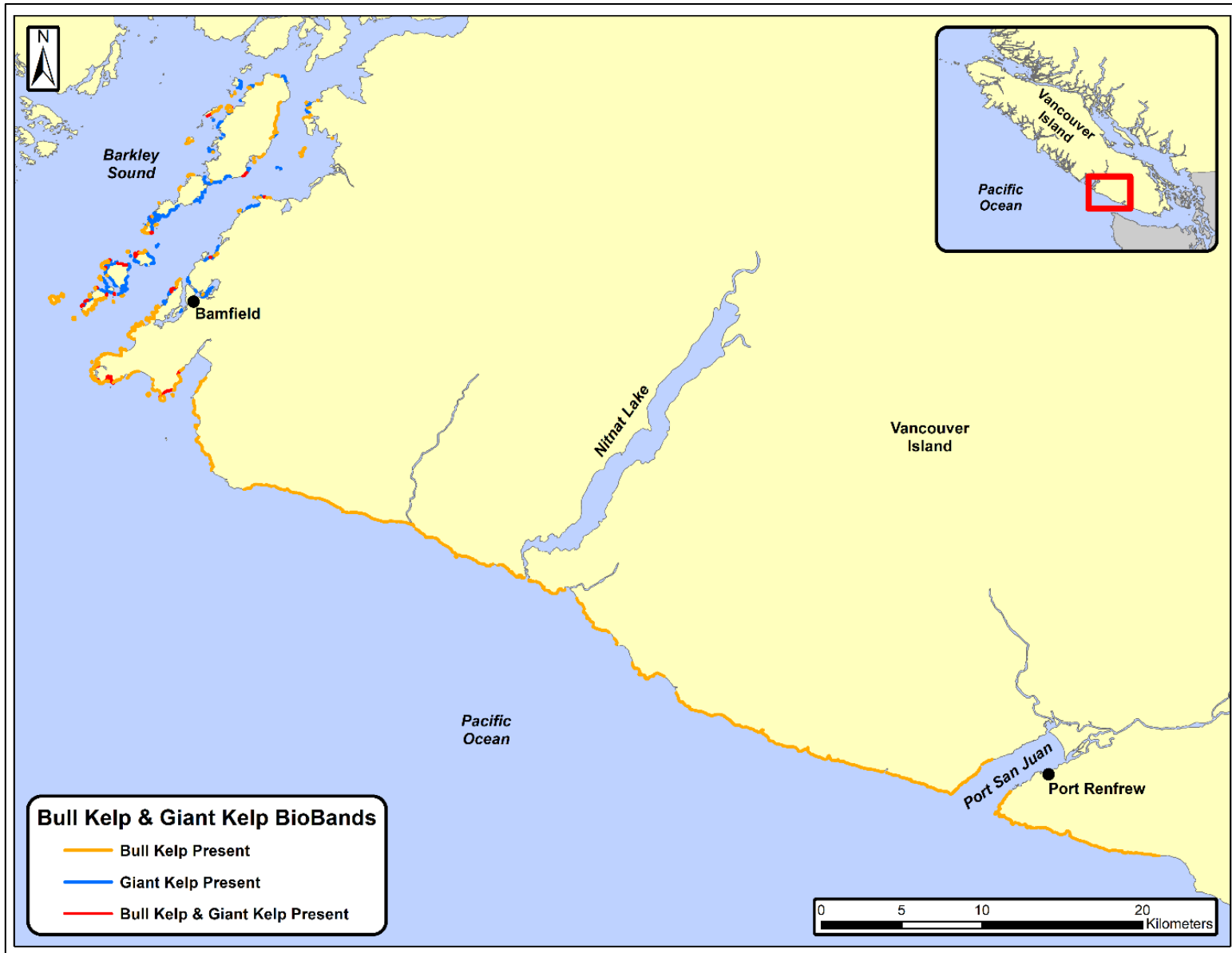


Figure 24. Distribution of the Bull Kelp (BUKE) and Giant Kelp biobands in the Barkley Sound survey area.

3.2 Biological Wave Exposure

Biological wave exposure categories range from Very Protected (VP) to Very Exposed (VE) and are usually defined in ShoreZone on the basis of 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 Barkley Sound are summarized in Figure 25 and a distribution map of the categories is shown in Figure 26. The coastline throughout the Barkley Sound survey area encompasses all wave exposures. The coastline is split fairly evenly between Protected (23.3%), Semi-Protected (25.6%), Semi-Exposed (21.2%) and Exposed (26.4%) wave exposures. Only 3.2% of the survey area is Very Protected.

