



Alaska ShoreZone



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ShoreZone Coastal Habitat Mapping



- Background
- Methods Review
- Alaska Program
- Web Products
- Future Plans



ShoreZone Coastal Habitat Mapping



Objective:

To produce an integrated, searchable inventory of geomorphic and biological features of the coastal and nearshore zone, which can be used as a tool for science, education, management, and environmental hazard planning.

- 1980s - 90s
British Columbia
(Howes et al. 1994)
Washington State
(Berry et al. 2004)
- 2001 Alaska



ShoreZone Method

Standardized Coastal Mapping System



ShoreZone characterizes **physical and biological attributes** both along-shore and across-shore components



wave exposure



geomorphology



sediment texture



intertidal/subtidal biota



supratidal biota



man-made features

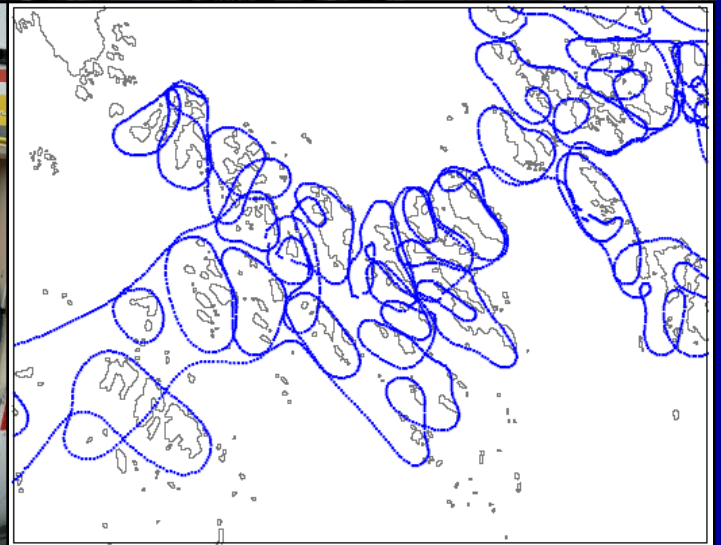
ShoreZone Method

Coastal Imagery



Mapping is based on
video and still imagery:

- Low-altitude
- Oblique
- Spatially-referenced
- Collected during low tides



ShoreZone Method

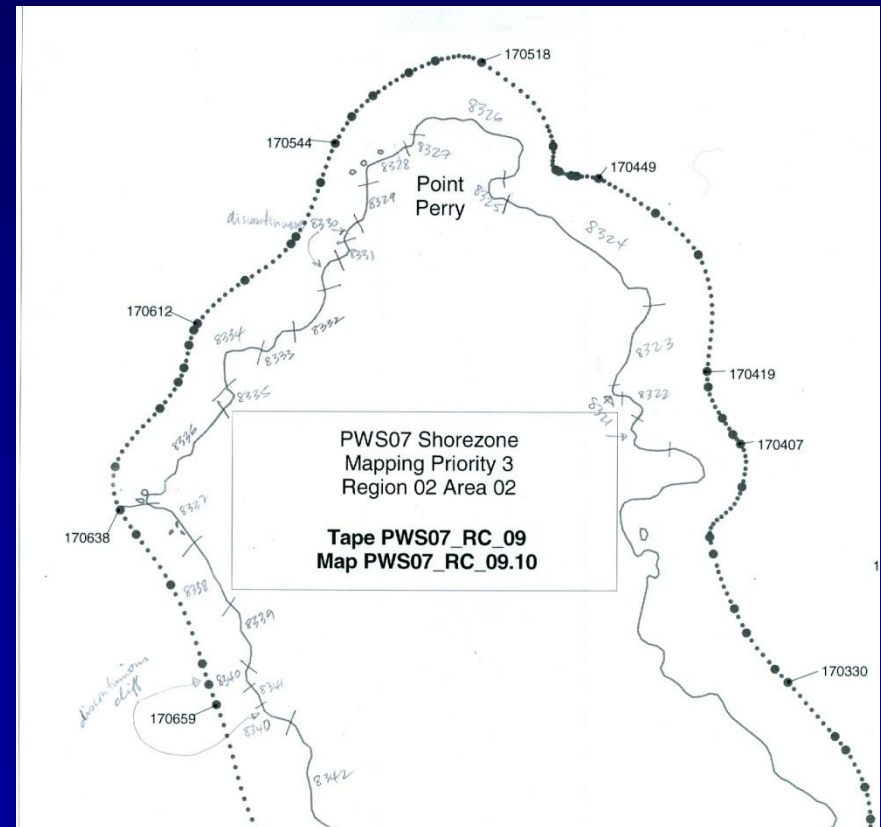
Digital Shoreline



GPS flight **trackline** recorded at 1-second intervals:



Navigation trackline and imagery are used to **segment** digital shoreline into along-shore **units**:



ShoreZone Method

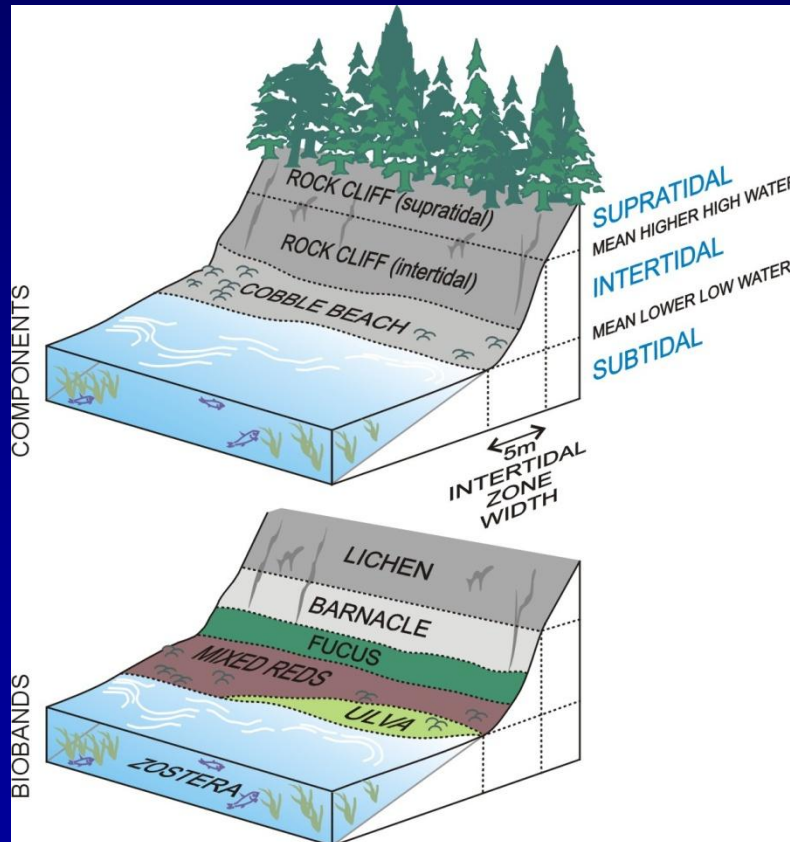
Biophysical Mapping



Physical and biological features of across-shore **zones** are mapped with respect to relative tidal position

Physical (geomorphic) attributes:

Biotic communities (“biobands”):



ShoreZone Method

Unique Biological Mapping - Biobands



Species assemblages having a characteristic color and across-shore elevation

Physical:

- Rock Cliff



ShoreZone Method



Unique Biological Mapping - Biobands

Physical:

- Rock Cliff

Biological:

- multiple biobands



Splash Zone Lichen (VER)

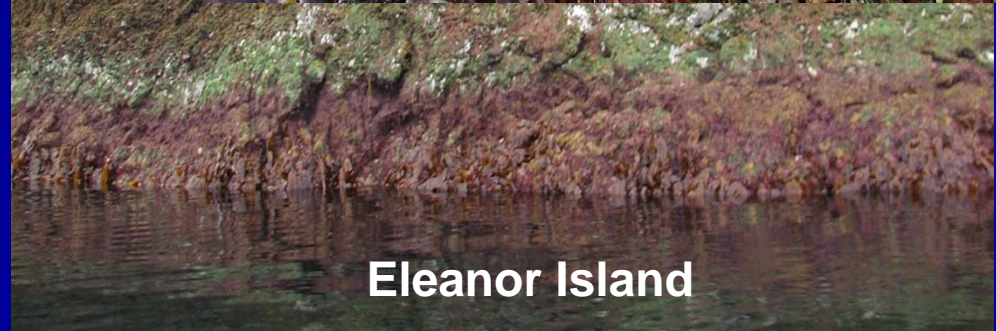
Barnacles (BAR)

Rockweed or Fucus (FUC)

Green Algae (ULV)

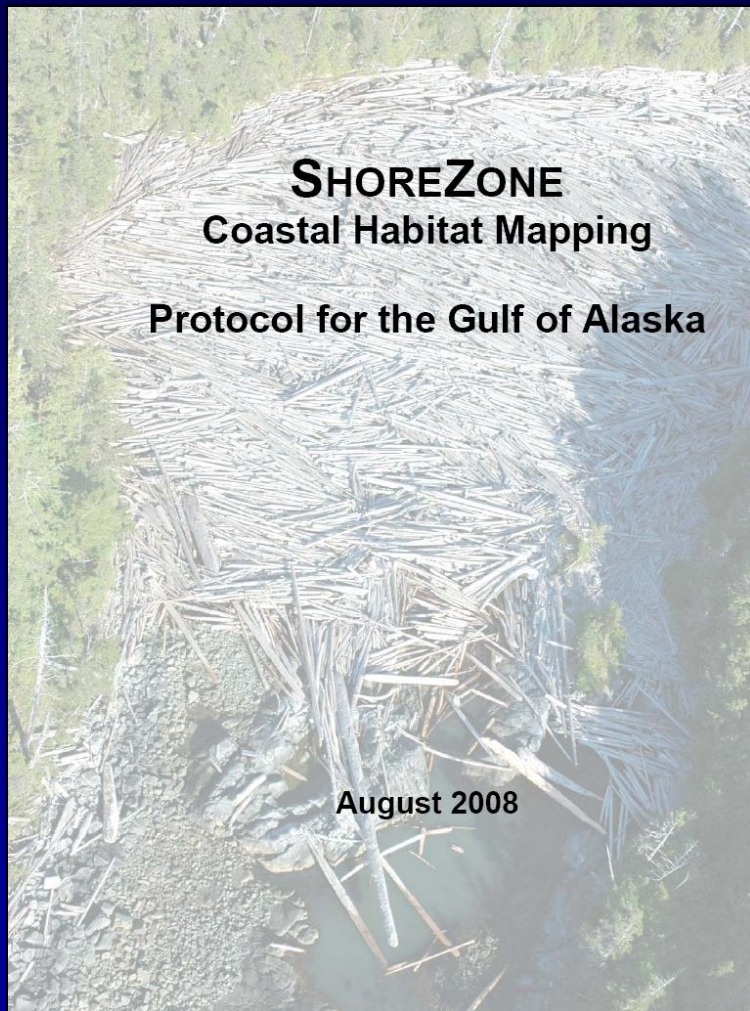
Red Algae (RED)

Soft Brown Kelps (SBR)



Eleanor Island

ShoreZone Protocols: available online



CORI Project: 08-01

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ShoreZone Coastal Habitat Mapping Protocol for the Gulf of Alaska 2008

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ShoreZone Protocols: Shore Types



Table A-2. Classification of shore types employed in ShoreZone mapping
(derived from the Howes et al. [1994] "BC Class" system in British Columbia)

