

**Semi-annual Program Performance Report for NA11NOS0120020  
FY 2011 Alaska Regional Coastal and Ocean Observing System  
For reporting period December 1, 2013 – May 31, 2014**

*Prepared by Molly McCammon, Project PI on June 25, 2014*

## **1.0 Project Summary**

The Alaska Ocean Observing System (AOOS) is the regional association for Alaska, managing the statewide and three regional coastal and ocean observing systems for the Alaska region. The mission of AOOS is to provide coastal and ocean observations, forecasts and data and information products to meet agency and stakeholder needs. This proposal builds upon efforts begun with our initial funding, and takes into account the paucity of real-time observations in Alaska by relying extensively on collaborations and leveraging with other programs. The proposal represents the priorities identified by stakeholder workshops and adopted by the 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 (GOA). AOOS has four thematic priorities: sustainability of marine ecosystems and fisheries and tracking of climate change and trends; safety of marine operations; mitigation of natural hazards and their impacts on coastal communities, especially inundation, coastal erosion, and changing sea ice conditions; and regional ocean and coastal partnerships and planning.

## **2.0 Progress and Accomplishments**

### **2.1 AOOS Regional Management**

#### *2.1.1 AOOS Board and Committees*

- Staff completed Board orientation for new member Duncan Fields (North Pacific Fishery Management Council).
- AOOS Data Management Advisory Committee met March 13 in Fairbanks with the AOOS staff and research team to review current activities and discuss options for future projects.
- AOOS Board met in Fairbanks March 14 to review and approve the 2014 work plan and budget.
- The Board's Executive Committee met February 18 and again on April 21 to review Molly McCammon's annual performance and proposed work plan for coming year.

#### *2.1.2 Participation in national IOOS activities*

- McCammon and Ellen Tyler attended the IOOS (Integrated Ocean Observation System) and IOOS Association spring meeting in Washington D.C. March 4-5. Two Hill briefings were also held March 5-6 to showcase the

importance of ocean observing. The House briefing was facilitated by McCammon and hosted by Alaska Congressman Don Young.

- McCammon participated in IOOS Association and IOOS Joint Planning Working Group meetings, including meetings January 8-10 with Ocean Acidification Program director Libby Jewett and other NOAA directors.
- Darcy Dugan participated in regular IOOS Education and Outreach calls.

#### *2.1.3 Partnerships and external affairs - Alaska*

- McCammon participated in meetings of Alaska Center for Climate Assessment and Policy Steering Committee (National Oceanic and Atmospheric Association's Alaska Regional Integrated Sciences and Assessments Program), member; NOAA's regional collaboration team, member; and Cook Inlet Regional Citizens' Advisory Council.
- AOS partnered with Alaska Sea Grant to host sessions of the Alaska Marine Policy Forum on January 15, March 12 and May 21, 2014.
- AOS co-hosted a Community Based Monitoring Workshop with the Alaska Sea Grant Program and COSEE Alaska April 1-2. The workshop was showcased at a special Alaska Forum on the Environment session Feb 7.
- AOS co-hosted the Alaska Marine Science Symposium in Anchorage January 20-24, attended by more than 950 scientists, resource managers and community members. During the event, AOS gave one of the oral talks, presented a poster, co-sponsored the annual Communicating Ocean Sciences workshop and hosted a modeling strategy workshop.
- McCammon has been asked by the Northwest Arctic Borough to sit on an advisory committee for the borough's new science program. The first meeting was held in Kotzebue April 22-25.
- Tyler is lead PI for AOS in a joint project with the USFWS Aleutian Bering Sea Islands Landscape Conservation Cooperative and the USGS Alaska Climate Science Center to conduct a climate vulnerability assessment for the ABSI region. The project has included 2 workshops at the AMSS, facilitation of 5 expert teams to conduct initial vulnerability assessment of key resources, outreach to communities and regional partners and will result in a peer reviewed publication, 2 community town halls, and a prioritized list of research and monitoring needs in the region and for the 3 partners.

#### *2.1.4 Partnerships and external affairs - national & international*

- McCammon participated in a White House-sponsored meeting on Arctic Observing Priorities January 28.
- McCammon attended an Ocean Research Advisory Panel (ORAP) meeting in Arlington VA December 3-4, 2013.
- McCammon presented a poster at Ocean Sciences 14 in Honolulu in February.
- McCammon attended a meeting of the NAS Gulf Program Advisory Group in Houston, Texas January 10-13, 2014 and participated in numerous working group meetings.
- McCammon attended the Arctic Observing Summit in Finland April 8-11 and presented the new AOS Ocean Data Explorer during a panel on data.