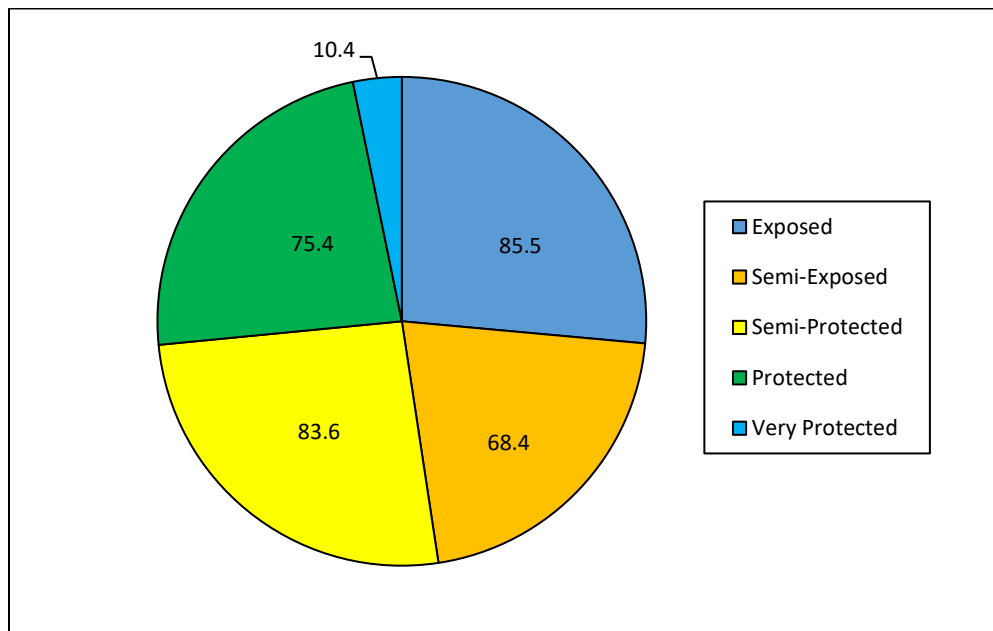


Figure 25. Distribution of Biological Wave Exposures mapped in the Barkley Sound survey area by shoreline length (km).

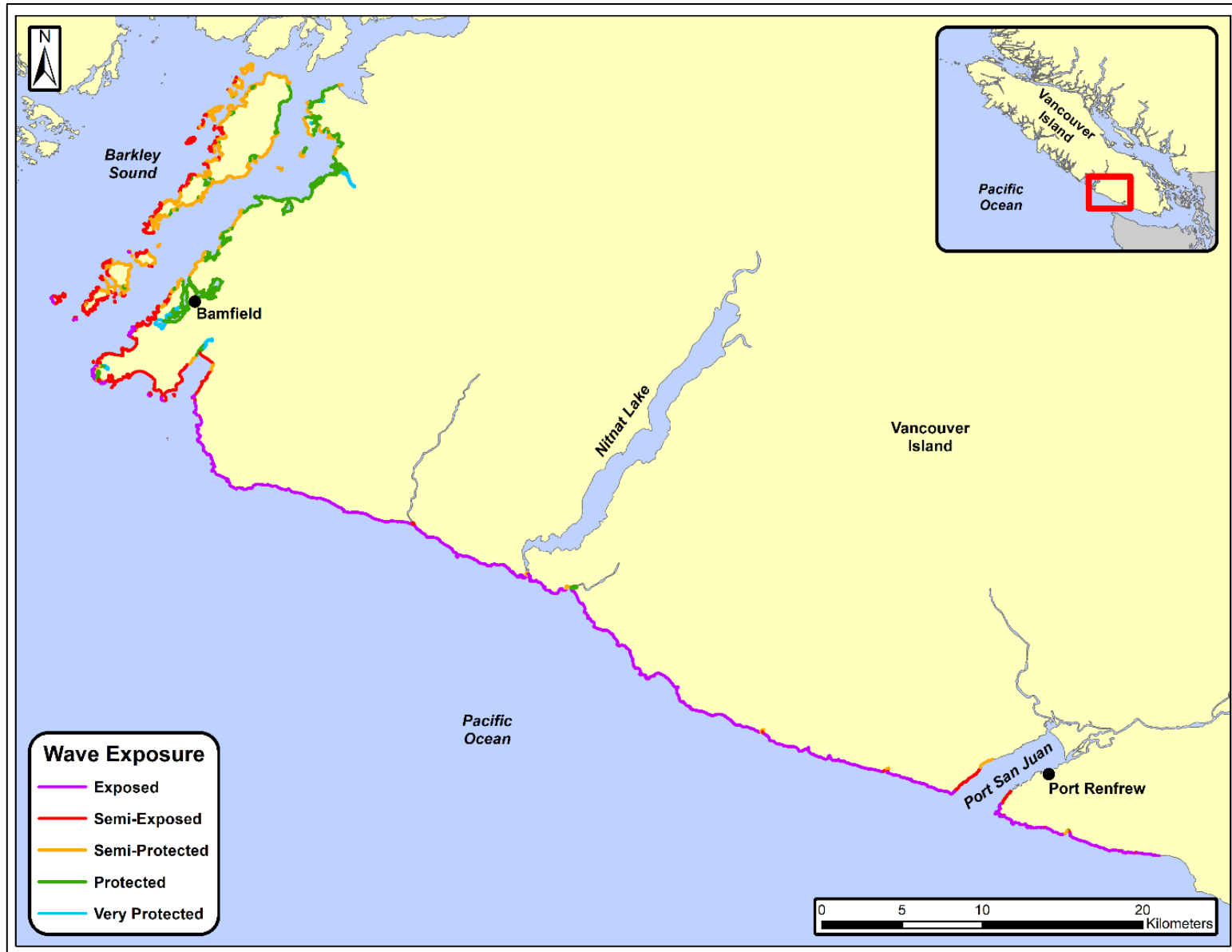


Figure 26. Distribution of the Biological Wave Exposure in the Barkley Sound survey area.

3.3 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 Barkley Sound survey area are summarized in Figure 27 and a distribution map of the categories is shown in Figure 28. Partially mobile substrate is the dominant shoreline type (58.1%), with Immobile accounting for the bulk of the rest (27.4%). The Estuary classification made up 4.2% 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. The Anthropogenic classification occurred in only 0.8% of units with much of that occurring near the communities of Bamfield and Sarita.