SUBSTRATE	SEDIMENT	WIDTH	SLOPE	COASTAL CLASS	NO.
ROCK	N/A	WIDE (>30 m)	STEEP (>20°)	n/a	
			INCLINED (5-20°)	Rock Ramp, wide	1
			FLAT (<5°)	Rock Platform, wide	2
		NARROW (<30 m)	STEEP (>20°)	Rock Cliff	3
			INCLINED (5-20°)	Rock Ramp, narrow	4
		FLAT (<5°)	Rock Platform, narrow	5	
ROCK & SEDIMENT	GRAVEL	WIDE (>30 m)	STEEP (>20°)	n/a	
			INCLINED (5-20°)	Ramp with gravel beach, wide	6
			FLAT (<5°)	Platform with gravel beach, wide	7
		NARROW (<30 m)	STEEP (>20°)	Cliff with gravel beach	8
			INCLINED (5-20°)	Ramp with gravel beach	9
			FLAT (<5°)	Platform with gravel beach	10
	SAND & GRAVEL	WIDE (>30 m)	STEEP (>20°)	n/a	
			INCLINED (5-20°)	Ramp w gravel & sand beach, wide	11
			FLAT (<5°)	Platform with G&S beach, wide	12
		NARROW (<30 m)	STEEP (>20°)	Cliff with gravel/sand beach	13
INCLINED (5-20°)			Ramp with gravel/sand beach	14	
		FLAT (<5°)	Platform with gravel/sand beach	15	
SAND	WIDE (>30 m)	STEEP (>20°)	n/a		
		INCLINED (5-20°)	Ramp with sand beach, wide	16	
		FLAT (<5°)	Platform with sand beach, wide	17	
	NARROW (<30 m)	STEEP (>20°)	Cliff with sand beach	18	
		INCLINED (5-20°)	Ramp with sand beach, narrow	19	
		FLAT (<5°)	Platform with sand beach, narrow	20	
SEDIMENT	GRAVEL	WIDE (>30 m)	FLAT (<5°)	Gravel flat, wide	21
		NARROW (<30 m)	STEEP (>20°)	n/a	
			INCLINED (5-20°)	Gravel beach, narrow	22
			FLAT (<5°)	Gravel flat or fan	23
	SAND & GRAVEL	WIDE (>30 m)	STEEP (>20°)	n/a	
			INCLINED (5-20°)	n/a	
			FLAT (<5°)	Sand & gravel flat or fan	24
		NARROW (<30 m)	STEEP (>20°)	n/a	
			INCLINED (5-20°)	Sand & gravel beach, narrow	25
			FLAT (<5°)	Sand & gravel flat or fan	26
	SAND / MUD	WIDE (>30m)	STEEP (>20°)	n/a	
			INCLINED (5-20°)	Sand beach	27
			FLAT (<5°)	Sand flat	28
NARROW (<30m)		FLAT (<5°)	Mudflat	29	
		STEEP (>20°)	n/a		
		INCLINED (5-20°)	Sand beach	30	
		FLAT (<5°)	n/a	n/a	
ANTHRO-POGENIC	Man-made	n/a	n/a	Estuaries	31
		n/a	n/a	Man-made, permeable	32
		n/a	n/a	Man-made, impermeable	33
CHANNEL	Current	n/a	n/a	Channel	34
GLACIER	Ice	n/a	n/a	Glacier	35

Shore Type: Rock (BC Classes 1-5)

Southeast Alaska



Steep high cliff (Form "Cash"); fixed-wing aerial survey photo
Taiva Point, Lynn Canal (Unit 10/04/3200)



Low-tide, irregular rock platform with tidepools (Form "Pihp")
Yakobi Island (Unit 10/02/1632)

Shore Type: Rock and Sediment (BC Classes 6-20, continued)

Kodiak Archipelago



Wide (>30 m) platform (<5° slope) with gravel beach (BC Class 7).
Geese Channel (Unit 05/04/8011)



Steep cliff (>20°) with narrow (<30 m) gravel beach (BC Class 8).
Geese Channel (Unit 05/04/8030)

Shore Type: Glaciers (BC Class 35)

Southeast Alaska



Glaciers of Russel Fjord (Form "Ilg")



Glaciers of Tsaa Fjord, with high cliffs and waterfalls (Forms "Ilg," "Cash," and "Rm")

Northern Yakutat Bay (Unit 09/02/0145)
SE05_ML_4494.jpg

Icy Bay (Units 09/01/0345-0349)
SE05_ML_3976.jpg

ShoreZone Protocols: Habitat Class



Table A-9. Habitat Class definitions

*shaded boxes in the Habitat Class matrix are not applicable in most regions

Dominant Structuring Process	Substrate Mobility	Coastal Type	Description	Biological Exposure Category*					
				Very Exposed VE	Exposed E	Semi-Exposed SE	Semi-Protected SP	Protected P	Very Protected VP
Wave Energy	<i>Immobile</i>	<i>Rock or Rock & Sediment or Sediment</i>	The epibiota in the immobile mobility categories is influenced by the wave exposure at the site. In high wave exposures, only solid bedrock shorelines will be classified as 'immobile'. At the lowest wave exposures, even pebble/cobble beaches may show lush epibiota, indicating an immobile Habitat Class.	10 VE_I	20 E_I	30 SE_I	40 SP_I	50 P_I	60 VP_I
	<i>Partially Mobile</i>	<i>Rock & Sediment or Sediment</i>	These units describe the combination of sediment mobility observed. That is, a sediment beach that is bare in the upper half of the intertidal with biobands occurring on the lower beach would be classed as 'partially mobile'. This pattern is seen at moderate wave exposures. Units with immobile bedrock outcrops intermingled with bare mobile sediment beaches, as can be seen at higher wave exposures, could also be classified as 'partially mobile'.	11 VE_P	21 E_P	31 SE_P	41 SP_P	51 P_P	61 VP_P
	<i>Mobile</i>	<i>Sediment</i>	These categories are intended to show the 'bare sediment beaches', where no epibenthic macrobiota are observed. Very fine sediment may be mobile even at the lowest wave exposures, while at the highest wave exposures, large-sized boulders will be mobile and bare of epibiota.	12 VE_M	22 E_M	32 SE_M	42 SP_M	52 P_M	62 VP_M
Fluvial/Estuarine Processes		<i>Estuary</i>	Units classified as the 'estuary' types always include salt marsh vegetation in the upper intertidal, are always associated with a freshwater stream or river and often show a delta form. Estuary units are usually in lower wave exposure categories.	13 VE_E	23 E_E	33 SE_E	43 SP_E	53 P_E	63 VP_E
Current energy		<i>Current-Dominated channel</i>	Species assemblages observed in salt-water channels are structured by current energy rather than by wave energy. Current-dominated sites are limited in distribution and are rare habitats.	14 VE_C	24 E_C	34 SE_C	44 SP_C	54 P_C	64 VP_C
Glacial processes		<i>Glacier</i>	In a few places in coastal Alaska, saltwater glaciers form the intertidal habitat. These Habitat Classes are rare and include a small percentage of the shoreline length.	15 VE_G	25 E_G	35 SE_G	45 SP_G	55 P_G	65 VP_G
Man-modified		<i>Anthropogenic – Impermeable</i>	Impermeable man-made Habitats are intended to specifically note units classified as Coastal Class 33.	16 VE_X	26 E_X	36 SE_X	46 SP_X	56 P_X	66 VP_X
		<i>Anthropogenic – Permeable</i>	Permeable man-made Habitats are intended to specifically note shore units classified as Coastal Class 32.	17 VE_Y	27 E_Y	37 SE_Y	47 SP_Y	57 P_Y	67 VP_Y
Lagoon		<i>Lagoon</i>	Units classified as Lagoons in the Secondary Habitat Class contain brackish or salty water that is contained within a basin that has limited drainage. They are often associated with wetlands and may include wetland biobands in the upper intertidal.	18 VE_L	28 E_L	38 SE_L	48 SP_L	58 P_L	68 VP_L



Figure 5.9. Habitat Class: Semi-Protected, Mobile. This Semi-Protected, **Mobile** beach in Hall Cove, Duke Island, is bare of attached biota. (SE06_MM_09242.jpg)



Figure 5.10. Habitat Class: Estuary. This is an example of an **Estuary** habitat class at the head of Traitors Cove. Dune Grass (GRA), Sedges (SED) and Salt Marsh (PUC) biobands cover a large area in the supratidal, while the delta fan has a sparse cover of Rockweed (FUC) and Barnacle (BAR) biobands. (SE06_MM_04099.jpg)

ShoreZone Protocols: Biobands

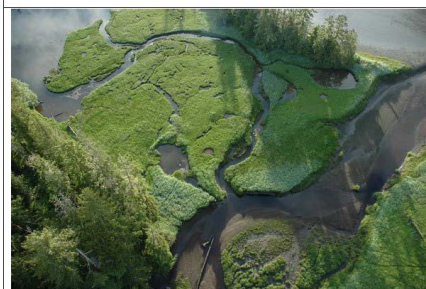


Table 5.1. Bioband definitions for aerial video interpretation: Southeast Alaska.

Zone	Bioband Name	Database Label	Colour	Diagnostic Indicator Species	Exposure *
Supratidal	Splash Zone	VER	Black or bare rock	Encrusting black lichens	Width varies with exposure
	Dune Grass	GRA	Pale blue-green	<i>Leymus mollis</i>	P to E
	Sedges	SED	Bright green to yellow-green	<i>Carex lyngbyei</i> <i>Carex</i> spp.	VP to SP
	Salt Marsh	PUC	Light or bright green	<i>Puccinellia</i> sp. Other salt-tolerant herbs and grasses	VP to SE
Upper to Mid-Intertidal	Barnacle	BAR	Grey-white to pale yellow	<i>Balanus</i> sp. <i>Semibalanus</i> sp.	P to E
	Rockweed	FUC	Golden-brown	<i>Fucus</i> sp.	P to SE
	Green Algae	ULV	Green	<i>Ulva</i> sp. Other small green algae	P to E
	Blue Mussel	BMU	Black or blue-black	<i>Mytilus trossulus</i>	P to E
	California Mussel	MUS **	Grey-blue	California Mussel (<i>M. californianus</i>), gooseneck barnacles (<i>Pollicipes polymerus</i>)	SE to E
	Bleached Red Algae	HAL	Olive, golden or yellow-brown	Bleached foliose or filamentous red algae <i>Palmaria</i> sp. <i>Odonthalia</i> sp.	P to SE
Lower Intertidal and Nearshore Subtidal	Red Algae	RED	Dark to bright red or pink (corallines)	<i>Odonthalia</i> sp. <i>Neorhodomela</i> sp. <i>Palmaria</i> sp. Other foliose red algae, and other coralline algae	P to E
	Alaria	ALA	Dark brown	<i>Alaria</i> sp.	SP to E
	Soft Brown Kelps	SBR	Yellow-brown, olive brown or brown.	<i>Saccharina latissima</i> <i>Cystoseira</i> sp.	VP to SE
	Dark Brown Kelps	CHB	Dark chocolate brown	Stalked <i>Laminaria</i> sp. <i>Cymathere</i> sp. Other bladed kelps	SE to E
	Surfgrass	SUR	Bright green	<i>Phyllospadix</i> sp.	SP to SE
	Eelgrass	ZOS	Bright to dark green	<i>Zostera marina</i>	VP to SP
Subtidal	Urchin Barrens	URC **	Underwater coralline white	<i>Strongylocentrotus franciscanus</i>	SP to SE
	Dragon Kelp	ALF	Golden-brown	<i>Alaria fistulosa</i>	SP to SE
	Giant Kelp	MAC	Golden-brown	<i>Macrocystis integrifolia</i>	P to SE
	Bull Kelp	NER	Dark brown	<i>Nereocystis luetkeana</i>	SP to E

The Dune Grass (GRA), Sedges (SED), and Salt Marsh (PUC) Biobands

Zone	Bio-band Name	Database Label	Colour	Indicator Species	Physical Description	Exposure	Associate Species
A	Dune Grass	GRA	Pale blue-green	<i>Leymus mollis</i>	Found in the upper intertidal zone, on dunes or beach berms. This band is often the only band present on high-energy beaches.	P-E	
A	Sedges	SED	Bright green, yellow-green to red-brown.	<i>Carex lyngbyei</i>	Appears in wetlands around lagoons and estuaries. Usually associated with freshwater. This band can exist as a wide flat pure stand or be intermingled with dune grass. Often the PUC band forms a fringe below.	VP-SP	<i>Carex</i> spp.
A	Salt Marsh	PUC	Light, bright, or dark green, with red-brown	<i>Puccinellia</i> sp. <i>Plantago maritima</i> <i>Glaux maritima</i>	Appears around estuaries, marshes, and lagoons. Usually associated with freshwater. Often fringing the edges of GRA and SED bands. PUC can be sparse <i>Puccinellia</i> and <i>Plantago</i> on coarse sediment or a wetter, peaty meadow with assemblage of herbs and sedges (including <i>Potentilla</i> , <i>Spergularia</i> , <i>Achillea</i> , <i>Dodecatheon</i> and other associated species).	VP-SE	<i>Carex</i> sp. <i>Potentilla anserina</i> <i>Honckerya peploides</i> <i>Salicornia virginica</i> <i>Triglochin maritima</i>



A mixture of tall, blue-green Dune Grass (GRA), lush Sedges (SED) and Salt Marsh (PUC) can be seen in this Protected (P) Estuary in Shinaku Inlet, Prince of Wales Island.

SE06_MM_19887.jpg
Bioarea SECR



A Protected (P) Estuary at the end of Frederick Cove, Prince of Wales Island, displaying extensive Dune Grass (GRA) and Salt Marsh (PUC) biobands.

SE06_MM_12046.jpg
Bioarea SECR

The Barnacle (BAR) Bioband

Zone	Bio-band Name	Database Label	Colour	Indicator Species	Physical Description	Exposure	Associate Species
upper B	Barnacle	BAR	Grey-white to pale yellow	<i>Balanus</i> sp. <i>Semibalanus</i> sp.	Visible on bedrock or large boulders. Can form an extensive band in higher exposures where algae have been grazed away.	P-E	<i>Endocladia muricata</i> <i>Gloiopeltis furcata</i> <i>Porphyra</i> sp. <i>Fucus</i> sp.



Located below the *Verrucaria* (VER), a continuous band of Barnacles (BAR) is visible in the high intertidal range of this Semi-Exposed (SE) shoreline in the Barrier Islands.

SE06_MM_02279.jpg
Bioarea SECR



A distinct band of creamy white Barnacles (BAR) extends across the Semi-Protected (SP) shore of this island south of St. Phillip Island.

SE06_MM_18990.jpg
Bioarea SECR

ShoreZone: A Rigorous Geospatial Database



PWS_Herring_ArcMap_jNh_12Jan09.mxd - ArcMap - ArcView

File Edit View Bookmarks Insert Selection Tools Window Help

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Labeling Links... Objects... Export Map...

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- Xshr

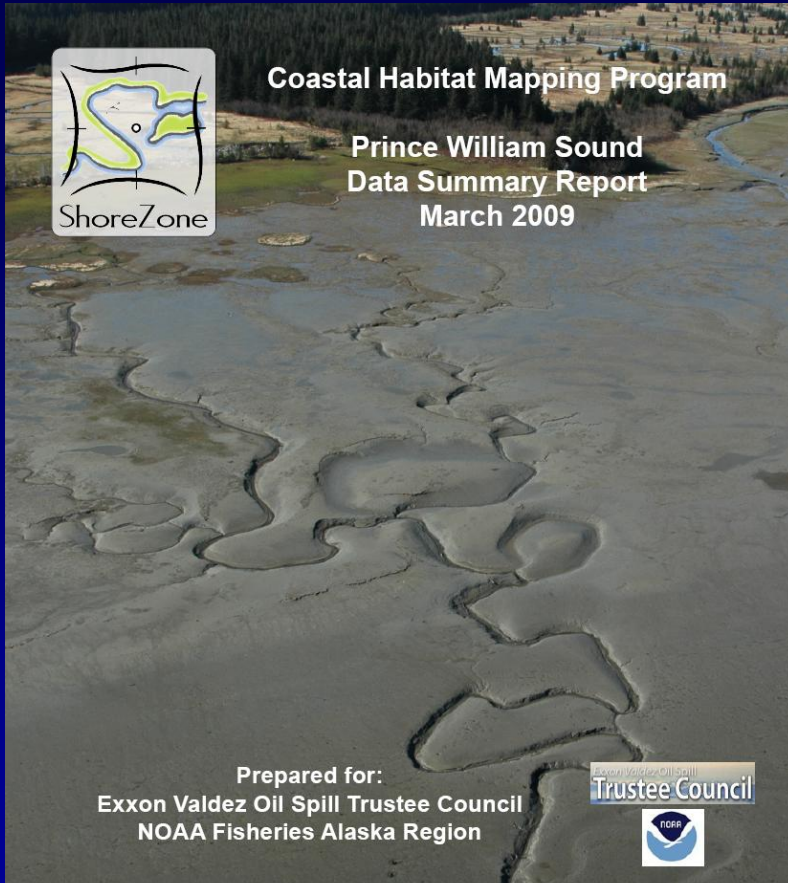
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02	02	8318	020283180	20
02	02	8319	020283190	22
02	02	8320	020283200	14
02	02	8322	020283220	12
02	02	8323	020283230	27
02	02	8324	020283240	6
02	02	8325	020283250	12
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02	02	8329	020283290	13
02	02	8331	020283310	7
02	02	8332	020283320	17
02	02	8333	020283330	13
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02	02	8335	020283350	6
02	02	8338	020283380	22
02	02	8339	020283390	21
02	02	8341	020283410	6
02	02	8342	020283420	50
02	02	8343	020283430	39
02	02	8344	020283440	19
02	02	8345	020283450	42
02	02	8346	020283460	36
02	02	8347	020283470	22
02	02	8348	020283480	10
02	02	8349	020283490	33

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ShoreZone Summary Reports

Coastal Habitat Mapping Program

Prince William Sound
Data Summary Report
March 2009

Prepared for:
Exxon Valdez Oil Spill Trustee Council
NOAA Fisheries Alaska Region

CORI Project: 2008-10

March 2009

ShoreZone Coastal Habitat Mapping Data Summary Report

Prince William Sound, Alaska

Prepared for:
Exxon Valdez Oil Spill Trustee Council
Prince William Sound Regional Citizens Advisory Council
NOAA National Marine Fisheries Service, Alaska Region

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ShoreZone Summary Reports



Shore Types

Table 2.1. Shore types by BC Class observed in Prince William Sound.

Substrate Type	Shore Type (BC Class)	Shore Type (BC Class)	Sum of Unit Length (km)	# of Units	% Occurrence (by length)	Cumulative Occurrence (%), km
Rock	1	Rock Ramp, wide	4.8	25	0.1%	9.4% 527.8 km
	2	Rock Platform, wide	8.1	30	0.1%	
	3	Rock Cliff	462.1	2204	8.3%	
	4	Rock Ramp, narrow	51.6	386	0.9%	
	5	Rock Platform, narrow	1.2	15	0.0%	
Rock & Sediment	6	Ramp with gravel beach, wide	128.2	494	2.3%	44.6% 2,489.0 km
	7	Platform with gravel beach, wide	128.0	296	2.3%	
	8	Cliff with gravel beach	443.9	1862	7.9%	
	9	Ramp with gravel beach	273.4	1317	4.9%	
	10	Platform with gravel beach	6.4	44	0.1%	
	11	Ramp w. gravel & sand beach, wide	253.3	1085	4.5%	
	12	Platform with GS beach, wide	232.7	777	4.2%	
	13	Cliff with gravel/sand beach	518.1	2561	9.2%	
	14	Ramp with gravel/sand beach	486.8	2378	8.7%	
	15	Platform with gravel/sand beach	14.5	112	0.3%	
	16	Ramp with sand beach, wide	0.0	0	0.0%	
	17	Platform with sand beach, wide	2.2	11	0.0%	
	18	Cliff with sand beach	0.7	5	0.0%	
	19	Ramp with sand beach, narrow	0.8	5	0.0%	
	20	Platform with sand beach, narrow	0.2	2	0.0%	
Sediment	21	Gravel flat, wide	79.0	321	1.4%	38.7% 2,163.5 km
	22	Gravel beach, narrow	50.1	220	0.9%	
	23	Gravel flat or fan	0.2	1	0.0%	
	24	Sand & gravel flat or fan, wide	1174.9	5216	21.0%	
	25	Sand & gravel beach, narrow	595.4	3019	10.7%	
	26	Sand & gravel flat or fan, narrow	32.1	212	0.6%	
	27	Sand beach	5.0	22	0.1%	
	28	Sand flat	98.4	179	1.8%	
	29	Mudflat	127.3	221	2.3%	
	30	Sand beach	1.2	4	0.0%	
Organics	31	Organic shorelines, marshes	348.1	1172	6.2%	6.2% 348.1 km
Man-made	32	Man-made permeable	22.6	36	0.4%	0.4% (23 km)
	33	Man-made impermeable	0.5	3	0.0%	
Channel	34	Channel	11.0	31	0.2%	0.2% (11 km)
Glacier/Ice	35	Shoer	23.1	18	0.4%	0.4% (23 km)

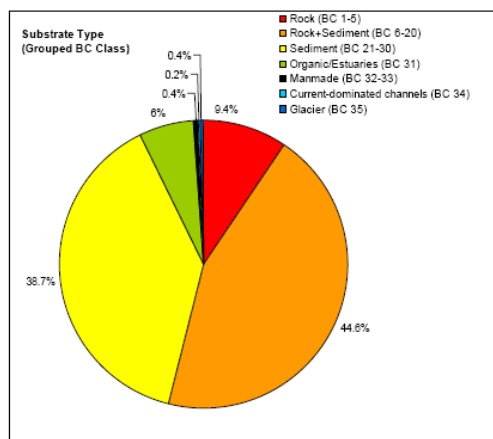
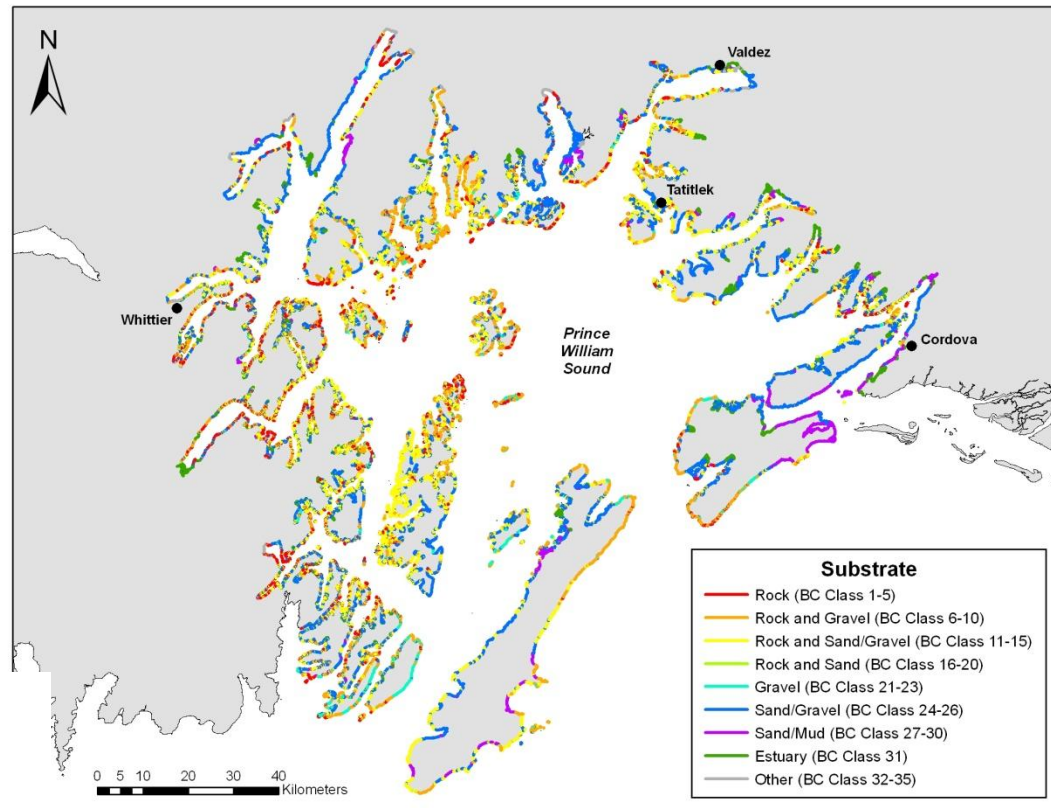


Figure 2.2. Relative abundance of principal substrate types (BC Classes 1-35) in Prince William Sound.

