

JUNE 2023 QUARTERLY REPORT

*Our Mission: To enhance understanding and appreciation of
the Kachemak Bay estuary and adjacent waters to ensure that
these ecosystems remain healthy and productive*

**Kachemak Bay
National Estuarine
Research Reserve**



ADMINISTRATIVE UPDATE

Program Update:

KBNER manager, Coowe Walker, has retired after 25 years with the Reserve. After three months of planning and implementation, the hiring process for a new manager has nearly concluded. Coowe has transitioned her projects and administration to ACCS and KBNER staff. The NOAA Operations and Bipartisan Infrastructure Law Capacity Building awards will now be led by Matt Carlson; the Salmon Watershed Stewardship award will be led by Erin Larson; and the various peatland awards will be led by Lindsey Flagstad.

Staff:

Coowe Walker, Reserve Manager and Program Watershed Ecologist (Retired)

Syverine Bentz, Coastal Training Program Coordinator and Acting Reserve Manager

Ingrid Harrald, Education Coordinator

Lauren Sutton, Research Coordinator

Jacob Argueta, Watershed Research and Stewardship Coordinator

Chris Guo, Research Professional, Nearshore Research

Jasmine Maurer, Harmful Species Lead

Kim Schuster, Research Technician

Ben Peters, Administrative Specialist, Community Council Liaison

Conrad Field, Research Technician and Education Specialist

McKenna Shook, Marine Research Technician

Reserve Students and Interns:

Jonah Jossert, Davidson Fellow 2022, mentored by Lauren Sutton

Eojin Lee, Hollings Scholar 2023, mentored by Mark Rains

Maxwell Lyons, Hollings Scholar 2023, mentored by Jacob Argueta

Seraina Rioult-Pedotti, Hollings Scholar 2023, mentored by Chris Guo

Nicole Reynolds, Hollings Scholar 2023, mentored by Jasmine Maurer and Ingrid Harrald

Facilities

Guests and students have begun to arrive at the bunkhouse, as we prepare for the busy field season.

Funding to upgrade audio-visual technology in the Reserve's seminar meeting room is included in the new NOAA Operations award.

The Stever has received essential repairs and maintenance and will be functional for this field season. Both boats are currently located at the Homer Harbor.

Funding Opportunities and New Projects Awarded

Sutton, L. \$30,234. "From taxonomy to function – a functional traits approach to nearshore fish communities in glacially influenced watersheds". 2023. Alaska NSF EPSCoR 2023 Faculty Research Seed Grant.

Sutton, L., Bentz, S., Causey, D., Harrald, I., Boege-Tobin, D., Rii, S., and Ching, C. \$63,900. "Explorations, Demonstrations and Novel applications for environmental DNA in Kachemak Bay, Alaska." 2023. National Estuarine Research Reserve System Science Collaborative.

"Engaging Middle School Students in Plant Conservation." 2023 Smithsonian Environmental Research Center

The new **NOAA Operations award** will include an 11% increase, for a total of \$867,113. The increase will help meet rising salary and benefit costs, provide student opportunities, and will meet core staffing needs for administration, SWMP, education and training programs, and harmful species monitoring.

The Reserve received NOAA funding for the purchase of peatlands at the head of Beluga Lake to serve as conservation and green infrastructure/storm water control. The proposal was submitted for funding under the **Bipartisan Infrastructure Law** (formerly Infrastructure, Investment, and Jobs Act) in partnership with the City of Homer. We are excited to begin the acquisition process with the city!

After a community-led prioritization process, the KBNERR council lands committee identified two land acquisition and conservation projects to pursue for the **2023 Bipartisan Infrastructure Law** opportunity. KBNERR, Land Trust, and City of Homer staff have begun the proposal development stage.

