

Semi-annual Program Performance Report for NA16NOS0120027
FY 2016-20 Implementation and Development of a Regional Coastal Ocean Observing
System: Alaska Ocean Observing System
For reporting period December 1, 2016 – May 31, 2017
Prepared by Molly McCammon, Project PI on June 30, 2017

1.0 Progress and Accomplishments

1.1 Regional Governance & Management Subsystem

1.1.1 Support ongoing board and committee activities.

- The AOOS Board met March 20 to approve a work plan for fiscal year 2017 and follow-up on the strategic planning effort begun in the fall of 2016.
- The AOOS Board's Executive Committee met to review and adopt an updated AOOS Employee Manual and conduct an annual review for Executive Director Molly McCammon, extending her contract for up to an additional 3 years.
- AOOS Operations Director, Carol Janzen, worked with McCammon to develop a statement of work and identify potential panel members for the upcoming external data management system review.
- The AOOS Data Management Advisory Committee (DMAC) met on April 21 to review new procedures for tracking AOOS data submissions and new product development and to discuss the proposed statement of work for the external data management system review.

1.1.2 Provide ongoing fiscal and administrative oversight for program.

- Staff worked with AOOS Principle Investigators and the Integrated Ocean Observing System (IOOS) program office to ensure National Environmental Policy Act (NEPA) compliance for all observing activities in the AOOS region.
- Staff developed no cost extensions for subawards for this cooperative agreement pending receipt of year 2 funds.
- Staff continued to develop new subawards for this cooperative agreement.
- AOOS continues to seek additional external funding, and in this reporting period, received 1 new award: a \$240K award from the Department of Homeland Security's Arctic Domain Awareness Center (ADAC) addressing Automated Information System (AIS) vessel tracking data.

1.1.3 Support national and international partnerships and collaborations.

- Janzen is leading the technical program planning committee for the MTS/IEEE OES OCEANS'17 conference which will be held in Anchorage, Alaska September 18-21, 2017.
- McCammon attended meetings of the Consortium for Ocean Leadership in January and March.
- McCammon attended a National Science Foundation and Sustained Arctic Observing Network (SAON)-sponsored workshop, International Arctic Observing Assessment Framework in January.
- McCammon participated in numerous meetings with the IOOS program office and the IOOS Association (IA). These included monthly meetings with other Regional Association directors, the IOOS Association Executive Committee (McCammon is IA treasurer) and the IA Finance Committee, as well as the March program meeting in Washington DC.
- AOOS helped to sponsor the Climate Prediction Applications Science Workshop, held for the first time in Anchorage in May. Kent and Janzen reviewed abstracts for this workshop and assisted with the technical program. Dugan presented a poster, and McCammon hosted a panel discussion.
- McCammon attended a meeting of the ADAC partners in February.

- McCammon participated in the Interagency Arctic Research Policy Committee's (IARPC) Data Team meeting in March.
- McCammon worked with the Director of the US Arctic Observing Network (US-AON) to convene a working group of partners working on AIS vessel tracking databases and products.
- Janzen presented at the Sea Grant hosted Wakefield Symposium on ecosystem models on the AOOS data portals May 10.
- AOOS hosted an event at the Alaska Marine Science Symposium to brief attendees on the status of the new Animal Telemetry Network (ATN) and is working with ATN Coordinator Bill Woodward and Office of Naval Research Michael Wiese to organize a workshop in Anchorage for December 2017.

1.1.4 Support Alaska and regional partnerships and collaborations.

- Staff met with the NOAA Arctic Environmental Response Management Application team as part of their quarterly meetings to share the latest in their activities and discuss future data sharing and collaborations.
- McCammon briefed the National Weather Service's Alaska regional office on the status of pilot projects for alternative water level observations in western Alaska.
- AOOS Director of Administration and Outreach, Holly Kent, served on the steering committee for the Western Alaska Interdisciplinary Science Conference held in Unalaska in April.
- Janzen attended the Alaska Long-term Monitoring Work Group meeting in February.
- McCammon participated on a community resources panel for the University of Alaska Anchorage's Arctic Research Day in March.
- McCammon attended the annual meeting of the Cook Inlet Regional Citizens Advisory Council as the Municipality of Anchorage representative.
- McCammon contributed to the Alaska chapter of the National Climate Assessment.
- Kent attended a meeting of the Lower Cook Inlet Marine Working Group in May.
- McCammon attended a workshop on coastal resiliency planning hosted by the Western Alaska and Bering Sea/Aleutian Islands Landscape Conservation Cooperatives.
- McCammon, as a member of the Alaska Host Committee, attended several sessions of the Week of the Arctic held concurrently with the May Arctic Council meetings in Fairbanks.
- McCammon attended the "Needs of the North" workshop held by ADAC's Arctic 2030: Projecting Challenges and Capability Gaps program during the Week of the Arctic.
- AOOS hosted a session at the Alaska Marine Science Symposium on "the Blob" (North Pacific sea surface temperature anomalies). This was open to the public as well as all those attending the symposium.

