

“WHAT CAN I DO TODAY?” Monitoring *Your* Coastline

Aleutian Life Forum

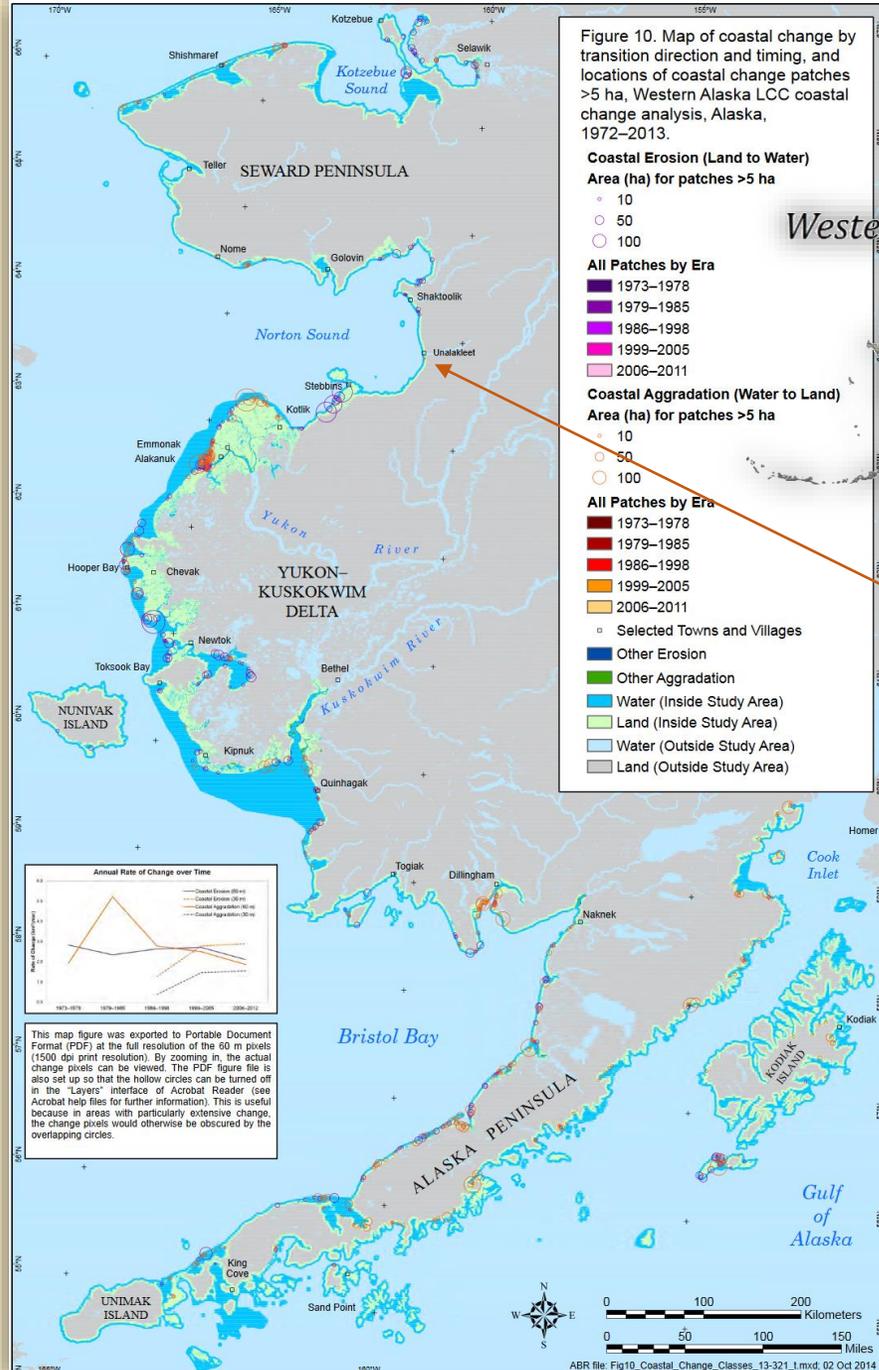
August 2016

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Coastal Hazards Program Manager



Environmental Change Scenarios

At what scale?