### 2.1.5 Program management, administration, fundraising and financial oversight

- The AOOs annual audit was completed by the Alaska SeaLife Center.
- A proposed 2014 work plan and budget was developed for Board consideration and then prepared for submission to IOOS.
- Proposal action:
  - NOAA Climate Office's Sectoral Applications Research Program (SARP) LOI with UAF and the Alaska Center for Climate Assessment and Policy (ACCAP) to increase state and community capacity for short-term response and long-term planning related to coastal flooding events and saltwater intrusion into freshwater supplies was NOT FUNDED.
  - Kenai Peninsula Fisheries Habitat Program with Cook Inlet Regional Citizens Advisory Council and Kachemak Bay Research Reserve to expand the Cook Inlet Response Tool and provide training on its use for emergency responders and fish and wildlife managers was APPROVED.
  - NOAA FATE (Fisheries and the Environment) Program with Anne Hollowed and others from NOAA Fisheries to use the eastern Bering Sea as a case study for developing analytic tools and spatial indicators for assessing climate impacts on marine fisheries was NOT FUNDED.
  - Marine Biodiversity Observing Network, one with UAF group on Arctic MBON and another with Axiom Consulting and other IOOS regions on data management for biodiversity monitoring are PENDING.
  - Marine Technology Transfer proposal with Tom Weingartner was APPROVED. MTT proposal with Mark Baumgartner was NOT FUNDED.
  - Ocean Acidification Technology for Shellfish Industry with NANOOS and other west coast RAs was APPROVED with reduced funding.
  - NSF Data Infrastructure Building Blocks proposal with University of Colorado was SUBMITTED.
  - Collaboration proposals with NPRB Long-term Monitoring for Seward Line (Hopcroft) and Chukchi Sea ecosystem mooring (Danielson) were both APPROVED.
- Draft contract with Alaska SeaLife Center for fiscal sponsorship has identified issues that need to be resolved before it can be finalized.
- Communications audit was completed.

## 2.2 Marine Operations

### 2.2.1 Maintain Snotel stations in Prince William Sound (PWS) and Cook Inlet (CI)

- Subaward to PWS Science Center.
- Annual maintenance conducted by National Resources Conservation Service (NRCS). Continuing to assess the value of each of the stations to ensure adequate funding to maintain those with the broadest use.

### 2.2.2 Pilot AIS dissemination of weather data

- Subaward to Marine Exchange of Alaska (MXAK).

- Following the October 2013 shift in U.S. Government Project Sponsorship and Oversight for transmission of weather data over AIS network from NOAA to the Coast Guard, Coast Guard authorization to transmit and MMSI assignments was issued on April 25, 2014. The initial system's "operational period" has been authorized for April 15, 2014 - March 31, 2017.
- In addition to sites in Juneau and Homer, USCG granted authority to operate five additional AtoNs in Anchorage, Dutch Harbor, Wales, Barrow and Prudhoe Bay, not all of which are directly AOOS-funded.
- MXAK has begun FCC Licensing process for all 6 AIS AtoN sites. This will need to be completed prior to fully activating the systems in Anchorage, Dutch Harbor, Wales, Barrow and Prudhoe Bay, but will not affect current operations in Juneau and Homer.
- The portable/autonomous Weather stations for Scull Island (Stephens Passage) and Little Island (Lynn Canal) have been assembled/fabricated and are awaiting final placement approval from the U.S. Forest Service (Scull Island) and State of Alaska Division of Parks (Little Island).
- MXAK entered into a joint project with Cook Inlet Regional Citizens' Advisory Council (CIRCAC) to install a weather system in Kenai at the mouth of the Kenai River in conjunction with new web cam to be installed with AOOS funding.
- Partnership Advisory Team comprised of members of the Alaska Maritime Community (Commercial Fishing Community, Pilots Association, AMHS, Tug & Barge Community, and State/Fed Agencies) was finalized.
- Site surveys were conducted in Wales and Anchorage for AtoN installations.

*2.2.3 Provide public access to High-Frequency Radar (HFR) data in Chukchi Sea & plan for future HFR*

- Subaward with University of Alaska Fairbanks.
- Winterized long-range High Frequency Radar (HFR) equipment at Point Barrow, Wainwright, Point Lay and Cape Simpson.
- Acquired permits and letters of non-objection from land owners for Summer 2014 field season and acquired replacement parts for all field sites.
- Point Lay field site has been reinstated for the open water season.

*2.2.4 Weather Research and Forecasting (WRF) wind model for PWS and CI*

- This subaward concluded.
- Peter Olsson prepared a summary manuscript: Olsson, P.Q., and K. P. Volz: *Routine Mesoscale Forecasting of Coastal Winds Along the North Gulf of Alaska: 2014*. (Manuscript in preparation; to be submitted to *Weather and Forecasting*.)

*2.2.5 Maintain operational Regional Ocean Modeling System (ROMS) model for GOA*

- Subaward with YI Chao for maintenance with daily update schedule.
- ROMS nowcasts and forecasts produced daily with images, analysis and model output published on AOOS web site. Model output from all three ROMS domains is ingested into AOOS data server once available.
- Ingested 5-year PWS ROMS retrospective simulation and analysis into AOOS Model Explorer for further distribution.

- Moved PWS forecast system from JPL's old computer system to new RSS cluster computer.

#### 2.2.6 *Validate hydrological model for PWS*

- Subaward to Prince William Sound Science Center.
- Hydrological model validation work underway, including collection of Stream flow measurements over a wide range of conditions.
- Presentation on project status occurred during the fall OSRI Board meeting.

