



## Sound Waves Monthly Newsletter

Coastal and Marine Research News from Across the USGS

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**Home** || **Sections:** [Spotlight on Sandy](#) | [Fieldwork](#) | [Research](#) | [Outreach](#) | [Meetings](#) | [Awards](#) | [Staff & Center News](#) | [Publications](#) || [Archives](#)

### Research



## Sound Waves

July–Sept. 2015 Issue

## Northern Alaska Coastal Erosion Threatens Habitat and Infrastructure

By [Paul Laustsen](#) and [Ann Gibbs](#)

July–Sept. 2015

in this issue:

[next story](#)

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In a new study published July 2015, scientists from the U.S. Geological Survey (USGS) found that the remote northern Alaska coast has some of the highest shoreline-erosion rates in the nation. Analyzing more than half a century of shoreline-change data, scientists discovered that the pattern is extremely variable, with most of the coast retreating at rates of more than 1 meter per year.

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in this issue:

### Research



cover story:

**Northern Alaska Coastal Erosion Threatens Habitat and Infrastructure**

[Climate Change Reduces Coral Reefs' Ability to Protect Coasts](#)

[Polar Bears Forced on Shore by Sea-Ice Loss Are Unlikely to Thrive on Land-Based Foods](#)

[Many Dry Tortugas Loggerheads Actually Bahamas Residents](#)

### Fieldwork



[USGS Oceanographer Participating on Collaborative U.S. and Canadian Research Cruise](#)

### Spotlight on Sandy

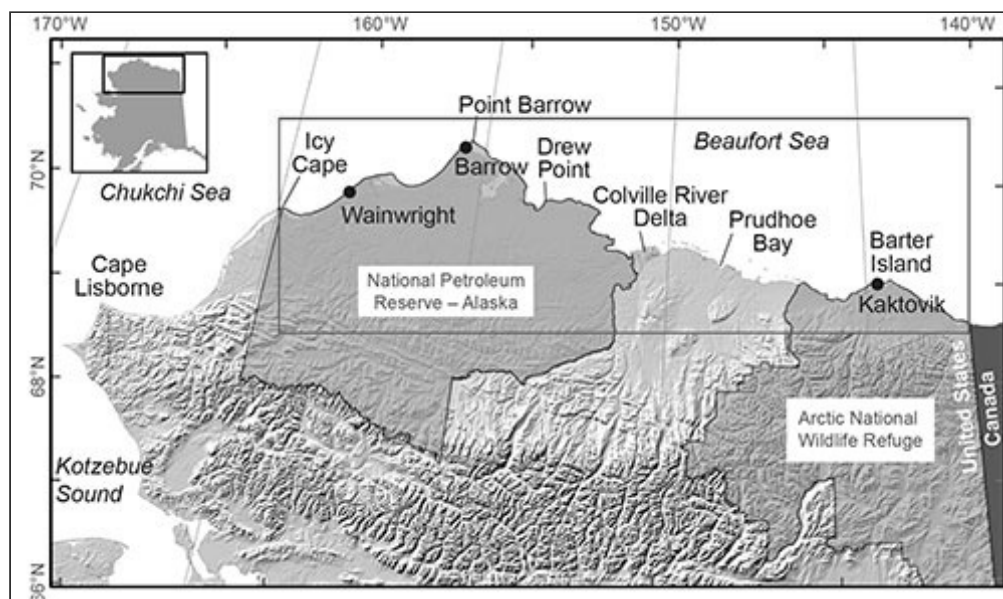


[Detailed Flood Information Key to More Reliable Coastal Storm Impact Estimates](#)

### Outreach



[Coral Photo Selected as Popular Photography's "Photo of the Day"](#)



**Above:** Shaded-relief map of the north coast of Alaska showing study area (U.S.-Canadian border to Icy Cape; rectangular box) and selected geographic locations. Modified from figure 1 of "National Assessment of Shoreline Change: Historical Shoreline Change Along the North Coast of Alaska, U.S.-Canadian Border to Icy Cape." [[larger version](#)]

"Coastal erosion along the Arctic coast of Alaska is threatening Native Alaskan villages, sensitive ecosystems, energy- and defense-related infrastructure, and large tracts of Native Alaskan, State, and Federally managed land," said **Suzette Kimball**, acting director of the USGS.

Scientists studied more than 1,600 kilometers of the Alaskan coast between the U.S.-Canadian border and Icy Cape, Alaska, and found that the average rate of shoreline change, taking into account beaches that are both eroding and expanding,

was a loss of 1.4 meters per year. Of those beaches that are eroding, the most extreme case exceeded 18.6 meters per year.

