



# TOOLS FOR MONITORING COASTAL CHANGE IN ALASKA

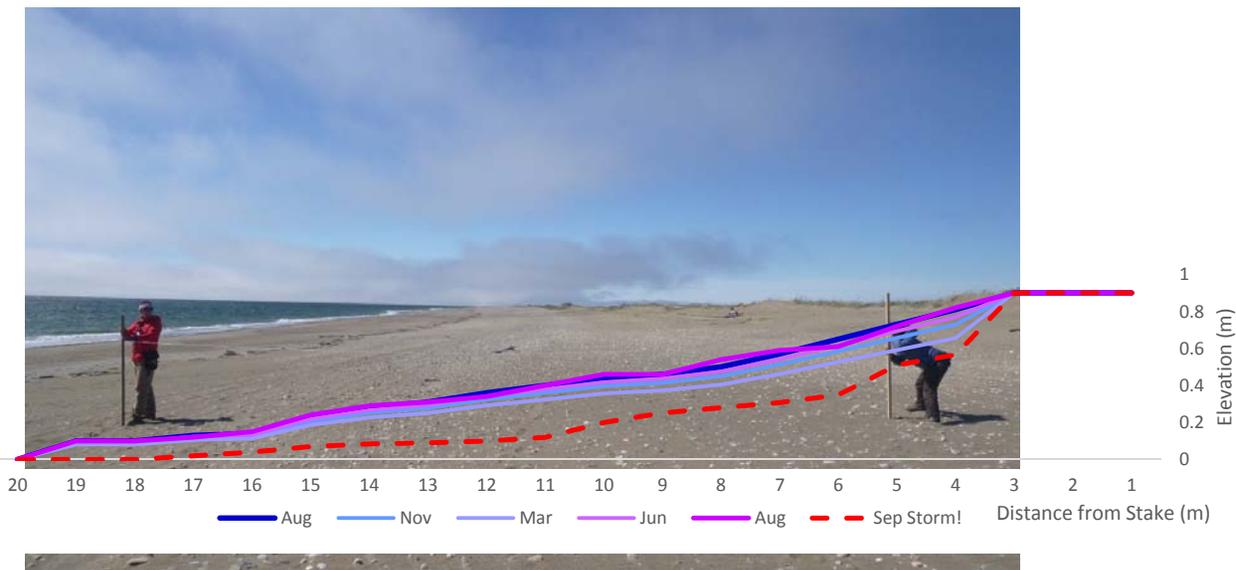
Richard Buzard and  
Jacquelyn R. Overbeck

Graduate Student  
University of Alaska Fairbanks  
Department of Geosciences

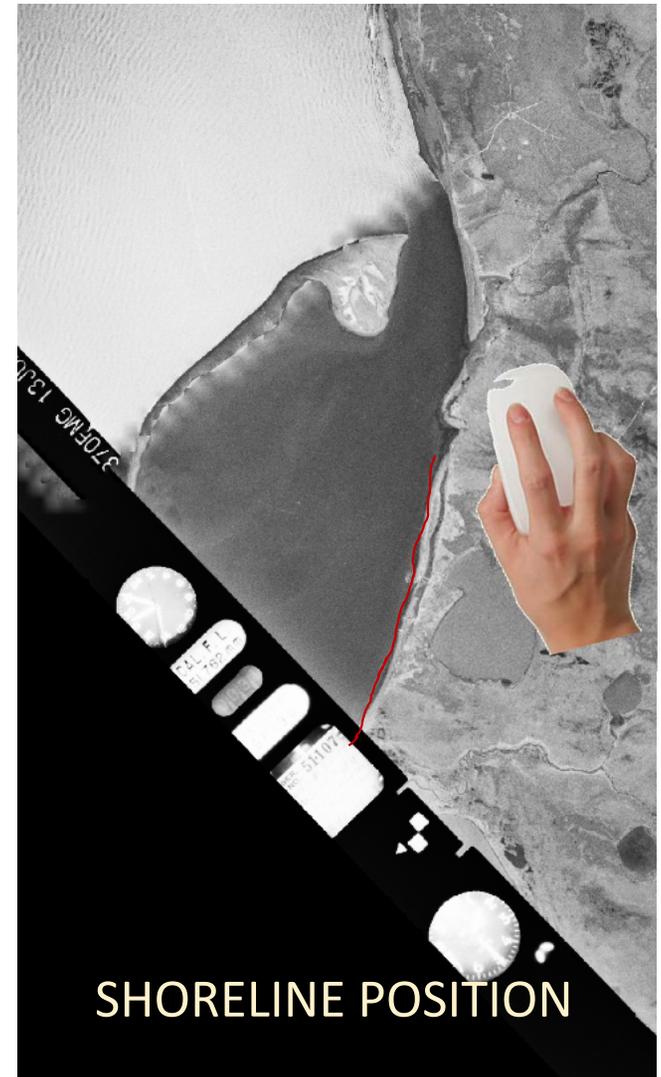
State of Alaska, Dept. of Natural Resources  
Division of Geological & Geophysical Surveys  
Coastal Hazards Program Manager