#### 2.2.7 *Ingest ROMS models for Bering Sea into JPL data assimilation system*

- This project has been completed.

### 2.3 **Coastal Hazards**

#### 2.3.1 *Monitor prior Alaska Harbor Observation Network (AHON) pilot projects in Seward and Kodiak and assess further expansion of AHON*

- Prior award with Alaska SeaLife Center. Other funding now being used.
- Discussions are underway to identify long-term support.

#### 2.3.2 *Maintain Coastal Data Information Program (CDIP) wave buoy in Cook Inlet*

- Buoy was sent to Scripps for repairs. A new top hat was purchased (\$15K) and is being shipped to Scripps for assembly.
- AOS has increased the annual appropriation for this asset to \$10K to handle small repairs, auxiliary equipment, and potential gas/ship time in case it cannot be launched or picked up by an oceanographic cruise or other leveraged entity.
- AOS staff is looking into additional funding options including donations from Homer associations, private industry, the NDBC, NWS, and others to augment the AOS buoy maintenance fund.

#### 2.3.3 *Produce electronic sea ice atlas*

- Subaward to ACCAP.
- Digital interface and database officially released in February 2014 via an ACCAP webinar. Data layers have been incorporated in the AOS Ocean Data Explorer as well accessed through the interface on the AOS website.
- A flyer (handout) describing the database and digital interface has been prepared and distributed at various conferences and venues.
- The sea ice atlas was presented as a poster at the Alaska Marine Science Symposium in Anchorage in January 2014 and as a talk at the Western Alaska Interdisciplinary Science Conference in Kotzebue in April 2014.
- User feedback has been obtained and synthesized by Nathan Kettle of ACCAP.

#### 2.3.4 *Develop coastal flooding, storm surge and sea level rise products.*

- Coastal Hazards meeting occurred in December 2013 to discuss progress towards priority actions identified in May 2012 meeting including low-cost and opportunistic water level measurements and monitoring and modeling strategies to better forecast coastal inundation.
- Wave buoy in Norton Sound was readied for July deployment using other funds.
- Subaward to ADNR to install a short-term tide gauge and develop a coastal profile data repository.
- National Geodetic Survey (NGS) OPUS solution of the tidal benchmark

position in Port Heiden, Alaska was submitted to NGS. Available online: <http://1.usa.gov/1pk0r6m>.

- 2013 Port Heiden tide station (9464075: Meshik, Alaska) data was formatted and submitted to NOAA CO-OPS for integration into National Geophysical Data Center (NGDC).
- Through an iterative development process, DGGs coastal geologists have worked with in-house programmers to design a suitable database for use with an interactive profile tool. The tool, which incorporates elements from similar interactive data products for coastal profiles in other parts of the country, will be primarily housed at DGGs and eventually available through the AOS data portal.
- AOS support to fill a portion of water level data gaps in Bristol Bay and our advocacy for additional observations throughout Alaska has spurred discussions with federal partners about how additional projects of this type can be accomplished using adjusted standards to meet our State's data needs.

## **2.4 Ecosystems/Fisheries and Climate Trends**

### *2.4.1 Maintain Arctic (now Statewide) Research Assets Map*

- Student intern maintaining map.
- Successfully collaborated with and currently sharing information and linking with NSF Arctic Observing Viewer team to ensure minimum overlap of efforts.
- Updated 2013 field season based on "what happened" rather than "what was planned."
- Contacted and incorporated statewide researchers into Research Assets Map.

### *2.4.2 Support sampling along Seward Line*

- Subaward to University of Alaska Fairbanks (UAF). May 2014 cruise successfully executed with all primary and all minor "in between" stations sampled and 2 additional stations added offshore.
- Shallow thermal stratification of the water column had begun along the entire Seward Line with phytoplankton blooms observed along outer half of the line. Average temperature in upper 100m in September at 16-year mean.
- Samples were taken for ocean acidification – *see OA report by Mathis*.
- Seward Line was selected for 5 years of collaborative funding for NPRB's Long-term Monitoring program. This funding will add phytoplankton-microzooplankton research and formalize funding for observations of seabirds and marine mammals.
- Proposal to Murdock Foundation to add high-resolution optical detection of biological and non-biological particles during CTD casts was funded (\$300K) and should be operational by next cruise. A new CTD frame is required to accommodate this equipment and is being partially supported by AOS funds.

### *2.4.3 Use AOS glider for high-latitude observation node in Chukchi & test glider use for monitoring marine mammals*

- Subaward to UAF/Woods Hole/University of Washington to record, detect, classify, and remotely report marine mammal calls in real time from autonomous platforms based on the digital acoustic monitoring (DMON)

instrument and the low-frequency detection and classification system (LFDCS), using previously developed (AOOS funded) Arctic-specific call library.