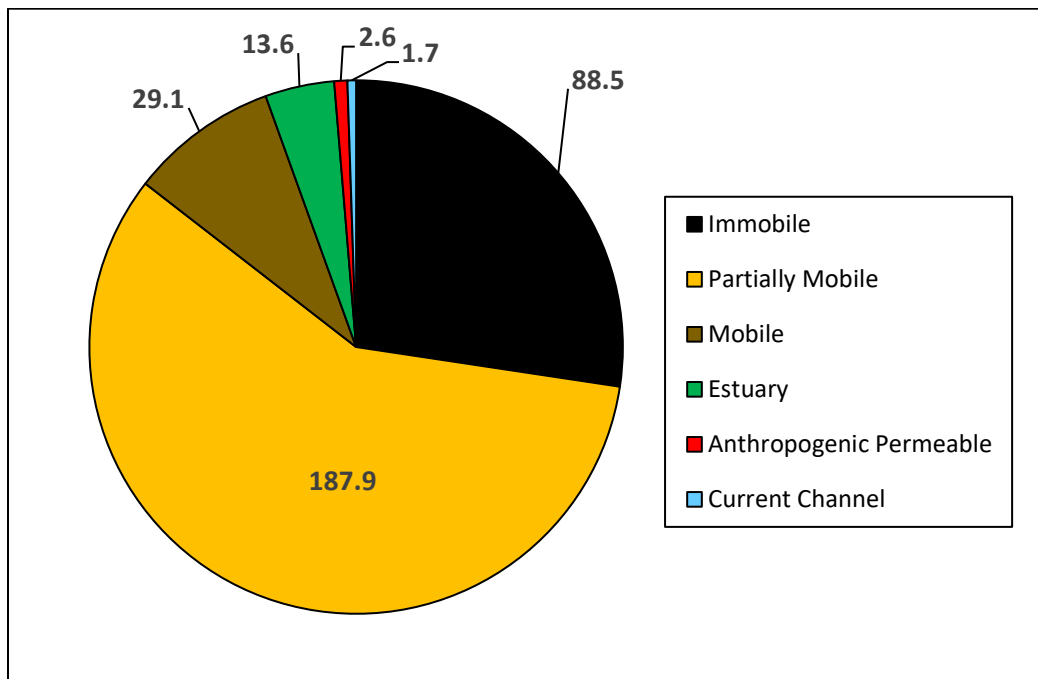


Figure 27. Distribution of Habitat Class categories in the Barkley Sound survey area by shoreline length (km).

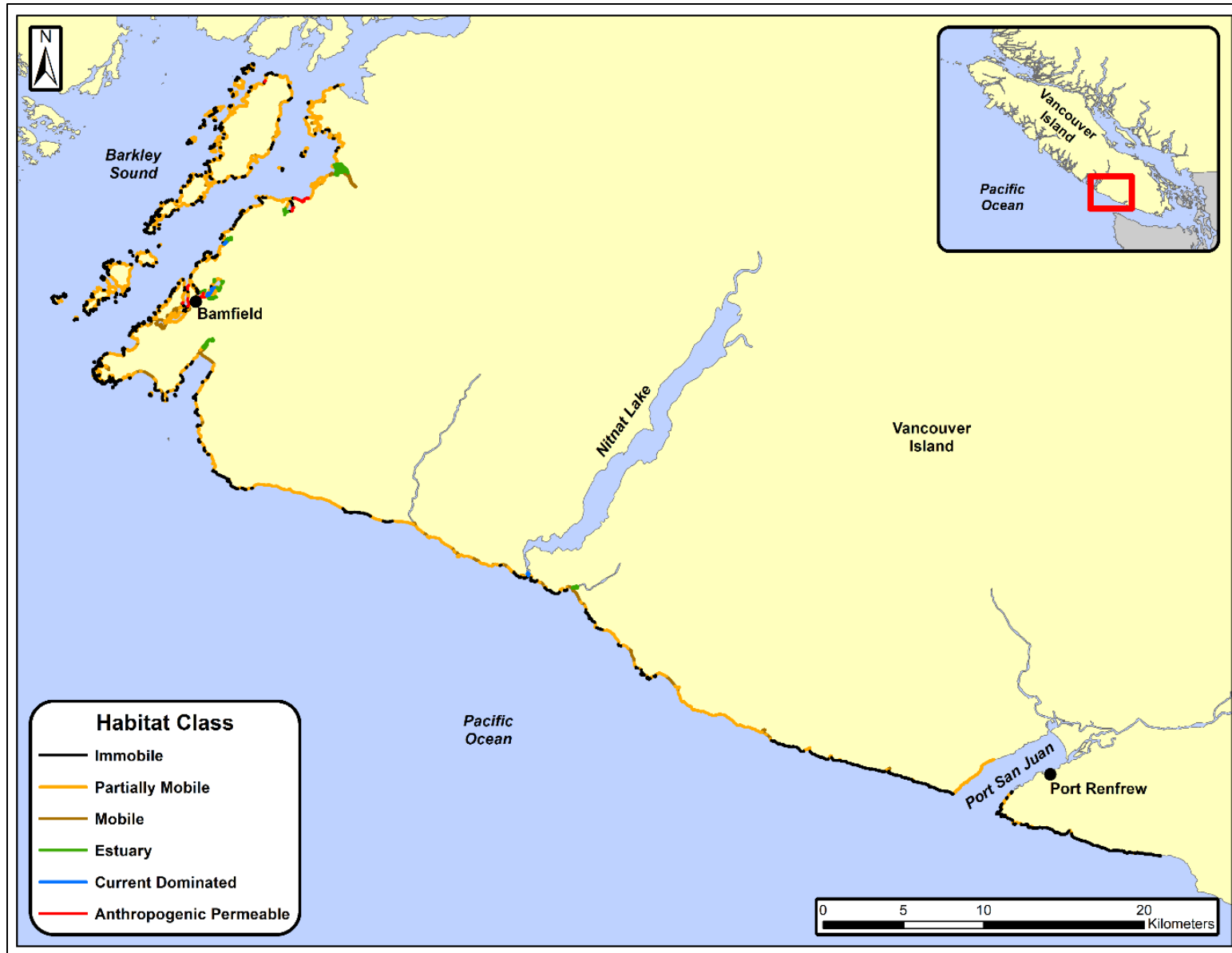


Figure 28. Distribution of Habitat Class categories in the Barkley Sound survey area.

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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. Video imagery can be viewed and digital stills for the US dataset can be downloaded online at www.ShoreZone.org or the [NOAA ShoreZone Page](#) and the BC imagery dataset can be accessed through the [Coastal and Ocean Resources' ArcGIS site](#). The mapping geodatabases and summary reports (as well as ground survey data and reports) can be downloaded through the [Coastal and Ocean Resources download center](#). Further ShoreZone resources, including a newly updated Illustrated Data Dictionary, can be accessed through the [NOAA ShoreZone Page](#).

Any hardcopies or published data sets utilizing ShoreZone products shall clearly indicate their source. For questions regarding the protocols or information in this report, please contact Sarah Cook, General Manager of Coastal and Ocean Resources at Sarah@coastalandoceans.com (250-658-4050). For data requests or analytical support contact Kalen Morrow at Kalen@coastalandoceans.com.

APPENDIX A

Photographic Examples of Coastal Classes and Biobands

Table A-1. Examples of the Coastal Classes in the Barkley Sound survey area (Page 36).

Table A-2. Examples of the Biobands in the Barkley Sound survey area (Page 44).

Table A-1. Examples of the Coastal Classes in the Barkley Sound survey area.



Photo bc21_bf_02252: Example of Coastal Class 2; Rock Platform, wide.
Trevor Channel.



Photo bc21_bf_02405: Example of Coastal Class 3; Rock Cliff.
Cape Beale.



Photo bc21_bf_00156: Example of Coastal Class 4; Rock Ramp.
Diana Island.



Photo bc21_bf_01978: Example of Coastal Class 8; Cliff with gravel beach.
Grappler Inlet.



Photo bc21_bf_02302: Example of Coastal Class 9; Ramp with gravel beach.
Cape Beale.



Photo bc21_bf_02637: Example of Coastal Class 11; Ramp with gravel & sand
beach, wide.
Pachena Bay.



Photo bc21_bf_00184: Example of Coastal Class 12; Platform with gravel & sand beach, wide.
Diana Island.



Photo bc21_bf_00616: Example of Coastal Class 13; Cliff with gravel & sand beach.
Tzartus Island.



Photo bc21_bf_00919: Example of Coastal Class 14; Ramp with gravel & sand beach.
Robbers Passage.



Photo bc21_bf_00298: Example of Coastal Class 22; Gravel beach, narrow.
Helby Island.



Photo bc21_bf_01434: Example of Coastal Class 24; Sand & gravel flat or fan.
Numukamis Bay.



Photo bc21_bf_00635: Example of Coastal Class 25; Sand & gravel beach,
narrow.
Tzartus Island.



Photo bc21_bf_02616: Example of Coastal Class 28; Sand flat.
Pachena Bay.



Photo bc21_bf_02076: Example of Coastal Class 29; Mud flat.
Bamfield Inlet.



Photo bc21_bf_02338: Example of Coastal Class 31; Organics/Fines.
Mud Cove.



Photo bc21_bf_01575: Example of Coastal Class 32; Permeable man-made
structures.
Sarita Bay.

Table A-2. Examples of the Biobands in the Barkley Sound survey area.

