

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Inventory and Monitoring of Coastal Erosion for Alaska's Arctic Network of Parks

Discipline: Natural

Type of Project: Research

Funding Agency: National Park Service

Other Partners/Cooperators: University of Colorado at Boulder and Denver

Effective Dates: 7/1/2005 - 6/30/2008

Funding Amount: \$425,718

Investigators and Agency Representative:

NPS Contact: Diane M. Sanzone, Arctic Network Coordinator, National Park Service, 201 First Ave. Fairbanks, AK 99701, 907-455-0626, Diane_Sanzone@NPS.gov

Investigator: Dr. William F. Manley, Institute of Arctic and Alpine Research (INSTAAR), University of Colorado, Boulder, CO 80309-0450, 303-735-1300, William.Manley@colorado.edu

Project Abstract:

This project will be a cooperative venture between the Arctic I&M Network of the National Park Service and University of Colorado, Boulder related to the extent and causes of coastal erosion in the Arctic. The current situation in Alaska includes: reduced sea-ice concentrations, longer ice-free seasons leaving the coastline exposed to wave action, increased seasonal permafrost melting, rising sea level, etc. Unusually high rates of coastal erosion (documented for portions of the Arctic) are typically the greatest environmental concern for coastal communities; have impacts through release of sediment and organic carbon on neighboring nearshore ecosystems; lead to loss of coastal and freshwater habitats; represent an important indicator of environmental response to climate change; and constitute some of the most rapid and most observable changes in Arctic ecosystems.

However, there is very little empirical evidence to demonstrate that coastal erosion is due to climate change per se. The limited data that exist at sufficiently high temporal resolution suggest that erosion is strongly controlled by the magnitude and frequency of extreme events (storms). For example, a preliminary analysis near Barrow indicates that as much as one-third of the erosion experienced over 49 years occurred during a single storm, in 1963. Similar evidence exists from Tuktoyaktuk on the Canadian Beaufort Sea coast, for a short-lived but powerful storm in 1970. Coastal erosion does not appear to be gradually responding to monotonic Arctic warming. Instead, erosion appears to be filtered through the climatology of storms as the coupled land-sea-atmosphere system responds to changing boundary conditions. Thus, inventory and monitoring is required to quantify both the temporal and spatial variability in coastal erosion, and its impacts on ecosystems. This project, making use of remotely sensed data in Arctic Alaska, will analyze some of these spatial and temporal patterns. This is a two-year project, with final reports due in 2007.

Outcomes with Completion Dates:

Revised science plan, if necessary; progress reports (semi-annually); high-resolution 2003 OrthoPhoto Mosaic; LIDAR DEM; georectified aerial photography; coastline GIS layers and derived GIS layers, with metadata; maps and other presentation materials in electronic format; final report with data analysis (due 06/30/2007).

Keywords: Inventory and Monitoring Program, coastal erosion, Alaska, Arctic I&M Network, Cape Krusenstern N.M. and Bering Land Bridge National Preserve, University of Colorado at Boulder, climate change

For Administrative Use Only:

Date Annual Report Received:

Date Final Report Received:

Publications, etc. on file: