

# NATURE-BASED SOLUTION IMPLEMENTATION FOR COASTAL RESILIENCE IN ARCTIC ALASKA

POINT LAY, ALASKA

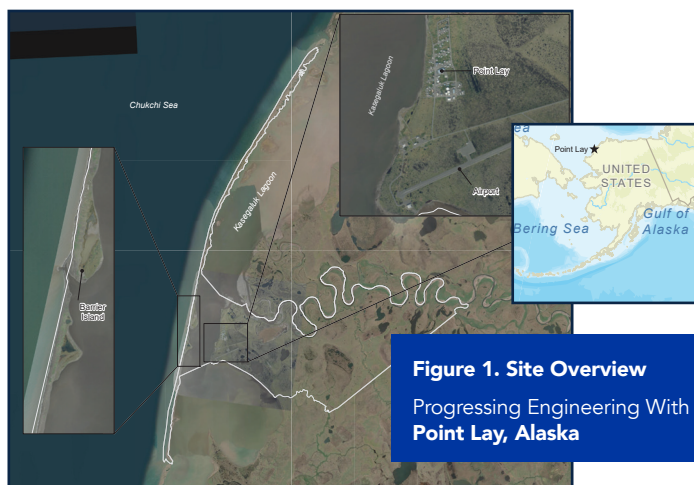
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## SYNOPSIS

EA Engineering, Science, and Technology, Inc., PBC (EA) and the Engineer Research and Development Center (ERDC) Cold Regions Research and Engineering Laboratory (CRREL) have identified an opportunity to expand the state of knowledge on the implementation of Nature-based Solutions (NbS) in Arctic Alaska through collaboration, data collection, community engagement, and documentation. This work will focus on the barrier islands fronting Point Lay, which provide important protection from coastal storm impacts, such as storm surge and waves, and serve as important habitat for marine mammals, seabirds, and other water-dependent animals. This research will fill a gap in the ongoing research that has not considered the importance of the barrier islands.

The State of Alaska's Erosion Exposure Assessment (which did not evaluate the barrier islands) found the shoreline at Point Lay was nearly stable except for erosion rates of 3 to 6 feet per year for the shoreline south of the airport (Buzard et al. 2021). However, storms in the fall of 2022 inundated the barrier islands and caused severe erosion in other areas, including the beach adjacent to the west edge of town, and damaged the boat dock (Tracey 2022), which demonstrates the importance of the barrier islands and stresses how critical it is to understand how these islands will adapt to sea level rise and changes in sea ice dynamics.

This project will (1) analyze the dynamics of the barrier islands by considering permafrost thaw, reduced sea ice duration and extent, sea level rise, and coastal storms to gain an understanding of breaching, overtopping, and erosion under a changing climate and (2) propose a nature-based shoreline protection project or multiple projects for the barrier islands (if deemed necessary) with the goal of protecting the community of Point Lay and preserving walrus habitat. There may be NbS techniques that can be incorporated on the barrier islands to increase the resilience of both the village and the haulout area.



**Figure 1. Site Overview**  
Progressing Engineering With Nature  
Point Lay, Alaska

The project team is currently developing a desktop analysis to investigate historical, existing, and future conditions of Point Lay based on the data as it relates to the following items:

- Historical imagery
- Sea ice observations
- Subsistence activities
- Historical flooding events and flood mapping
- Bathymetric and topographic datasets
- Climate change variables
- Natural resources (wildlife, vegetation, and habitat)
- Water level/tidal data
- Wind and storm data
- Wave information
- Geotechnical reports
- Historical and projected sea level rise

Field data collection in summer 2024 by the project team will be dependent on the data gaps identified during the desktop analysis. Currently the project team is planning to collect field data on sediment characteristics, topographic data, and bathymetry data (of Kasuguluk Lagoon and the Chukchi Sea). To avoid duplicating data, please email the project team at [cpijanowski@eaest.com](mailto:cpijanowski@eaest.com) if you are planning to or already have collected similar data.

## REFERENCES

- Buzard, R.M., M.M. Turner, K.Y. Miller, D.C. Antrobus, and J.R. Overbeck. 2021. Erosion Exposure Assessment-Point Lay. Report of Investigation 2021-3 Point Lay. State of Alaska Department of Natural Resources Division of Geological & Geophysical Surveys.
- Tracey, B. 2022. North Slope Borough Assembly Member. Transcription of Kali Community/Regional Advisory Group Meeting. 18 November.
- UAF Institute of Northern Engineering, USACE Alaska District, and USACE CRREL. 2019. Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities. November.