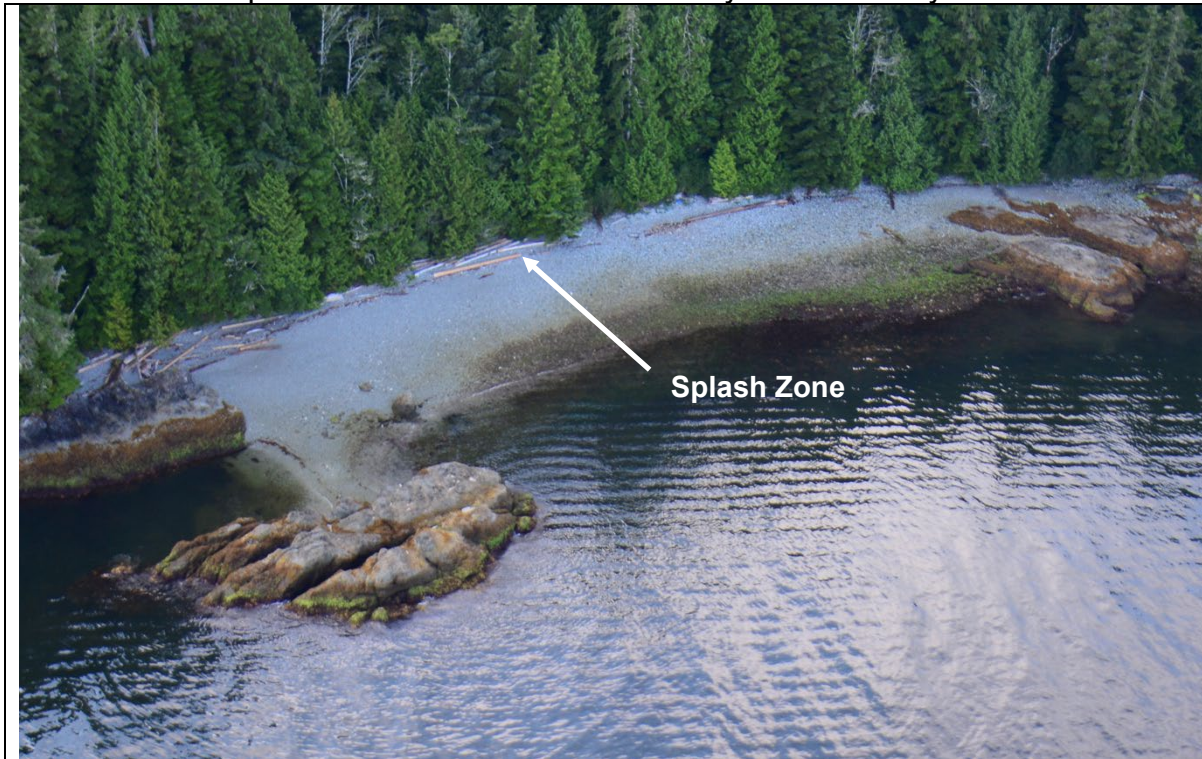


Photo bc21_bf_01689: Good example of the Splash Zone (SPZO) bioband which is an erosional or active A Zone without attached vegetation. North of Roquefeuil Bay.



Photo bc21_bf_01699: Good example of White Lichen (WHLI) bioband in the supratidal zone, above the Black Lichen band. Ellis Islet.



Photo bc21_bf_00061: Good example of the Yellow Lichen (YELI) bioband which is a yellow-orange band in the supratidal zone. Southwestern tip of Edward King Island.



Photo bc21_bf_01822: Good example of the Black Lichen (BLLI) bioband which is a black band in the supratidal zone, usually caused by the lichen *Verrucaria* sp. North of Grappler Inlet.



Photo bc21_bf_02532: Good example of blue-green Dune Grass (DUGR) bioband in the supratidal zone. East Clutus Point.



Photo bc21_bf_01607: Good example of Salt Marsh (SAMB) bioband in the supratidal/intertidal zone. Poett Nook.



Photo bc21_bf_02575: Good example of the Barnacle (BARN) bioband in the intertidal zone. Pachena Bay.

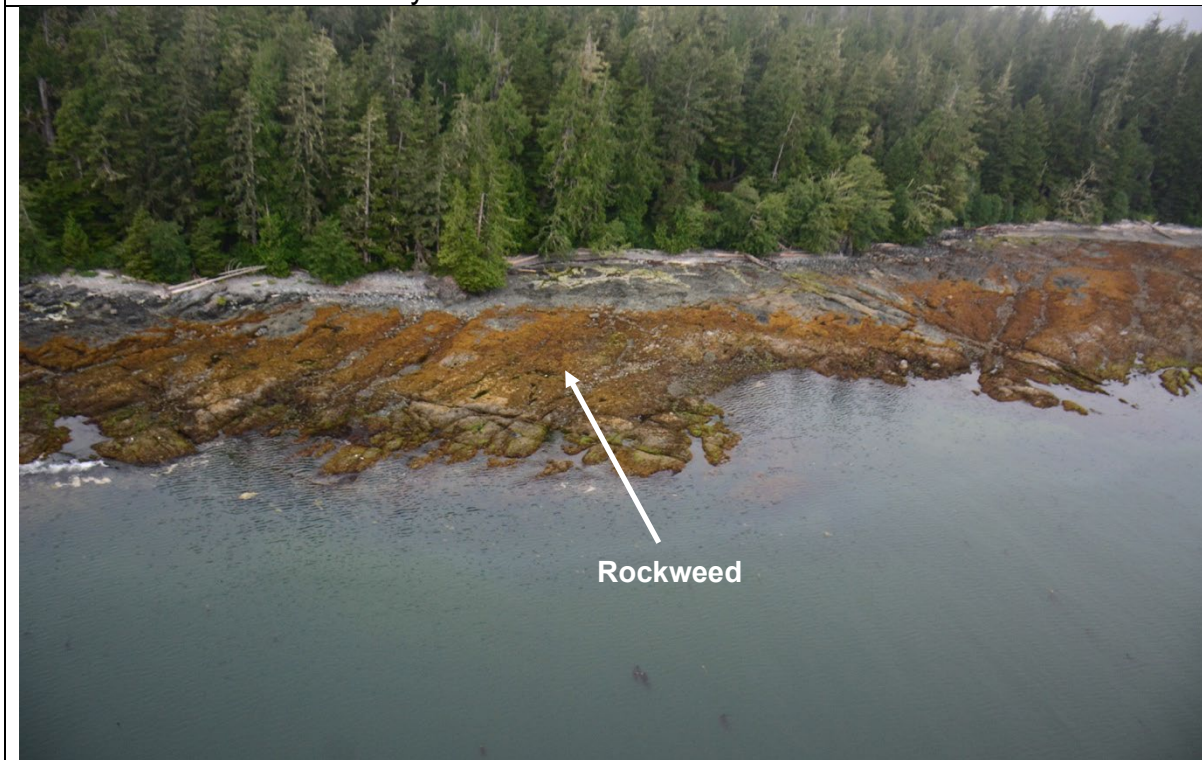


Photo bc21_bf_02563: Good example of the golden-brown Rockweed (ROCK) bioband. Pachena Bay.