Science Collaborative Proposals Submitted

The Race is On: Transferring Knowledge Ahead of Marine Invasives

Funding Source and Amount: NERR Science Collaborative, \$74,908

Collaborative Team: Ingrid Harrald, Syverine Bentz, Jasmine Maurer, Lauren Sutton

Partners: Washington Sea Grant, Padilla Bay NERR, ADF&G, Alaska Sea Grant, Prince William Sound Regional Citizens' Advisory Council

Explorations, Demonstrations and Novel Applications for Environmental DNA in Kachemak Bay, Alaska

Funding Source and Amount: NERR Science Collaborative, \$63,900

Collaborative Team: Lauren Sutton, Syverine Bentz, Ingrid Harrald

Partners: UAA Biological Sciences, UAA KPB KBC, He'eia NERR

Integrating Indigenous knowledge and NERR science and monitoring to improve estuarine stewardship and management, with shared benefits for birds and local communities

Funding Source and Amount: NERR Science Collaborative, \$199,976

Collaborative Team: Syverine Bentz, Pacific Birds Habitat Joint venture, He'eia NERR, Kachemak Bay NERR, Padilla Bay NERR, South Slough NERR

Outreach and Service

Argueta, J. Participates in monthly Land and Easement Committee sessions for the Kachemak Heritage Land Trust (KHLT) and provides watershed and GIS expertise. Developed flow path models for KHLT adjacent parcels slated for development.

Harrald, I. Shorebird monitoring at lighthouse village.

Maurer, J and Schuster, K. Members of the AKISP Marine Invasive Species Committee attending monthly meetings and the AHAB Network monthly meetings.

Sutton, L. Participates in monthly Port and Harbor Commission meetings

SYSTEM-WIDE MONITORING PROGRAM (SWMP)

Program Update

The KBNERR SWMP program includes water quality and weather monitoring. For water quality, we have paired instruments just under the surface of the water and just above the seafloor (at an average depth of about 26 feet) at both the Homer and Seldovia ferry docks. We have two weather stations, one on the end of the Homer Spit, and one on the shore near Anchor Point. We also collect water samples for nutrient analysis as part of this program. KBNERR's SWMP began in 2001, and we now have 22 years of continuous monitoring data.

Research Coordinator Lauren Sutton and SWMP Tech Chris Guo attended the annual SWMP Tech Training Workshop during March 14-16th, strengthening existing relationships with other NERR SWMP programs and the SWMP Centralized Data Management Office (CDMO).

During this quarter the SWMP Meteorology (MET), Water Quality (WQ), & Nutrients (NUT) regular sampling schedule (monthly) shifted from mid-month to the first week of each month. Regular monthly sampling & maintenance occurred for each during March, April, and May. KBNERR maintains four real-time telemetered sites: Homer Deep WQ (kachdwq), Seldovia Deep WQ (kacsdwq), Homer Spit MET (kachomet), and Anchor Point MET (kacapmet). Seldovia Deep telemetry hardware was removed April 4, 2023. Hardware is currently undergoing upgrades and replacements. Real-time data is expected to be available in June 2023.

The Homer Spit station was removed from its location on top of Land's End on March 21, 2023 at 09:56 AM due to Land's End's upcoming roof renovation, requesting station removal for two years. KBNERR deemed two years too long of a period to have a station

not collecting data, so KBNERR is working with City of Homer Port & Harbor to relocate the station. Location has been decided, but not made official. New MET station is expected to begin installation July 2023.



Before and after Homer Spit MET station removal, March 2023

Upcoming Programs

SWMP is working with City of Homer Port & Harbor to collect and report water quality data related to their fish grinder outflow. KBNERR will collect semi-annual water quality data at two sites: close to the fish grinder outflow (distance less than 100 feet) and ambient receiving water (distance > 500 feet). Additionally, City of Homer Public Works is providing KBNERR materials to sample Total Residual Chlorine

SWMP is coordinating with Public Works to improve understanding of KBNERR WQ and MET stations and exploring ways of partnering. SWMP training for all SWMP technicians and selected research coordinators will occur March 12-17 in South Carolina. Chris and Lauren will attend.