Western Alaska LCC

State of Alaska | myAlaska | My Government | Resident | Business in Alaska | Visiting Alaska | State Employees

Alaska Shoreline Change Tool

Alaska Division of Geological & Geophysical Surveys

State of Alaska > Natural Resources > Geological & Geophysical Surveys > Maps > Alaska Shoreline Change Tool

Base Layer

- Street Map
- MapQuest Open Aerial
- MapQuest Open OSM
- GINA Satellite
- GINA Topographic
- GINA Shaded Relief

Overlays

- Quadrangle Boundaries

Legend:

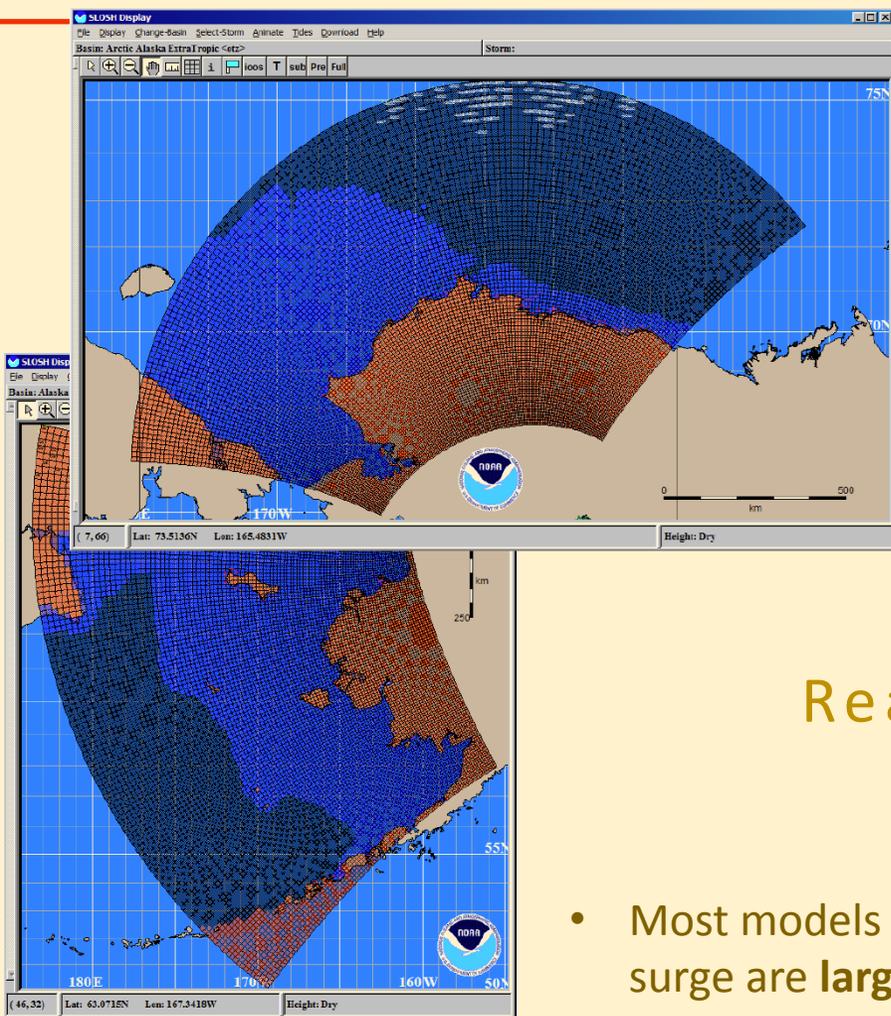
- 1951 Shoreline
- 1981 Shoreline
- 2004 Shoreline
- 2005 Shoreline
- 2012 Measured Shoreline
- 2012 Implied Shoreline
- 2020 Projected Shoreline
- 2020 Uncertainty
- 2025 Projected Shoreline
- 2025 Uncertainty
- 2030 Projected Shoreline
- 2030 Uncertainty

Location List:

- Port Heiden [Zoom to extent]
- Unalakleet [Zoom to extent]
- Wales [Zoom to extent]
- Kivalina [Zoom to extent]
- Central Beaufort [Zoom to extent]
- East Beaufort [Zoom to extent]
- East Chukchi [Zoom to extent]
- West Beaufort [Zoom to extent]
- Bering Land Bridge National Park [Zoom to extent]
- Cape Krusenstern National Monument [Zoom to extent]

Historical Shoreline vs Projected Shoreline

Estimated Position
Shoreline Uncertainty
Transsect



Realities for Alaska

- Most models of coastal change and storm surge are **large scale or non-existent**.
- Most models of coastal change and storm surge rely on **limited data for validation**.