ShoreZone Summary Reports

Habitat Class



Table 3.9. Summary of habitat classes observed in Prince William Sound.

Dominant Structuring Process	Habitat Class		Habitat Class Codes*	Length (km)	% of Mapping
	Exposure Category	Substrate Mobility			
Wave energy	Exposed	Stable	E_I	14	<1
		Partially Mobile	E_P	125	2
		Mobile	E_M	25	<1
	Semi-Exposed	Stable	SE_I	46	1
		Partially Mobile	SE_P	245	4
		Mobile	SE_M	36	1
	Semi-Protected	Stable	SP_I	293	5
		Partially Mobile	SP_P	1933	35
		Mobile	SP_M	81	1
	Protected/ Very Protected**	Stable	P_I, VP_I	171	3
Partially Mobile		P_P, VP_P	1928	35	
Mobile		P_M, VP_M	108	2	
Fluvial processes	Estuary	E_E, SE_E, SP_E, P_E, VP_E	504	9	
Current energy	Current-Dominated	SP_C, P_C	13	<1	
Glacial processes	Glacier	P_G	28	1	
Man-modified	Anthropogenic	SP_X, SP_Y, P_X, P_Y	35	1	
TOTALS			5585	100	
	Lagoon***	SE_L, SP_L, P_L, VP_L	225	4	

*See Appendix A, Tables A-8 and A-9 for full definitions of Habitat Class rationale and codes. Note that the Very Exposed (VE) categories were not mapped in the study area.
 **Very Protected/ Partially Mobile was grouped with Protected because it accounted for <0.5% of the shoreline.
 ***Lagoons are only mapped as a 'Secondary Habitat Class'.



Figure 3.21. Habitat Class: Glacier. The tidewater edge of the Harriman Glacier, Harriman Fjord completely dominates the shoreline at the head of fjord. Biota are absent and the intertidal is covered by calving glacial ice (PWS07_ML_07544.jpg).

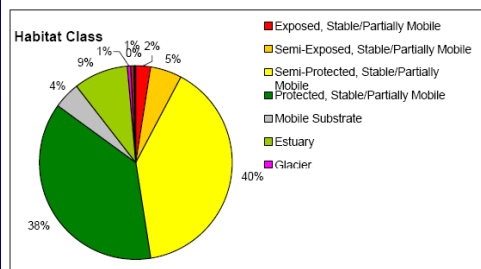
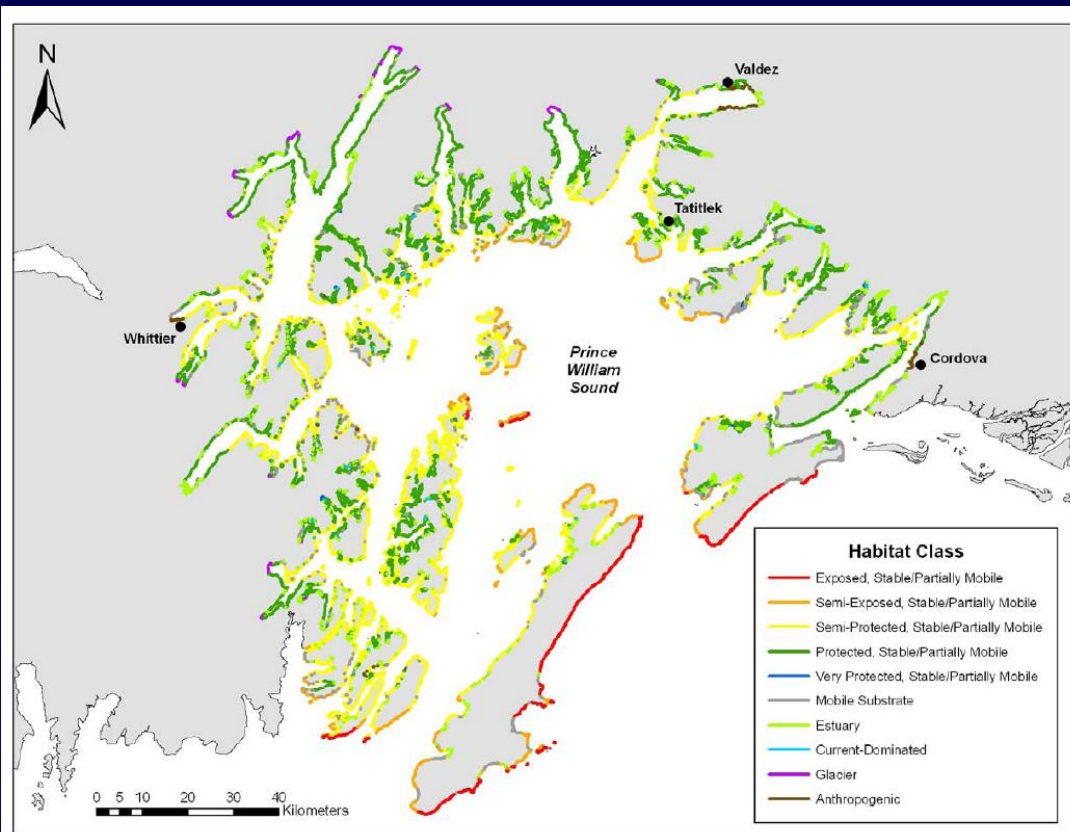


Figure 3.24. Summary of habitat classes in Prince William Sound. Note that the Very Exposed (VE) categories were not mapped in the study area and that Very Protected/ Partially Mobile classes were grouped with Protected/ Partially Mobile because it accounted for <0.5% of the mapping.

ShoreZone Summary Reports

Biobands - Seagrasses



The occurrence of each bioband mapped in Prince William Sound is summarized in Table 3.3 and Figure 3.4.

Table 3.3. Bioband abundances mapped in Prince William Sound.

Bioband Names	Code	Continuous		Patchy		Total (km)	% of Mapped
		(km)	%	(km)	%		
Dune Grass	GRA	1,467	26	845	15	2,312	41
Sedges	SED	241	4	163	3	404	7
Salt Marsh	PUC	960	17	803	14	1,763	31
Barnacle	BAR	3,445	62	1,393	25	4,838	87
Rockweed	FUC	3,486	62	1,385	25	4,871	87
Green Algae	ULV	3,011	54	1,748	31	4,759	85
Blue Mussel	BMU	188	3	745	13	933	16
Bleached Red Algae	HAL	437	8	866	16	1,303	24
Red Algae	RED	1,534	27	1,144	20	2,678	47
Alaria	ALA	452	8	246	4	698	12
Soft Brown Kelps	SBR	2,437	44	1,015	18	3,452	62
Dark Brown Kelps	CHB	161	3	132	2	293	5
Surfgrass	SUR	163	3	175	3	338	6
Eelgrass	ZOS	1,635	29	891	16	2,526	45
Dragon Kelp	ALF	5	<1	11	<1	16	<1
Bull Kelp	NER	74	1	47	1	121	2

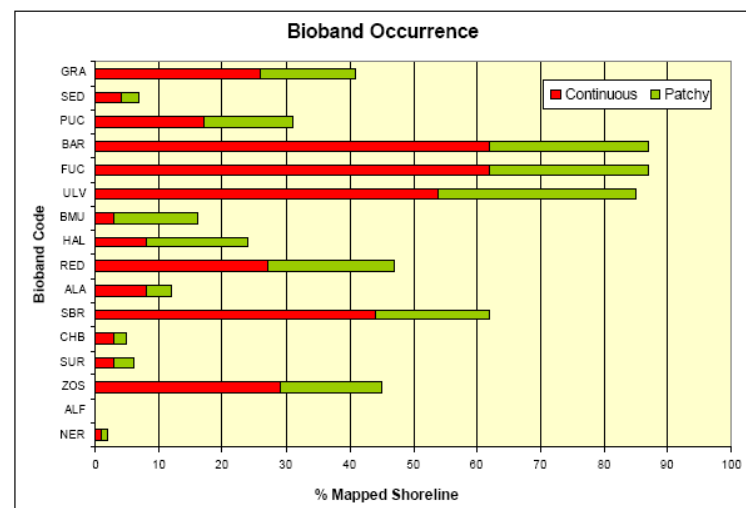
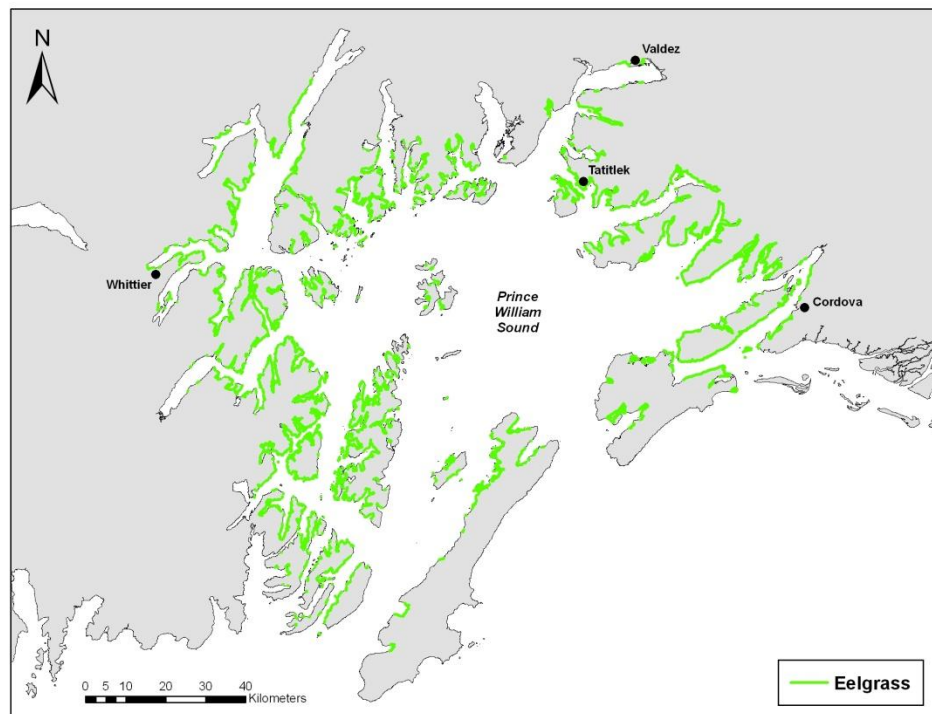


Figure 3.4. Occurrence of biobands mapped in Prince William Sound.