- Manually analyzed all acoustic data collected during 2013 pilot effort, as well as oceanographic data from glider deployment. Acquired wind and satellite-derived data for comparison with acoustic detections.
- Submitted manuscript to Marine Technology Society Journal special issue on Polar Research Instrumentation and Technologies entitled: "Glider-Based Passive Acoustic Monitoring in the Arctic."
- Began refinement of call library for 2014 glider deployments.

#### *2.4.4 Support Distributed Biological Observatory*

- Subaward to University of Alaska Fairbanks (UAF) for NE Chukchi mooring.
- Took delivery of the ASL AZFP and Sequoia LISST instruments
- Constructed mooring frame and floatation package in Seward, AK - Early mooring design featured in Sikuliaq display at UAF Museum of the North.
- Conducted short test deployment in Seward, AK.
- Submitted proposal to fund operations and outreach under the NPRB Long Term Monitoring program. Proposal was funded.
- Initiated talks with potential partners to add more instruments and parameters (sediment trap sampling and passive acoustic recorders).

#### *2.4.5 Maintain ocean acidification (OA) sampling along Seward Lin; support OA sensors on moorings in Chukchi, Gulf of Alaska and Bering Sea; conduct OA monitoring at Alutiiq Shellfish Hatchery; and develop OA forecast for Gulf of Alaska.*

- Subaward to UAF.
- Conducted May 2014 Seward Line cruise with expanded sampling. Now have 6 1/2 years (13 cruises) of data from Seward Line demonstrating definitive evidence of increasing inventories of anthropogenic CO<sub>2</sub> in northern GOA and subsequent changes in ocean carbonate chemistry.
- 4 moorings statewide equipped with surface and bottom sensor packages measuring pCO<sub>2</sub>, pH, temp, salinity, nitrate, oxygen, chlorophyll, and turbidity.
- OA monitoring system installed at Alutiiq Pride Shellfish Hatchery in Seward. System is online and monitoring real-time pCO<sub>2</sub>, pH, temperature, salinity.
- Postdoctoral scientist Samantha Siedlecki began work on forecast model for GOA reparameterizing a number of boundary conditions and initial parameterizations in existing ROMS model (i.e., nutrient concentrations, particle sinking rates), which could not be validated from observational data. She is now working on integrating the OA module.

#### *2.4.6 Test use of conductivity sensors at Cordova tide station*

- Subaward to PWSSC. Data was approved for distribution and is now available through AOOS and CO-OPS.
- Oral and written presentations given to AOOS Board and stakeholders.
- Sensor maintained (primarily cleaning)

#### *2.4.7 Support mooring turnovers for biological monitoring*

- Subaward to PWSSC. Data from Ocean Tracking Network acoustic array downloaded. Array detected fish tagged from multiple programs.

#### *2.4.8 Conduct Conductivity/Temperature/Depth (CTD) surveys in Kachemak Bay and lower Cook Inlet*

- Conducted monthly CTD surveys at mid-Kachemak Bay transect (Homer Spit line) in December 2013 and January, February, March, April, and May 2014.
- Conducted CTD surveys at Kachemak Bay outer bay transect in February and April 2014.
- Conducted additional along-bay CTD surveys in Kachemak Bay on 28 March 2014 and May 2014 to assess response of the estuary to anomalously low freshwater input conditions.
- Provided CTD data to NOS/NCCOS researchers for PSP studies and to AOS for upload to Ocean Workspace and publication on the AOS Gulf of Alaska data portal.
- Developed graphic products to illustrate spatial and temporal variability in oceanographic patterns. Used in science presentations at AMSS in January 2014 and to train marine science educators in Homer in March 2014.
- Deployed drifter buoys in March 2014 to support Kachemak Bay NERR/University of Alaska Fairbanks project to validate Cook Inlet ocean circulation model.

### **2.5 Regional Ocean and Coastal Partnerships and Planning DARC**

#### *2.5.1 Expand data management capacity to integrate data*

- Ongoing. See Section 2.6 below.

#### *2.5.2 Create spatial visualization tools for AK through STAMP project - "Spatial Tools for Arctic Mapping and Planning"*

- Workshop held April 16 attended by 50 people and included a live demo of the tool, case studies by practitioners and discussion on next steps.
- Demonstrated current data tool to a large number of audiences to promote awareness, collaboration, and feedback. See list in section 2.8.4.

### **2.6 Data Management & Products – Subaward to Axiom Consulting**

#### *2.6.1 Support AOS website, data portal & applications. Maintain & provide access to products developed in this project. Explore developing multi-regional products with other RAs.*

- Most of AOS Ocean Portal Framework fully ported over to HTML 5 enabling all AOS data types (sensors, models, GIS and project level datasets) to be accessible and visualized on iOS devices (iPads and iPhones).
- New version of AOS statewide portal – AOS Ocean Data Explorer – released. Provides users access to AOS' entire data holdings.
- Providence RI East Coast data center fully functioning. Data and web services geo-replicated. AOS is now a high availability Data Assembly Center (DAC).
- Next Generation HPC storage up and running in Portland and Providence. New storage cluster is 400% higher performance than legacy platform.



