



# PULSE OF THE BAY

Fall 2015 Quarterly Newsletter of the Kachemak Bay National Estuarine Research Reserve Vol. 4 No. 3



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## NOAA Habitat Blueprint: Where have all the clams gone?

By Angela Doroff,  
Research Coordinator



Beginning in the late 1900s the native bivalve populations in southcentral Alaska decreased significantly. Native and hatchery-reared bivalves are facing climate-related changes to freshwater inputs, salinity, and increasing water temperatures and we do not know the extent to which ocean conditions are associated with the observed native bivalve population declines. As ocean conditions continue to change, better information and tools are needed to inform efforts to sustain the productivity of native bivalve populations within southcentral Alaska. This past year, the Reserve was awarded a Coastal and Marine Habitat Focus Area Grant for Kachemak Bay titled [Building a Foundation of Decision-Support Tools Integrating Existing Mapping and Monitoring Information for the Benefit of Long-Term Shellfish Sustainability and Management in Kachemak Bay and Cook Inlet, Alaska.](#)

The goal of the project is to work collaboratively with stakeholders to promote native bivalve population recovery efforts that are consistent with the long-term sustainability of a healthy and functional ecosystem. To accomplish this, we are synthesizing available habitat information from multiple sources to develop deductive habitat models for key bivalve species in the region. These models will be used to predict species occurrence through the modeling of associated environmental variables, which is an important first step in providing a solid foundation to measure future changes in bivalve habitat at a regional scale. Currently, we are assembling basic habitat data into a Geographic Information System (GIS) to build landscape-scale habitat maps for multiple species including intertidal (Baltic macoma and littleneck clams), intertidal and subtidal (butter clams and razor clams) and subtidal (scallop) species.

GIS offers a common platform for integrating data across disciplines and provides visualization and analytical tools. The end result will be a tool to aid in understanding land facets important to resource management. Land facets are non-biological features that help define key habitats that may be more resistant to or buffered from changes in climate. Understanding those habitats with the most topographically, bathymetrically, and geochemically heterogeneous features can aid in the development of important habitat reserves to inform best management strategies in the face of a changing climate. Deductive habitat modeling is valuable because it uses basic habitat relationships to predict habitat availability for species of interest and can then be used to focus exploratory and monitoring surveys.



Integrating data to build habitat maps (China Poot Bay)

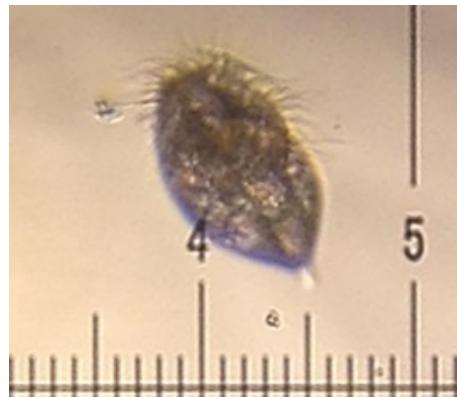


## ...NOAA Habitat Blueprint: Where have all the clams gone?



In partnership with the Alutiiq Pride Shellfish Hatchery, we are testing the feasibility of hard-shell clam spawning gardens and pilot monitoring methods for larval dispersal to guide the selection of potential future restoration sites.

To understand the relationship between bivalve population declines and changing ocean conditions, we are augmenting our long-term water quality monitoring program with SeaFET™ Ocean pH Sensors. We will also address key information gaps about bivalves to bolster the functionality of habitat prediction tools. Collectively, these efforts will support ecosystem-based management of bivalves by providing decision-support tools to managers, and they will establish a framework upon which future restoration efforts informed by an engaged community of stakeholders can be built.



Butter Clam Veliger at  
Alutiiq Pride Shellfish Hatchery

## Semester By the Bay Interns with Kachemak Bay Campus

This fall semester we were lucky enough to have several undergraduate students attending Kachemak Bay Campus here in Homer help out with research projects as part of the Semester by the Bay Program.