Data and Other Products

Regular monthly sampling & maintenance occurred during March, April, and May for MET, WQ, and NUT. Authenticated data are now available via the [CDMO Data Export System](#) or Advanced Query System. Look for data from both our water quality and weather stations at the [AOS Ocean Data Explorer portal](#) and the [NERRS Central Data Management Office](#).

Primary QAQC was completed by KBNERR for MET / WQ 2023 second quarter (April 1 – May 31, 2023) and accepted by the CDMO.

Secondary QAQC was completed for MET / WQ 2023 first quarter (January 1 – March 31, 2023) and submitted to the CDMO on May 1, 2023.

Secondary QAQC was completed for MET / WQ 2022 annual review (January 1 – December 31, 2022) and submitted to the CDMO on April 17, 2023 and May 15, 2023 respectively.

Tertiary QAQC was completed for WQ 2021 annual review (January 1 – December 31, 2021) and submitted to the CDMO on May 7 and finalized on May 10, 2023.

COMMUNITY MONITORING

Harmful Algal Blooms

KBNERR staff and SVT partners continue to collect weekly phytoplankton samples through the spring. KBNERR staff also are collecting weekly OA and phytoplankton samples for Alutiiq Pride Marine Institute. Staff held the Annual Spring Community Monitor Training in April and reoriented current community monitors and partners. Kim has been conducting phytoplankton identification during the spring and will continue into the summer field season; visit [KBNERR's Facebook page](#) for Kim's weekly *Phytoplankton Friday* posts to see what she's captured using the microscope monitor.

Marine Invasive Species Monitoring

Tunicate plate monitoring began again in March, starting with the Homer Harbor. This start date is earlier in the year to align with updated protocols in the national Plate Watch Program. Jasmine discussed marine invasive species and monitoring protocols with UAA students in Journalism and Communications classes during their visit to KBNERR during spring break and to support the development of outreach materials for European green crab as part of their coursework. As a result, the students produced two videos on the topic of invasive green crab in Alaska. Staff are active in updating the Alaskan European green crab Rapid Response Plan and planning for a rapid response drill in Kachemak Bay in August. Staff also are coordinating with statewide partners to update field protocols, datasheets and data sharing for early detection and monitoring of invasive green crab.



SACRED Gathering Participants explore marine invasive monitoring at Kasitsna Bay Lab.

Oral & Poster Presentations

Maurer, J. *Turning the Tide on Invasive European green crab in Alaska.* Virtual oral presentation at Alaska Forum on the Environment, April 2023.

Maurer, J. *Invasive European green crab Threat to Alaska Fisheries.* In-person oral presentation at Kenai Fish Habitat Symposium Soldotna, April 2023.

Maurer, J; Schuster, K. **Alaska** Non-native Aquatic Species Clearinghouse update. In-person oral presentation at Kenai Fish Habitat Symposium Soldotna, April 2023.

Maurer, J. Phytoplankton Monitoring Methods and HAB Community Monitoring. In-person oral presentation at AHAB Network Annual Workshop, Anchorage, March 2023.

Schuster, K. Alaska Non-native Aquatic Species Clearinghouse update. In-person oral presentation at AKSIP partnership meeting, Anchorage, October 2022.

Data & Other Products

Update EGC Molt Walk Survey Datasheet and Protocol. This datasheet and protocol will be used throughout Alaska as an early detection tool for invasive EGC.

Alaska Non-native Aquatic Species Clearinghouse

Jasmine is a member of the Alaska Early Detection and Rapid Response Plan for EGC development committee working to update the AK EDRR plan for EGC and host a drill in August 2023.

Invasive Green Crab in Alaska four-minute video product completed in partnership with UAA JPC students. This video was shared in the AKISP Spring newsletter and during KBNERR education activities with McNeil and Port Graham students. It was also presented at the KP Fish Habitat Symposium.

RESEARCH

Program Update

Research is getting ready for the busy summer field season. Along with the long-term monitoring of weather, water quality, and invasive species, the research team is preparing to add nearshore fish to our monthly monitoring programs. We will also be welcoming a seasonal field technician, McKenna Shook on May 29 who will be our primary boat captain for The Stever and will assist in other field efforts. She is a full-time student in the University of Alaska Fairbanks Marine Science undergraduate program who spent four years in the coast guard and brings experience *of navigating Alaskan waters*. Welcome McKenna!