# SHORELINES



# CROSS SHORE PROFILE

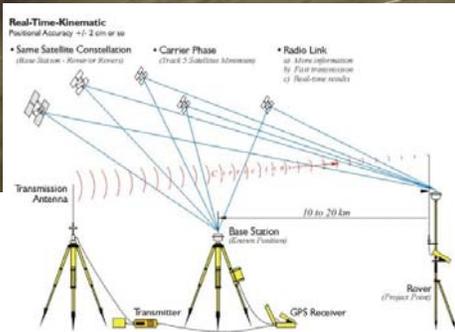


## Precise Method

## Community-Based Monitoring Equivalent

DGPS Survey

Emery Rod



## Cross-Shore Profiles

## Stake Locations



## Emery Rod Profiles

Collect bearing—profiles are perpendicular to coastline



Use hand level to site the change in elevation



Have a dedicated note-taker



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

# ALASKA COASTAL PROFILE TOOL

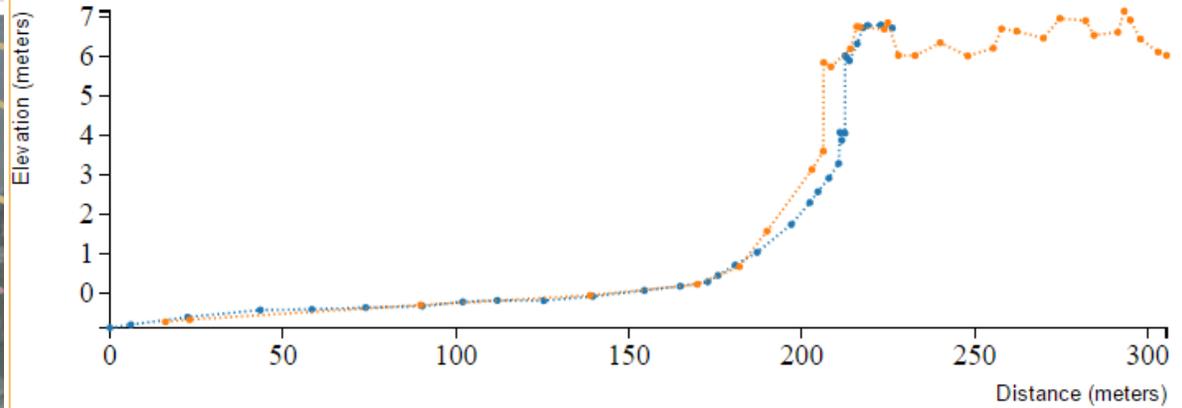
State of Alaska > Natural Resources > Geological & Geophysical Survey



<http://maps.dggs.alaska.gov/acpt/>

Plot of Elevations

Images



Profile ID: Port Heiden 1

Vertical

Exaggeration:

Maximum

Collection Dates:

2013-10-12

2013-08-13

2013-10-12

Plot of Elevations

Images

[2013-10-12](#) [2013-08-13](#)