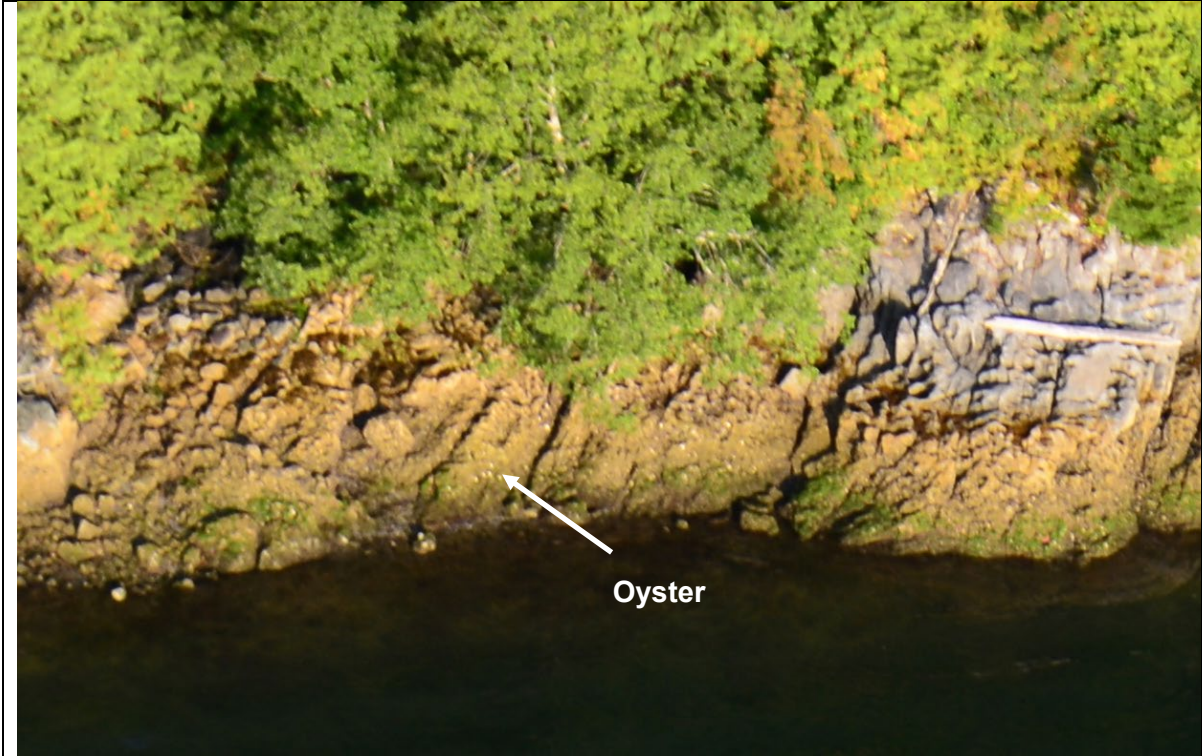


Photo bc21_bf_00668: Good example of the white spots of the Oyster (OYST) bioband. Northeastern Tzartus Island.

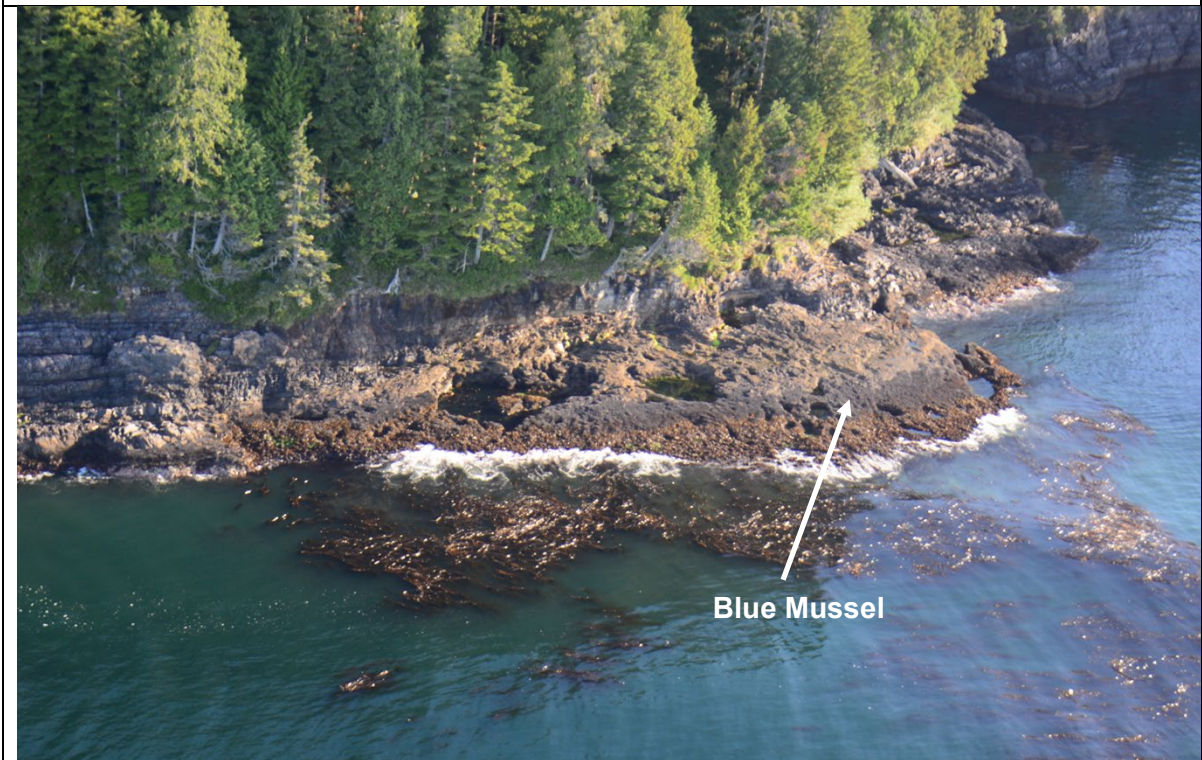


Photo bc21_bf_03383: Good example of the black Blue Mussel (BLMU) bioband in the mid-intertidal. West of Providence Cove.



