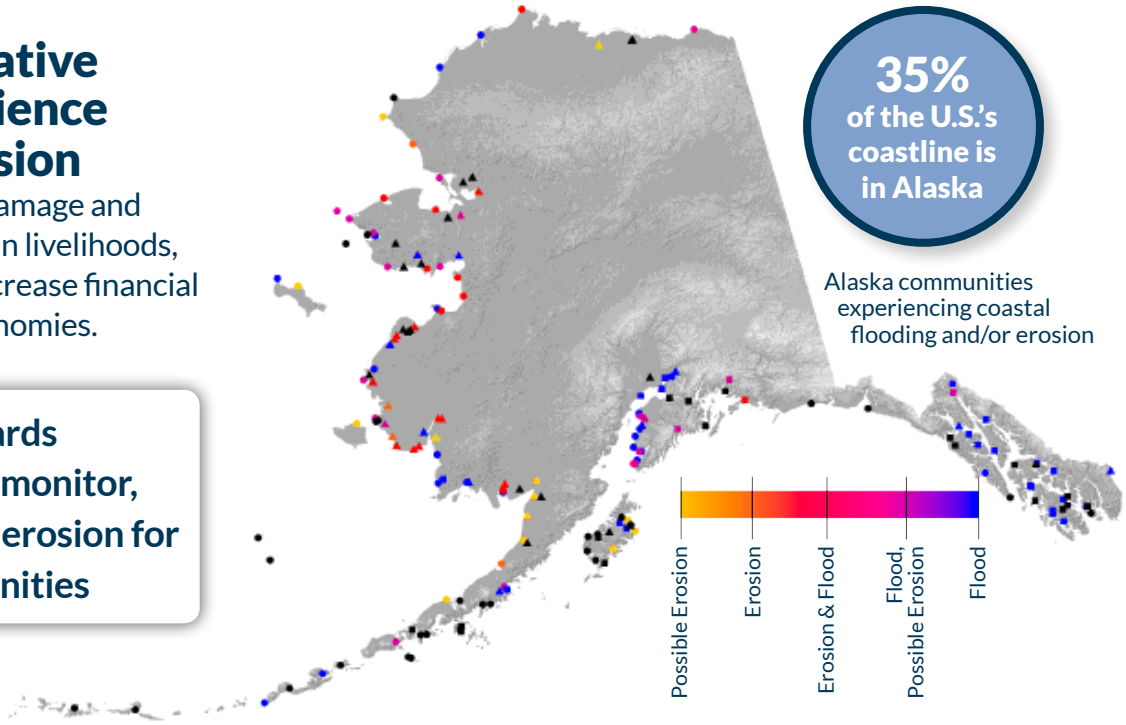
Coastal Flooding & Erosion in Alaska

Alaska Division of Geological & Geophysical Surveys

87% of all Alaska Native communities experience flooding and/or erosion

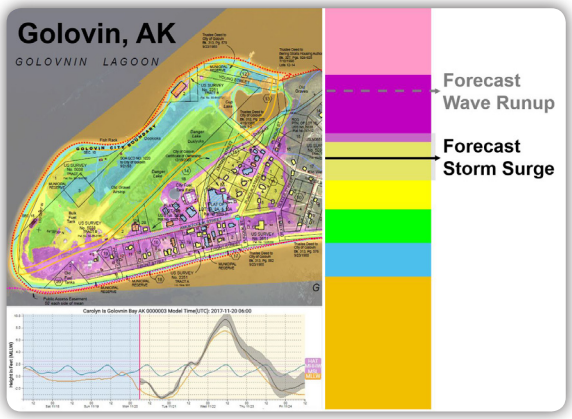
Coastal erosion and flooding damage and destroy infrastructure; threaten livelihoods, security, and life safety; and increase financial burdens on state and local economies.

