

Preparing for Alaska's changing landscape

Project Location

Kachemak Bay Research Reserve,
Alaska

Project Lead

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Targeted End Users and Products

- [Project final report](#)
- [Video: Examining the Influences of Sea and Land Level Change for Better Informed Decision-Making](#)
- [Video: Stakeholder Integration in Monitoring Coastal Habitat Change](#)
- [Video: Community Monitoring in Assessing Sea and Land Level Changes](#)

Project Partners

- [Kachemak Bay Reserve](#)
- [City of Homer](#)
- [Geophysical Institute, University of Alaska Fairbanks](#)
- [Kenai Peninsula Borough](#)
- [Seldovia Village Tribe](#)

About the Science Collaborative

The National Estuarine Research Reserve System's Science Collaborative supports collaborative research that addresses coastal management problems important to the reserves. Learn more at www.nerrs.noaa.gov.

Overview

Kachemak Bay is one of Alaska's most productive, diverse, and intensively used estuaries. It is also one of the most vulnerable. Local ice fields are melting rapidly, while at the same time the coast continues to experience coastal uplift from a powerful earthquake that rocked the area in 1964. Estimates for sea level rise are lacking, and many local communities are established on land that is vulnerable to erosion and inundation. To plan for a future in this uncertain landscape, these communities need to understand the implications of coastal uplift and sea level rise in this area. To help meet that need, the Kachemak Bay reserve led a team to assess changes in land and sea levels in the coastal landscape and monitor the impacts of coastal uplift, glacial melt, and sea level rise on the Bay's biological communities.

Project Benefits

- As a result of this project, Kachemak Bay decision makers from a range of organizations have access to much needed information and tools focused on how local changes in land and sea levels will impact coastal habitats, local communities, natural resources, and public safety.
- The National Park Service, U.S. Geological Survey, and U.S. Fish and Wildlife Service are using this project's high precision models to examine the combined impacts of sea level rise and land level changes in the Kachemak Bay area.
- The project established long-term salt marsh monitoring sites and trained a group of citizen scientists to ensure that decision-makers will continue to have up-to-date, local information about changes impacting the Bay.
- A key finding from the project is that certain areas are experiencing slower land level rise relative to the surrounding landscape, making some areas more vulnerable to sea-level rise and storm surges.
- Based on this finding, municipal decision makers have used the project's models to investigate potential impacts to infrastructure and land-use practices, identify adaptation approaches, and develop a research proposal to further investigate local land level changes.

Project Approach

The Kachemak Bay reserve partnered with researchers from the University of Alaska Fairbanks to characterize large-scale changes in ecology, landscape, and sea level rise for Alaska's Kachemak Bay and inform local land use management and decision making.

- **Stakeholder Engagement:** To launch the project, the team organized a core group of people who would use project results, including local decision makers, coastal managers, and scientists. Team members met with the group throughout the project to refine their research approach, review data, and identify products and tools that were useful for local decision makers and managers.
- **Data collection and Modeling:** The team used high-precision global positioning units to measure and assess the rate of vertical land level changes around Kachemak Bay and incorporated this data into vertical land motion models to improve model accuracy. They also established study plots in local salt marshes to monitor long-term, changes in sea levels, as well as biological and vegetation changes resulting from sea level rise and fall, glacial melt water, and coastal uplift. Working with local stakeholders, they integrated their results to develop predictive models of relative sea level rise and land changes for the Kachemak Bay area.
- **Training and Education:** Stakeholders participated in the project's experiential learning activities, including their Discovery Labs, to get first-hand experience with the project's research approach and support data collection. The team also trained citizen scientists to participate in a community monitoring program to collect long-term data on salt marsh vegetation, birds, mammals, and insects to determine the effects of sea level rise and coastal uplift on coastal ecosystems.

