



Introduction to **ShoreZone**

Imaging and Mapping Alaska's Coast

Prepared for:
Local Environmental Observers (LEO) Network, Sept, 17, 2013



Prepared by
Darren Stewart, Alaska ShoreZone Coordinator,
The Nature Conservancy

ShoreZone Alaska Partners

- Alaska Department of Environmental Conservation
- Alaska Department of Fish and Game
- Alaska Department of Natural Resources
- Alaska Division of Geological and Geophysical Surveys
- Alaska Ocean Observatory System
- Aleutian and Bering Sea Islands LCC
- Archipelago Marine Research Ltd.
- Arctic LCC
- Bureau of Ocean and Energy Management
- Coastal and Ocean Resources Inc.
- Cook Inlet Regional Citizens Advisory Council
- Exxon Valdez Oil Spill Trustee Council
- Kachemak Bay National Research Reserve
- Coastal Impact Assistance Program
- National Park Service
- NOAA National Marine Fisheries Service, Alaska Region and Alaska Fisheries Science Center

- North Pacific Research Board
- Nuka Research
- Oil Spill Recovery Institute
- Prince William Sound Regional Citizens Advisory Council
- Prince William Sound Science Center
- Royal Caribbean Cruise Lines, Ocean Fund
- The Skaggs Foundation
- The Gordon and Betty Moore Foundation
- Sitka Tribe of Alaska
- Southeast Alaska Petroleum Resources Organization
- The Nature Conservancy
- US Coast Guard
- USDA Forest Service
- US Fish and Wildlife Service
- University of Alaska Fairbanks
- University of Alaska Southeast
- Western Alaska LCC



Why Alaska's Nearshore is Important - Resources



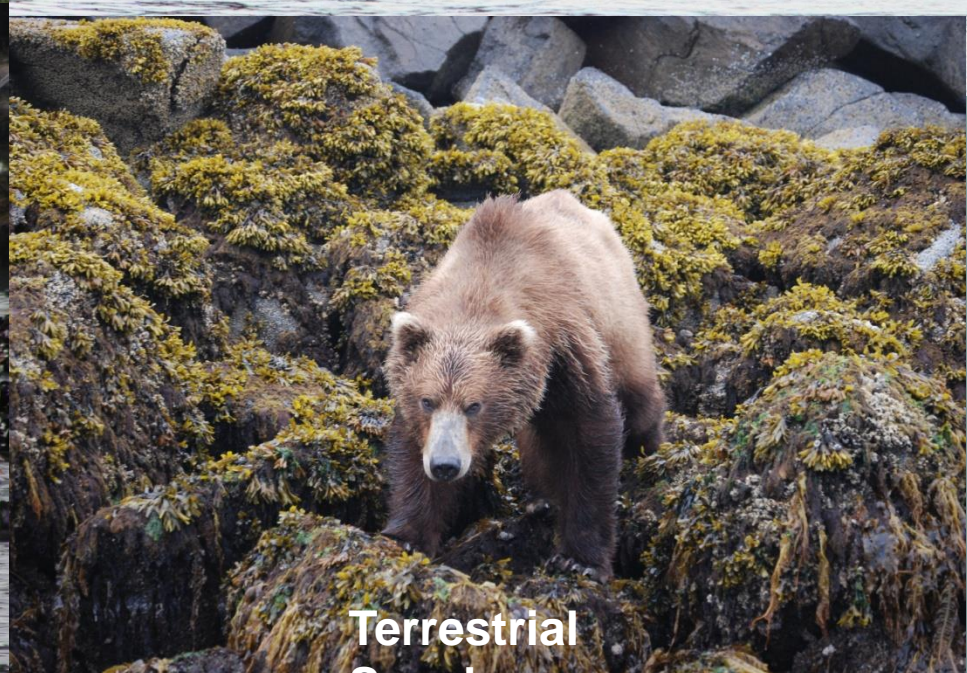
Essential Fish Habitat



Marine Mammals



Seabird Habitat



**Terrestrial
Species**

Coastal Issues in Alaska



Climate change



Increased vessel traffic



Oil and gas



Coastal Development

How can ShoreZone assist the LEO Network?

- By providing a **baseline** of coastal imagery that is dated, geo-referenced and mapped for various attributes.
- ShoreZone can be used to observe changes to a shoreline over time (ex: monitor erosion or invasive species) or after a specific incident by providing the before incident baseline imagery
- The aerial imagery can be used to share traditional place-based knowledge with others via detailed pictures

What is ShoreZone?



ShoreZone is a standardized coastal habitat mapping system that characterizes physical and biological resources of the shoreline.

ShoreZone features:

- georeferenced *imagery*
- georeferenced *data*
- searchable *database*



What is ShoreZone?