## Precise Method

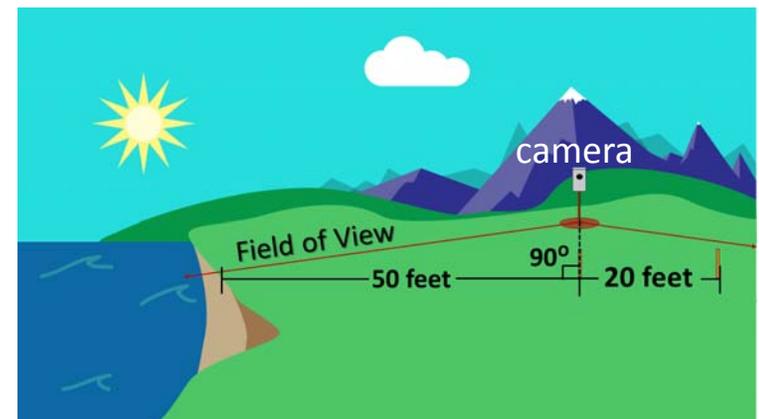


Remote Sensing

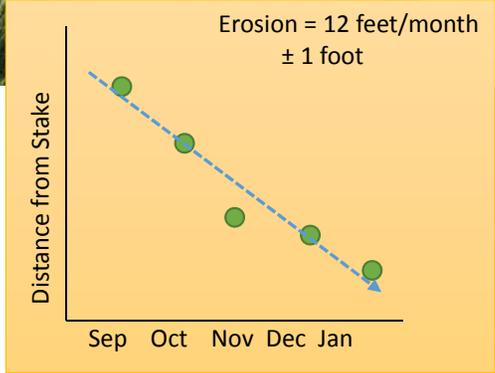
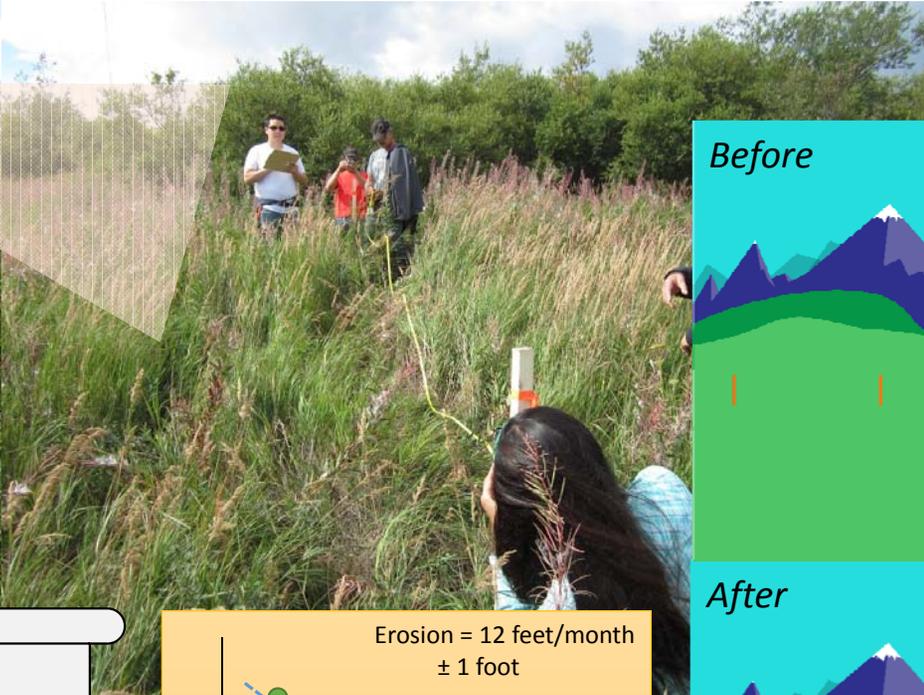
## Community-Based Monitoring Equivalent



