

# Alaska Regional Coastal and Ocean Observing System 2014 NOPP REPORT

Molly McCammon  
1007 W Third Ave., Suite 100  
Anchorage, AK 99501-1936  
Phone: (907) 644-6703 FAX: (907) 644-6780 E-mail: [mccammon@aoos.org](mailto:mccammon@aoos.org)

*Award Number: NA11NOS0120020*

<http://www.aoos.org>

## LONG-TERM GOALS

The long-term goals of this project represent the priorities identified by stakeholder workshops and adopted by the Alaska Ocean Observing System (AOOS) Board: 1) Increase access to existing coastal and ocean data; 2) Package information and data in useful ways to meet the needs of stakeholders; and 3) Increase observing and forecasting capacity in all regions of the state, with a priority on the Arctic and the northern Gulf of Alaska.

## OBJECTIVES

The scientific or technological objectives of this effort include:

- Improving marine safety in key locations by sustaining weather and surface current observations, improving weather and marine forecasts, and more effectively disseminating information to users.
- Improving the ability to forecast and plan for coastal hazards due to changing storm and sea ice conditions, and their impacts on coastal communities by focusing on increasing water level and wave observations, and developing an electronic sea ice atlas of historical sea ice data.
- Building on existing activities to develop an integrated network of physical, chemical and biological observations off Alaska to meet short- and long-term needs including maintaining time series datasets, expanding ocean acidification observations, and advancing sentinel monitoring in Prince William Sound (PWS) and Cook Inlet.
- Supporting a regional data portal for coastal and ocean information and developing data integration and visualization tools and products to meet the needs of a variety of stakeholders.
- Working with partners to enhance individual modeling efforts to further model development and integration.
- With our partners, promoting greater awareness of the value of ocean observations to meet stakeholder needs and encouraging support for increasing ocean observing capacity in Alaska.

## APPROACH AND WORK PLAN

*Approach:* The Alaska Ocean Observing System builds upon existing efforts, and takes into account the paucity of real-time observations in Alaska by relying extensively on collaborations. This includes leveraging with other programs, and providing coordination and synthesis services to better integrate existing activities. The Board has placed a priority on expanding observational capacity in the Arctic and in the northern portion of the Gulf of Alaska (GOA). The GOA includes Prince William Sound

and Cook Inlet, two regions with high vessel traffic and dynamic circulation systems that border the main population centers of Alaska.

### *Work Plans and Key Investigators*

#### Regional Management

Molly McCammon (Executive Director) and two Program Managers support all program components, implement the observing system to meet stakeholder needs, work with the data team to develop products for users and collaborate with other regional, national and international ocean observing initiatives.

- Support IOOS Regional Association organization.
- Initiate Alaska Oceans & Coasts Report.

#### Education and Outreach

- Support regional information initiatives, partnerships and collaborations. Numerous partners including the North Slope Science Initiative (NSSI), the Alaska Climate Change Executive Roundtable (ACCER), the Alaska Center for Climate Assessment and Policy Steering Team (ACCAP is the NOAA RISA for Alaska), Alaska Sea Grant Program and its advisory group, the new Department of Interior Climate Science Center and Landscape Conservation Cooperatives, and NOAA's regional collaboration team.
- Continue partnership with COSEE Alaska ([www.coseealaska.net](http://www.coseealaska.net)). Activities include the Communicating Ocean Sciences Workshop at the Alaska Marine Science Symposium, teacher training workshops and a workshop on Community-Based Monitoring: Best Practices and Lessons Learned.
- Increase awareness and usage of AOOS data tools through presentations, demonstrations, and small group tutorials with government agencies and other organizations.
- Co-host with Alaska Sea Grant the bi-monthly Alaska Marine Policy Forum, sharing news about legislation, budgets, and issues related to Alaska's marine environment at the international, national, state and local levels.

#### Observations and Products: Marine Operations

- Sustain Snotel weather observations in Cook Inlet and Prince William Sound. Lead is Dr. Scott Pegau with the Oil Spill Recovery Institute (OSRI) and Ms. Sue Saupe with the Cook Inlet Regional Citizens Advisory Council.
- Assess Alaska Harbor Observation Network pilot projects in Seward and Kodiak and determine future viability. Lead is AOOS staff.
- Maintain new wave buoy in Cook Inlet. Partners are Army Corps of Engineers' CDIP program at Scripps (Julie Thomas) and the Kachemak Bay Research Reserve in Homer (Angie Doroff).
- Maintain wave buoy in Norton Sound. Partners are Western Alaska Landscape Conservation Cooperative (USFWS) and Norton Sound Economic Development Corporation.
- Implement AIS transmitters to disseminate real-time weather data and forecasts to vessels. Lead is Captain Ed Page, Marine Exchange of Alaska.
- Support surface current mapping efforts in Chukchi Sea and work with partners to develop operational HF Radar stations in Cook Inlet and Prince William Sound. Partners include Alaska Bureau of Ocean Energy Management and University of Alaska Fairbanks' Dr. Thomas Weingartner.
- Assess and determine future needs of operational WRF model for wind forecasting. Lead is Dr. Peter Olsson, University of Alaska Anchorage.

