

Assembling the Puzzle Pieces of Cook Inlet



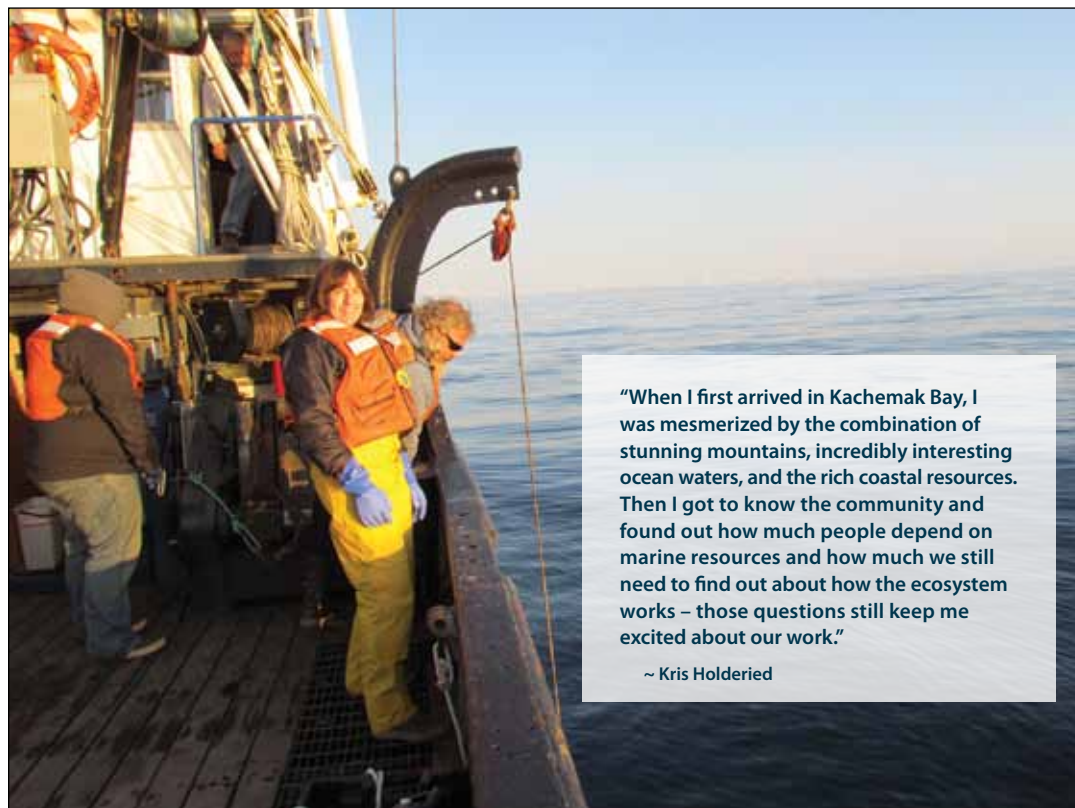
Kris Holderied is the director and physical oceanographer at the NOAA Kasitsna Bay Laboratory, located on Kachemak Bay and operated in partnership between NCCOS and the University of Alaska. In addition to leading the laboratory operations and science program, she also coordinates research and education activities with regional partners. AOOS has come to rely on Kris for her knowledge of Alaska's coastal system, her warm can-do attitude, and her ability to link both scientific concepts and people to come up with creative solutions.

On a recent warm summer, Kris Holderied swung a 3-foot metal cage with a set of oceanographic instruments aboard the Kasitsna Bay Laboratory research boat. The primary instrument, called a CTD profiler (short for "conductivity-temperature-depth"), is used to measure water temperature, salinity and pressure as it is lowered to the bottom. Other sensors attached to the CTD measure dissolved oxygen, light, turbidity, and fluorescence. The result is a detailed vertical profile of physical water properties, which then also drive biological processes. Kasitsna Bay Laboratory, under the National Centers for Coastal Ocean Science (NCCOS) of NOAA's National Ocean Service, conducts research to understand how these physical changes affect coastal resources.