1.1.5 Finalize certification application (Year 1 completion date.)

- AOOS responded to two rounds of comments on our certification application, with final approval received from the IOOS Program Office in May.

1.2 Outreach, Stakeholder Engagement & Education Subsystem

1.2.1 Support website, Facebook and printed publications as key AOOS communication tools.

- Kent continued to add content to the AOOS website and Facebook page, including news, featured stories, and descriptions of new data tools.
- Staff produced monthly updates and started a monthly proposal update for board members.
- Staff circulated a quarterly e-newsletter in April to a list-serve of over 500 recipients and produced a hard copy winter newsletter.
- AOOS published its first Annual Impact Report.
- AOOS prepared a two-page spread for the annual Delta Sound Connections magazine published by the Prince William Sound Science Center (PWSSC) and widely distributed within coastal communities and through the Alaska Marine Highway System.

1.2.2 Support ongoing stakeholder interactions.

- AOOS began meeting with stakeholders and partners from Juneau, Fairbanks, Anchorage, and Seattle in reviewing our statewide and Arctic buildout plans to determine what existing and new long-term sustained observations should be supported in Alaska.
- AOOS staff served on a planning committee with Alaska Sea Grant for a two-day workshop on HABs that was held in December and has led to efforts to start an Alaska Harmful Algal Bloom Network. Carol Janzen gave a presentation and provided a whitepaper on sustained coastal and ocean observing initiatives around Alaska.
- Dugan and Kent delivered presentations in March on AOOS and the Ocean Data Portal to 20 people from NOAA, USCG and the Ted Steven Marine Research Institute in Juneau.
- Janzen gave a presentation on Making Ecosystem Model Data Accessible for Rapid Assessment and Visualization Through the Alaska Ocean Observing System Model Explorer Data Portal at the Sea Grant-sponsored Wakefield Symposium in May.

1.2.3 Support stakeholder working groups including ocean acidification network, integrated water level observation network, Alaska Pacific Anomalies Working Group, and long-term observing system coordination and integration.

- AOOS staff Darcy Dugan, the Alaska Ocean Acidification Network Director, organized and facilitated an OA “State of the Science” conference in Anchorage that included 150 participants in person and another 100 participants remotely from across the state. The workshop included 17 presentations, 4 break-out groups and meetings of the researchers and network steering committee.
- Dugan interviewed researchers monthly for stories and produced a monthly e-news distributed to a list serve of over 1,000 people.
- Dugan attended a meeting sponsored by the NOAA OA Program in Seattle in January to review OA initiatives across the country.
- Dugan gave an overview presentation on the AK OA Network to an audience of 600 at the Alaska Marine Science Symposium in January.
- Dugan gave a presentation on OA and the Alaska OA Network to 65 people at the Alaska Forum on the Environment.
- Dugan gave an update on the AK OA Network to the AOOS Board of Directors in March.
- Janzen gave a presentation on technologies being used by AOOS supported observing programs, including an update on the integrated water level observing initiatives to the AOOS Board of Directors in March.
- AOOS hosted a booth at Anchorage’s Earth Day event that included AOOS and the AK OA Network.
- Dugan presented a poster on the AK OA Network at the Climate Prediction Applications Science Workshop in May.
- The AK OA Network’s outreach working group met twice to review existing outreach avenues, provide recommendations, and identify upcoming outreach opportunities.
- The AK OA Network’s fishing industry working group began the development of a brochure and webpage targeting the industry, and circulated information on OA to fishing permit holders. They are also discussing strategies for partnering with the fishing industry to financially support monitoring efforts.
- The AK OA Network’s K-12 education working group met in a joint session of scientists and teachers to hear about what methods are being used in the classroom and what resources teachers need.
- The AK OA Network’s policy group met to discuss strategies for the OA Networks’ approach to policy.

- AOOS and Alaska Sea Grant co-sponsored a statewide Harmful Algal Bloom workshop in December in Anchorage. Janzen presented at this workshop on sustained observing initiatives in the Alaska region.
- Dugan serves as co-chair of the new Alaska HAB Network (AHAB) and has launched an AHAB website.
- McCammon and Janzen are working with partners to implement pilot projects for alternative water level observation technologies.