**Gary McPhee and Maeve St. Ledger (right) assisted Coowe Walker with juvenile salmon research on the Anchor River.**



Tricia Bhatia (left) checked settling plates for invasive tunicates as part of a monitoring project with Catie Bursch.

**Madison Lytle and Elaina Marcotte (right) explored the bay with Angie Doroff sampling scat as part of a sea otter diet project.**

*We were so pleased to be able to offer this opportunity for students to gain research experiences and enhance understanding and appreciation of the Kachemak Bay estuary!*





## Fish & Fishing Education at KBRR

By Carmen Field, Aquatic Education Specialist and Naturalist

KBRR staff continue to partner with ADF&G Sport Fish Division and the Alaska EPSCoR [Experimental Program to Stimulate Competitive Research] project to offer fish, fishing, and watershed education programs in Homer and beyond.

This fall and winter Jessica and Carmen are working with EPSCoR Southcentral Test Case project partners to plan January 2016 classroom and field salmon research studies that will pair Homer High School students with EPSCoR biologist Molly McCarthy for three days. Students will get hands-on insights into the scientific process and learn what sediment cores from Kenai Peninsula lake bottoms can tell us about past salmon populations.

The ADF&G Sport Fish Division has sponsored the following events, activities & opportunities for students and families this fall:



- ADF&G Rod Loaner Program: Visitors to Homer continued to borrow salmon rods and tackle through early October, due to late-season saltwater king salmon fishing opportunities in Kachemak Bay.



Out of state angler with salmon caught on loaner rod (June, 2015)



Salmon dinner caught on loaner rod (June, 2015)

- Freshwater angling opportunities on the Kenai Peninsula have switched to hardwater fishing, so ice fishing jiggling rods, augers, and ice ladles can now be borrowed at no cost at the AK Islands & Ocean Visitor Center's lobby desk during open hours (Tue-Sat from 12-5pm). ADF&G's Ice Fishing Gear Loaner Program continues through March 31, 2016. ADF&G's/KBRR's annual Ice Fishing Discovery Lab at Islands & Ocean was held this month (Friday, December 18 from 2-5pm).
- Anchor River Egg Take / Salmon in the Classroom event for K – 12 students > 400 students from central and lower Kenai Peninsula Borough School District schools participated in an educational field program at the Anchor River with ADF&G staff from Homer and Soldotna (including Carmen) on October 7th to learn about salmon life history and stream fish identification. Each participating teacher returned to their classroom from this event with fertilized coho eggs to raise in the classroom with their students throughout the school year.
- Salmon Habitat EE programs were provided by Carmen for 100 Little and Big Fireweed Academy students this fall. Kindergarten, first and second grade students participated in an October 23rd outdoor class at Beluga Slough, where they learned about the various habitats that salmon call home throughout their life cycle. Third through sixth grade students enjoyed an in-class program with Carmen on December 4th, where they learned about local salmon research being conducted on the Kenai Peninsula and how to age and identify salmon using scales from salmons' bodies.

Upcoming fish and fishing education programs include a month-long Think Like a Fish series of Discovery Labs for the public and local preschool through third grade students in January, a family ice fishing expedition in February to a Peninsula lake stocked with rainbow trout, and April Discovery Labs for the public and fourth through sixth grade students highlighting watershed and salmon research in the Kenai River watershed.