With the help of AOOS funding, Holderied and her team will complete a five-year monthly and seasonal sampling project in Kachemak Bay. This oceanographic data aids a number of research initiatives being conducted by AOOS partners in Cook Inlet this summer. Among those anxious for the data are NCCOS and Kachemak Bay National Estuarine Research Reserve researchers who study the toxic plankton species that cause paralytic shellfish poisoning, or PSP.

"It has been interesting to see how stable the water column is vertically throughout the summer and early fall months, even during the strongest tides," said Holderied. CTD measurements show that it does change near tide rips, where surface waters come together and mix vertically. That matters because physical features like convergence zones may create biological hot-spots and a stable water column can promote phytoplankton blooms, including of toxic PSP species."

Continued on back



"When I first arrived in Kachemak Bay, I was mesmerized by the combination of stunning mountains, incredibly interesting ocean waters, and the rich coastal resources. Then I got to know the community and found out how much people depend on marine resources and how much we still need to find out about how the ecosystem works – those questions still keep me excited about our work."

~ Kris Holderied

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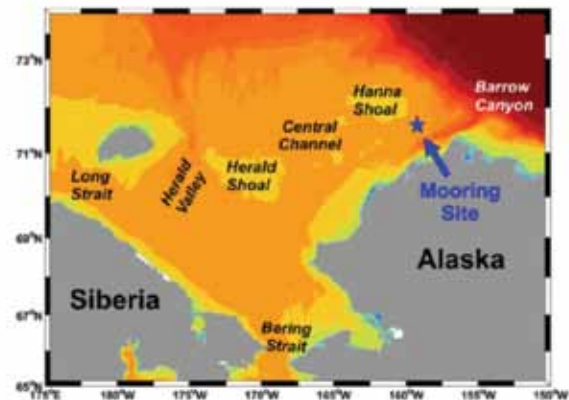
Deploying CTD from cable in lower Cook Inlet on the Alaska Dept. of Fish and Game research vessel *Pandalus*.

Seven New AOOS

1 New Observing Capacity in Northeast Chukchi Sea

When fully instrumented and deployed in 2014, a new northeast Chukchi Sea mooring will establish year-round measurements of 23 physical, chemical, geological, and biological parameters, essential for understanding time-varying ocean processes under different environmental conditions in this biological “hotspot”. The mooring will be the first of its kind in Alaska and the goal is to deploy one in the Beaufort Sea as well. ■

PARTNER: UNIVERSITY OF ALASKA FAIRBANKS



Jeremy Mathis and Samantha Siedlecki analyze water samples from the Seward Line OA cruise.

2 Ocean Acidification (OA) Model for the Gulf of Alaska

Building on field observations over the past eight years, this numerical model will be able to forecast OA events across the GOA and improve understanding of regional drivers of OA and the impacts of OA on sensitive marine organisms. The research team hopes to use this model to develop operational forecasting tools for the Gulf, as well as the Arctic. ■

PARTNERS: UNIVERSITY OF ALASKA FAIRBANKS, NOAA PMEL AND UNIVERSITY OF WASHINGTON

3 Vulnerability Assessment in the Aleutian and Bering Sea Islands

This assessment will draw on expertise across disciplines to identify vulnerability thresholds for key resources and ecosystem services across future climate scenarios. The project builds on downscaled climate models developed by SNAP (Scenarios Network for Alaska and Arctic Planning) and the University of Washington, and sponsored by AOOS and the joint NSF/NPRB Bering Sea Ecosystem Study. ■

PARTNERS: ALEUTIAN AND BERING SEA ISLANDS LANDSCAPE CONSERVATION COOPERATIVE (ABSILCC) AND USGS ALASKA CLIMATE SCIENCE CENTER



Typical Aleutian Island landscape.

Projects to Watch

4 Digital Repository for Coastal Elevation Profiles

Uniting Alaskan coastal elevation profiles across multiple agencies and visualizing data through existing AOOS portals will facilitate repeat coastal transect monitoring, and provide valuable information to the broader science community. ■

PARTNER: ALASKA DEPT. OF NATURAL RESOURCES



A team from the AK Dept. of Natural Resources takes repeat measurements for elevation profiles in Unalakleet.



