Alaska Regional Coastal and Ocean Observing System
2012 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

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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.
- Serving as a regional data portal for coastal and ocean information and develop data integration and visualization tools and products for Alaska 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 observing in meeting stakeholder needs and to increase ocean observing capacity in Alaska.

APPROACH AND WORK PLAN

Approach: This proposal 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 observation 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

AOOS Program staff: Molly McCammon (Executive Director) and two Program Managers manage all program components, implement the observing system to meet stakeholder needs, work with the data team to develop products for users and collaboration 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) activities including the Communicating Ocean sciences Workshop at the Alaska Marine Science Symposium, and teacher training workshops.

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.
- 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.
- Maintain 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.

Observations and Products: Coastal Hazards

- Monitor development of Alaska Harbor Observation Network pilot projects in Seward and Kodiak. Lead is Howard Ferren, Alaska SeaLife Center, along with Dr. Orson Smith at University of Alaska Anchorage, and the Seward and Kodiak Harbormasters.

- Purchase, deploy & 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 (Terry Thompson).
- Develop 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.

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
- Support ocean acidification sampling along Seward Line and at three mooring locations in Beaufort, Bering Sea, and Resurrection Bay. Lead is Dr. Jeremy Mathis, UAF.
- 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 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.

Modeling

- Develop regional and statewide modeling collaborations to promote enhance modeling efforts. Program staff will work with AOOS and other Alaska modelers to develop these collaborations.

WORK COMPLETED

All tasks described above were completed on schedule. Two items to highlight this year include the deployment and retrieval of the wave buoy in Cook Inlet. Funded by AOOS, the buoy is part of the Coastal Data Information Program (CDIP), and provides real-time wave information for the recreational and commercial boating community in lower Cook Inlet. It has broken from its mooring twice in the past year. Enormous efforts on the part of a host of partners resulted in its retrieval, decision to re-locate to a new location, and then its successful re-deployment. The buoy is now providing valuable winter conditions for local residents. A user survey conducted by AOOS and completed by over 60 local mariners reiterated the widespread reliance on the data from this buoy.

Another item to highlight is the effort of the AOOS data team to provide integrated data visualization products for the ocean observing community. A collaboration with the Cook Inlet Regional Citizens Advisory Committee has led to development of the Cook Inlet Response Tool, a data tool incorporating GIS environmental data layers, real-time sensors, forecast model output, and High Definition videography and photos of the shoreline that can be used for multiple resource management needs. This tool is being beta tested and will soon be publicly available. Another collaboration is developing an Arctic data portal that will incorporate multiple data layers for resource management use in the northern Bering and Chukchi Seas.

RESULTS

Oceanographic cruises along the Seward Line were successfully conducted in May and September of 2012 with better than expected spatial coverage due to good weather. In 2011, the first aragonite undersaturations were observed at the surface on the inner shelf of the Gulf of Alaska. Data synthesis will continue and four manuscripts are underway.

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.

Science Education and Communication

AOOS is working to ensure that real-time data and data visualization products are included in education and communication initiatives such as COSEE Alaska.

TRANSITIONS

Economic development: The Cook Inlet wave buoy information is used broadly by the recreational and charter boat industry, as well as by the National Weather Service. 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.

Quality of Life: The Arctic Asset Map developed by the AOOS data team is in the process of being expanded into a statewide program, and is widely used by managers across the state.

RELATED PROJECTS

AOOS is a founding partner of COSEE Alaska and works closely with their staff on education and outreach activities, especially those related to climate change. For more information, see www.coseealaska.net. AOOS is co-located with the North Pacific Research Board, an organization that funds marine research in Alaska. See www.nprb.org.

OUTREACH MATERIALS

Many photos are included on our website: **www.aoos.org.** A video describing a buoy retrieval can be found at http://www.aoos.org/wave-buoy-returns-to-cook-inlet/