1.2.4 Support partnerships with marine education and outreach programs.

- Kent participated on the organizing committee for the January Communicating Ocean Sciences Workshop (COSW) in conjunction with AMSS.
- Staff supported the Shorezone project as a partner.
- Kent presented on OA and the Pacific Anomaly to a marine biology class at East High School in Anchorage.
- Kent maintained a web page with resources for educators on AOOS.org.
- Staff provided support to Alaska Sea Grant's marine education programs.

1.2.5 Support Alaska Marine Policy Forum

- AOOS partnered with Alaska Sea Grant to host sessions of the Alaska Marine Policy Forum (AMPF) in January, March and May 2017.

1.2.6 Continue AOOS short film contest.

- AOOS expended outreach to solicit entries for the fourth annual Short Film Contest.

1.2.7 Continue to co-sponsor the Alaska Marine Science Symposium.

- AOOS staff participated on the steering committee for the event.
- AOOS staff coordinated workshops and keynote addresses for symposium week

1.2.8 Participate in IOOS Outreach Committee

- Kent attended monthly meetings of the committee and responded to various requests for materials from the IOOS office for inclusion into IOOS publications and website.
- Kent updated the IOOS Education and Outreach Inventory.

1.3 Observing Subsystem

1.3.1 Marine Operations

1.3.1.1 Sustain weather observations in the GOA.

- **Subaward to Prince William Sound Science Center to service 8 SnoTel stations in Prince William Sound and Cook Inlet; Original completion date: May 2017.**
Status: Complete – May 2017.

1.3.1.2 Increase access to weather observations using AIS.

- **Subaward to the Marine Exchange of Alaska to install and maintain joint weather/AIS stations in at least two new remote locations; Original completion date: May 2017.**
Status: Complete – May 2017. Stations were installed at Point Gardner, Ketchikan, Akutan, and Whittier. An additional station will be installed at Nome in late August 2017.

1.3.1.3 Sustain critical wave buoys for navigation safety.

- **Operate and maintain Cook Inlet buoy; Original completion date: Ongoing.**
Status: On Track. The buoy was recovered and replaced in December 2016.
- **Operate and maintain Norton Sound Buoy; Original completion date: Ongoing.**
Status: Delayed – The buoy has not been deployed because it needs maintenance at an appropriate facility and is now being shipped back to Seward as we work to develop a partnership to assist with future deployment, retrieval, and maintenance.

1.3.1.4 Map surface currents with high frequency radars (HFRs)

- **Subaward to University of Alaska Fairbanks to support operation and maintenance of four HFR sites on the Chukchi and Beaufort Seas as part of a consortium; Original Completion Date: May 2017.**
Status: Complete – May 2017. However, due to inadequate funding from other partners, 2

radars were removed this spring, leaving only 2 to be operated in the ice-free season in 2017.

1.3.2 Coastal Hazards & Inundation

1.3.2.1 Increase water level observations in western & northern Alaska

- **Subaward to the Alaska Department of Natural Resources to install sensors at village and coastal sites most vulnerable to inundation, flooding and erosion; Original Completion Date: May 2017.**
Status: Delayed – July 2017 Awardee was not able to begin work until July 2017, and thus, agreement performance dates will be adjusted.
- **Subaward to the Atmospheric and Space Technology Research Associates (ASTRA) to install two dual frequency GPS receivers as a pilot study on GPS reflectometry for tidal measurements; Original Completion Date: May 2017.**
Status: Complete – May 2017.

1.3.3 Ecosystems, Fisheries & Climate Trends

a. Sustained Observation Network

1.3.3.1 Sustain ship-based sampling along the Seward Line.

- **Subaward to University of Alaska Fairbanks to support two sampling cruises along the Seward Line; Original Completion Date: May 2017.**
Status: Complete – May 2017.

1.3.3.2 Support ecosystem moorings in Alaska's Large Marine Ecosystems.

- **Subaward to University of Alaska Fairbanks to support addition of sensors to the Chukchi Mooring and purchase equipment for an additional mooring in another LME; Original Completion Date: May 2017.**
Status: Complete – May 2017.