Standardized Coastal Mapping System



wave exposure



geomorphology



sediment texture



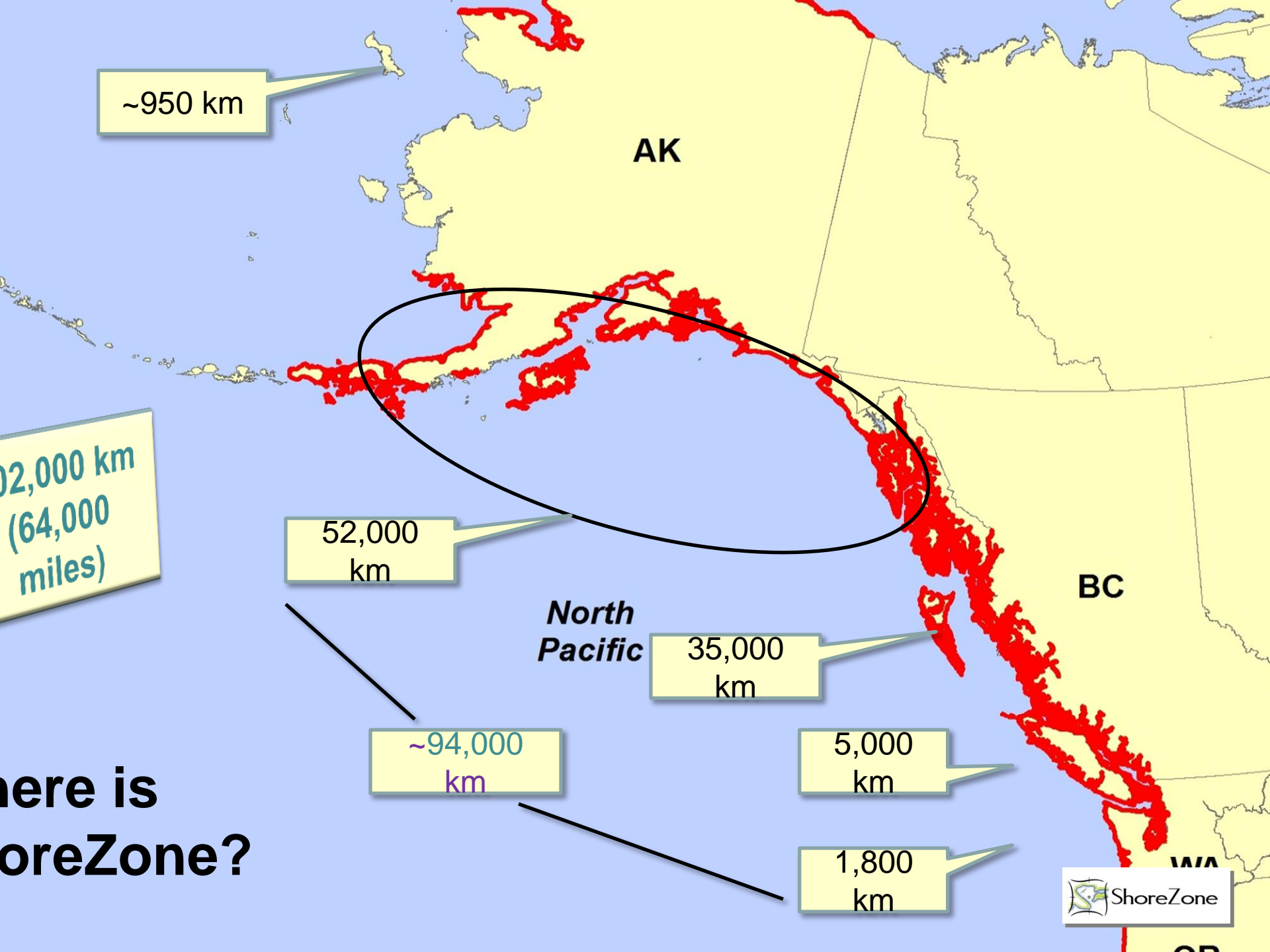
intertidal/subtidal biota



supratidal biota



man-made features

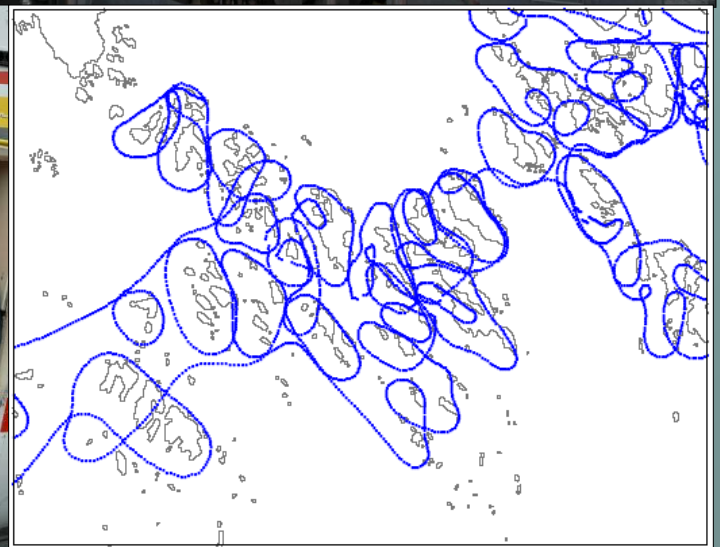


ShoreZone Method: Coastal Imagery



Mapping is based on video and still imagery:

- low-altitude flights of $< 200\text{m}$
- zero tides or lower
- oblique camera view
- spatially-referenced





Alaska ShoreZone Online: home page

www.alaskafisheries.noaa.gov/shorezone

- A collaboration between SZ partners and NOAA AK Regional Office (Steve Lewis)
- Website is constantly being updated
- New features are being added
- Terabytes of information
~ 4 million images

NOAA Fisheries NATIONAL MARINE FISHERIES SERVICE ALASKA REGIONAL OFFICE

Search

Alaska ShoreZone Coastal Mapping and Imagery

ALASKA SHOREZONE - INTRODUCTION

The ShoreZone mapping system has been in use since the early 1980s and has been applied to more than 40,000 km of shoreline in Washington and British Columbia (Berry et al 2004; Howes 2001). Through partnerships with other agencies and organizations, portions of southeastern and central Alaska have been imaged and mapped. This project is funded by NOAA and a number of other agencies and organizations as listed below.

This standardized system catalogs both geomorphic and biological resources at mapping scales of better than 1:10,000. The high resolution, attribute rich dataset is a useful tool for extrapolation of site data over broad spatial ranges and creating a variety of habitat models.

Low-tide-oblique aerial imagery sets this system apart from other mapping efforts. You can "fly the coastline" (video), view still photos, and access biophysical data using our interactive ArcIMS web-site. This site will include more of Alaska's coast-line as new data becomes available.