(NWS, 2014)

Opportunities for Community Involvement

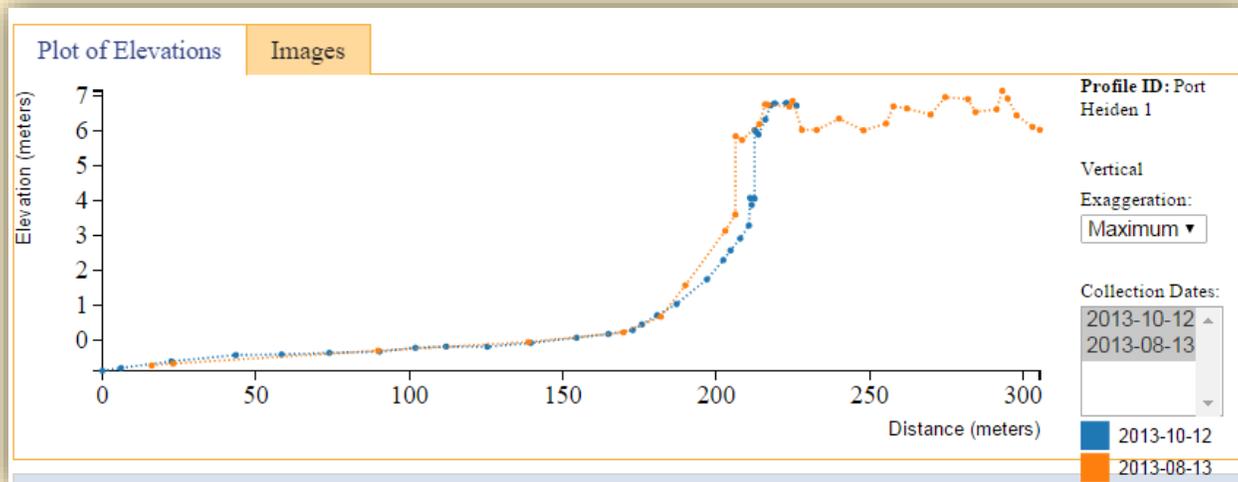
- **Low-cost** methods for monitoring the coastline.
- **Scientific oversight** for specific projects.
- **Protocols** for documentation.
- Provide **higher spatial and temporal** resolution than are currently able with other methods.