ShoreZone Summary Reports

Oil Residence Index



College Fjord

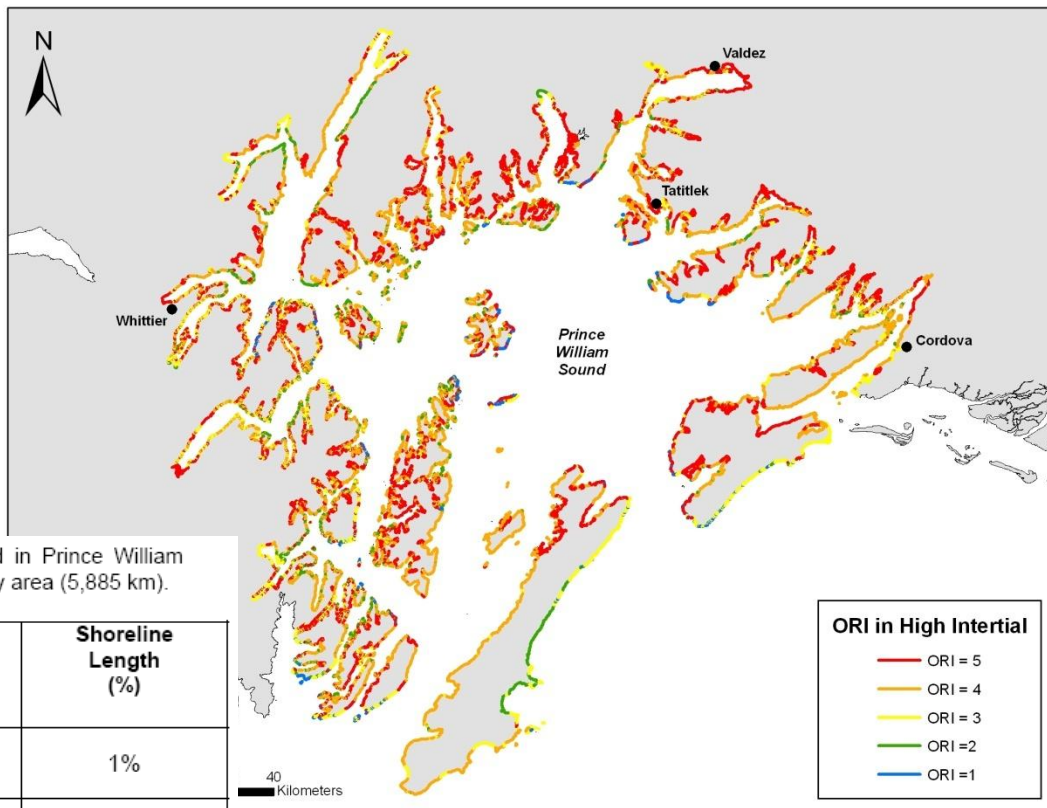


Table 2.3. Summary of Oil Residence Index for shore units mapped in Prince William Sound. Percentage of shoreline length is based on total shoreline in study area (5,885 km).

Relative Persistence	Oil Residence Index (ORI)	Estimated temporal persistence	Shoreline Length (km)	Shoreline Length (%)
Short	1	Days to weeks	41.0	1%
	2	Weeks to months	205.2	4%
Moderate	3	Weeks to months	857.7	15%
	4	Months to years	1704.4	31%
Long	5	Months to years	2777.2	50%

ORI in High Intertidal

- ORI = 5
- ORI = 4
- ORI = 3
- ORI = 2
- ORI = 1

ShoreZone Summary Reports

Shoreline Modifications



Valdez Oil Terminal

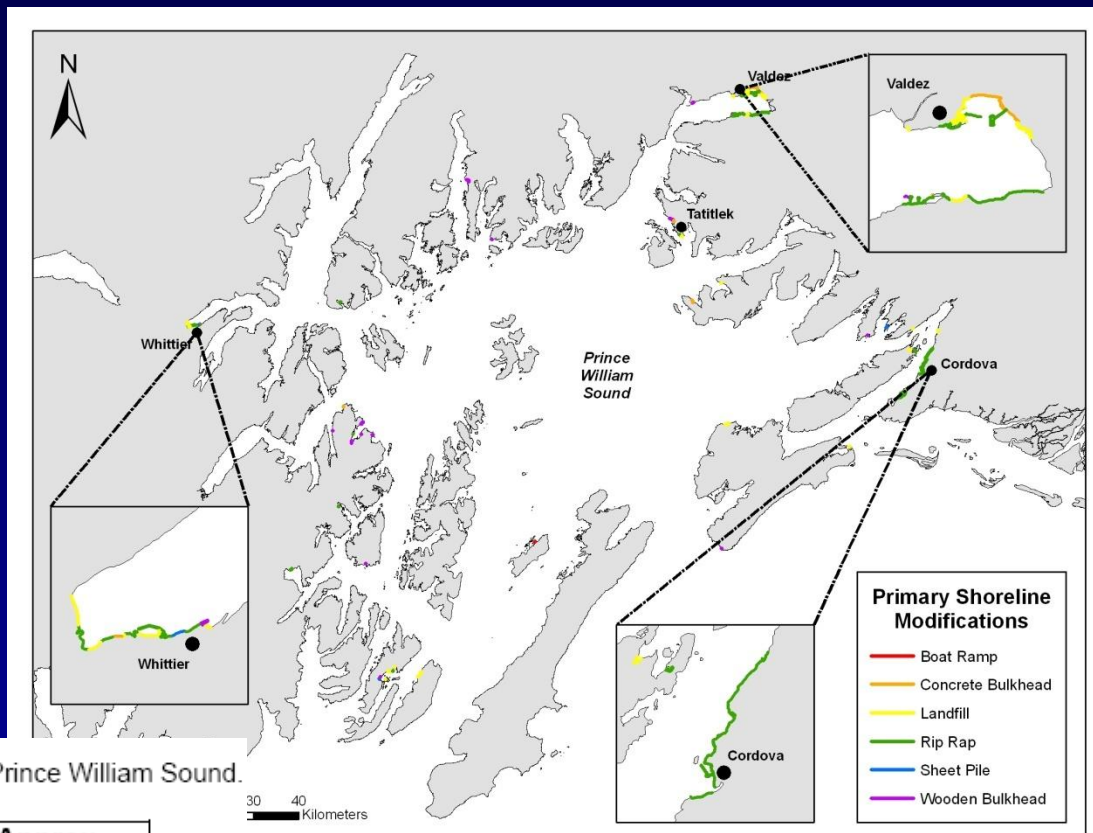


Table 2.4. Summary of shore modifications observed in Prince William Sound.

Shore Modification	Code	# of occurrences	Approx. shoreline length (km)*
boat ramp	BR	8	0.7
concrete bulkhead	CB	14	3.2
landfill	LF	51	8.9
riprap	RR	51	22.5
sheet pile	SP	12	1.5
wooden bulkhead	WB	25	1.8

*calculated from SM% field multiplied by unit length

ShoreZone: Shore Stations and Verification



Verification Surveys



Shore Station Surveys



Alaska ShoreZone Project

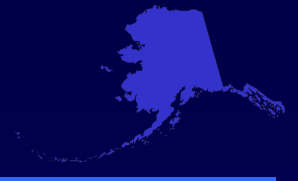


- Partners
- Progress
- Applications
- Web Products

Alaska

“ To make
physically and intellectually
accessible ”

Alaska ShoreZone Partners (2001-08)



NOAA Fisheries

Alaska Dept. of Natural Resources

The Nature Conservancy

Regional Citizens Advisory Council

Exxon Valdez Oil Spill Trustee Council

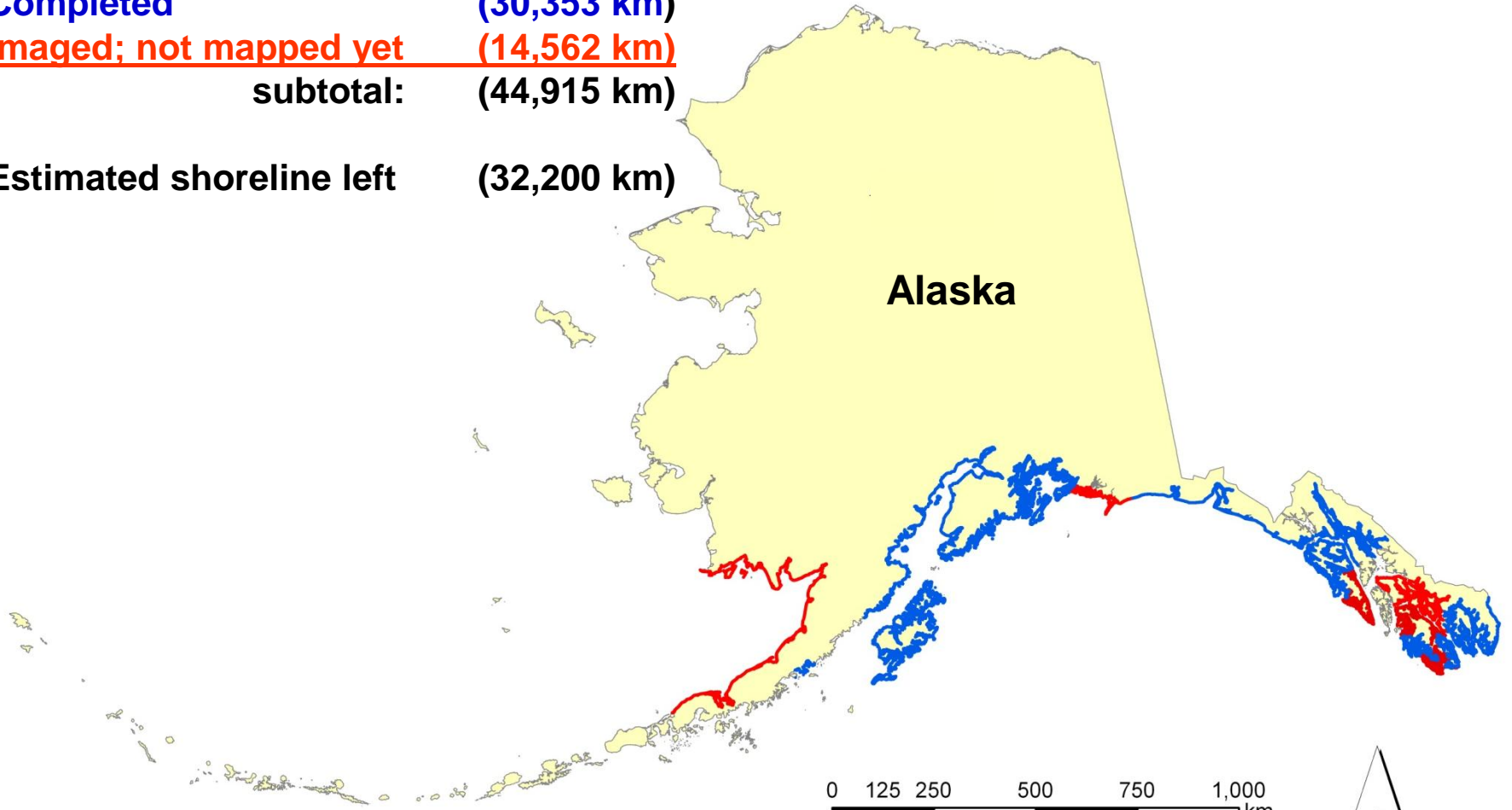
An aerial photograph of a coastal area in Alaska. The water is a deep blue, and several small, forested islands are scattered throughout. The islands are covered in dense green trees. In the background, there are more islands and a range of mountains under a clear blue sky.