Groundwater Vulnerability in the Kenai Lowlands

KBNERR continues to support groundwater research at University of South Florida. Yearlong weekly and monthly water collection at various sites in the Anchor River

drainage will help illustrate the contributions of groundwater to stream base flow through the different seasons. Tyelyn Brigino has transitioned into a PhD program at USF and is currently analyzing the data collected this past winter.



Jacob Argueta using an auger to access a groundwater sampling site during the winter.

Peatland Carbon Valuation

This project is funded by the US Fish and Wildlife Service. PI transferred from Coowe Walker to Lindsey Flagstad at ACCS. Doctor Lindsey Flagstad is a wetland ecologist and botanist who has worked across Alaska and brings her expertise to the project. Project members are working with Sylvestrum Climate Associates on completing Project Information Notes for two carbon market scenarios, land trades between the Kenai Peninsula Borough and material site operators, and reintroduction of beavers to keep peatlands wet and storing carbon. A gas flux analyzer has been purchased and is due to arrive in August. This tool will allow us to better understand the net gas exchange in our peatlands, a vital step in creating a carbon project. Scott Bridgham, a peatland expert from University of Oregon, will lead training and installation of infrastructure for the instrument.

Beavers and Peatlands

This is a collaborative partnership between Alaska Wildlife Alliance, University of South Florida, and KBNERR, funded by the Doris Duke Foundation. PI for this project transferred from Coowe Walker to Lindsey Flagstad at ACCS. This project will examine the impacts of beaver dams on groundwater levels in adjacent peatlands. Site selection is underway; beaver sites are to be scoped late May as the snow melts and access is possible. Instrumentation is being purchased for groundwater monitoring at three sites, a control and two treatments. Beavers as ecosystem engineers were a high priority topic at the first in-person meeting of the Kachemak Bay Watershed Collaborative, showing both public and organizational support for this line of inquiry.

Salmon Watershed Stewardship

The Reserve continues to work on the Salmon Watershed Stewardship award, funded through congressionally directed spending via Don Young's office. This project will

now be led by ACCS ecologist Erin Larson. Both Coowe Walker and Erin Larson have met with the Fish Habitat Partnership coordinators and steering committees from the Kenai Peninsula and Matanuska-Susitna, respectively, to discuss the project and the possibility of a Cook Inlet-wide salmon science symposium. SWS project leaders worked together to develop a list of interested parties and are having conversations with those potential partners to discuss workshop topics of interest to inform planning in the next year. SWS project leaders are also starting to work on a situation assessment to get a baseline of watershed monitoring activities and needs in the Cook Inlet region. All project members attended the Kenai Peninsula Fish Habitat Partnership salmon symposium in April to continue to network and make progress on project goals around outreach. At the symposium, a special panel discussion centered around how to get science into policy was held, including representatives from state, borough, and city levels of government and scientists. Project members have been meeting with Tribal partners (including Chickaloon Native Village, Eklutna Native Village, and the Knik Tribe) to discuss their watershed monitoring needs and will send out a more formal survey to decide on watershed monitoring workshop topics in the next quarter. ROCA Communications has met with project members to discuss their perspectives on the Reserve's audiences and communication strategies and needs.

Aquatic Invasive Species Data Portal

Kim is working with ACCS and Axiom to curate and simplify the current version of this data portal to make a more user friendly product. This includes a universal data entry form, which PIs will fill out quarterly. The final product will hopefully streamline the data upload process and allow for more communication with project PIs and the resource managers.

Nearshore Research

KBNERR intends to continue beach seine sampling for nearshore fish in the summer of 2023, sites locations TBD

NOAA Hollings Scholar, Seraina Rioult-Pedotti, will work with KBNERR to collect marine forage fish data via citizen science sampling of predatory fish stomach contents.

