



# Promoting Resilient Groundwater Resources and Holistic Watershed Management at the Kachemak Bay Research Reserve

## Overview

### Project Location

Kachemak Bay National Estuarine Research Reserve

### Project Duration

November 2017 to October 2019

### Project Lead

Coowe Walker  
Kachemak Bay National Estuarine Research Reserve  
(907) 235-4792  
[Cmwalker9@alaska.edu](mailto:Cmwalker9@alaska.edu)

### Project Type

Collaborative Research – generating science that informs decisions

### Project Partners

- Cook Inlet Keeper
- Homer Soil and Water District
- Kachemak Bay National Estuarine Research Reserve
- Kachemak Bay National Estuarine Research Reserve Community Council
- Kenai Peninsula Borough
- Project GRAD
- University of South Florida

In 2016, the Kachemak Bay National Estuarine Research Reserve hosted a workshop series to develop strategies for coping with coastal climate change on the Kenai Peninsula in Alaska. The workshops were the result of a Science Collaborative Science Transfer grant, as well as involvement in the Successful Adaptation Indicators and Metrics Science Collaborative project.

Through the workshops, scientists, agency resource planners and regulators, conservation non-profits, tribal members, and community leaders were brought together to share ideas about what a thriving Kachemak Bay community might look like, and to explore how climate and environmental changes may affect the future. Participants also identified strategies and actions needed for building more resilient communities, and linked these to local efforts to move adaptive planning forward in the area. Resource planners, regulators, NOAA scientists, and Kachemak Bay reserve staff identified the critical need for information on groundwater flows that could be used in decision making. As a result of these workshops, the Kachemak Bay Reserve identified classifying and mapping groundwater discharge and recharge areas as a top priority, contributing to reserve efforts to lead ecosystem service valuation and climate change adaptation efforts.

This project takes existing spatial data sets, modeling frameworks, and local expertise, and integrates them with new science aimed at developing a comprehensive conceptual model and validated geospatial layer that can be used to predict specific locations where groundwater discharge and recharge occur. Working collaboratively with key end users who participated in the climate adaptation project, and with additional end users identified through the Kachemak Bay Reserve's Community Council, the project team will interpret the groundwater model for use in land use planning, permitting, policy decisions, and habitat protection.

## Anticipated Benefits

- Informed planning and decision making for the Kachemak Bay Reserve;
- Increased awareness and understanding of salmon habitat vulnerabilities for decision makers;
- Improved capacity for partnering with diverse organizations;
- Strengthened stakeholder network around groundwater resources, coastal fisheries resilience, and a changing climate; and
- Regional progress toward tangible conservation and restoration actions.

## Project Approach

This project will bring together multiple experts—including management and regulatory end users, community members, hydrologists, salmon scientists, Native Alaskans, land owners, and collaborative learning facilitators—to develop tools for visualizing and managing groundwater discharge and recharge to Kenai Lowland salmon streams. The team will expand current understanding of groundwater flows in the Kachemak Bay region by leveraging existing spatial data sets, modeling frameworks, and local expertise to develop a conceptual model that can be used to predict groundwater recharge and discharge to streams in locations where field data and thermal imagery exist. Subsequently, the team will use the conceptual model to predict groundwater recharge and discharge in other locations within Kachemak Bay area watersheds, and then conduct field visits to ground truth results. Once complete, the conceptual model will be made into a geospatial layer that can be used to predict specific locations where groundwater recharge or discharge occurs.

## Targeted End Users and Anticipated Products

Targeted end users include the Kachemak Bay Reserve Community Council, Homer Soil and Water District, Kenai Peninsula Borough, Cook InletKeeper, and Project GRAD. Each of these targeted end users will serve as a liaison to working groups with distinct focuses, from whom they will gain insights, including Native Alaskans, agricultural users, resource managers, and conservation non-profits. This project will result in the following products that are directly responsive to end user needs:

- New spatial data set of groundwater discharge and recharge areas for key Kachemak Bay salmon watersheds;
- Integration and application of existing research and spatial data relevant to ecosystem services supported by groundwater;
- End user meetings, workshops, and field trips throughout project to inform the development and application of tools;
- Tools for managing groundwater, including tailored spatial data sets, visualizations, presentations, best management practices, and other decision-support tools to be determined through collaboration with end users;
- Published scientific journal articles; and
- Presentation of results and evaluation of collaborative methods presented at the reserve system's annual meeting and Alaska regional meetings.

### 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. The Science Collaborative is managed by the University of Michigan's Water Center through a cooperative agreement with the National Oceanic and Atmospheric Administration (NOAA). Funding for the research reserves and this program comes from NOAA. Learn more at [coast.noaa.gov/nerrs](http://coast.noaa.gov/nerrs) or [graham.umich.edu/water/nerrs](http://graham.umich.edu/water/nerrs).*