U.S. Fish and Wildlife Service
Alaska Dept. of Fish & Game
University of Alaska Fairbanks
US Forest Service
National Park Service

Alaska ShoreZone Progress (2008)



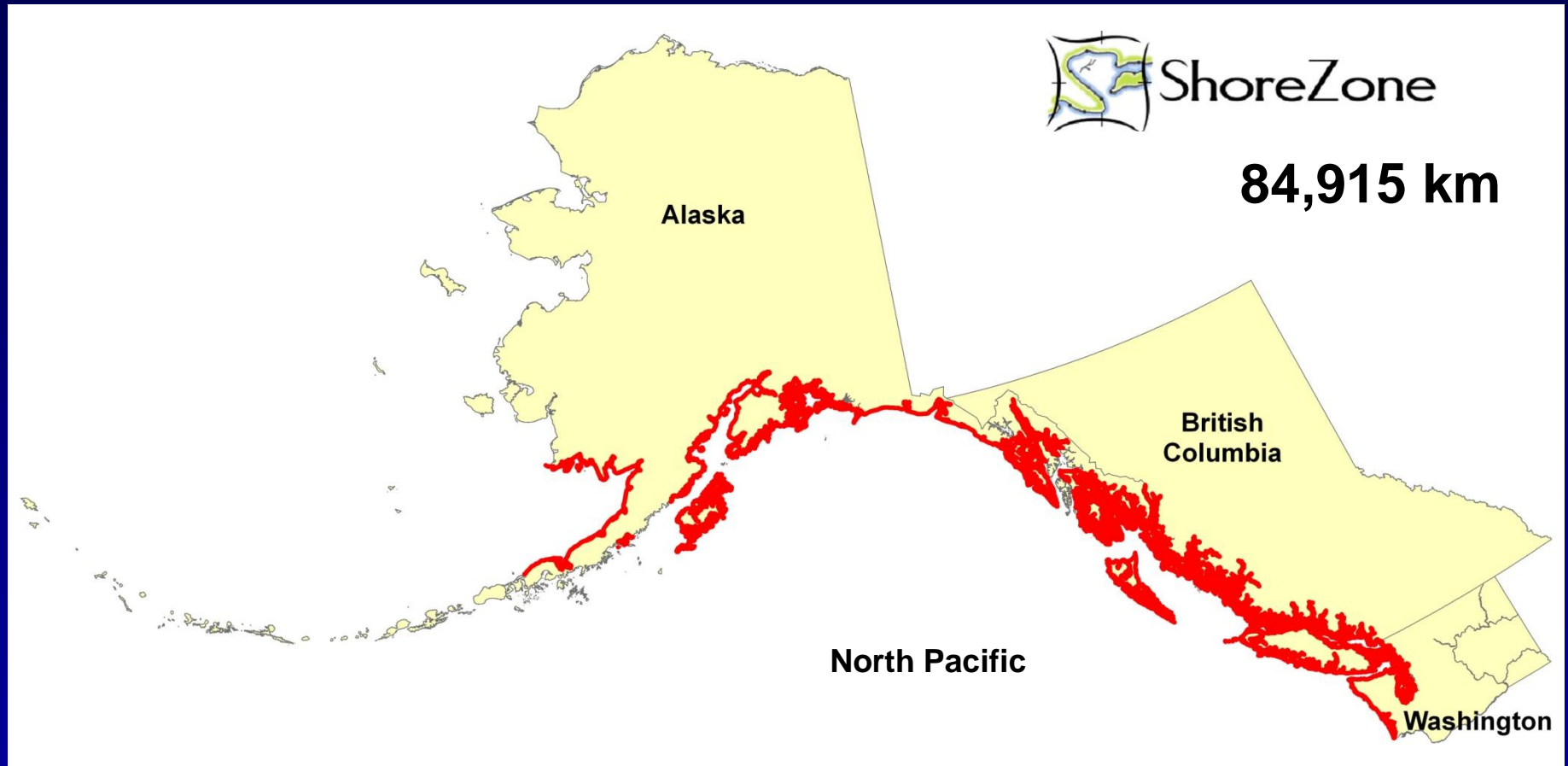
Completed	(30,353 km)
<u>Imaged; not mapped yet</u>	<u>(14,562 km)</u>
subtotal:	(44,915 km)
Estimated shoreline left	(32,200 km)



Map date: 08 December 2008



Extent of ShoreZone Imagery



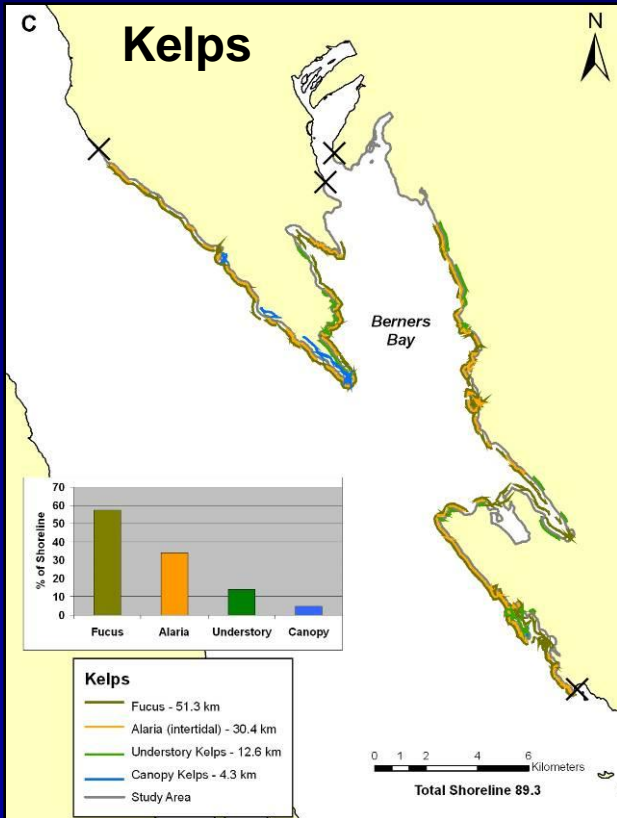


Applications: Resource Management

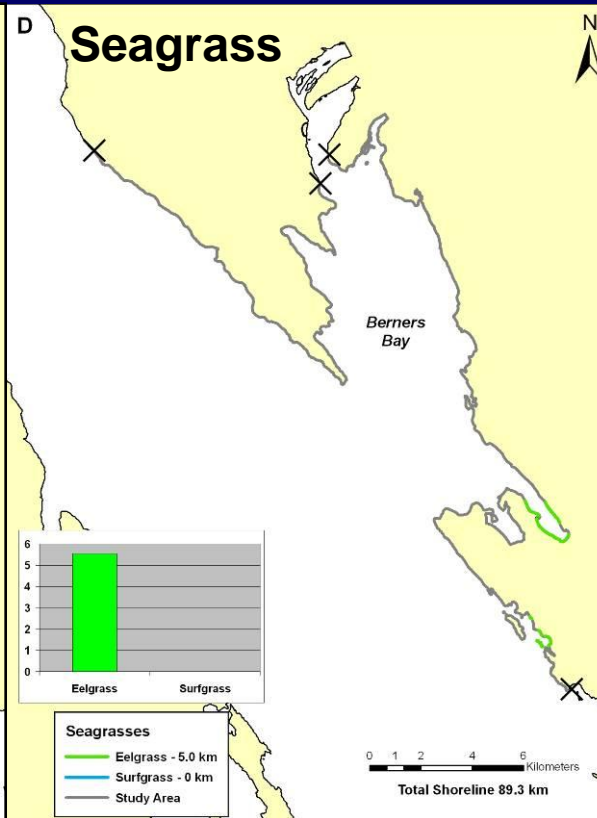


PACIFIC HERRING: litigation

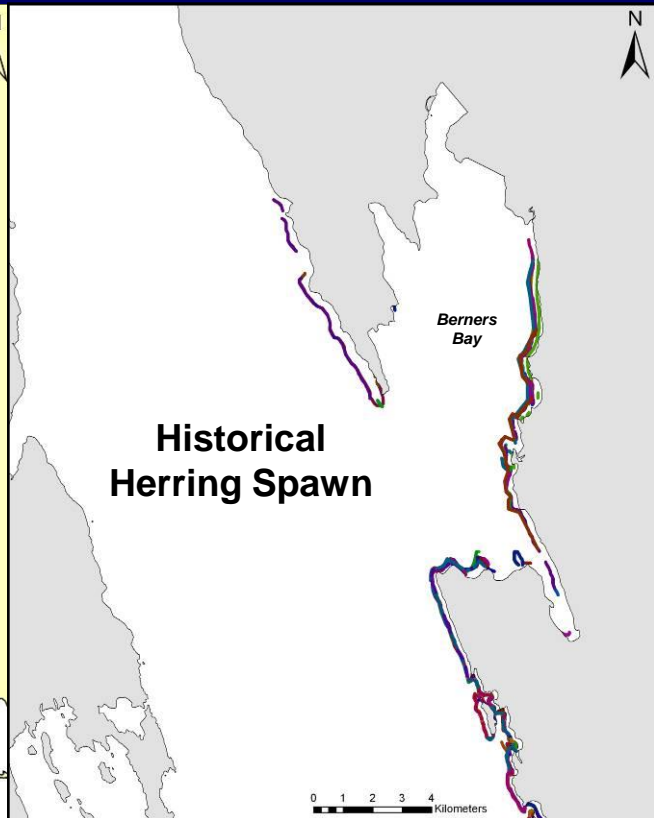
Lynn Canal Herring population placed on the Endangered Species List?