1.3.3.3 Pilot use of gliders to monitor ocean conditions and marine mammals

- **Subawards to Woods Hole Oceanographic Institute, University of Alaska Fairbanks and University of Washington to support the pilot implementation of a real-time marine mammal detection system deployed on a glider operating in the Chukchi Sea; Original Completion date: January 2018.**
Status: On Track

1.3.3.4 Host regional ATN workshop

- **AOOS to host a regional ATN workshop and build on data tools previously developed; Original Completion Date: December 2017.**
Status: On-Track.

b. Regional Sentinel Observations

1.3.3.5 Support sentinel monitoring in Prince William Sound including ocean tracking network and weather stations.

- **Subaward to Prince William Sound Science Center to support partnership to operate and maintain acoustic arrays across major PWS entrances and maintain conductivity sensor; Original Completion Date: May 2017.**
Status: Complete – May 2017.

1.3.3.6 Support sentinel monitoring in Cook Inlet including repeat transects in the inlet and in Kachemak Bay.

- **Funding set aside to NOAA/UAF's Kasitsna Bay Laboratory and other partners to collect oceanographic data along repeated transects in Kachemak Bay and lower Cook Inlet; Original Completion Date: May 2017.**
Status: Complete – May 2017.

1.3.4 Water Quality

1.3.4.1 Sustain Ocean acidification (OA) monitoring including moorings, sampling along the Seward Line, Burkolators and an instrumented ferry.

- **Subaward to University of Alaska Fairbanks to maintain OA sampling along the**

Seward Line in the northern Gulf of Alaska during May and September and help support two moorings (Bering Sea and Gulf of Alaska) equipped with surface and bottom sensor packages to measure various OA parameters; Original Completion Date: May 2017.

Status: Complete – May 2017.

- **Subawards to Hakai Institute and the University of Washington to instrument an Alaska state ferry that routinely transits the Gulf of Alaska to collect various OA parameters; Original Completion Date: May 2017.**

Status: Delayed until August 2017 – All aspects of this project have been completed except the ride-along scheduled for the beginning of the ferry’s summer operations which has been delayed until August 2017.

1.3.4.2 Support Alaska OA Network

- **AOOS received funding from the national OA Program to host the Alaska OA Network website, list serve, and experts network and to convene a statewide State of the Science workshop and regional workshops. Original Completion Date: December 2016 for State of the Science Workshop; May 2017 for other activities.**

Status: Complete – May 2017.

1.4 Data Management & Communications Subsystem

Subaward to Axiom Data Science.

1.4.1 Provide technical support to AOOS Data Assembly Center cyber infrastructure

- **Operationalize next generation Data Center; Original Completion Date: April 2017.**
Status: Complete.

1.4.2 Maintain and enhance the Ocean Data Explorer including the Arctic, Gulf of Alaska and Bering Sea portals.

- **Transition all Portals to Next Generation User Interface; Original Completion Date: June 2017**
Status: On-Track.
- **Transition all Models to ncWMS2; Original Completion Date: August 2017.**
Status: On-Track.

1.4.3 Implement QARTOC QA/QC checks for AOOS real time data feeds.

- **Work with the IOOS Community to Develop Python Library for QARTOD; Original Completion Date: June 2017.**
Status: On-Track.

1.4.4 Provide technical support for existing data products (including the Real-time Sensor Map, Research Assets Map, Model Explorer, Sea Ice Atlas and Cook Inlet Response Tool).

- **Support 2017 Yukon-Kuskokwim Chinook Run Timing Forecast; Original Completion Date: May 2017.**
Status: Complete – May 2017.
- **Support Research Assets Map, Original Completion Date: May 2017.**
Status: Complete – May 2017.
- **Support Real-time sensor map, Sea Ice Atlas and Cook Inlet Response Tool; Original Completion Date: May 2017.**
Status: Complete – May 2017.

1.4.5 Develop new data products

- **Deploy Cruise and Glider 4D Visualization System; Original Completion Date: February 2017.**
Status: Complete - February 2017.
- **Expose Climatology Tool for Sensors; Original Completion Date: April 2017.**
Status: Complete – April 2017.
- **Deploy Alaska HAB Prototype; Original Completion Date: June 2017.**

Status: On-Track.

1.4.6 *Provide overall DMAC project management and oversight.*

- **Submit written semi-annual reports to the AOOS Executive Director; Original Completion Date December 2016.**
Status: Complete – December 2016.
- **Support Spring AOOS DMAC Meeting; Original Completion Date: April 2017.**
Status: Complete – April 2017.
- **Assist with developing review criteria for AOOS data system review; Original Completion Date: May 2017.**
Status: Complete – May 2017.
- **Assist AOOS' revision of the RICE certification application; Original Completion Date: February 2017.**
Status: Complete – February 2017.