- Formal relationship established with CeNCOOS to coordinate system development to maximize leveraging of effort and products across regions.
- 2.6.2 *Ingest prioritized datasets, support warehouse and archive functions & provide access through query and mapping tools*
- STAMP data ingestion complete. A large number of new datasets are now available via AOS systems including a sample set of AIS tracks from AK Marine Exchange, Sea Ice Character from Shell and NWS, and Marine Arctic Synthesis from Audubon.
  - Historic sensor archive nearing completion.
  - Several datasets funded by AOS consolidated and reviewed for ingestion, including Seward Line, GAK1 and Ocean Acidification datasets.
  - Approximately 120 new sensors, 12 model ensembles (162 variables) and 89 marine GIS data layers have been added to AOS data system.
  - Data from the Bering Sea Sub Network Subsistence Hunt Surveys incorporated as prototype hex bin visualization interface for obfuscation of individual effort and for future incorporation into AOS data portal.
  - Cook Inlet beluga sightings data layer drafted and pending review before being added to AOS system.
- 2.6.3 *Continue ADF&G (Alaska Department of Fish & Game) partnership*
- Established 2014 Annual Yukon River Chinook forecast powered by AOS data feeds with communication and outreach on complementary AOS web reporting page.
  - Digitization of AYK salmon database complete, pending expert review before added to AOS system.
- 2.6.4 *Support of 2014 APOP portal for support of the BSAI LLC*
- Alaska Portal of Opportunity provides scientists with ability to discover potential opportunities to cost share on cruises.
- 2.6.5 *Collaborate with other state, regional, national and international data management programs*
- Participated in ADIWG (Alaska Data Integration Working Group) meetings to assist in data integration across Alaska entities.
- 2.6.6 *Continue to develop IOOS SOS service and assist other RAs in deployment and begin work on IOOS Systems Integration Test.*
- Worked with several RAs (GCOOS, GLOS and NANOOS) to deploy 52 North Software Stack
  - Supported bug fixes and cultivation to 52 North software stack.
  - Received early 2014 funding to begin IOOS Systems Integration Test.
- 2.6.7 *Develop new products and applications*
- HTML 5 real time sensor portal deployed in January of 2014.
  - HTML 5 statewide portal released in Feb 2014.
  - HTML Arctic Portal (STAMP) deployed in April 2014.
- 2.6.8 *Provide Data Management services for integrated research programs with separate funding: EVOSTC Long Term Monitoring & Herring Research and Monitoring Programs; NPRB's Gulf of Alaska Integrated Ecosystem Research Program; RUSALCA program; Arctic Ecosystem Integrated Survey; and Distributed Biological Observatory.*

- Currently supporting programs with Research Workspace application.
  - Participating in monthly and other PI meetings as needed.
  - Visualized RUSALCA data made available on AOS portal.
  - Gulf Watch Alaska project data exposed through AOS catalog.
- 2.6.9 *Serve up oil & gas industry data on AOS portal*
- Annex 2 data submitted to NODC archives.
  - Data updates received and processed in April 2014 and being served out through Research Workspace.
  - Currently 71 users have requested access to industry-provided datasets.

## 2.7 Modeling & Analysis

### 2.7.1 *Initiate statewide circulation model exchange & ensemble modeling*

- Hosted a modeling workshop at the Alaska Marine Science Symposium in January 2014 to obtain input on a modeling strategy for AOS.
- Identified possible opportunities for AOS to add value to existing modeling efforts:
  - Convening a statewide modeling forum for modelers and model users to network and share information, and ultimately advise AOS on how best to leverage funding to fill gaps.
  - Adding value to existing model outputs (e.g., larval trajectory on circulation model; change detection by overlaying spatial polygons over climate downscale ensembles).
  - Model to model comparison via Ocean Data Explorer.
  - Developing an application similar to AOS Research Assets Map that surveys modelers about upcoming modeling efforts.
- Conceptual Design and Pilot Demonstration of Multi-Model Explorer in review.

## 2.8 Communication, Education & Outreach

### 2.8.1 *Support COSEE Alaska partnership*

- Lead sponsor for Communicating Ocean Sciences Workshop at AMSS January 20 and supported student poster process.
- Co-hosted Community Based Monitoring session at the Alaska Forum on the Environment Feb. 7.
- Co-hosted Community Based Monitoring workshop April 1-2 and provided logistical support and funding for 51 non-Anchorage participants.
- Conducted Communicating Ocean Science Course at UAF.

### 2.8.2 *Support AOS website and publications*

- Continued to add content to website, including news, featured stories, and explanations for new data tools.
- Produced monthly updates.
- Circulated bi-monthly e-newsletter to list serve of over 500 recipients.
- Received final Strategies360 communications and outreach audit.

### 2.8.3 *Scope out potential Alaska Oceans & Coast Report*

- Continue to refine draft white paper with Alaska Sea Grant Program and explore funding options.

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**Comment [1]:** I'm unclear here whether these are things AOS did or things COSEE did or things AOS and COSEE did together. I have Robin's list but am not sure which items to add based on the answer to that question.