ShoreZone



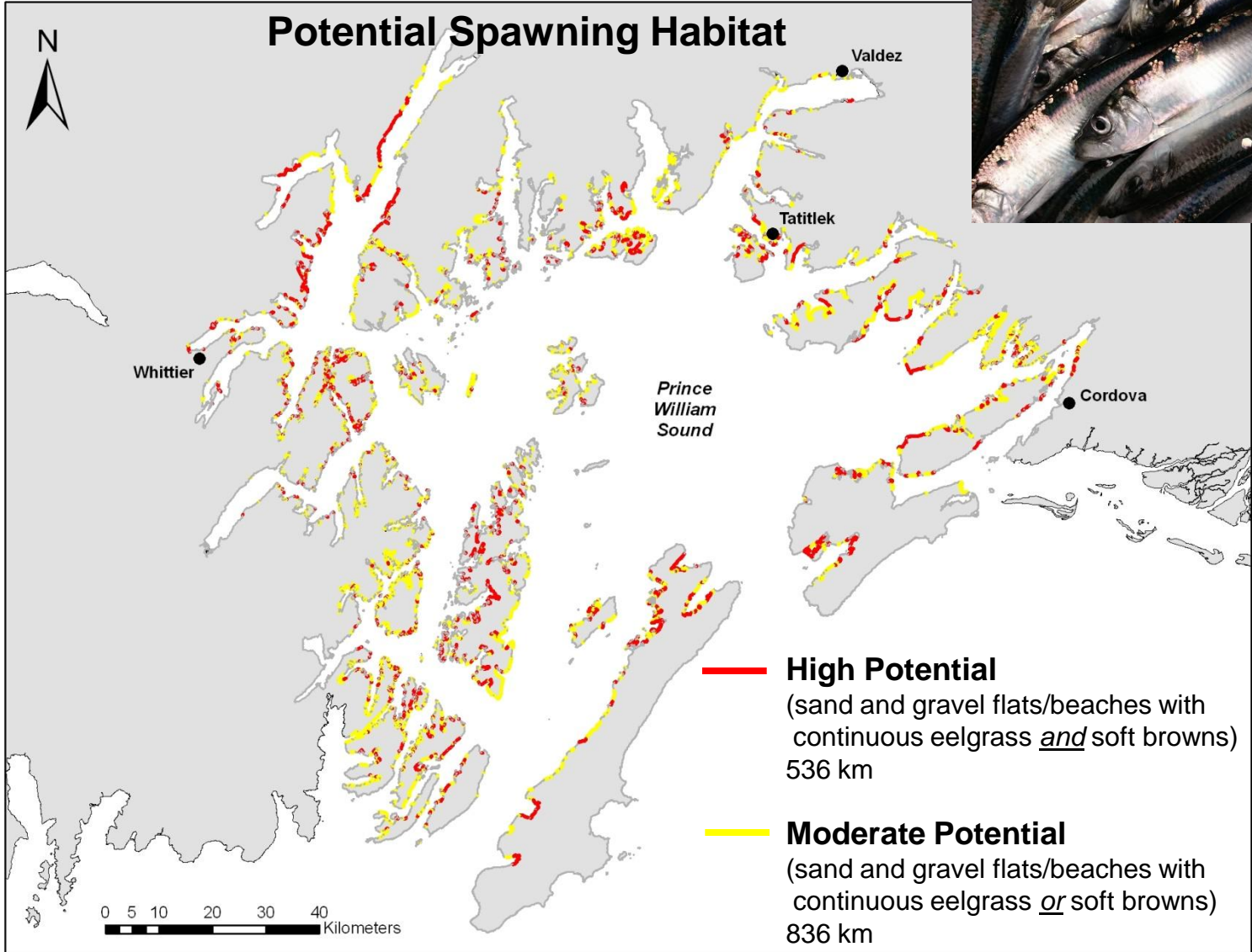
ShoreZone



ADF&G

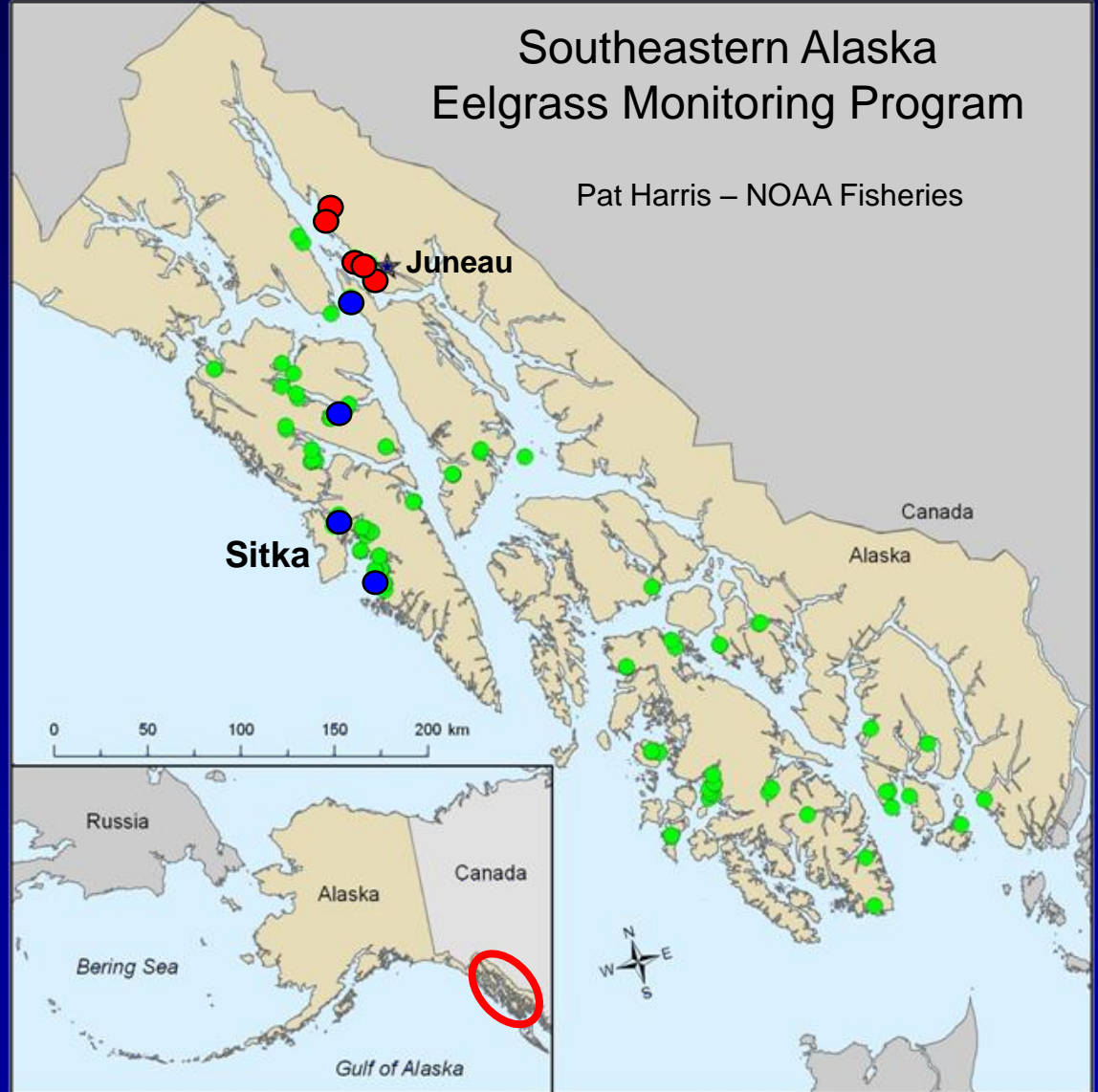


Applications: Resource Management





Applications: Resource Management





Applications: Invasive Species



Habitat Suitability Modeling

High risk areas for migration into SEAK waters



Salt Marsh Cordgrass, *Spartina*



European Green Crab,
Carcinus maenas

Green Crab Index

Jodi Harney - Coastal and Ocean Resources Inc.
Linda Shaw - Habitat Conservation Division, Juneau AK

Applications:

First Responders



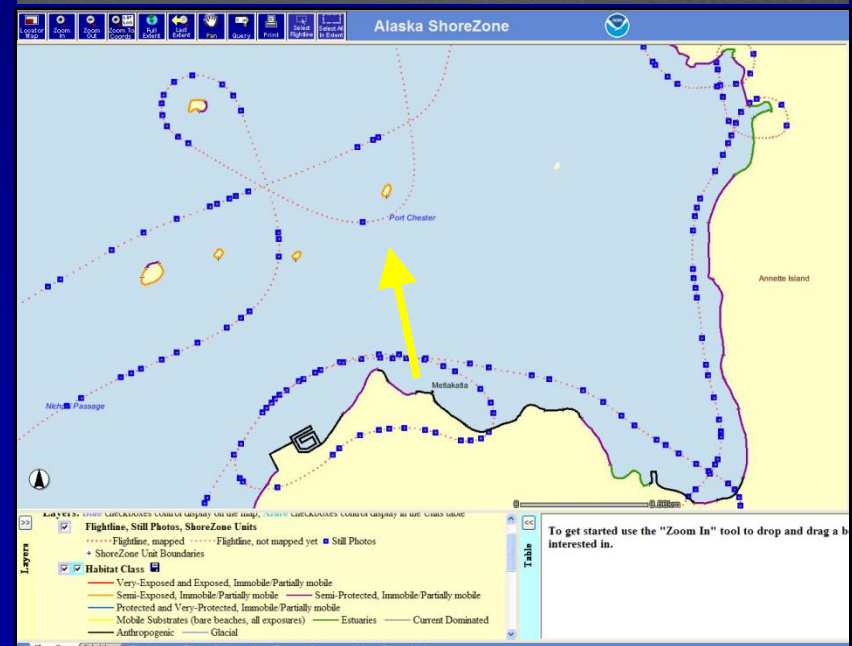
Grounding of the ferry *Lituya*
Metlakatla Jan. 30, 2009



“.... *ShoreZone* provided valuable information prior to any response assets could arrive on scene. It was extremely helpful and we'll use it again next time.”

LT Chris Williammee, USGC
Incident Management Sector Juneau

ShoreZone
web photo



Applications:

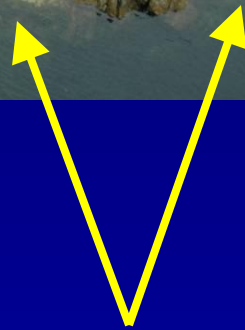
Coastal Archaeology



Clam Gardens



Intertidal rock wall
Sitka Sound



Alaska ShoreZone Web Products



www.alaskafisheries.noaa.gov/maps/szintro

- A collaboration between SZ partners and NOAA Fisheries AK Regional Office (Steve Lewis - data manager)
- Website is constantly being updated
- New features are being added
- Terabytes of information ~ 3 million images

The screenshot shows the NOAA Fisheries website for the Alaska ShoreZone Coastal Mapping and Imagery project. The page features a navigation menu on the left with links to Home, Fisheries, Online Services, Protected Species, Habitat Conservation, Regulations, News, Grants, Jobs, and Administration. Below the menu is contact information for the Alaska Regional Office, including the website URL (alaskafisheries.noaa.gov), address (PO Box 21668, Juneau, Alaska 99802-1668), and phone/fax numbers. There is also an accessibility section with options for text size and text-only display. The main content area is titled "Alaska ShoreZone Coastal Mapping and Imagery" and includes an "INTRODUCTION" section. The introduction text describes the ShoreZone mapping system, its history, and its purpose. A photograph of a rocky shoreline is included, with a caption: "Southeast Alaska Lynn Canal shoreline. Photo: NOAA Fisheries". Below the introduction, there are sections for "FLY THE COASTLINE" and "FLIGHT LOGS AND REPORTS". The "FLY THE COASTLINE" section lists links for "Advanced site", "Simple site", "Metadata", and "Mapping Protocol for the Gulf of Alaska". The "FLIGHT LOGS AND REPORTS" section lists links for "2004 SE Flight Log", "2004 SE Summary Report", "2004-05 SE Summary Report", "2005 SE Flight Log", "2006 SE Flight Log", "2006 Craig Flight Log", "2006 Ketchikan Area Summary Report", and "2007 SE Flight Log". There are also sections for "Additional ShoreZone Websites" (linking to Washington State) and "ShoreZone Related Databases" (linking to Prince William Sound (PWS)).

Interactive Geospatial Database Online



Logos: Map, Zoom In, Zoom Out, Zoom To Coords, Full Extent, Last Extent, Pan, Query, Print, Select Rightline, Select All In Extent

Alaska ShoreZone

ShoreZone Query Engine

Step 1: Select Unit attributes

```
((*BC_CLASS=24) AND (*PUC Is Not Null) AND (*ZOS Is Not Null) AND (*HAB_CLASS='43' Or *HAB_CLASS='53' Or *HAB_CLASS='63' Or *HAB_CLASS='33')) OR ((*BC_CLASS=24) AND (*GRA Is Not Null) AND (*ZOS Is Not Null) AND (*HAB_CLASS='43' Or *HAB_CLASS='53' Or *HAB_CLASS='63' Or *HAB_CLASS='33')) OR ((*BC_CLASS=24) AND (*SED Is Not Null) AND (*ZOS Is Not Null) AND
```

Sample Queries

-

Layers: Blue che

- Flightline
- Shoreline
- Habitat
- Biological
- Oil Res
- Splash
- Salt ma
- Upper i
- Lower i
- Seagra
- S
- E
- Canopy

- Habitat Class
- BC Class
- Environmental Sensitivity Index
- Biological Wave Exposure
- Oil Residency Index
- SplashZone
- Salt marsh vegetation
- Marsh grasses, herbs, sedges
- Dune Grass
- Sedges

5744N2158 12522W821 1-05

Elgrass

- Continuous
- Continuous
- Continuous
- Patchy

ShoreZone / Fish Atlas / Disclaimer / Privacy Policy / Home Page / Contact / Help / Recent Updates

Upgrade for ShoreZone: ArcGIS server 9.3



Web Mapping Application ESRI | ESRI Support Center | Help

ShoreZone Video

5809N2587 13610W5649
174630 Q206-03-04

Map Contents

- Query Layers
 - QueryLayer1
- ShoreZone Layers
 - Imagery
 - Flightline
 - 1s
 - 10s
 - Still Photos
 - ShoreZone Units
 - BioBands
 - Seagrasses
 - Canopy Kelps
 - Unit Boundaries
 - Unit Envelopes
 - Shoreline
 - Alaska

0.00 0.350 0.07 Miles



- Home
- Fisheries
- Online Services
- Protected Species
- Habitat Conservation
- Regulations
- News
- Grants
- Jobs
- Administration

Alaska Regional Office
alaskafisheries.noaa.gov
PO Box 21668
Juneau, Alaska 99802-1668
[Contact Information](#)

Related Websites

Select from below

Accessibility

Text Size: [T](#) [T](#) [T](#)
Text Only: [Yes](#) | [No](#)