5 Year-round Wave Measurements in the Beaufort Sea

Expanding monitoring of ocean current velocity and significant wave height, period and direction throughout the year will improve fundamental understanding of nearshore circulation and related systems. Observations through the entire ice-free season will improve National Weather Service wave predictions. ■

PARTNER: UNIVERSITY OF AK FAIRBANKS

6 Port Heiden Tide Gauge in Bristol Bay

The instillation of this gauge will support local coastal investigations and reestablish a tidal datum for the area. Filling this statewide data gap will allow for a reanalysis of local sea level, enabling researchers to determine the region's rate of sea level change. ■

PARTNER: ALASKA DEPARTMENT OF NATURAL RESOURCES

7 Acoustic Call Library for the Arctic

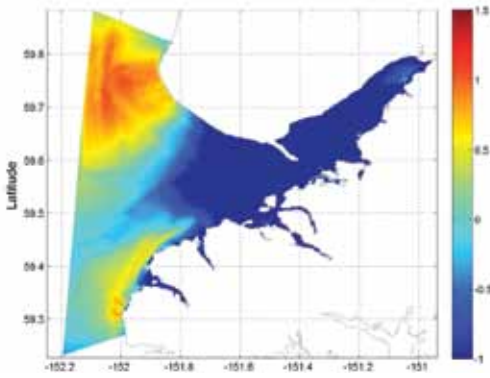
Developing an Arctic specific library of marine mammal calls (walrus, seals, belugas, whales) will enable a leap forward in marine mammal detection and environmental monitoring using hydrophone-equipped autonomous underwater vehicles (gliders) that can transect large parts of the Arctic shelf areas. ■

PARTNERS: UNIVERSITY OF AK FAIRBANKS, WOODS HOLE OCEANOGRAPHIC INSTITUTE AND UNIVERSITY OF WASHINGTON



Fin whale spotted in the Chukchi Sea.

Continued from front



This map created by NOS model output shows relative tidal energy in the Kachemak Bay/Lower Cook Inlet region.

Graphic courtesy of Lyon Lanerolle, NOS Coast Survey Development Lab

Holderied's observations also help to validate other types of models, such as an operational ocean circulation model that NOAA's National Ocean Service is developing for the entire inlet. This model predicts water level, 3-dimensional currents, temperature and salinity, and is being used to produce a Cook Inlet tidal energy assessment through a partnership between NOAA and the Alaska Energy Authority. A third initiative that will use the oceanographic information is an NCCOS project to quantify the variability of ocean acidification in Kachemak Bay. ■



AOOS Board Chair Ed Page Speaks to Congress

On June 11 in Washington D.C., AOOS Board chairman Ed Page testified before the Senate Subcommittee of Ocean, Atmosphere, Fisheries and Coast Guard about the importance of ocean observing. Page is the director of the Marine Exchange of Alaska, a non-profit that provides information and services for safe and environmentally responsible maritime operations.

In his testimony, Page discussed the importance of partnerships in meeting the nation's needs for ocean observing. Page noted that the harsh and extreme environment of Alaska and the Arctic requires quality real time information for safe shipping and to respond to emergencies. He highlighted the partnerships AOOS has fostered to provide real time weather observations that are not only useful to mariners but to the Coast Guard, NGOs, Department of the Interior, and others concerned about the environment in Alaska. ■



Welcome to Jordan Jenckes

Now pursuing a degree in Geology at UAA, Jordan grew up in Kenai and has lived and worked along the coast, including in commercial fishing. He is passionate about the outdoors and wants to conduct research that will help to preserve Alaska's coastal/marine environment. We are excited to have him join AOOS and AXIOM as a student intern, taking over the work of Nathan Hollenbeck in updating the AOOS Research Assets map. ■

"I love my work that I am doing now for both AOOS and Axiom and I am learning valuable skills in data management that I will undoubtedly use in the future."

AOOS Welcomes New Board Members

In April, the AOOS Board approved the addition of three new members to the board:



MARGARET WILLIAMS
WORLD WILDLIFE FUND
ENVIRONMENTAL NGO



DUNCAN FIELDS
NPFMC MEMBER
COMMERCIAL FISHING



ROBERT RAYE
SHELL
OIL AND GAS INDUSTRY

A full list of AOOS Board members can be found on the AOOS website. These new Board members join representatives from three state agencies, four federal agencies, seven research entities, and an industry NGO for a total of 19 members.