#### *2.8.4 Interact with stakeholders and partners*

- Tyler presented on AOOs data tools at Kodiak Marine Science Symposium April 23-24.
- AOOs Partnered with ABSI LCC and AK CSC to present on downscaled climate projections and implications for vulnerability assessment via Alaska Center for Climate and Policy webinar on December 17.
- Kris Holderied presented on behalf of AOOs at a Harmful Algal Blooms conference in Homer, Feb 11.
- Tyler presented on OA and HAB monitoring and research at KBRR workshop on bivalve recovery in Kachemak Bay and lower Cook Inlet March 11-12.
- Facilitated conversations between the Tsunami Warning Center, AK DGGS, NOAA regional headquarters, Arctic LCC and other parties concerned with poorly described water level coastal profiles.
- Entered into discussions about potential collaboration between AOOs and UAA, should UAA be selected as DHS Center of Excellence in coming year.
- Organized steering committee to develop plans for 2014 AOOs 10<sup>th</sup> Anniversary events.
- Conducted presentations with demos to receive feedback on new AOOs Arctic and Gulf of Alaska portals. Audiences included:
  - USGS headquarters in Anchorage
  - Alaska Dept of Transportation – quarterly meeting
  - Alaska Marine Science Symposium plenary session

### **3.0 Scope of Work (Priorities for next 6 months, June 1 – November 30, 2014, and anticipated changes to SOW)**

#### **3.1 AOOs Regional Management**

##### *3.1.1 AOOs Board and Committees*

- Full board meeting planned for fall.
- Data Management Advisory Committee meeting planned for July 11, 2014 to review Axiom work plan. Full committee meeting planned for fall.

##### *3.1.2 Participate in national IOOS*

- Participate in IOOS regional director retreat in Boulder CO Aug 26-28, 2014.
- Continue to participate in IOOS Association activities.

##### *3.1.3 Partnerships and external affairs – in Alaska*

- Begin planning for upcoming workshops: coastal hazards, marine navigation, and climate/ecosystems in anticipation of next 5-year proposal.
- Begin planning for ocean acidification workshop with ACCAP.

##### *3.1.4 Partnerships and external affairs – national & international*

- Finish participation in NAS Gulf Program Advisory Group.
- Meet with new National Ocean Council director Beth Kerttula.

##### *3.1.5 Program management, administration, fundraising and financial oversight*

- Finalize long-term agreement with Alaska SeaLife Center for fiscal management.
- Work on additional funding proposals.

- Continue consideration of possible 501(c)(3) once ICOOS Act is reauthorized.
- Develop plan for certification implementation.

### **3.2 Marine Operations**

#### *3.2.1 Maintain Snotel stations in PWS and CI*

- Conduct annual maintenance. Consider moving station in CI.

#### *3.2.2 Pilot AIS dissemination of weather data*

- Install weather stations at: Scull Island, Little Island, Kenai, Skagway, Ketchikan, Guard Island, Wales, Barrow and Prudhoe Bay.
- Install AIS AtoN transceiver systems at: Anchorage, Dutch Harbor, Wales, Barrow and Prudhoe Bay.
- Continue development of weather data processing software and website distribution.
- Assess range of AIS/WX transmissions from vessel observations by installing software on State of Alaska vessel MEDEIA and MXAK's CLEAT.

#### *3.2.3 Provide public access to HFR data in Chukchi & plan for future HFR*

- Deploy and maintain long-range High Frequency Radar (HFR) equipment at Point Barrow, Wainwright, Point Lay, and Cape Simpson. Point Barrow and Cape Simpson are remotely powered using wind and solar.
- Geodetically level each of these stations and report to DGGS for potential incorporation in a "tier three" system of water level observations.
- Provide real-time data freely by posting to the NOAA IOOS National HFR Data Server in real-time, as well as on project websites: [www.chukchicurrents.com](http://www.chukchicurrents.com) and <http://dm.sfos.uaf.edu/chukchi-beaufort/>
- Develop plan for future O&M of these sites.

#### *3.2.4 Maintain WRF wind model for PWS and CI*

- This project is completed.

#### *3.2.5 Maintain operational ROMS model for GOA*

- Continue operating ROMS model at basic level.

#### *3.2.6 Validate hydrological model for PWS*

- Analysis phase next.

#### *3.2.7 Ingest ROMS models for Bering Sea into Jet Propulsion Laboratory (JPL) data assimilation system*

- No activity. Completed.

#### *3.2.8 Deploy bottom-mounted pressure sensors in Beaufort*

- Subaward to UAF (Weingartner).
- Work with NCEP to ensure data is used to validate Wavewatch III model.

### **3.3 Coastal Hazards**

#### *3.3.1 Monitor prior AK Harbor Observation Network pilot projects in Seward and Kodiak and assess further expansion of AHON*

#### *3.3.2 Maintain CDIP wave buoy in Cook Inlet*

- Repairs are to be completed in late July and users have been notified that buoy will likely be deployed in August.