Nearshore Fish Atlas of Alaska

NEARSHORE FISH PHOTOS

The following is a partial list of species captured, mostly by beach seining. A few species (e.g., Pacific halibut, yelloweye rockfish), were captured by jigging; jig catch data will be included in a later update of this website. The photo catalog will be updated as more fish photos become available. More information about the species may be accessed through the [Fish Atlas database](#).

cods - Gadidae

- » Arctic cod (*Boreogadus saida*)
- » Pacific cod (*Gadus macrocephalus*)
- » Saffron cod (*Eleginus gracilis*)
- » Walleye pollock (*Theragra chalcogramma*)

fathead sculpins - Psychrolutidae

- » Soft sculpin (*Psychrolutes sigalutes*)

gobies - Gobiidae

- » Bay goby (*Lepidogobius lepidus*)
- » Blackeye goby (*Rhinogobiops nicholsii*)

greenlings - Hexagrammidae

- » Juvenile greenling (*Hexagrammidae*)
- » Kelp greenling (*Hexagrammos decagrammus*)
- » Lingcod (*Ophiodon elongatus*)
- » Masked greenling (*Hexagrammos octogrammus*)
- » Painted greenling (*Oxylebius pictus*)
- » Rock greenling (*Hexagrammos lagocephalus*)
- » Whitespotted greenling (*Hexagrammos stelleri*)

gunnels - Pholidae

ronquils - Bathymasteridae

- » Northern ronquil (*Ronquilus jordani*)
- » Searcher (*Bathymaster signatus*)
- » Smallmouth ronquil (*Bathymaster leurolepis*)

sailfin sculpins - Hemitripterae

- » Crested sculpin (*Blepsias bilobus*)
- » Sailfin sculpin (*Nautichthys oculoasciatus*)
- » Silverspotted sculpin (*Blepsias cirrhosus*)

salmonids - Salmonidae

- » Arctic cisco (*Coregonus autumnalis*)
- » Chinook salmon (*Oncorhynchus tshawytscha*)
- » Chum salmon (*Oncorhynchus keta*)
- » Coho salmon (*Oncorhynchus kisutch*)
- » Cutthroat trout (*Oncorhynchus clarkii*)
- » Dolly Varden (*Salvelinus malma*)
- » Least cisco (*Coregonus sardinella*)
- » Pink salmon (*Oncorhynchus gorbuscha*)
- » Sockeye salmon (*Oncorhynchus nerka*)
- » Steelhead trout (*Oncorhynchus mykiss*)



http://mapping.fakr.noaa.gov/?theDB=FishAtlas_de...

Common name: **Saffron cod**
Scientific name: *Eleginus gracilis*
Family: cods - Gadidae

juvenile (265 mm)

adult (365 mm)

juvenile (138 mm)

young-of-the-year (75 mm)

Nearshore Fish Atlas Online



Nearshore Fish Atlas of Alaska

Chichagof Island

Crab Bay

0 0.888km

[Atlas Home](#)

Search Database

Regions

Fish Distribution

Habitat Distribution

Locales

St James Bay

St John Baptist Bay

Steamer Bay

Sylbum Harbor

Tenakee Inlet

Tenakee Springs

Habitat key

- Bedrock
- Eelgrass
- Kelp
- Sand-Gravel

Layers

- Flightline, Still Photos, ShoreZone Units
 - Flightline, mapped Flightline, not mapped yet ■ Still Photos + ShoreZone Unit Boundaries
- Fish Atlas Locales and Sites
 - Locales
 - Bedrock sites ● Eelgrass sites ● Kelp sites ● Sand-Gravel sites
- Habitat Class
- Biological Wave Exposure
- Oil Residency Index
- SplashZone
- + Salt marsh vegetation
- + Upper intertidal biobands
- + Lower intertidal biobands
- Seagrasses
 - - - Patchy ——— Continuous
- Surfgrass

Tenakee Springs, southeastern Alaska

[Start Over](#) [Back](#)

	Site	SubLocale	Latitude	Longitude	Habitat	# Species	Catch	Site
<input checked="" type="checkbox"/>	B01		57.7387	135.2709	Eelgrass	19	815	
<input checked="" type="checkbox"/>	B02		57.7390	135.1819	Kelp	7	52	
<input checked="" type="checkbox"/>	B03		57.7550	135.1129	Bedrock	8	809	
<input checked="" type="checkbox"/>	B05		57.7789	135.1319	Bedrock	1	1	
<input checked="" type="checkbox"/>	B06		57.7775	135.1272	Bedrock	2	2	
<input checked="" type="checkbox"/>	B07		57.7742	135.1981	Bedrock	0	0	
<input checked="" type="checkbox"/>	B08		57.7742	135.1981	Bedrock	4	10	
<input checked="" type="checkbox"/>	B17	Crab Bay	57.7364	135.3875	Eelgrass	24	1,163	
<input checked="" type="checkbox"/>	B18	Crab Bay	57.7367	135.3836	Eelgrass	25	3,287	
<input checked="" type="checkbox"/>	B19		57.7750	135.1011	Eelgrass	9	110	

[Download table](#)

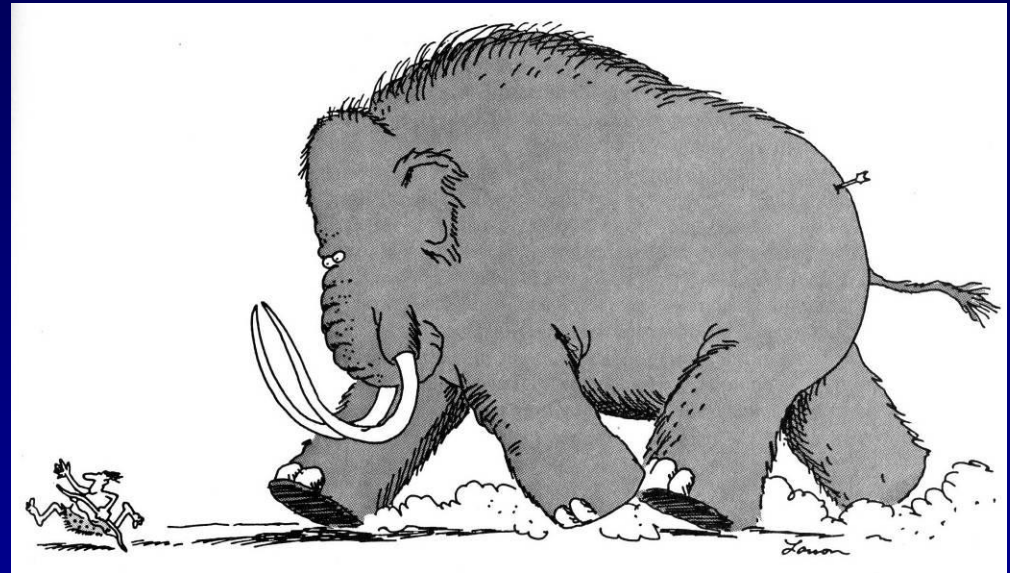
ShoreZone
Fish Atlas
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[Privacy Policy](#)
[Home Page](#)
[Contact](#)
[Help](#)
[Recent Updates](#)

Alaska ShoreZone Website – next steps



- Server upgrade
(ArcGIS 9.3)
- Add server nodes
(Fairbanks -GINA)
(ADNR – Alaska Mapper)
- Video Tutorials
- Offline products
- Google Earth?
- Apply for funding

“Stimulus and Response”



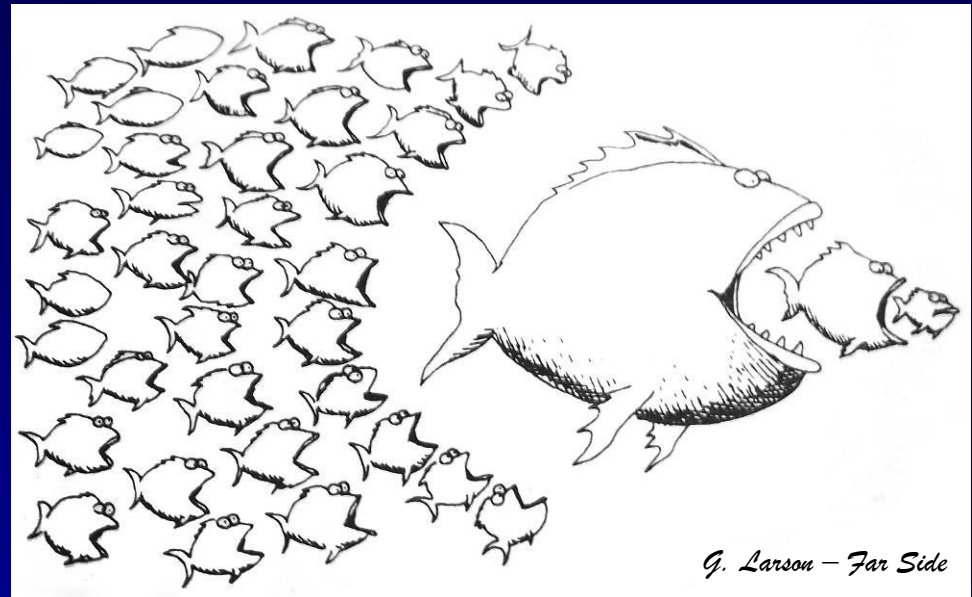
G. Larson – Far Side

Alaska ShoreZone: Challenges



- Management of continental-scale dataset (QA/QC)
- Users – communication & training
- Balancing multi-agency needs
- Transferring funds & long term funding sources

“Be Aware!”

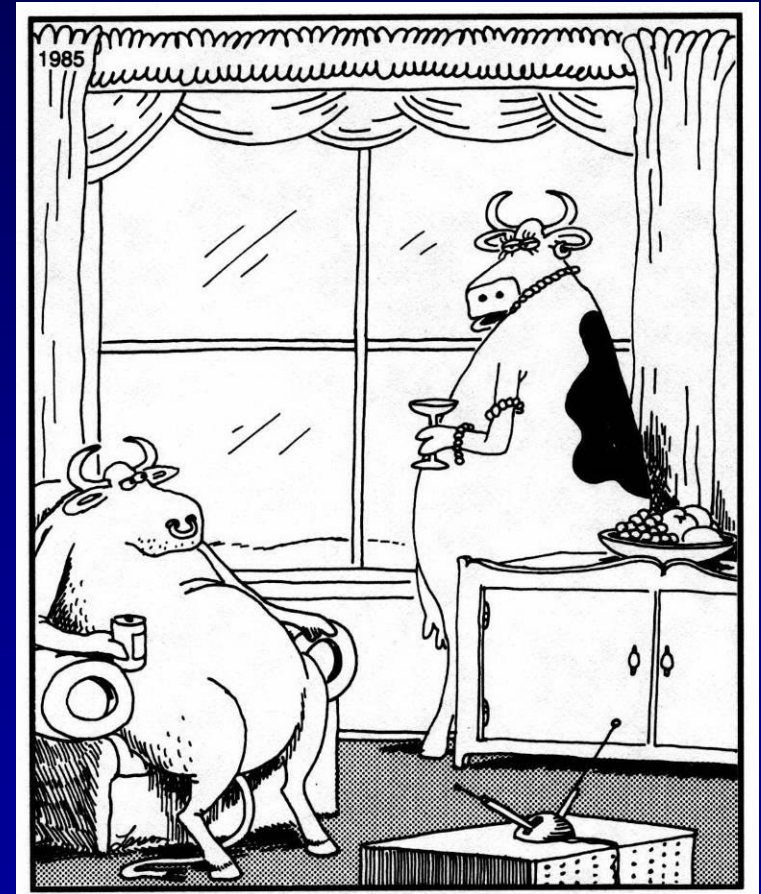


Future Plans for ShoreZone



“Wendell...I’m not content.”

- Complete Alaska
(Imagery & mapping)
- Add datasets & tools
(ground stations, first responders)
- WA, BC, AK ShoreZone?
(International borders)



G. Larson - Far Side



Thank You