Kruzof Island, Sitka Sound, Alaska.
Photo: NOAA Fisheries

ALASKA SHOREZONE

ShoreZone - Photographs, Video, Maps

Fly the Coastline and View Habitat Maps

- » [ShoreZone Flex Site](#) New!
- » [ShoreZone-Fish Atlas-ShoreStation Website](#) (works in all platforms/browsers)
- » [ShoreZone Site](#) (to be replaced by above sites)
- » [Video Tutorials](#)
- » [Required Internet Explorer Settings](#)
- » [How to Get Started](#)


PROGRAM ACTIVITIES AND NEWS

- » Newsletters
 - » Year in Review: [2010, 2009](#)
 - » [Kake, 2009](#)
- » [Workgroup, Meetings and Events](#)
- » [Alaska ShoreZone Partners](#)

RELATED DATABASES

- » [Nearshore Fish Atlas of Alaska](#)
- » [Shore Station Database](#)

ShoreZone Flex Site Desktop

 Alaska ShoreZone

Alaska Base

[Disclaimer](#) [Privacy Policy](#) [ShoreZone Page](#) [Metadata](#) [Contact](#) [ShoreZone Data Dictionary](#)

Layer Legend Layer Query Task Management

☒ Show all layers in service

☒ Shore Zone Layers

☒ Still Photos

☒ Video Flightline

Derived ShoreZone Attributes

☐ Habitat Class

☐ BC Class

☐ Biological Wave Exposure

Response Attributes

☐ Environmental Sensitivity Index (ESI)

☐ Oil Residency Index (ORI)

Biological Attributes

☐ SplashZone; Black Seaside Lichen bioband

☐ Dune Grass, Sedges, and Salt Marsh Vegetation

☐ Dune Grass

Video Snapshots

Current extent is too large. Reduce extent size to see snapshots.



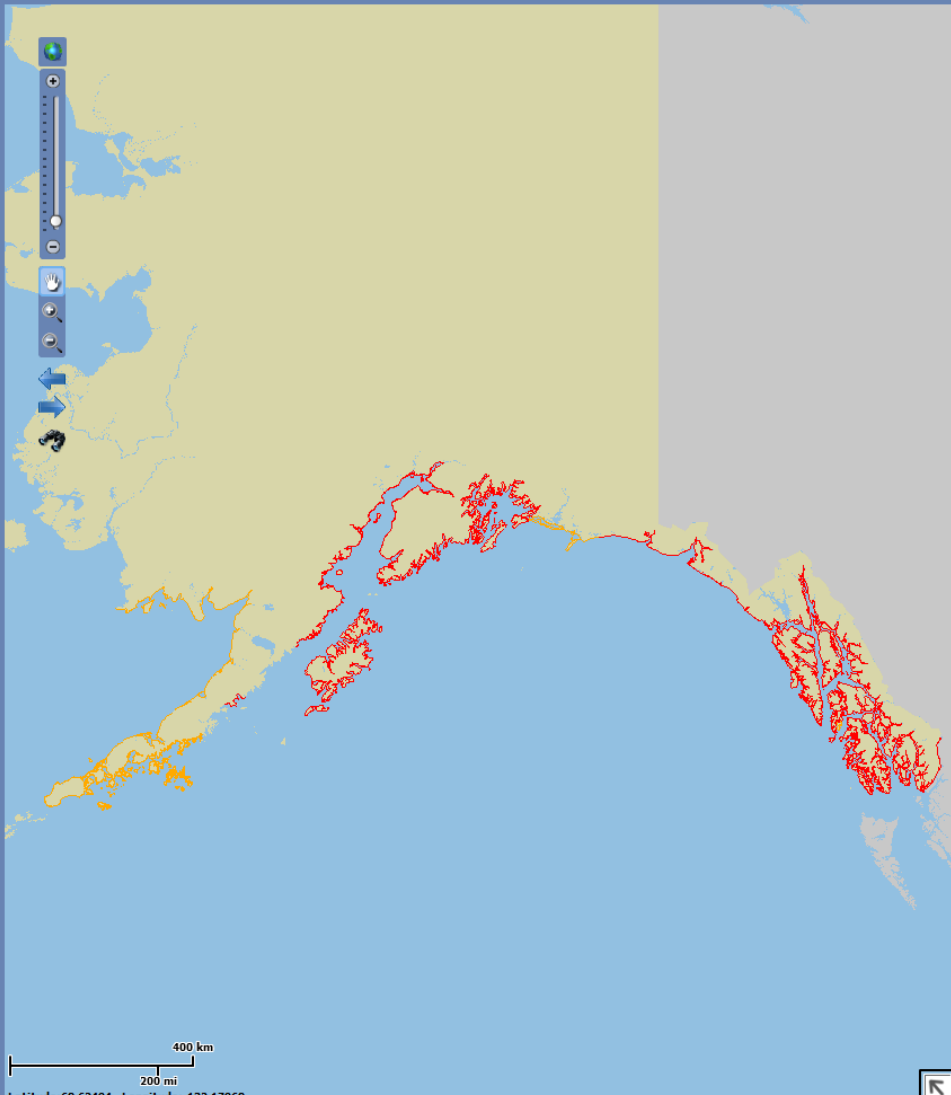


Photo Snapshots

Current extent is too large. Reduce extent size to see photos.





400 km
200 mi
Latitude:68.62494 Longitude:-132.17968

Unit Description Table

Know your way around the desktop

The screenshot displays the Alaska ShoreZone desktop application. The interface is divided into several panels:

- Mapping Panel:** The main map area on the left, showing a map of Alaska with a red coastline. It includes a scale bar (0 to 400 km) and coordinates (Latitude: 68.62494, Longitude: -132.17968).
- Attribute Panel:** A panel on the right side, titled "Attribute Panel", which lists various layers and attributes. It includes a "Show all layers in service" checkbox and a list of layers such as "Shore Zone Layers", "Still Photos", "Video Flightline", "Derived ShoreZone Attributes", "Response Attributes", and "Biological Attributes".
- Video Panel:** A panel at the bottom center, titled "Video Panel", which displays a video player interface. It includes a "Video Snapshots" section and a "Current extent is too large. Reduce extent size to see snapshots." message.
- Stills Panel:** A panel at the bottom right, titled "Stills Panel", which displays a photo player interface. It includes a "Photo Snapshots" section and a "Current extent is too large. Reduce extent size to see photos." message.