1.4.7 *Collaborate with other state, regional, national and international data management programs*

- **Participate in statewide and national conferences; Original Completion Date: Ongoing.**
Status: Complete – Ongoing.

1.4.8 *Support national IOOS Program data management activities*

1.4.8.1 *AOOS will augment and maintain the i52n SOS server and supporting software packages.*

- **Upgrade 52 North Software Stack to SOS 2.0 template; Original Completion Date: May 2017.**
Status: Complete – May 2017.
- **Deliver SOS 2.0 52 North Software Stack; Original Completion Date: June 2017.**
Status: Complete – May 2017.

1.4.8.2 *Continue enhancements to the Environmental Sensor Map and its integration with the IOOS Catalog*

- **Deploy advanced National Sensor Map; Original Completion Date: February 2017.**
Status: Delayed - Prototype released in February 2017, but public release waiting for completion of climatology tool box to be used in conjunction with sensor map when exposing historical data. AOOS is tracking the progress closely.
- **Deliver improved environmental sensor map with API access; Original Completion Date: April 2017.**
Status: Complete – April 2017.

1.4.8.3 *Develop tools for users producing animal telemetry data sets which streamline the data management process and accelerate integration into relevant data assembly centers (ATN DAC)*

- **Develop mapping portal user interface system to display ATN assets in various regions; Original Completion Date: February 2017.**
Status: Complete – January 2017.

1.4.8.4 *Develop a scalable methodology for storing and querying the national AIS data set assembled by the NOAA Office of Coast Survey.*

- **Develop AIS analytical system; Original Completion Date: May 2017.**
Status: Complete – January 2017.

1.4.8.5 *Improve tools for preserving High Frequency Radar (HFR) output and allowing for reprocessing HFR data*

- **Develop research workspace for HFR data; Original Completion Date: May 2017.**
Status: Complete - April 2017.

1.4.8.6 *Support and enhance USGS Coastal and Marine Geology Program portals*

- **Deploy Next Generation Charting and Data Integration Portal Original Completion Date May 2017.**
Status: Complete – April 2017.

1.5 Modeling, Analysis & Product Development Subsystem

1.5.1 *Support existing models & data products including Historical Sea Ice Atlas, Research Assets Map and Yukon-Kuskokwim Chinook Run Timing Forecast*

- **Subaward to University of Alaska International Arctic Research Center to update Historical Sea Ice Atlas twice a year; Original Completion Date: March 2017.**
Status: Delayed – First annual update completed September 2016; second update scheduled for March 2017 is delayed due to late release of data from National Snow and Ice Data Center, now expected in June 2017.
- **Subaward to Axiom Data Science to support 2017 Yukon-Kuskokwim Chinook Run Timing Forecast; Original Completion Date: May 2017.**
Status: Complete – May 2017.
- **Subaward to Axiom Data Science to support Research Assets Map; Original Completion Date: May 2017.**
Status: Complete – May 2017

1.5.2 *Continue to assess support for ROMS forecasts for PWS and GOA*

- **Assess support for ROMS model; Original Completion Date: May 2017.**
Status: Complete – May 2017. Model was funded by PWSSC for completion of a circulation study of Valdez Arm. With that project now complete, we are again assessing future funding of this model.

1.5.3 *Continue support for Model Explorer and increase capabilities*

- **Support Model Explorer; Original Completion Date: Ongoing.**
Status: On-Track.

1.5.4 *Continue to explore support for Alaska Modeling Testbed*

- **Explore support for Alaska Modeling Testbed; Original Completion Date: Ongoing.**
Status: On-Track.

1.6 Additional Activities and Successes Related to Mission

- Alaska Harmful Algal Bloom Network launched.

2.0 Scope of Work

- The Norton Sound Buoy is being shipped back to Seward for maintenance as we investigate a longer-term plan for its deployment.
- The milestone to develop a deployment pathway to the USGS cloud hosting services under Data Management & Communications Subsystem - Support national IOOS Program data management activities has been aborted due to complexities with the USGS cloud hosting security enterprise.
- Two of the four HF radars on the North Slope are being removed this summer due to a lack of long-term funding.
- We do not expect any other changes to the project Scope of Work at this time.

3.0 Personnel and Organizational Structure

- There have been no changes in AOOS personnel or organizational structure. A new grant manager for AOOS at the Alaska SeaLife Center started full-time in December. The AOOS Board extended McCammon's contract for up to an additional 3 years.

4.0 Budget Analysis

All financial reports are up to date and have been submitted on time. There are no risks to the project that need identifying. There was no equipment purchased during this period.