#### *3.3.3 Produce electronic sea ice atlas*

- Atlas will be updated on semi-annual basis.
- First update will take place in July 2014 (incorporating satellite passive microwave data through June 2014).

#### *3.3.4 Develop coastal flooding, storm surge and sea level rise products.*

- Take leadership role in Coastal Processes work group being spun-up by Arctic Landscape Conservation Cooperative.
- Complete beta development, programming, and testing of digital Alaska coastal elevation profile repository.
- Begin seeding coastal profile tool with historic information.
- Test alternative geodetic leveling of Chukchi/Beaufort Coast community tide gauges being deployed by North Slope Borough Department of Wildlife Management and University of Alaska Fairbanks.
- Pilot development of short-term water level stations on Y-K Delta in collaboration with NOAA CO-OPS to be compatible with new tiered data policy that is currently under development.

### **3.4 Ecosystems/Fisheries and Climate Trends**

#### *3.4.1 Maintain Research Assets Map*

- Expand and maintain statewide efforts.

#### *3.4.2 Support sampling along Seward Line*

- Next cruise: Mid September

#### *3.4.3 Use AOOs glider for high-latitude observation node in Chukchi & continue testing use of gliders for other uses*

- Improve and expand Arctic Call Library.
- Deploy two DMON-equipped gliders in Chukchi Sea in September 2014 for ~3 weeks each.
- Maintain public website during glider deployment.
- Address reviewer comments from submitted manuscript as they come in and submit final version of peer-reviewed paper.

#### *3.4.4 Support Distributed Biological Observatory*

- Final mooring construction and testing to take place in Seward.
- Deploy mooring off of Norseman II vessel in September.
- Submit purchase orders for instrumentation that will be deployed in 2015.

#### *3.4.5 Maintain OA sampling along Seward Line & OA mooring sensors*

- Collect OA measurements on fall Seward Line cruise, at Alutiiq Pride Shellfish Hatchery in Seward & from 4 moorings.
- Upgrade hatchery system to new "Burkolator" style unit over next 2 months.
- Continue processing mooring and hatchery data in preparation for data transfer to AOOs and 2015 Alaska Marine Science Symposium.
- Finish synthesis paper based on six years of data from Seward Line cruises for submission to Journal of Geophysical Research.
- Continue to develop and integrate the OA module into the model.

#### *3.4.6 Test use of conductivity sensors at Cordova tide station*

- Provide report describing operation of conductivity sensor at tide station along with a recommendation on expansion.

#### 3.4.7 *Support mooring array for biological monitoring*

- Download data.
- Complete 3<sup>rd</sup> year of model validation.

#### 3.4.8 *Conduct CTD surveys in Kachemak Bay and lower Cook Inlet*

- Conduct monthly CTD surveys at mid-bay transect in Kachemak Bay.
- Conduct two seasonal CTD surveys at outer bay transect in Kachemak Bay.
- Provide CTD data to CSDL, AOOS and others as requested.

### **3.5 Regional Ocean and Coastal Partnerships and Planning**

#### 3.5.1 *Create data management capacity to integrate data*

- Ongoing. See section 3.6 below.

#### 3.5.2 *Create spatial visualization tools for AK: STAMP*

- Continue adding relevant data layers to the STAMP/Arctic portal.
- Finalize project.

### **3.6 Data Management & Products**

#### 3.6.1 *Support AOOS website, data portal & applications. Maintain & provide access to products developed in this project. Explore developing multi-regional products with other RAs.*

- Improve data catalog usability by grouping logical data layers into coherent modules (model parameters and multiple GIS data sets).
- Develop improved indexing of AOOS data assets so users can search by space, time and taxonomy.
- Develop and implement improved keyword scheme.

#### 3.6.2 *Ingest prioritized datasets, support warehouse and archive functions & provide access through query and mapping tools*

- Continue to ingest data sets to support STAMP tool and Arctic Portal with focus on fisheries, marine mammals, subsistence use and habitat.

#### 3.6.3 *Continue ADF&G partnership*

- Continue to support and prepare for next salmon season.
- Implement AYK salmon study interactive GIS data layer.
- Discuss with ADF&G future activities.

#### 3.6.4 *Collaborate with other state, regional, national & international data management programs*

- Develop proposals with UAA.
- Work with Arctic cyber infrastructure groups on collaborative proposals.

#### 3.6.5 *Continue to develop/support IOOS SOS service and assist other RAs in deployment and conduct System Integration Test.*

- Integrate QA/QC into sensor ingestion and storage.
- Execute IOOS SOS scalability experiment and demonstrate results.
- Participate in IOOS System Integration Test.

#### 3.6.6 *Develop new products and applications*

- Continue to improve Ocean Portal Framework in HTML 5 to enable AOOS applications to run on iPad/iPhone.
- Implement multidimensional data model.

3.6.7 *Develop advanced visualization system for time series (RUSALCA, Seward Line, GAK 1, Fisheries Data).*

- Process and stage RUSALCA and other CBMP Arctic datasets for next generation data visualization.
- Explore data visualizations for Seward Line, ocean moorings and ocean acidification data.
- Ingest NOAA fisheries data (BASIS) and develop visualization strategy.