- Validate and maintain PWS ROMS (Regional Ocean Modeling System) forecasting. Lead is Dr. Yi Chao, JPL.
- Validate hydrological model for PWS. Lead is Dr. Scott Pegau, Oil Spill Recovery Institute.
- Conduct small boat ADCP surveys in Cook Inlet. Lead is Kris Holderied, Director, NOAA's Kasitsna Bay Lab.
- Deploy bottom-mounted pressure sensors in Beaufort Sea to validate NCEP wave forecasts. Lead is Dr. Tom Weingartner, UAF.

#### Observations and Products: Coastal Hazards

- Develop and update on regular basis electronic historical sea ice atlas for use by National Weather Service and modelers. Lead is Dr. John Walsh and Dr. Sarah Trainor at the University of Alaska Fairbanks' Alaska Center for Climate Assessment and Policy.
- Develop website archive for coastal beach profiles. Develop pilot flood maps for western Alaska communities. Lead is Nicole Kinsman at Alaska Department of Natural Resources.

#### Observations and Products: Ecosystems

- Continue long time series in Gulf of Alaska along the Seward Line. Lead is Dr. Russ Hopcroft, University of Alaska Fairbanks.
- Support transects in Chukchi Sea by providing use of AOOS glider. Lead is Dr Peter Winsor, UAF.
- Test use of glider using an Arctic-specific library of marine mammal calls incorporated into hydrophone system to record, detect, classify, and remotely report marine mammal calls in real time in Chukchi Sea. Leads are Dr. Peter Winsor, UAF, Dr. Mark Baumgartner, Woods Hole Oceanographic Institute, and Kate Stafford, University of Washington.
- Deploy fully instrumented mooring collecting physical, biological, chemical, and geological information in an identified hotspot of Chukchi Sea. Lead is Dr. Seth Danielson at University of Alaska Fairbanks.
- Support Distributed Biological Observatory (DBO) program. Lead is Jackie Grebmeier, University of Maryland.
- Support ocean acidification sampling along Seward Line and at four mooring locations in Bering Sea and Gulf of Alaska. Support OA sensor at Alutiiq shellfish hatchery in Seward. Continue development of Gulf of Alaska forecast model. Lead is Dr. Jeremy Mathis, UAF and NOAA PMEL.
- Enhance sentinel monitoring in Prince William Sound by testing the use of conductivity sensors at the Cordova tide station. Lead is Dr. Scott Pegau, OSRI.
- Support operations of acoustic monitoring equipment to track tagged salmon, sharks, whales and others passing through Prince William Sound in partnership with the Ocean Tracking Network (OTN) and Pacific Ocean Shelf Tracking Network (POST). Lead is Dr. Rob Campbell at the Prince William Sound Science Center.
- Conduct monthly CTD surveys at four locations in Cook Inlet to support development and validation of the NOAA operation circulation forecast model. Lead is Kris Holderied, director, NOAA's Kasitsna Bay Lab.

#### Data Management

- Provide data management services, maintain web portal, ingest, archive and stream data. Lead is Rob Bochenek, Axiom Consulting & Design.

- Develop and enhance data products. Lead is Rob Bochenek, Axiom Consulting & Design.
- Host oil and gas industry data collected in Chukchi Sea on AOOS portal. Lead is Rob Bochenek, Axiom Consulting & Design.

### Modeling

- Develop regional and statewide modeling collaborations to promote enhance modeling efforts.
- Develop long-term modeling strategy for AOOS in concert with national IOOS Program Modeling Strategy.
- See sections above for additional modeling products.

## **WORK COMPLETED**

All tasks described above are on schedule.

## **RESULTS**

A special highlight from the past year included release of the new AOOS Ocean Data Explorer, an IOOS-compliant data portal providing data integration and visualization for hundreds of data layers including real-time sensor streams, satellite imagery, model forecasts, and GIS project data.

AOOS co-hosted with Alaska Sea Grant and COSEE Alaska a very successful Community Based Monitoring Workshop in April 2014. More than 100 people attended, providing input into a new handbook on Best Practices and Lessons Learned for CBM in Alaska.

AOOS also coordinated a wave buoy in Norton Sound which provided critical data on waves and wind in the Bering Strait – an area of extreme conditions and significant vessel traffic. Users of this data ranged from National Weather Service forecasters to local subsistence hunters and the Norton Sound Economic Development Council.

AOOS has fostered a number of new partners to expand data sharing and ingestion into the AOOS system. Examples include the World Wildlife Fund’s Arctic program, the Canadian Department of Fisheries & Oceans, Oceana and Audubon.