Shorelines



Beach Volume



Storm Water Levels



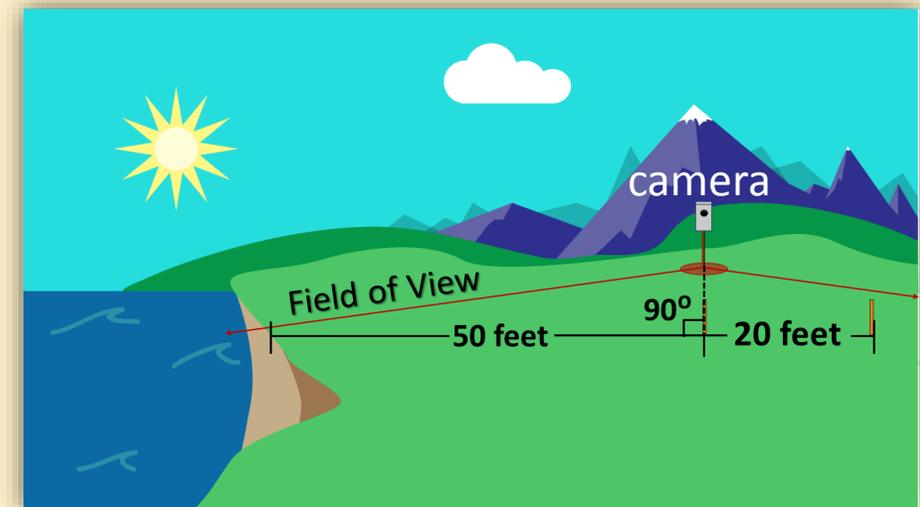
Precise Method



Community-Based Monitoring Equivalent



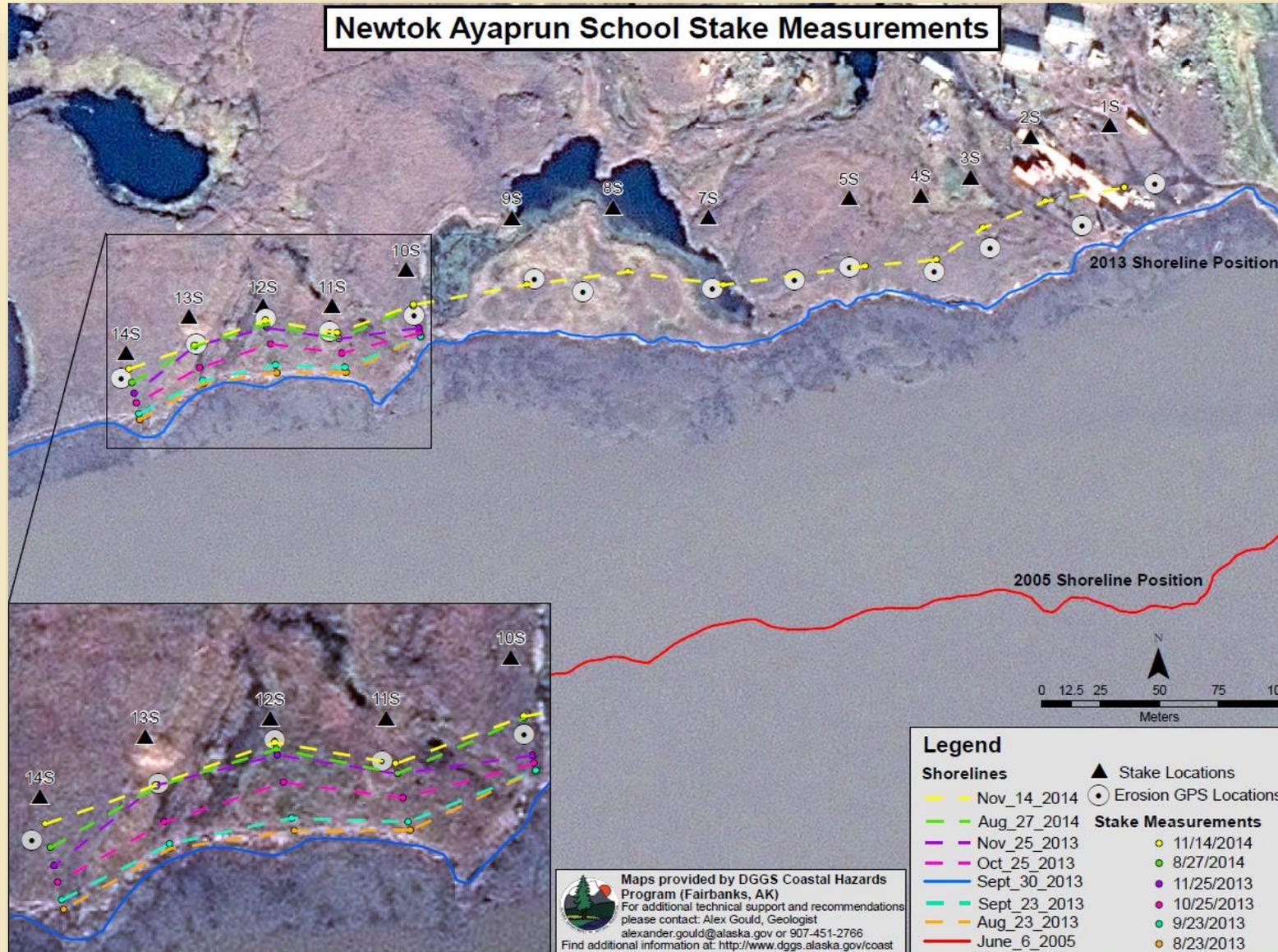
Shorelines



Stake Ranging

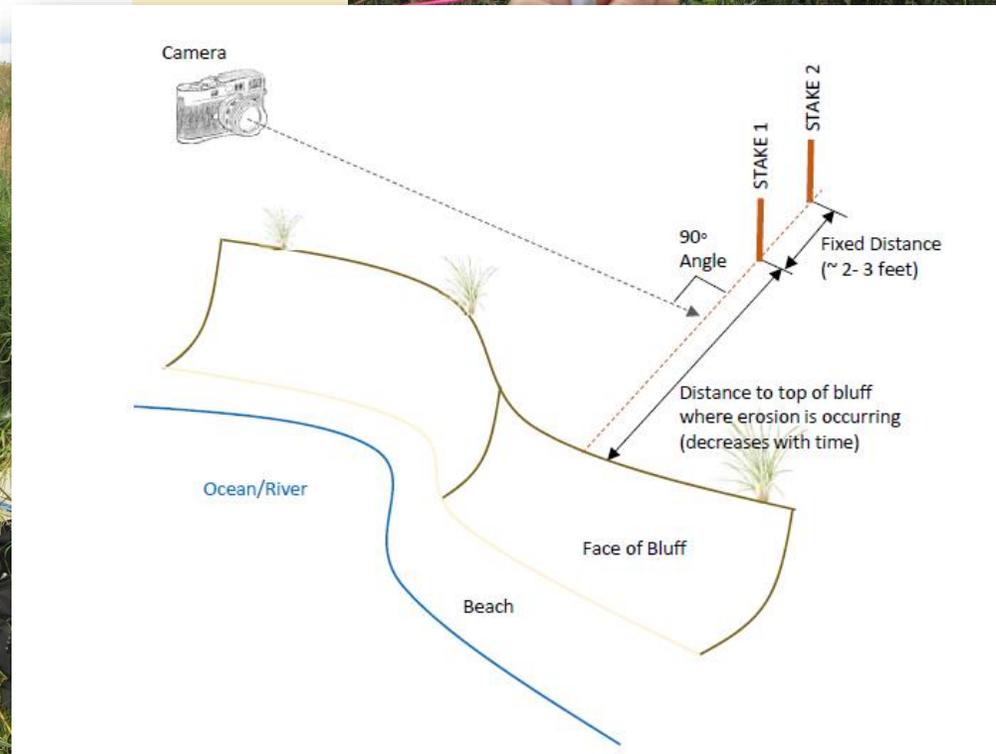
Shorelines







Time-Lapse Photography



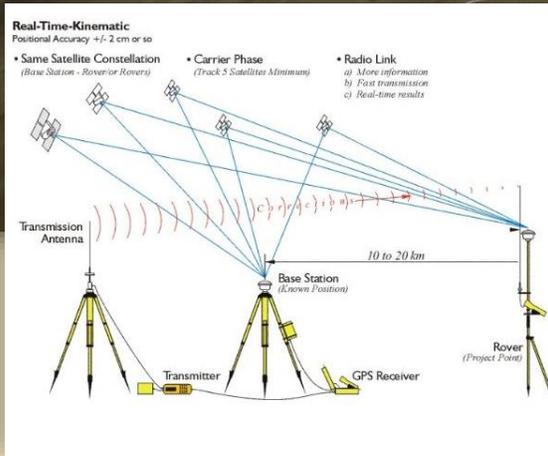
Shorelines



Precise Method

Beach Volume

Community-Based Monitoring Equivalent



Cross-Shore Profiles



Δx

Δz

$$\frac{\Delta x}{\Delta z} = \text{slope}$$

Nome