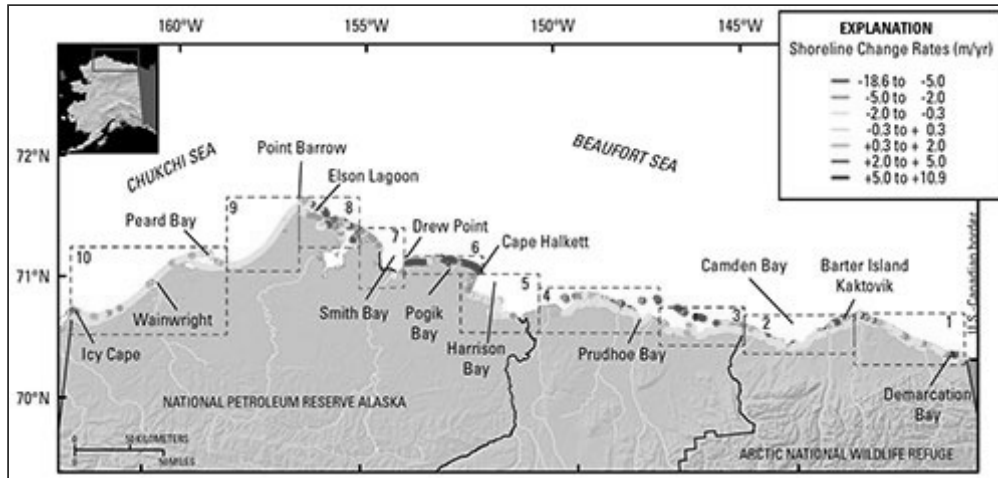
## Staff & Center News

[New Marine Facility Chief for the Pacific Coastal and Marine Science Center](#)

[George Tate Retires from the Pacific Coastal and Marine Science Center](#)

## Publications

[July–Sept. Publications](#)



**Above:** North coast of Alaska study area showing color-coded shoreline-change rates, boundaries of the 10 analysis regions (dashed boxes and numbers) used in the study, and key geographic locations. Figure 72 in "[National Assessment of Shoreline Change: Historical Shoreline Change Along the North Coast of Alaska, U.S.-Canadian Border to Icy Cape.](#)" [[larger version](#)]

"This report provides invaluable objective data to help Native communities, scientists, and land managers understand natural changes and human impacts on the Alaskan coast," said **Ann Gibbs**, USGS geologist and lead author of the new report.

Coastlines change in response to a variety of factors, including changes in the amount of available sediment, storm impacts, sea-level rise, and human activities. How much a coast erodes or expands in any given location is due to some combination of these factors, which vary from place to place.



**Above:** Erosion of the coastal bluff on Barter Island, 2011. Photograph by **Benjamin Jones**, USGS Alaska Science Center. [[larger version](#)]

"There is increasing need for this kind of comprehensive assessment in all coastal environments to guide managed response to sea-level rise and storm impacts," said **Bruce Richmond**, USGS research geologist and coauthor of the new report. "It is very difficult to predict what may happen in the future without a solid understanding of what has happened in the past. Comprehensive regional studies such as this are an

important tool to better understand coastal change."

The recent study is part of the National Assessment of Coastal Change Hazards, a USGS project that combines observation and modeling of the nation's shorelines to help identify areas most vulnerable to diverse coastal change hazards, including beach and dune erosion, long-term shoreline change, and sea-level rise.



**Above:** Screenshot from sequence of time-lapse photographs of Barter Island in Alaska during three summer months in 2014. Note the slumping bluffs. The full [time-lapse video](#) shows melting of pack ice and subsequent impacts to the beach and bluffs by storms. [[larger version](#)]

Compared with other coastal areas of the United States, where typically four or more historical shoreline data sets are available, generally back to the mid-1800s, shoreline data for the coast of Alaska are limited. The researchers used two historical data sources, from the 1940s and 2000s, which include maps and aerial photographs, as well as modern sources, such as elevation data from lidar ("light detection and ranging"). Combining the historical and modern data, the researchers calculated shoreline change at nearly 27,000 locations.

There is no widely accepted standard for analyzing shoreline change. One impetus behind the National Assessment of Coastal Change Hazards project was to develop a standardized method of measuring changes in shoreline position that is consistent on all coasts of the country. The goal was to facilitate the process of periodically and systematically updating the results in a consistent manner.



**Above:** Oblique aerial photograph from 2006 showing the Barter Island long-range radar station landfill threatened by coastal erosion. The landfill was subsequently relocated further inland; the coastal bluffs continue to retreat. [[larger version](#)]

The new report, titled "[National Assessment of Shoreline Change: Historical Shoreline Change Along the North Coast of Alaska, U.S.-Canadian Border to Icy Cape](#)", is the eighth report on [Long-Term Coastal Change](#) produced as part of the USGS [National Assessment of Coastal Change Hazards](#) project. A comprehensive database of digital vector shorelines and rates of shoreline change for Alaska from the U.S.-Canadian border to Icy Cape is presented along with this report. Data for all eight long-term coastal change reports are also available on the USGS [Coastal Change Hazards Portal](#).

#### Related *SOUND WAVES* Stories



##### **Erosion Doubles Along Part of Alaska's Arctic Coast —Cultural and Historical Sites Lost**

May 2009

#### Related Websites



##### **National Assessment of Shoreline Change: Historical Shoreline Change Along the North Coast of Alaska, U.S.-Canadian Border to Icy Cape**

USGS Open-File Report 2015-1048

##### **National Assessment of Shoreline Change—A GIS Compilation of Vector Shorelines and Associated Shoreline Change Data for the North Coast of Alaska, U.S.-Canadian Border to Icy Cape**

USGS Open-File Report 2015-1030

##### **National Assessment of Coastal Change Hazards** USGS

##### **USGS Coastal Change Hazards Portal** USGS

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