## Shorelines



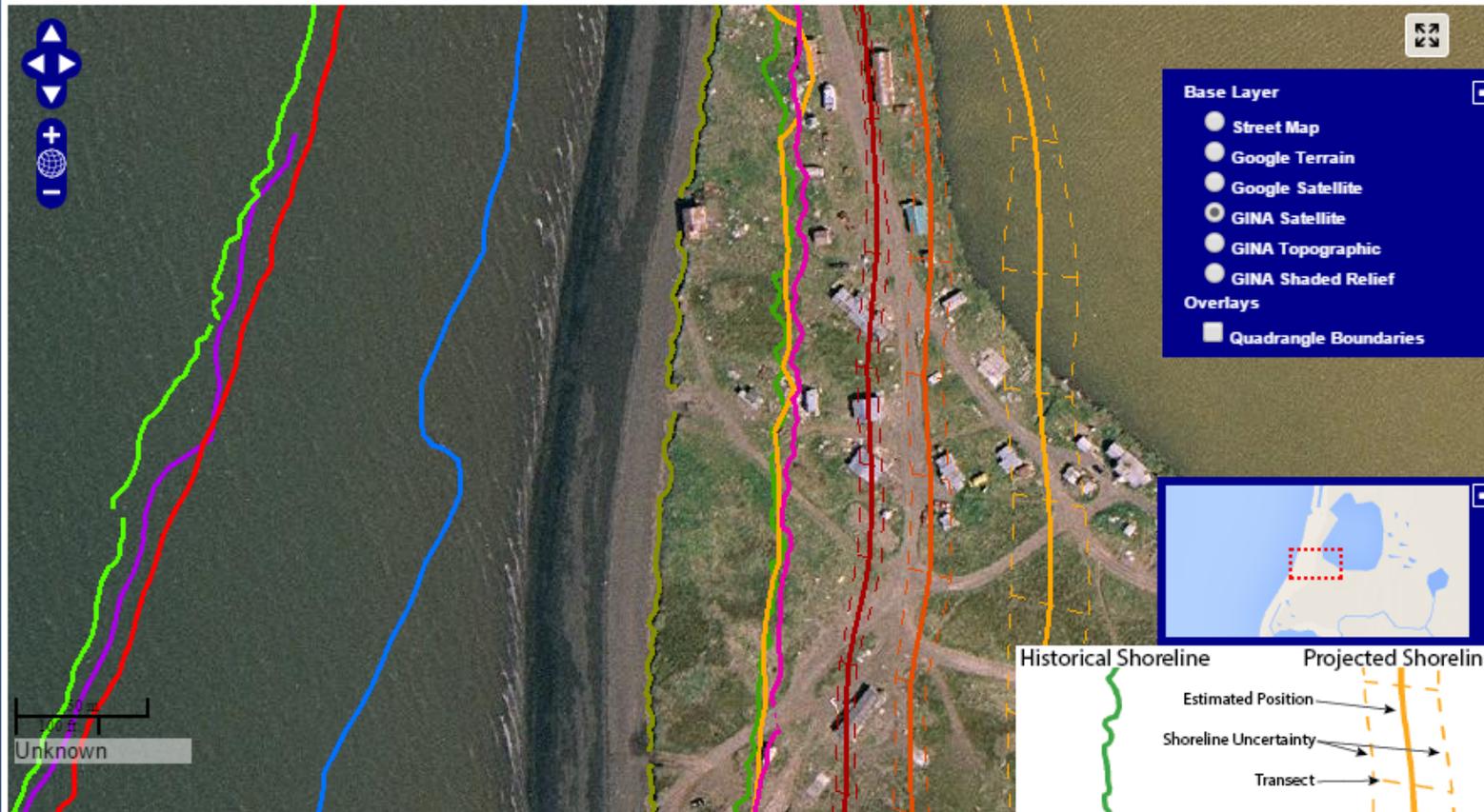
# Shoreline Positions



# Alaska Shoreline Change Tool

Alaska Division of Geological & Geophysical Surveys

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



### Port Heiden [\[Zoom to extent\]](#)

- 1957 Shoreline
- 1963 Shoreline
- 1973 Shoreline
- 1983 Shoreline
- 2002 Shoreline
- 2009 Shoreline
- 2011 Shoreline
- 2013 Measured Shoreline
- 2013 Implied Shoreline
- 2020 Projected Shoreline
- 2020 Uncertainty
- 2025 Projected Shoreline
- 2025 Uncertainty
- 2035 Projected Shoreline
- 2035 Uncertainty

### 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 [\[Zoom to extent\]](#)

<http://maps.dggs.alaska.gov/shoreline/>

# ALASKA COASTAL PROFILE TOOL—FUTURE EFFORTS

**Alaska Shoreline Change Tool**  
Alaska Division of Geological & Geophysical Surveys

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

Basic Layer  
● Street Ma  
● MapQue  
● MapQue  
● GINA Sat  
● GINA Top  
● GINA Sh  
Overlays  
■ Quadrang

Historical Shoreline  
Estimated Position  
Shoreline Uncertain  
Transect

This interactive tool displays historic and predicted shoreline position throughout the state to see where shoreline has been in the past, and where it will be in the future. This is determined by looking at aerial photographs and satellite imagery dating back to the 1960s. Using the Digital Shoreline Assessment Tool (DSAS), rates of shoreline change were calculated. The positions. Each predicted shoreline has an uncertainty, shown by a collar of confidence that the shoreline will be within that area for that year. Current shoreline positions are known but predicted shoreline positions are not.

The development of this map is funded with qualified outer continental shelf research assistance from the 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/27359>

**Alaska Coastal Profile Tool (ACPT)**  
Alaska Division of Geological & Geophysical Surveys

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

TO USE:  
1. Click to zoom to a Region (○)  
2. Select a Coastal Profile:  
3. Elevation Plot will appear. Adjust the vertical exaggeration to change the visible level of relief.  
4. View multiple time-series, if available, by highlighting more than one collection Date (hold down Shift key).

This interactive tool enables access to beach elevation profile measurements collected throughout Alaska since the 1960s. Users can explore profile measurements collected by DGGS and others as time-series plots and location-based images of the shoreface environment. The map has been designed to accommodate datasets collected with differing techniques, including differential leveling, survey-grade GPS or extraction from lidar-derived digital elevation models.

Lines on the overview map depict the position and shape of the most recent data at each coastal profile; remeasured profiles are displayed as coincident for comparative purposes, however, the precise location of past measurements may vary due to differing collection methods.

[Source data](http://www.dggs.alaska.gov/pubs/id/27359) for this application is available for download. For complete citation information and metadata, please see <http://www.dggs.alaska.gov/pubs/id/27359>

Funding for this work was provided by the [Alaska Ocean Observatory System \(AOOS\)](http://www.dggs.alaska.gov/pubs/id/27359).

- Add baseline datasets to the tool
- Add post-storm datasets
- Establish more community-based observation sites

# CONTACT INFORMATION

Jacquelyn Overbeck  
Coastal Hazards  
Program Manager  
Ph: 907-451-5026  
Fax: 907-451-5050  
jacquelyn.overbeck@alaska.gov



**Thank you to the St. Paul Tribe Ecological Conservation Office and all of the participants of the Stakes for Stakeholders workshop held in Dillingham!**



<http://dggs.alaska.gov/sections/engineering/profiles/coastalhazards.html>

State of Alaska > Department of Natural Resources > Division of Geological & Geophysical Surveys > Engineering Geology

### COASTAL HAZARDS

Alaska's extensive shorelines are incompletely mapped and under-instrumented for the evaluation of coastal dynamics. The Coastal Hazards Program at DGGS is engaged in ongoing investigations that will expand our understanding of how the coastline has evolved and how it will respond to hazardous events and long-term changes. This program is dedicated to fostering scientific partnerships that will improve the quality and quantity of the critical baseline data that are necessary to fuel informed decision-making throughout the state.

We routinely respond to information requests by agencies and the general public. If we can assist you in any way [please contact our program directly](#)

#### HEADLINES

- Online data distribution, educational outreach, and innovative observation strategies for severe storms will remain a focus in 2015-2016
- Coming soon: Alaska Sea Grant project to establish community-based sites for erosion monitoring in Bristol Bay
- New release of [aerial photos and elevation models](#) over west coast communities
- Updates to the [Alaska Coastal Profile Tool](#) including data in Norton Sound and St. Lawrence Island
- The [Alaska Tidal Datum Portal](#) has been updated with [new content for 2016]
- 2015 Release of the [Alaska Shoreline Change Tool](#)
- December 2015 [WALCC webinar on the Alaska Shoreline Change Tool](#)

#### STAFF

Jacquelyn Overbeck	Program Manager
Alex Gould	Geologist

#### RESEARCH INTERNS

Lauren Southerland	Graduate Intern
Richard Rummier	Undergraduate Intern

#### TOPICS OF INVESTIGATION

##### Geohazard Evaluation and Geologic Mapping for Coastal Communities

- + Overview
- + Focus Communities
- + Publications and Data Products
- + Partners and External Resources

##### Coastal Topography

- + Overview
- + Featured Projects