Stake Locations



Emery Rod Profiles

Collect bearing—profiles are perpendicular to coastline



Use hand level to site the change in elevation



Beach Volume



Move across beach, taking new measurements, some measurements require a shorter string



Storm Water Levels

Precise Method

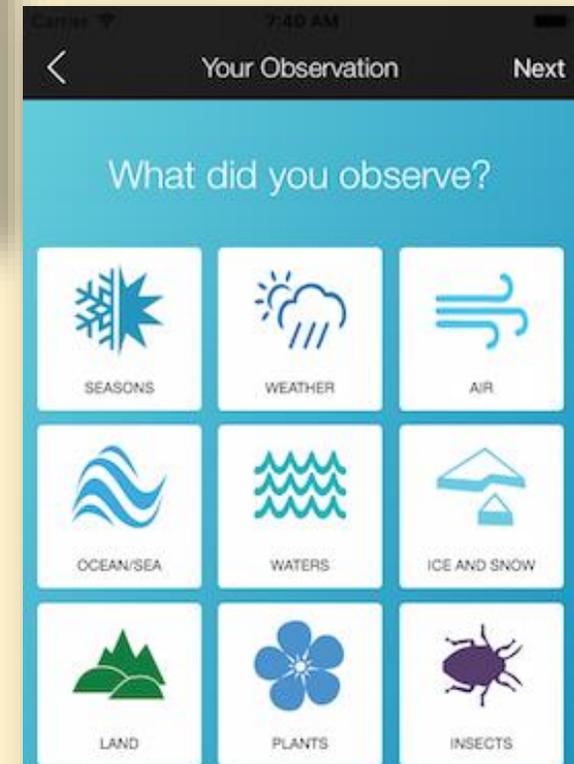


Opportunity for Local Involvement

Monument Documentation



LEO Application
ANTHC



Storm Water Levels

Monument Documentation



LEO Application, ANTHC



LEO Webinar
on September
22nd!