The top of the application features a header with the "Alaska ShoreZone" logo and a navigation bar with links for "Disclaimer", "Privacy Policy", "ShoreZone Page", "Metadata", "Contact", and "ShoreZone Data Dictionary". The navigation bar also includes tabs for "Layer Legend", "Layer Query", and "Task Management".

Where do you want to go?

The screenshot displays the Alaska ShoreZone web application. The main map area shows a coastal region with a yellow landmass and blue water. A yellow circle highlights the navigation toolbar on the left, which includes a compass, a scale bar, and a search icon. The top navigation bar features the "Alaska Base" dropdown menu and links for "Disclaimer", "Privacy Policy", "ShoreZone Page", "Metadata", "Contact", and "ShoreZone Data Dictionary". The right sidebar contains three panels: "Layer Legend", "Layer Query", and "Task Management". The "Layer Legend" panel is expanded, showing a list of layers with checkboxes. The "Video Snapshots" and "Photo Snapshots" panels are also visible, both displaying a message: "Current extent is too large. Reduce extent size to see snapshots/photos." The bottom of the interface includes a scale bar (0 to 400 km) and coordinates (Latitude: 68.62494, Longitude: -132.17968).

Alaska ShoreZone

Alaska Base

Disclaimer Privacy Policy ShoreZone Page Metadata Contact ShoreZone Data Dictionary

Layer Legend Layer Query Task Management

☒ Show all layers in service

- ☒ Shore Zone Layers
 - ☒ Still Photos
 - ☒ Video Flightline
- Derived ShoreZone Attributes
 - ☐ Habitat Class
 - ☐ BC Class
 - ☐ Biological Wave Exposure
- Response Attributes
 - ☐ Environmental Sensitivity Index (ESI)
 - ☐ Oil Residency Index (ORI)
- Biological Attributes
 - ☐ SplashZone; Black Seaside Lichen bioband
 - ☐ Dune Grass, Sedges, and Salt Marsh Vegetation
 - ☐ Dune Grass

Video Snapshots

Current extent is too large. Reduce extent size to see snapshots.

Photo Snapshots

Current extent is too large. Reduce extent size to see photos.

400 km
200 mi
Latitude: 68.62494 Longitude: -132.17968
Unit Description Table

Viewing ShoreZone Imagery

Alaska ShoreZone

Alaska Base [Disclaimer](#) [Privacy Policy](#) [ShoreZone Page](#) [Metadata](#) [Contact](#) [ShoreZone Data Dictionary](#)

Layer Legend Layer Query Task Management

☒ Show all layers in service

- ☒ Shore Zone Layers
 - ☒ Still Photos
 - ☒ Video Flightline
- Derived ShoreZone Attributes
 - ☐ Habitat Class
 - ☐ BC Class
 - ☐ Biological Wave Exposure
- Response Attributes
 - ☐ Environmental Sensitivity Index (ESI)
 - ☐ Oil Residency Index (ORI)
- Biological Attributes
 - ☐ SplashZone; Black Seaside Lichen bioband
 - ☐ Dune Grass, Sedges, and Salt Marsh Vegetation
 - ☐ Dune Grass

Video Snapshots

Lat: 59 25' 4" N Lon: 153 23' 46" W

5925N0747 15323W7731

2008-10-15 10:00:15

Photo Snapshots

Lat: 59 22' 48" N Lon: 153 20' 30" W

Unit Description Table

3 km 2 mi

Latitude: 59.45737 Longitude: -153.35371

Low

Viewing ShoreZone Imagery

Alaska ShoreZone

Alaska Base

[Disclaimer](#) [Privacy Policy](#) [ShoreZone Page](#) [Metadata](#) [Contact](#) [ShoreZone Data Dictionary](#)

Video Snapshots

Lat: 59 25' 4" N Lon: 153 23' 46" W

5925N0747 15323W7731
200846 0208-23-03

3 km
2 mi

Latitude: 59.45719 Longitude: -153.31937

Unit Description Table

Low

The screenshot displays the Alaska ShoreZone web application interface. On the left, a map shows a coastal area with red and blue lines indicating the shoreline. A scale bar at the bottom left indicates 3 km and 2 mi. The bottom left corner shows the coordinates Latitude: 59.45719 and Longitude: -153.31937, along with a link to the Unit Description Table. On the right, a video snapshot window is open, showing an aerial view of the coastal area. The window title is 'Video Snapshots' and it displays the coordinates Lat: 59 25' 4" N Lon: 153 23' 46" W. Below the coordinates, the coordinates are repeated in a larger font: 5925N0747 15323W7731 and 200846 0208-23-03. The video snapshot window has a yellow circle around the title bar. At the bottom right, there is a 'Low' button and a set of navigation controls.

Mapping Attribute Layers

Alaska ShoreZone

Alaska Base

[Disclaimer](#) [Privacy Policy](#) [ShoreZone Page](#) [Metadata](#) [Contact](#) [ShoreZone Data Dictionary](#)

Layer Legend Layer Query Task Management

☒ Show all layers in service

- ☒ Shore Zone Layers
 - ☒ Still Photos
 - ☒ Video Flightline
- Derived ShoreZone Attributes
 - ☐ Habitat Class
 - ☐ BC Class
 - ☐ Biological Wave Exposure
- Response Attributes
 - ☐ Environmental Sensitivity Index (ESI)
 - ☐ Oil Residency Index (ORI)
- Biological Attributes
 - ☐ SplashZone; Black Seaside Lichen bioband
 - ☐ Dune Grass, Sedges, and Salt Marsh Vegetation
 - ☐ Dune Grass

Video Snapshots

Lat: 59 25' 4" N Lon: 153 23' 46" W

5925N0747 15323W7731

2008-10-15 12:00:00

Photo Snapshots

Lat: 59 22' 48" N Lon: 153 20' 30" W

3 km
2 mi

Latitude: 59.45737 Longitude: -153.35371

Unit Description Table

Mapping Attribute Layers

Alaska ShoreZone

Alaska Base [Disclaimer](#) [Privacy Policy](#) [ShoreZone Page](#) [Metadata](#) [Contact](#) [ShoreZone Data Dictionary](#)