## **IMPACT AND APPLICATIONS**

### **Economic Development**

Numerous weather-related marine casualties in Alaska have led to the loss of life, property and environmental harm. Many of these could have been avoided if the mariners had been able to access better real-time observations and forecasts. For example, 95 percent of Alaska’s goods cross Cook Inlet, navigating through dynamic sea ice and extreme tidal and circulation variation, to arrive at the Port of Anchorage. An accident in these waters could have massive environmental and human consequences. As ice and sea state conditions fluctuate due to changes in climate, observing and forecasting needs become even more relevant for shippers, fishing and tourism vessels, and offshore oil and gas developers.

## **Quality of Life**

Ecosystem change in Alaska has direct social and economic implications. Great benefits can be gained to the fishing industry and subsistence-based communities by enhancing research and monitoring initiatives and integrating the data they produce. Multiple entities are looking for information on sea ice conditions to support subsistence hunting and coastal travel, and enhance community safety. Alaska's existing wave buoys cover only a small fraction of Alaska's 44,000 miles of coastline, creating major challenges in forecasting storms, reporting conditions and effectively responding to contaminant spills. Increased and enhanced observations, as well as integrated data products will all add to the quality of life of Alaskans. Making industry-collected environmental data available to National Weather Service forecast offices and to the scientific community is a tremendous contribution to existing marine research and operations.

## **Science Education and Communication**

AOOS is working to ensure that real-time data and data visualization products are included in education and communication initiatives. Although COSEE Alaska is ending in spring 2015, many of the initiatives it spearheaded will continue on, including the annual Communicating Ocean Sciences Workshop held in conjunction with the annual Alaska Marine Science Symposium. Additionally, AOOS works with a variety of organizations and working groups to communicate the latest research and technology across geographic regions and disciplines. Groups include a coastal hazards workgroup, participation in the Alaska Center for Climate Assessment and Policy, and various presentations and workshops at the annual Alaska Marine Science Symposium. The AOOS website provides resources and background information for multiple audiences.

## **TRANSITIONS**

**Economic development:** The Cook Inlet wave buoy information is used broadly by the recreational and charter boat industry for real-time decisions about when and where to operate their businesses. The McNeil River weather station is now being used by a number of groups for critical wind information on the western side of Cook Inlet. A new weather station and webcam at the mouth of the Kenai River is providing information to ice forecasters, weather forecasters, and summertime fishermen, as well as transmitting conditions in real-time to passing vessels via AIS. The Norton Sound wave buoy is used by local fishermen, barge captains and ships transiting the region. Commercial fishermen, shellfish farmers, and state planners are keeping close watch on ocean acidification data from the OA buoy network and potential impacts on Alaska's fish and shellfish resources. The Yukon River Delta fishery benefited directly from an accurate Chinook salmon run outlook and forecast, developed and communicated in collaboration with AOOS.

**Quality of Life:** The AOOS Real-Time Sensor map has become a resource widely used across the state, serving as a go-to tool for entities such as the US Coast Guard, small aviators, engineering firms and recreationists. An increasing number of people are also coming to the AOOS portal for sea ice data. AOOS disseminates high-resolution satellite data from Shell, as well as ice data from the NWS, NSIDC, and a variety of forecast models. Improved data interoperability contributes to better marine forecasts and emergency response.

## **RELATED PROJECTS**

AOOS is a founding partner of COSEE Alaska and has worked closely with their staff on education and outreach activities, especially those related to climate change. For more information, see

[www.coseealaska.net](http://www.coseealaska.net). Unfortunately, NSF has discontinued funding for the COSEE program. AOOS is co-located with the North Pacific Research Board, an organization that funds marine research in Alaska. See [www.nprb.org](http://www.nprb.org).

The NOAA-funded STAMP project – Spatial Tools for Arctic Mapping and Planning – is now coming to a close. However AOOS will continue to work with partners to populate the AOOS Arctic data portal integrating multiple data types for planning and management. There are currently over 200 unique datasets in the portal ranging from real-time sensors and model forecasts to habitat types, coastal geology, and human infrastructure.

AOOS is also an active participant in other projects including: NPRB's Gulf of Alaska Integrated Ecosystem Research Program, the *Exxon Valdez* Oil Spill Trustee Council's Gulf Watch Alaska program, and BOEM's new Marine Arctic Ecosystem Study (MARES) and Arctic Marine Biodiversity Observing Network (AMBON) projects.

### **OUTREACH MATERIALS**

Many photos are included on our website: [www.aos.org](http://www.aos.org). Newsletters, poster and oral presentations, and other materials are available on this site. AOOS has a 4-page brochure describing and depicting its most frequently used data tools. One-pagers for specific topics such as the AOOS Research Workspace, AOOS activities in the Arctic, and AOOS fisheries-related activities are also available.

AOOS celebrated its 10<sup>th</sup> anniversary this year and used this as an opportunity to highlight ocean observing achievements in the past decade. A video contest featuring short films on anything ocean or coastal attracted more than 30 entrants. The winning submissions were shown at a 10<sup>th</sup> anniversary event at the Anchorage Museum on November 19, which also featured remarks by IOOS Executive Director Zdenka Willis from Silver Spring, Maryland.