## From the Research Coordinator: By Angela Doroff



Humpback Whales in Kachemak Bay

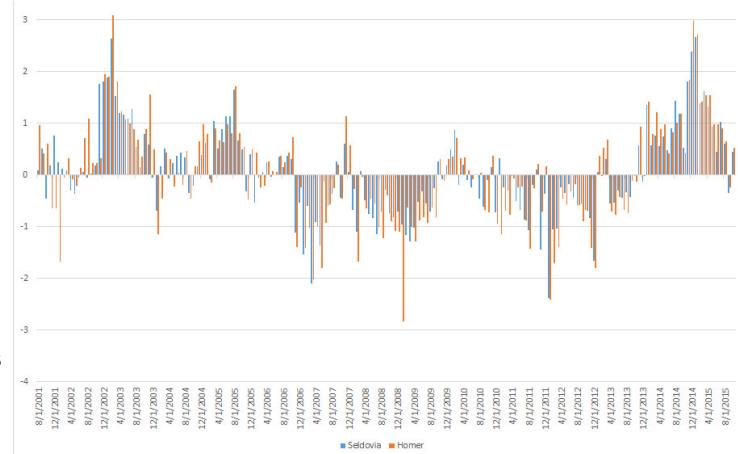
In Kachemak Bay during 2015 we noticed a great deal of change in our local environment. Sea surface temperatures were above the 14-year average for all months of the year with the exception of September. In 2014, the stage for warmer ocean temperatures was already being set. Water inside Kachemak Bay mirrored warm water temperatures in the Gulf of Alaska and the north Pacific Ocean. In early summer, a large extent of the north Pacific experienced bloom conditions for *Pseudo-nitzschia*, a phytoplankton species that has the potential to produce domoic acid and, later in the year, we experienced a paralytic shellfish toxin bloom of *Alexandrium* in the inside waters. Concurrently, there were many anomalies observed including multiple mortality events for marine mammals (fin and humpback whales, walrus, and locally, sea otters) and colony failure, mortality, and shifts in distribution for seabirds (primarily common murre, shearwaters, kittiwakes) throughout the Gulf of Alaska and north Pacific. It has also been an uncommon year for forage fish, this was to the benefit of some species, like killer whales in Prince William Sound and humpback whales in Kachemak Bay. During our annual Gulf Watch meetings in November, these anomalies were discussed from the vantage point of how long-term monitoring programs can facilitate understanding the underlying physical and biological processes that contribute to ecosystem shifts.

In 2001, we began monitoring water quality, nutrients, and meteorological parameters; this year we will be starting a more targeted monitoring program for ocean acidification (OA) in the Reserve. Ecosystem processes associated with OA conditions are beginning to be understood in the open ocean in Alaska, however, little is known about responses to changing OA conditions in estuary habitats. We have been collecting pH as our routine water quality monitoring, however, the sensors are not refined enough help inform biological processes associated with OA. Along the Pacific coast, OA events have been periodic upwelling events that bring cold, nutrient-rich but more corrosive waters to the surface; this has resulted in local shellfish mariculture failures. In Kachemak Bay, in addition to deep water upwelling, two major ice fields contribute highly corrosive melt water during the summer months which adds an additional monitoring challenge. Glacier meltwater has likely always been more corrosive and a normal part of intertidal ecology here, however, changes in the timing and duration of glacier melt into the estuary may be impacting shell-forming organisms by making it difficult to maintain their calcification (it will be more energetically costly when the ocean waters favor dissolution for a longer period of time in the summer and fall).

In 2016, the Reserve will be conducting field trials for new OA sensors, working with NOAA Kasitsna Bay Lab on monitoring water quality and structure in Kachemak Bay and lower Cook Inlet, and assisting the Alutiiq Pride Shellfish Hatchery with their community monitoring program for OA trends in Southcentral Alaska. Our research and monitoring goals for ocean acidification are:

- To build out our monitoring program in order to understand short-term variability and long-term trends in ocean acidification within the Kachemak Bay estuary.
- Link patterns in ocean acidification to changes in the near shore ecology.
- Participate and share information with local, regional, national, and international ongoing ocean acidification monitoring, research, and management forums.

System Wide Monitoring Program data showing Seldovia and Homer monthly temperature anomalies August 2001-2015