Photo bc21_bf_00208: Good example of the Green Algae (GRAL) bioband in the lower intertidal. Northern Diana Island.



Photo bc21_bf_00354: Good example of the Echinoderm (ECHI) bioband which was all *Pisaster* sp. in this study area. Ohlat Islet.



Photo bc21_bf_01795: Good example of the golden Bleached Red Algae (BRAL) bioband in the lower intertidal. East of Dixon Island, South of Roquefeuil Bay.



Photo bc21_bf_00181: Good example of the Filamentous and Foliose Red Algae (FFRA) bioband in the lower intertidal. Northern Diana Island.



Photo bc21_bf_02800: Good example of the Coralline Red Algae (CORA) in the lower intertidal. East of Darling River.

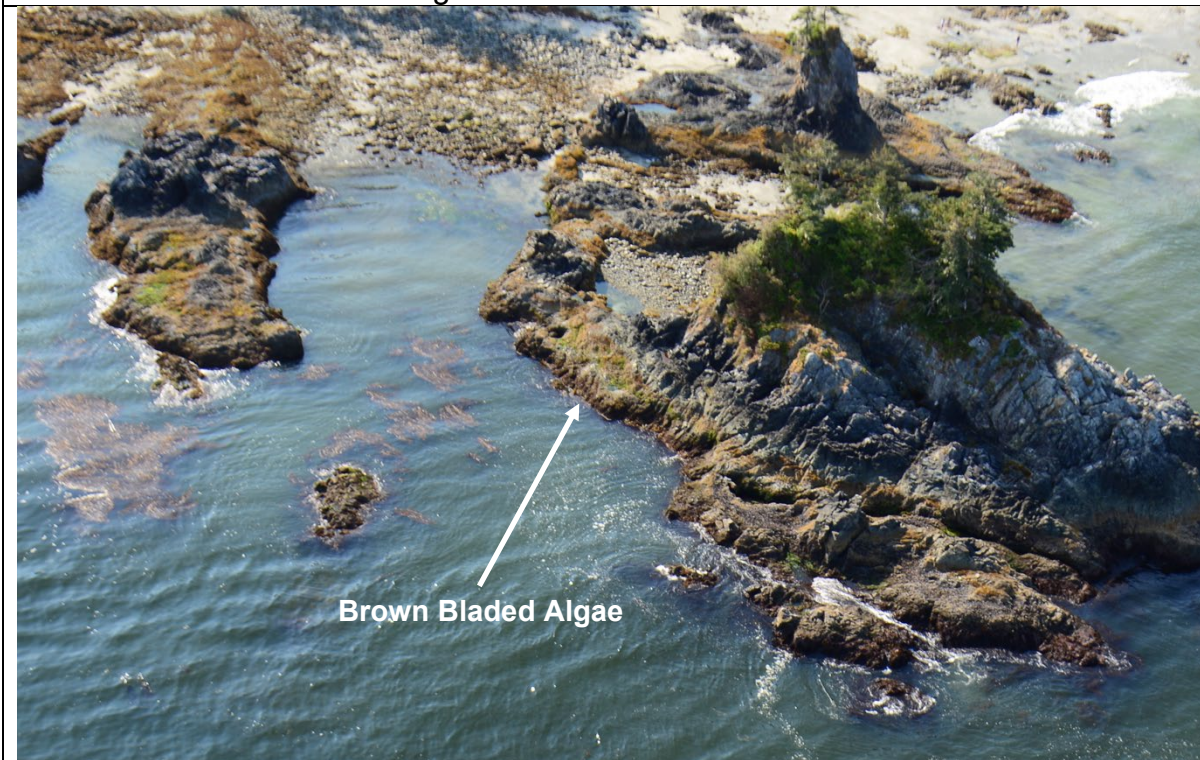


Photo bc21_bf_02215: Good example of the Brown Bladed Algae (BRBA) bioband. North of Tapaltos Bay.



Photo bc21_bf_02493: Good example of the Dark Brown Kelps (DABK) bioband. Reef south of Keeha Bay.



Photo bc21_bf_02530: Good example of the Surfgrass (SURF) bioband in the subtidal. East Clutus Point.



Photo bc21_bf_02052: Good example of the Eelgrass (EELG) bioband in the subtidal. Bamfield Inlet.



Photo bc21_bf_00492: Good example of the fluffy, floating Sargassum (SARG) bioband. Eastern Fleming Island.