Layer Legend Layer Query Task Management

☒ Show all layers in service

☒ Shore Zone Layers

- ☐ Still Photos
- ☐ Video Flightline

Derived ShoreZone Attributes

- ☐ Habitat Class
- ☐ BC Class
- ☐ Biological Wave Exposure

Response Attributes

- ☐ Environmental Sensitivity Index (ESI)
- ☒ Oil Residency Index (ORI)
 - 1 Short persistence; days to weeks
 - 2 Short persistence; weeks to months
 - 3 Moderate persistence; weeks to months
 - 4 Moderate persistence; months to years
 - 5 Long persistence; months to years

Biological Attributes

- ☐ SplashZone; Black Seaside Lichen bioband
- ☐ Dune Grass, Sedges, and Salt Marsh Vegetation
- ☐ Dune Grass
- ☐ Sedges
- ☐ Salt Marsh Vegetation
- ☐ Barnacles
- ☐ Rockweed
- ☐ Blue Mussels
- ☐ Green Algae
- ☐ Red Algae
- ☐ Bleached Red Algae
- ☐ Alaria
- ☐ Soft Brown Kelps
- ☐ Dark Brown Kelps

3 km
2 mi
Latitude: 59.38178 Longitude: -153.31909

Unit Description Table

Mapping Attribute Layers

Alaska ShoreZone

Alaska Base

[Disclaimer](#) [Privacy Policy](#) [ShoreZone Page](#) [Metadata](#) [Contact](#) [ShoreZone Data Dictionary](#)

Layer Legend Layer Query Task Management

☒ Show all layers in service

☒ Shore Zone Layers

- ☐ Still Photos
- ☐ Video Flightline

Derived ShoreZone Attributes

- ☐ Habitat Class
- ☐ BC Class
- ☒ Biological Wave Exposure

very protected
protected
semi-protected
semi-exposed
exposed
very exposed

Video Snapshots

Lat: 59 25' 5" N Lon: 153 23' 48" W

5925N0911 15323W8115

Photo Snapshots

Lat: 59 22' 48" N Lon: 153 20' 30" W

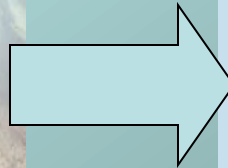
3 km
2 mi

Latitude: 59.34627 Longitude: -153.35720

Unit Description Table

How is ShoreZone mapped?

from imagery to maps with database



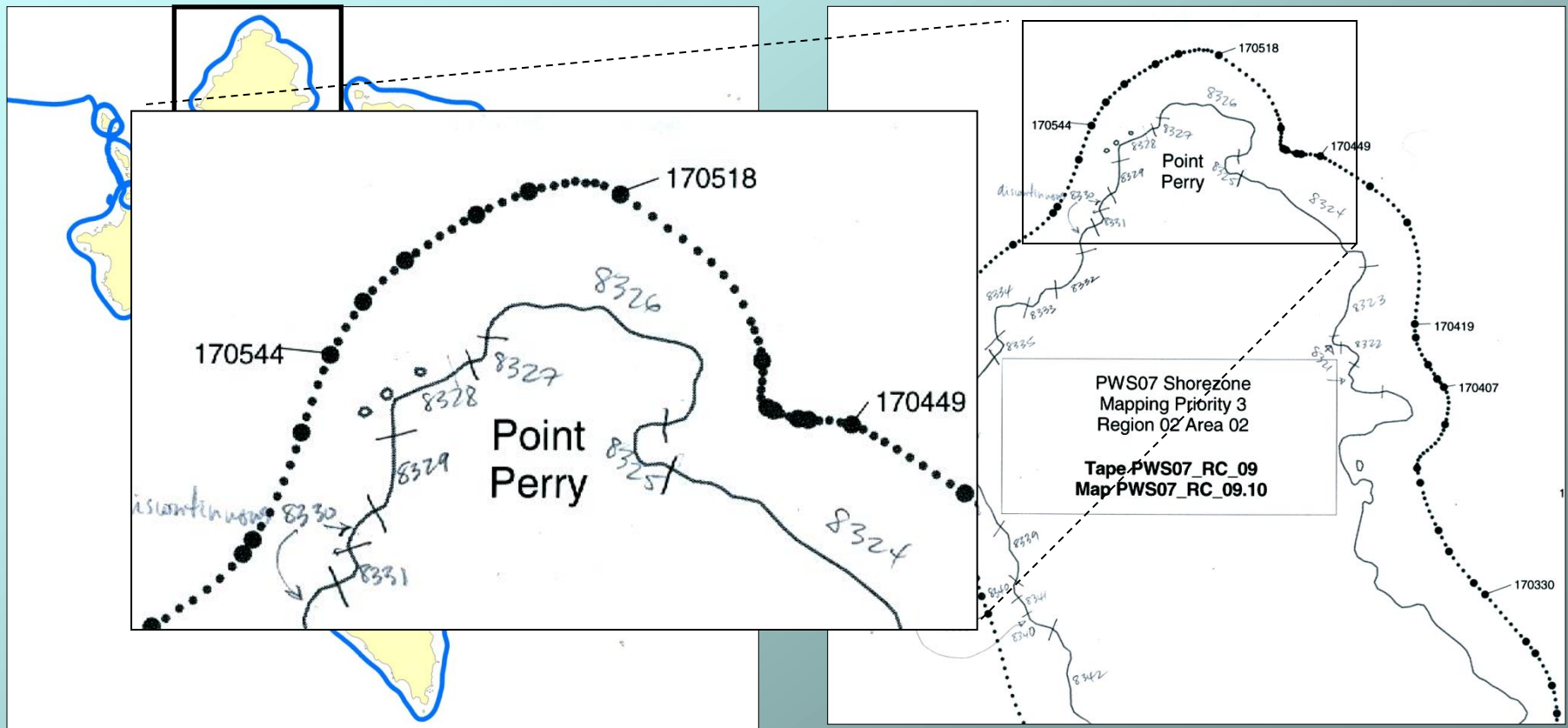
ShoreZone Method: Digital Shoreline



GPS flight trackline recorded at
1-second intervals:



Trackline and imagery are used
to segment digital shoreline
into along-shore units:





688

687

689

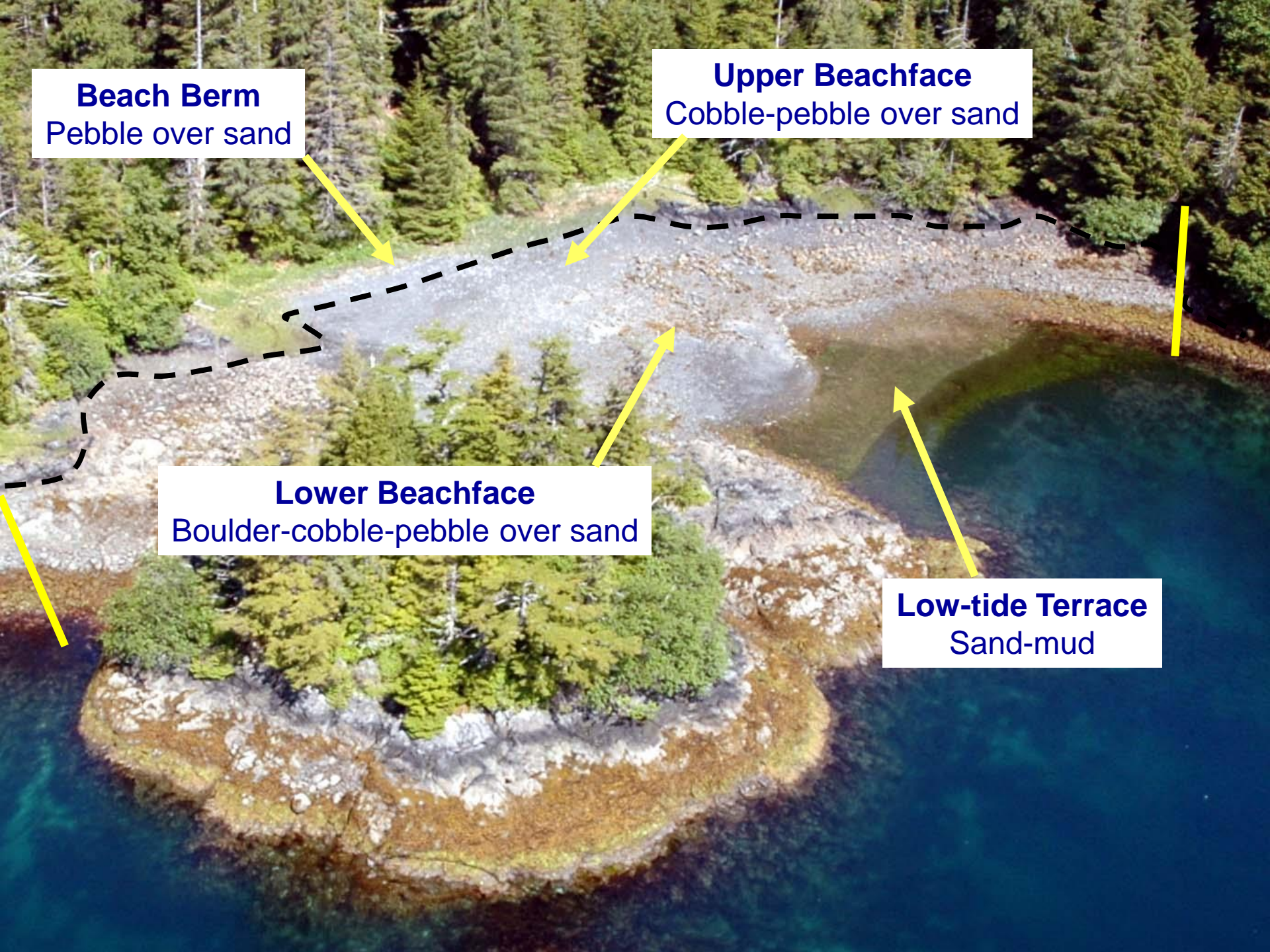
690

Beach Berm
Pebble over sand

Upper Beachface
Cobble-pebble over sand

Lower Beachface
Boulder-cobble-pebble over sand

Low-tide Terrace