Eroding bluff threatens road

Chevak, Alaska, USA

- INFRASTRUCTURE
- TRANSPORTATION

OBSERVATION: This bluff side has been eroding since 70's-80's. The road closed in 2005 or 2007, what used to be a road, now has just a narrow path to walk up, if careful. This erosion has always been happening, but has become much worse over the past weekend. It has been raining off and on since last month and this weekend was the most rain there was. We usually have this type of weather in Fall season, August - September, but it started too soon. This erosion is endangering the home and residential area. The whole bluff side starting from this area is affecting other areas such as a historical building and 3- residential homes. Cynthia Paniyak

LEO COMMENT: Chevak is one of 26 communities designated as "priority action community" in Alaska, by the U.S. Army Corp on Engineers. [Alaska Baseline Erosion Report](#)

RESOURCE: NOAA National Weather Service Alaska: The objective of the hydrologic service program of the NWS are to mitigate loss of life and property damages caused by floods by providing the nation with timely issuance of river and flood forecasts; to conduct the necessary research to implement and improve forecast and warnings; to provide hydrometeorological data for broad application to water resource planning, flooding plain management and operational programs. [NWS Alaska-Pacific River Forecast Center](#)

RESOURCE: State of Alaska Erosion Management Policy: Erosion threatens individual structures, roads, airports, utility infrastructure and in some locales, entire communities (city, village, subdivision) can be at risk. This policy concerns state-funded and state pass-through funded construction. Other entities in Alaska who construct erosion control structures, or propose development near coastal waters or rivers, are encouraged to consider the following siting, design, and construction policies, [read more.](#)



Online Tools

maps.dggs.alaska.gov

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Alaska Coastal Profile Tool (ACPT)

Alaska Division of Geological & Geophysical Surveys

State of Alaska > Natural Resources > Geological & Geophysical Surveys > Maps > ACPT

Alaska Shoreline Change Tool

This interactive tool displays historic and predicted shoreline position throughout Alaska.

[See citation details for Alaska Shoreline Change Tool](#)



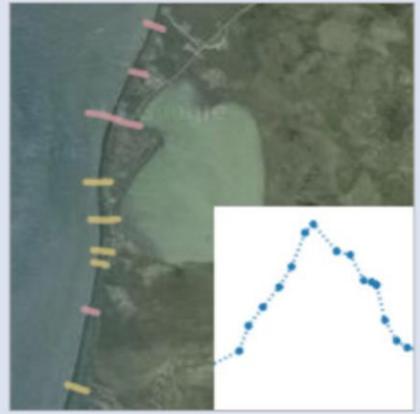
This interactive tool displays historic and predicted shoreline position throughout Alaska. The development of this map is funded with qualified outer continental shelf oil and gas revenues by the Coastal Impact Assistance Program, U.S. Fish & Wildlife Service, U.S. Department of the Interior.

For complete citation, source data, metadata, and application guide, please see <http://www.dggs.alaska.gov/pubs/id/29504>

Alaska Coastal Profile Tool

This interactive tool enables access to beach elevation profile measurements collected throughout Alaska since the 1960s.

[See citation details for Alaska Coastal Profile Tool](#)



- TO USE:
- Click to zoom to a Region (O)
 - Select a Coastal Profile:
 - One measurement
 - Repeat measurements
 - Elevation Plot will appear. Adjust the vertical exaggeration to change the visible level of relief.
 - View multiple time-series, if available, by highlighting more than one Collection Date (hold down Shift key).

1960s. Users can explore profile measurements map has been designed to accommodate datasets derived digital elevation models.

and profiles are displayed as coincident for methods.

see <http://www.dggs.alaska.gov/pubs/id/27359>



THANK YOU

dggs.alaska.gov
Coastal Hazards



CIAP
Coastal Impact
Assistance Program

AOOS
Alaska Ocean Observing System



St Paul Island Ecological
Conservation Office
Pamela Lestenkof, Lauren Divine,
Paul Melovidov, Aaron Lestenkof,
Rafael Mata

DGGS Field Crew: Alex Gould, Lauren
Southerland, Ritch Rummler

UAF Field Crew: Chris Maio, Richard
Buzard, Gabe Dunham

Accommodations and Logistics:
NOAA Marine Mammal Lab

Transportation on St Paul: ADF&G

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Fairbanks Fodar