Oral & Poster Presentations

Sutton, L., Hauri, C., Pages, R., Mueter, F., and Iken, K. Predicting epibenthic functional distribution on changing Arctic shelves. Oral presentation at the Fifth Effects of Climate Change on our World's Oceans (ECCWO)/ in person in Bergen, Norway, April, 2023.

Sutton, L. Ecology of Homer Harbor: what do we know and where are the gaps? Oral presentation to the Port and Harbor Commission May, 2023.

Manuscripts

Guerrón-Orejuela EJ, Rains KC, Brigino TM, Kleindl WJ, Landry SM, Spellman P, Walker CM, Rains MC. 2023. Mapping Groundwater Recharge Potential in High Latitude Landscapes Using Public Data, Remote Sensing, and Analytic Hierarchy Process. Remote Sensing.

Sutton, L., Hauri, C., Pages, R., Mueter, F., and Iken, K. 2023. Predicting epibenthic functional distribution on changing Arctic shelves. In preparation for Elementa.

Ulaski, B., Sutton, L., Guo, C., Beaudreau, A., Lundstrom, N., & Jenkes, J. 2023. Comparing taxonomic and functional diversity of two glacially influenced Alaskan fish communities. In preparation for Estuaries and Coasts.

Lauren and Chris are participating in early discussion with national SWMP working group coordinated by K. Reinl (Lake Superior NERR). Proposed topic: evaluate short-term variability and long-term trends in estuarine water quality with a focus on parameters that are relevant at the national level. Specifically, parameters related to eutrophication and hypoxia (ie. N, P, Chl-a, Temp, and DO, among other possibilities). Manuscript title and target journal: TBD

EDUCATION UPDATE

K-12 School Programs:

Homer Middle School: Two days with seventh grade classes exploring invasive species, benthic invertebrates, fish monitoring.

McNeil Elementary: Field trip to Seldovia for natural history, Invasive species, Cultural History, and ROV. Green Crab classroom visit and field trip.

Project Grad: 2 day field trip to Kasitsna Bay with Port Graham and Nanwalek 3-5 grade students. Focus on Plankton, intertidal, invasive species.

Port Graham: Schoolwide Sea week activities: green crab trapping, plankton, carapace walk, ROV

Nanwalek: Schoolwide Sea Week activities: intertidal, plankton, carapace walk

Homer High School and Homer Flex Biology Classes: Davidson Fellow visit to classroom - benthic samples. Tiglax Field Trip focusing on plankton and invasive species

ANSEP: Monthly half day classes on harmful algal bloom and invasive species for Middle School Academy.

Partnerships:

Shorebird Festival: Junior Birder Coordinating team. Leading 3 events, collaborating on 4 others.

He'eia NERR: Hosted Claire during shorebird festival, collecting tattler diet samples for research project.

EPSCoR

Seldovia Village Tribe/Chugachmiut/Groundtruth Trekking: Collaborated with Chugachmiut and SVT on multiple field trips using harbor science, ROV monitoring, natural history. Attended Chugachmiut Tea and Tang on subsistence gathering.

KBC: Working with Semester By the Bay program to develop mentoring guidelines.

Project Grad / CACS: Port Graham and Nanwalek Sea week

KBEEA: Strategic Planning meeting with all KBEEA partners, collaboration events planned for the summer (discovery labs, mud wallow, master naturalist).

USFWS: Planning weekly Beluga Slough walks starting in June.

Student Internships

High School Interns

Diane Lemieux - Pietrowski: part time High School education intern started January for work credit, contract extends through June.

Undergraduate Students

Nicole Reynolds: Hollings Invasives/Education intern

KBC/SBB: Interviewing and planning for 3 fall education/harbor porpoise interns.

Graduate Students

Sutton, L. Serving as a committee member for Lizi Byrd's MS project looking at historical diets of shorebirds in Kachemak Bay, Alaska.

Sutton, L Serving as a committee member for Chris Guo's PhD project looking at nearshore fish communities in Alaska.