Sand-mud

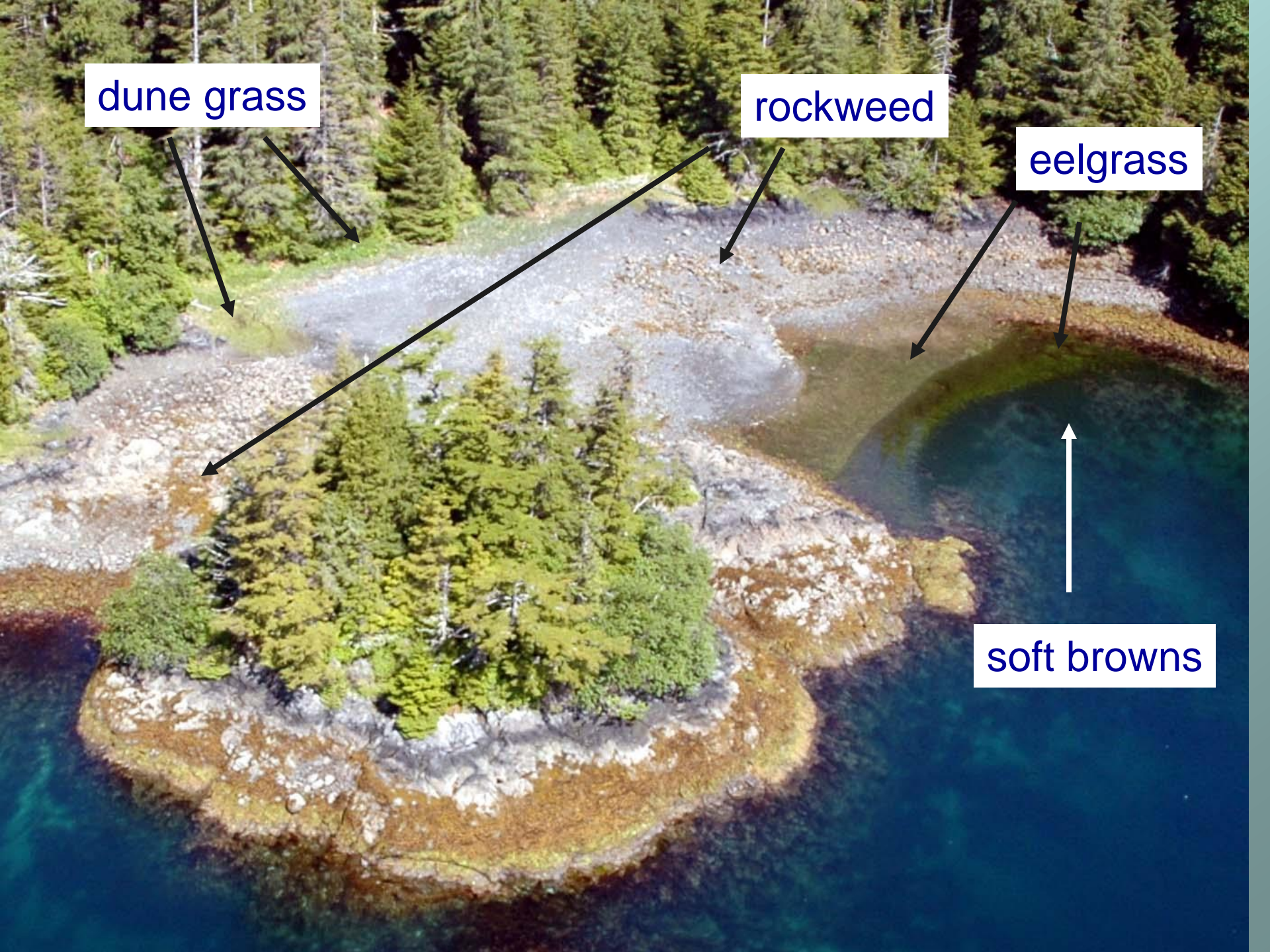


dune grass

rockweed

eelgrass

soft browns



Biobands in ShoreZone

A *bioband* is species assemblage with a characteristic colour and across-shore elevation.



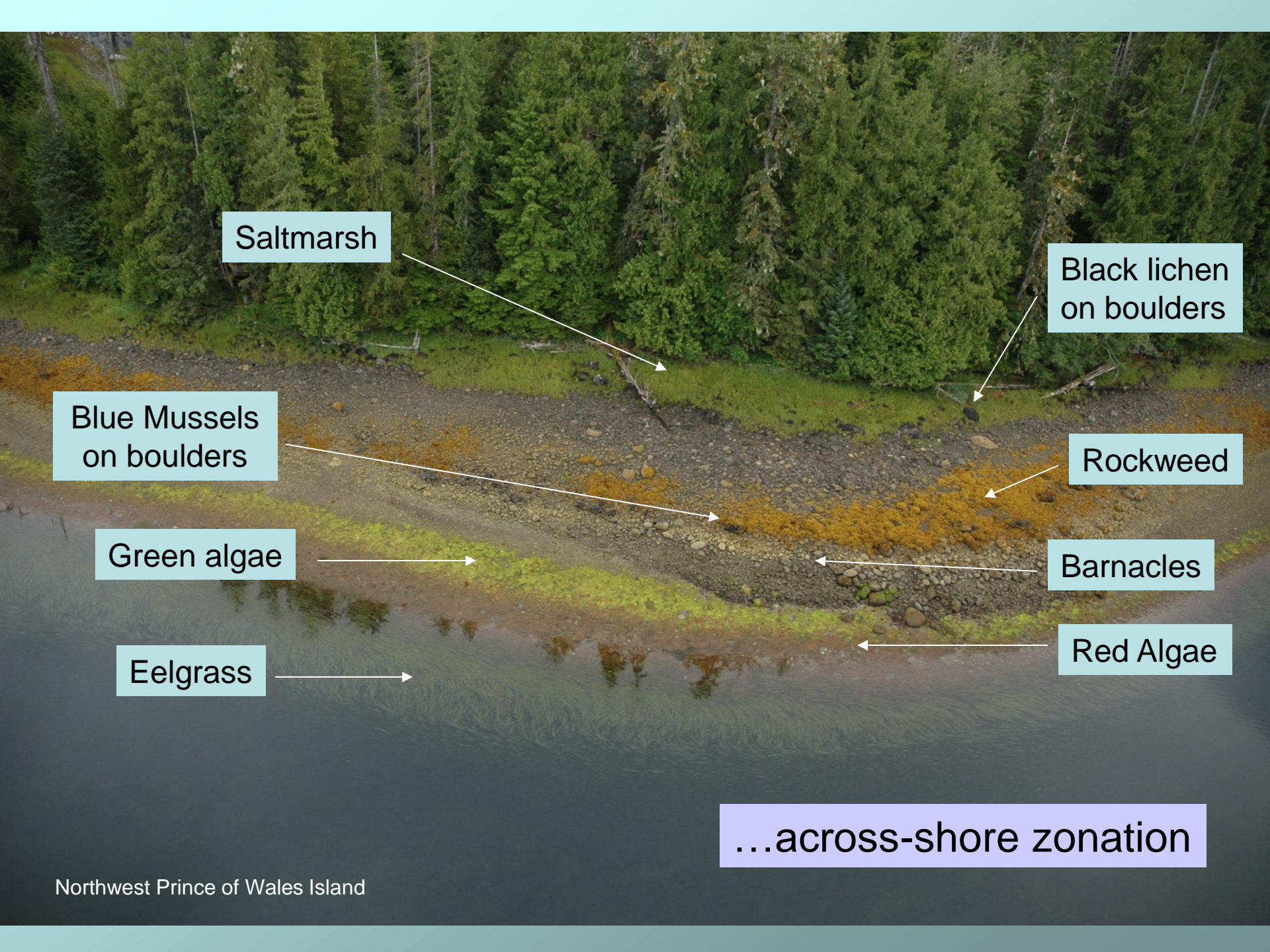
Splash zone lichen (VER)