The DGGS Coastal Hazards Program works to map, monitor, and model flooding and erosion for Alaska's coastal communities



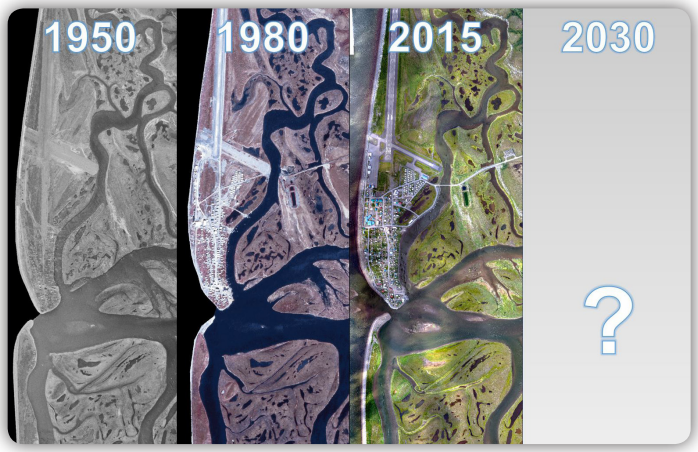
Erosion and flooding are caused by:

- Permafrost thaw
- Coastal storms occurring in an ice-free ocean
- Relative sea level rise
- Changes to ocean conditions



Real-time Forecasting

Coastal flooding forecasts are currently only available at a regional level and only take into account storm surge. **Local forecasts are needed at individual communities to effectively respond to and avoid impacts to people and infrastructure.** Storm forecasts must also include wave runup to predict total flooding.



Long-term Predictions

If we want to plan for where the coast will be or how high we expect floods to reach, **long-term models of flooding and erosion are necessary**. This information feeds into climate change adaptation planning, community infrastructure placement, and engineering projects in the nearshore.

Above: On-the-fly updates of potential flood impact during storms
Left: Orthorectified aerial photographs used to determine past shoreline positions

Learn more online: dggs.alaska.gov or contact the Coastal Hazards Program manager
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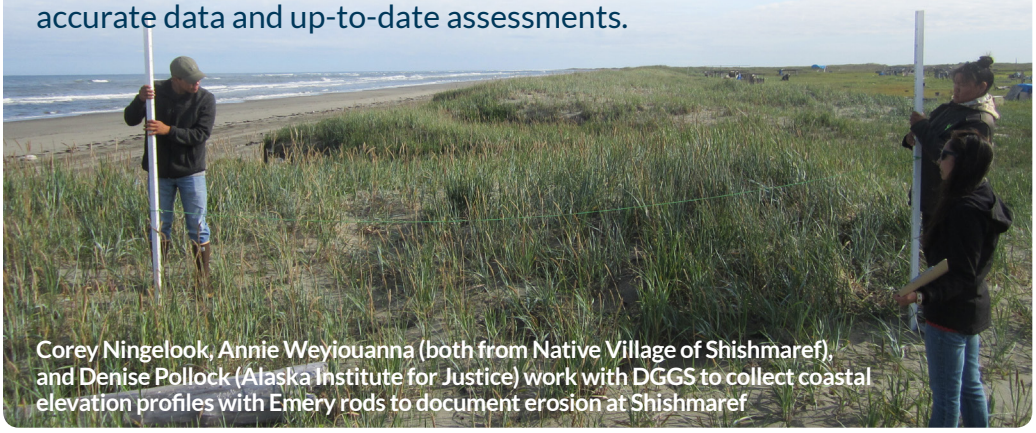
BASELINE DATA

Huge strides have been made to improve baseline coastal data related to flooding and erosion using new technology and collaborative approaches. **Large gaps in baseline data, however, still exist.** Continuous monitoring efforts, both at the community level and through statewide initiatives, are required to provide accurate data and up-to-date assessments.



Corey Ningelook, Annie Weyiouanna (both from Native Village of Shishmaref), and Denise Pollock (Alaska Institute for Justice) work with DGGS to collect coastal elevation profiles with Emery rods to document erosion at Shishmaref

Baseline Data Needs

These are some of the types of data that are required to provide accurate assessments of coastal data in Alaska

- Orthoimagery
- Topography
- Bathymetry
- Water levels
- Waves
- Continually operating reference systems
- Sea ice thickness and extent

Predicting flood impacts requires combining multiple baseline datasets to convert modeled storm water levels to local elevations. DGGS provides these products where adequate data is available.

Right. Flooding at Kwigillingok, October 2017 Photo: Lewis Amik III
Below. Color-indexed elevation map for Golovin, AK

Online Tools for Coastal Hazards

DGGS has several online tools that provide information about coastal hazards available at dggs.alaska.gov

- Alaska Shoreline Change Tool
- Alaska Coastal Profile Tool
- Color-Indexed Elevation Maps for Flood Communication
- Alaska Tidal Datum Calculator

The figure above illustrates how each color corresponds to elevation on the color-indexed elevation map (above left).

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