Sutton, L Mentoring Jonah Jossart, a UAF graduate student under the Margaret A. Davidson fellowship. He is studying benthic communities in Kachemak Bay.

Cross Program Collaborations

UAA Journalism and Public Communications Department

Education, Training and Harmful Species staff worked with 8 undergraduate students and 4 instructors in digital storytelling and strategic communications on a semester-long project including classroom visits and a two-day site visit to Kachemak Bay as a capstone opportunity where videos and op-eds were produced about marine invasive issues facing the State of Alaska. Approximately 120 student contact hours over the semester.

Outreach & Presentations

Maurer, J. and Schuster, K. Elementary classroom visit and field work exploring marine invasive species topics and completing an early detection event for EGC on Homer Spit.

Homer Middle School 7th grade science field trip. Ingrid lead an invasive station, Chris lead a nearshore fish station, Lauren lead a benthic ecology station, all located at the Homer Harbor.

McNeil Canyon Day with Scientists in Seldovia discovering methods of collection and the importance of phytoplankton in Kachemak Bay and investigating marine invertebrates native to Kachemak Bay and monitoring for marine invasive tunicates.

TRAINING UPDATE

Trainings, Events, & Workgroups

SACRED Workshop

Southcentral Alaska Collaborative for Resilience through Education and Decision-making is a Community Resilience Education program in partnership with monitoring, education and cultural entities. The goal of this work is to foster and support community-driven educational and monitoring programs that will safeguard healthy marine resources and abundant freshwater resources against rapid, ongoing climatic changes. This spring, KBNERR co-developed and hosted an in person 3-day gathering at Kasitsna Bay Lab with 20 partners to build on established partnerships and co-develop projects and programs that align research and monitoring with the foundation of heritage knowledge in local communities.



SACRED Gathering participants identify spring phytoplankton samples

Kenai Peninsula Fish Habitat Science Symposium

KBNERR staff provide technical assistance in design and evaluation and assessment mechanisms for engaging partners in future habitat monitoring for conservation.

Syverine Bentz was on the planning committee for the 2-day KPFHP Science Symposium, which engaged 110 participants, and shared KBNERR activities, facilitated network development, and built capacity to integrate with the Salmon Watershed Stewardship Project.

Community Monitor Harmful Species Training

To kick off the field season the CTP partnered with the Harmful Species Program to deliver their annual community monitor training to 16 participants including community monitors and environmental educators. This training happens every spring and initiates the start of sampling for the program. The focus this year was on sampling techniques, plans for the upcoming season, a review on the previous season, and report outs on harmful algal bloom research projects in the region. Presentations by the KBNERR Harmful Species Coordinator as well as Thomas Farrugia of the Alaska Harmful Algal Bloom Network were well received.

Kachemak Bay Watershed Collaborative

KBNERR science is in high demand for stakeholders in the collaborative, and CTP and Stewardship staff presented reserve projects to this group this spring and are on the Executive Committee, helping set priorities, developing processes to guide decision-making and collective action, and identifying outreach strategies for additional engagement.

Kachemak Bay Science Friday Lunch Pub Club

This monthly opportunity was started in January 2023 to increase awareness and access to local science. This group engages researchers, resource managers and environmental educators and meets monthly to discuss a recent scientific journal article that is of interest and relevance to coastal professionals. The group averaged about 18 participants over the 5-month series, which included locally relevant topics of beach wrack, glaciers and salmon, beavers as ecosystem engineers, harmful algal bloom toxins, and marine carbon sequestration.

Ocean Acidification Vulnerability Workshop

The Coastal Training program assisted partners from Alaska Sea Grant and NOAA-Alaska Fisheries Science Center to recruit and set up a venue for researchers to work with 13 community members and local industry representatives in a 2 hour work session to characterize dependencies on marine resources, and adaptive strategies in the face of a changing marine ecosystem.

Oral & Poster Presentations

Chambers, C. & Bentz, I.S. (2023) Fish Need Land Too. Kenai Peninsula Fish Habitat Partnership Science Symposium, Kenai, Alaska.