Barnacle (BAR)

Blue mussel (BMU)

Dark brown kelps (CHB)

Islet, Kenai Fjords National Park



Saltmarsh

Black lichen
on boulders

Blue Mussels
on boulders

Rockweed

Green algae

Barnacles

Eelgrass

Red Algae

...across-shore zonation



Biological Wave Exposure

- derived from the combination of biobands present in the unit.

Very exposed

Exposed

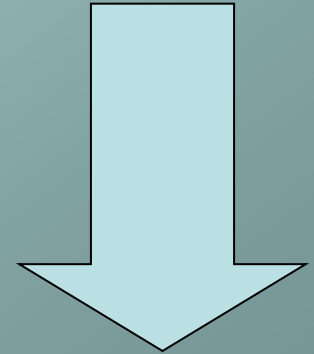
Semi-exposed

Semi-protected

Protected

Very Protected

HIGH energy



LOW energy

ShoreZone Applications: A Spatial Framework for Coastal Habitat Management

Habitat Observing and Suitability



Development Siting



Essential Fish Habitat



Planning and Response




Summary of ShoreZone Overview

- based on low-tide imagery
- a *digital, georeferenced, searchable* baseline dataset of geomorphic and biological attributes.
- imagery is web-posted, along with summary data tables and maps



- A collaboration with The Nature Conservancy
- Provides centralized location for supporting materials and databases.
- Supports a Blog, FAQ's, link to mailing list, facebook and twitter
- Identifies scheduled events such as outreach, training, and meetings.



Alaska ShoreZone Coastal Inventory And Mapping Project

[HOME](#) [TUTORIALS](#) [FLY THE COASTLINE](#) [SUPPORTING DOCUMENTATION](#) [OUTREACH & MEETINGS](#) [FAQS](#) [BLOG](#) [CONTACT US](#)

Why ShoreZone Is Important

Alaska has more coastline than the continental United States. For the first time ever, the Alaska ShoreZone Project is taking an inventory of the biology and geology of Alaska's coast.

More than 20 partners are helping to make millions of photos, video, and digital data, all geo-referenced, available to the public, through the internet. The Alaska ShoreZone Project received the 2009 Coastal America Spirit Award from the Dept. of the Interior.

Increasing storm frequency and coastal erosion issues associated with changes in climate are a concern for Alaska's coastal communities. Also, projected increases in shipping traffic and offshore oil and gas development make it vital that coastal managers have access to data to support planning and response efforts. This baseline data will greatly improve our ability to understand, respond to and plan for the dynamic coastal changes taking place in Alaska.


You can fly the coastline, download spatial data and view photos for:


- [Oil spill and emergency planning, response, and recovery](#)
- [Community planning for climate change impacts](#)
- [Search and rescue](#)
- [Fisheries habitat management](#)
- [Desktop reconnaissance](#)
- [Invasive species detection and monitoring](#)
- [Marine debris clean-up](#)

What's New

There will be an Alaska ShoreZone tutorial session at the Alaska Marine Science Symposium on Tuesday January 19, 2011. Make sure to check out the [Alaska Marine Science Symposium](#) agenda and the [ShoreZone session](#).

All materials from Alaska ShoreZone Annual Meeting are now available under the [News, Activities, and Partners](#) tab. Also, sign up for the new [ShoreZone blog](#) and tell us about how you use ShoreZone.





Surveys of Alaska's coast are conducted at extreme low tides during the summer.

[JOIN ALASKA SHOREZONE](#)

From The Blog

ESRI ArcNews Features ShoreZone
Check out the latest article on ShoreZone at ESRI's ArcNews website. [Read Full Post](#)
January 8, 2011

Just what we have all been waiting for....the Field Guide to Seaweeds of Alaska
How many seaweeds in Alaska can you identify? Just in case the answer is "I don't even know how many seaweeds there are in Alaska!"...look no further. [Read Full Post](#)
January 7, 2011

Add ShoreZone Extent to Your Google Map Interface
A Google Map file which illustrates the extent of Alaska ShoreZone is available for you. Click on "Fly the Coastline" to access the KML file.... [Read Full Post](#)
January 7, 2011

Our Partners

- [Kenai Peninsula Borough Assembly](#)
- [National Park Service](#)
- [Coastwise Services](#)
- [Alaska Department of Natural Resources](#)
- [The Gordon and Betty Moore Foundation](#)
- [NOAA Fisheries, Alaska Fisheries Science Center, Auke Bay Laboratories](#)
- [Alaska Ocean Observing System](#)
- [Cook Inlet Regional Citizens Advisory Council](#)
- [US Coast Guard Response Division, District 17](#)
- [University of Alaska Fairbanks](#)
- [Alaska Department of Fish and Game](#)

Key Contacts



www.ShoreZone.org

ShoreZone NOAA website at:

<http://alaskafisheries.noaa.gov/shorezone/>

➤ **ShoreZone coordinator at The Nature Conservancy:**

Darren Stewart (TNC Anchorage field office)

dstewart@tnc.org (907) 865-5711

➤ **the NOAA ShoreZone website & database distribution:**

Steve Lewis (NOAA Fisheries, Juneau)

steve.lewis@noaa.gov (907) 586-7858



Survey Questions:

Based on the map shown earlier, has your coastal area already been surveyed by ShoreZone?

Yes or No

As a Local Environmental Observer, do you see ShoreZone as a useful tool and something you may use?

Yes or No