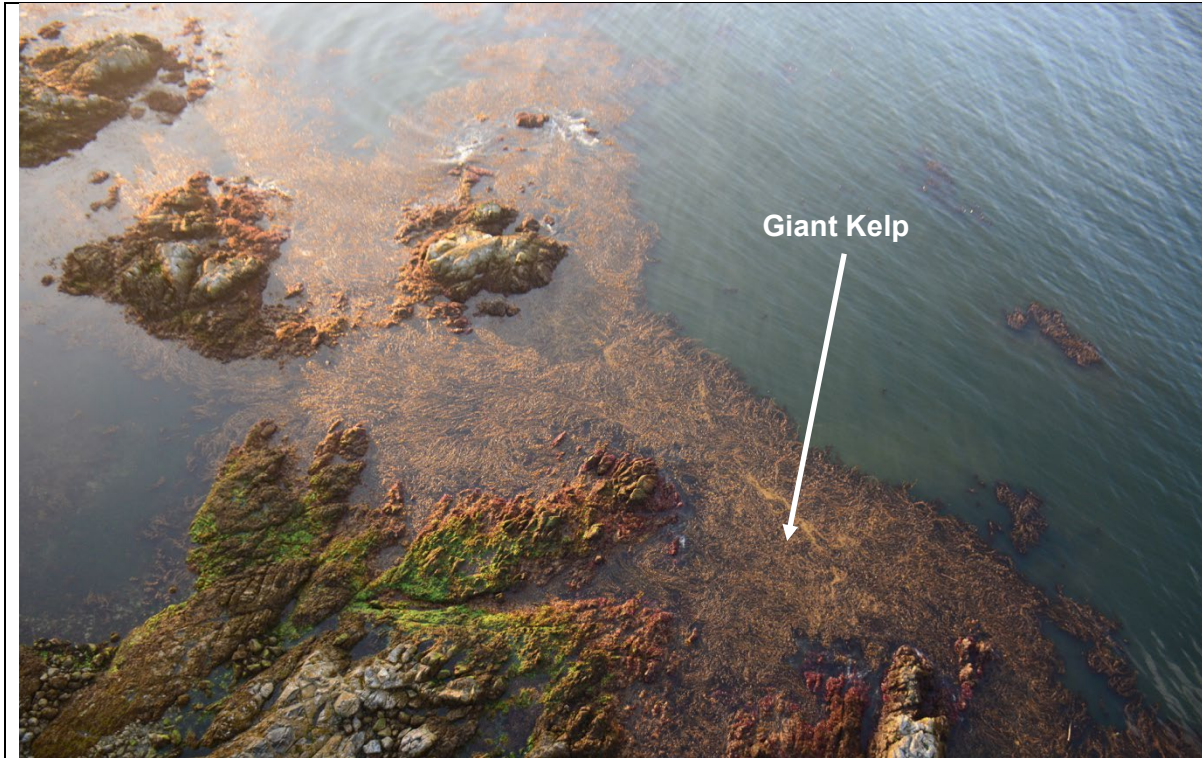


Photo bc21_bf_00101: Good example of the Giant Kelp (GIKE) bioband in the nearshore. Bordelais Islets.



Photo bc21_bf_03207: Good example of the Bull Kelp (BUKE) bioband in the nearshore. East of Cullite Cove.



Photo bc21_bf_02199: Good example of the Brown Canopy-Forming Algae (BRCA) bioband in the nearshore. Eagle Bay, west of Bamfield.

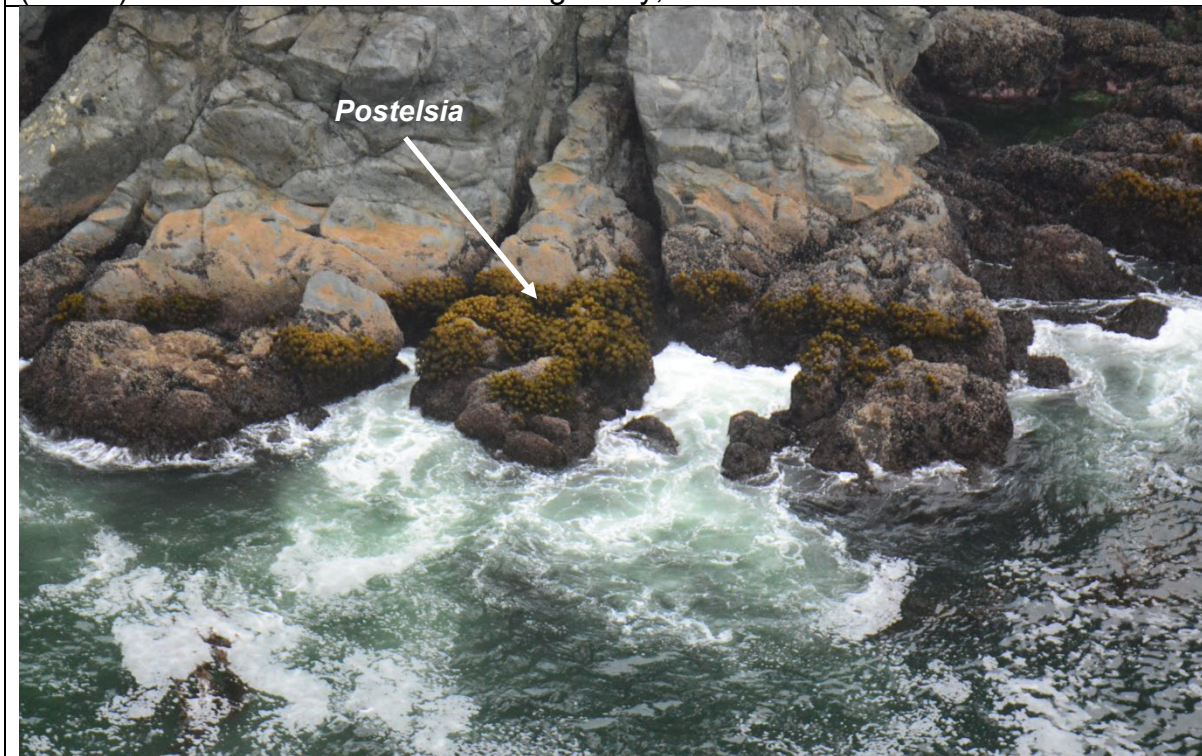


Photo bc21_bf_02663: Good example of the Dark Brown Bladed Algae, *Postelsia palmaeformis* bioband. South of Pachena Bay.



Photo bc21_bf_02543: Good example of the Urchin Barrens (URBA) bioband in the subtidal. East Clutus Point.