SeaFET™ Ocean pH Sensor to be installed

**The KBNERR Team****Staff****Jessica Shepherd**

Acting Manager &  
Education Coordinator

**Angie Doroff**

Research Coordinator

**Carmen Field**

Aquatic Education  
Specialist & Naturalist

**Coowe Walker**

Watershed Ecologist

**Steve Baird**

Field Biologist &  
Research Analyst

**Catie Bursch**

Harmful Species  
Program Coordinator

**Syverine Abrahamson**

Research Support & Coastal  
Training Program Coordinator

**Jim Schloemer**

Research Technician

## *From the helm...*

When we sent out our last newsletter, in May of this year, we were finalizing a transition to the Alaska Center for Conservation Science (ACCS) within the University of Alaska, Anchorage and parting ways (amicably) with the Alaska Department of Fish and Game, Sport Fish Division (ADF&G). In the ensuing seven months, on top of a very busy field and education season, we weeded through 15 years of educational materials, drawers of laboratory supplies, stacks of periodicals, and a veritable mountain of paperwork. In September, with help from friends and family who pitched in for the heavy lifting, we relocated our offices to our former 2181 Kachemak Drive headquarters, and set up our lab at 1432 Bay Avenue. Under ACCS we acquired new email addresses, phone numbers, and a website and began to navigate under a new system of grant administration and travel authorization.

Five Kachemak Bay National Estuarine Research Reserve staff made the transition to UAA - Angie Doroff, Catie Bursch, Coowe Walker, Steve Baird, and me. Despite reduced funding this fiscal year all staff are fully funded. Carmen Field has remained under the employment of ADF&G as their Aquatic Education Specialist but she partners with us on grants and educational programs, and she will continue with us in this associate capacity.



By Jessica Shepherd,  
Acting Reserve Manager



**Syverine Abrahamson and Jim Schloemer assist with fieldwork**

And we're growing! By the first of the year we'll officially hire Syverine Abrahamson as our Coastal Training Program Coordinator. Syverine has been with us as a temporary employee in administrative and research support capacity since March and has increasingly taken over CTP duties. In November Jim Schloemer joined us as a temporary hire to bring us up to speed on biological data processing. He's a quick study and will remain with us through the spring.

Moving forward we have some challenges. For one, we need to work harder than ever to let people know what the Research Reserve is and what we can offer by way of place-based research, education, and training. Secondly, we need to grow our staff, and to do that we need to find new funding. We're working hard on that and our new partnership with ACCS is already helping us to explore new and exciting partnerships.

It has occurred to me that the timing of our transition could not have been better. If we were just coming to this fork in the road now, rather than 18 months ago when State budgets were still somewhat stable, we might be at looking at a 'dead end' sign, instead of a green light. Thanks to each and every one of you for your support and encouragement.



Kachemak Bay National Estuarine Research Reserve  
Alaska Center for Conservation Science  
UNIVERSITY of ALASKA ANCHORAGE

*Enhancing understanding and appreciation  
of the Kachemak Bay estuary*



## Winter/Spring 2016 Calendar

### Discovery Labs

January 6th 3pm – 5pm Think Like a Fish Discovery Lab  
February 3rd 3pm – 5pm Our Amazing Ocean Discovery Lab  
April 6th 3pm – 5pm Translating the Science of our Landscape Discovery Lab

### Meetings

March 2nd 12–3pm KBNERR Community Council

### Events

#### HIGH SCHOOL SCIENCE January 2016

Members on KBBR education staff are working with EPSCoR partners this fall/winter to plan a January 2016 classroom and field science program for Homer High School biology students. The youth will engage with EPSCoR researcher/fish biologist Molly McCarthy to learn about her lake coring project and experience hands-on science in the outdoors at a local lake coring session with her.

#### WATER BIRDS IN WINTER Feb –Mar 2016

Staff at the Kachemak Bay Research Reserve and AK Maritime National Wildlife Refuge are collaborating to offer four outdoor winter bird program for students during the months of February and March.

#### CLIMATE ADAPTATION FOR COASTAL COMMUNITIES Mar 22-24 2016

NOAA Learning Services Division, with input from Homer's climate adaptation workgroup, will conduct a three-day no-cost adaptation workshop for area managers and decision-makers at Kachemak Bay Campus.

#### ESTUARY WALKS May 2016

These ever popular walks will be offered during the month of May to students, giving them an opportunity to escape the classroom as the season warms and learn about the coastal environment.

*Warm winter wishes from all of us at Kachemak Bay  
National Estuarine Research Reserve!*



Holiday smiles and new faces at the December Community Council Meeting and potluck

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