3.6.8 *Provide Data Management services for integrated research programs: EVOSTC Long Term Monitoring & Herring Research and Monitoring Programs; NPRB's Gulf of Alaska Integrated Ecosystem Research Program; RUSALCA program; and Arctic EIS program – all with separate funding*

- Cultivate and expand capabilities of AOS Research Workspace.
- Attend all PI meetings.

3.6.9 *Serve up oil & gas industry data on AOS portal*

- Manage access to industry data and facilitate updates to the resource.
- Make data publicly available with simple search tool.
- Work with NODC to streamline archive process.

### **3.7 Modeling & Analysis**

3.7.1 *Initiate statewide circulation model exchange & ensemble modeling*

- Compile an inventory of current needs and existing capabilities for ecological forecasts of HABs, vibrio, pathogens, species and habitat distribution and change as well as the spread of invasive species for each of five regions throughout the state.
- Host a webinar on ecological forecasting in Homer in September in cooperation with NOAA's Ecological Forecasting Roadmap.

### **3.8 Communication, Education & Outreach**

3.8.1 *Support COSEE Alaska partnership*

- Work with COSEE Alaska as they wind down and transition their program (NSF funding ends in October).

3.8.2 *Support AOS website and publications*

- Produce fall newsletter, bi-monthly e-news, and monthly ED updates.
- Transfer contacts to MailChimp and develop new sublists.
- Implement observing project pages on website.
- Work with partner institutions to include link to AOS on their website.

3.8.3 *Scope out potential Alaska Oceans & Coast Report*

- Circulate white paper to potential partners.

3.8.4 *Interact with stakeholders and partners*

- Continue providing demos of AOS tools to interested organizations and agencies.
- Implement AOS 10<sup>th</sup> anniversary activities, including event on Nov 19.
- Assess Facebook presence.
- Reach out to local media contacts to improve frequency of earned media.

#### **4.0 Personnel and Organizational Structure**

No issues to report on.

#### **5.0 Budget Analysis**

All financial reports are up to date and have been submitted on time.

#### **6.0 Issues**

None at this time.

#### **7.0 Special Report: Regional Ocean Governance Organization Activities**

AOOS received a competitive grant in 2012 from NOAA's Regional Ocean Partnership Program to "*Create spatial visualization tools for Arctic Mapping and Planning.*"

- Developed interactive web-based data integration and visualization tool for the Alaskan Arctic based on AOOS data infrastructure, including over 250 data sets from a wide variety of sources
- Held steering committee meeting via webinar in June 2013 to demonstrate the latest developments of the portal and get feedback on data ingestion priorities and planned advancements of the tool.
- Ingested and displayed new high profile datasets, (e.g., National Weather Service and Shell Sea ice data, ShoreZone data on shoretype and biological information, social and economic data sets from UAA, and downscaled climate models for the offshore from UAF and many more).
- Held project stakeholder workshop in April 2014, which included a live demo, case studies by practitioners on how the tool can be applied, and discussion on next steps. 50 people participated.
- Gave presentations on the Arctic portal to multiple audiences to increase awareness of the portals' resources and solicit feedback. Audiences included:
  - Alaska Marine Conservation Council (live demo & meeting, August 2013)
  - Alaska Dept. of Transportation (live demo, October 2013)
  - Alaska Assoc. of Harbor Masters & Port Administrators (live demo, October 2013)
  - Bureau of Ocean Energy (live demo and meeting, July 2013)
  - Alaska Department of Environmental Conservation spill response (live demo and meeting, October 2013)
  - Alaska Department of Natural Resources - Division of Mining Land and Water (presentation, October 2013)
  - Inuit Circumpolar Council (live demo and meeting, September 2013)
  - NOAA Auke Bay Lab (live demo, November 2013)
  - NOAA headquarters, Juneau (live demo, November 2013)
  - North Pacific Fisheries Management Council - Ecosystems Committee (live demo via webinar, September 2013)
  - R&M Engineering (live demo, November 2013)
  - UAA's Institute for Social & Economic Research (live demo and meeting, October 2013)



- US Coast Guard, Juneau (live demo, November 2013)
- US Fish & Wildlife Service/Geographic Information Network of Alaska/Alaska Landscape Conservation Cooperatives – (live demo + webinar, November 2013)
- Alaska DOT quarterly design meeting (live demo, January 2014)
- USGS managers (live demo, February 2014)

### **8.0 Special Report: Efforts to Leverage IOOS Funding**

AOOS actively seeks to leverage IOOS funding in three ways: by submitting multiple proposals for funding from additional sources, by joining forces with other entities to support observing activities, and by providing data management services for other research programs.

#### *AOOS Proposals:*

- AOOS received one grant from the Bering Sea/Aleutian Islands Landscape Conservation Cooperative AND USGS Alaska Climate Center to develop a climate vulnerability index for the Aleutians. Several other proposals have been approved: Kenai Peninsula Fisheries Habitat Program with Cook Inlet Regional Citizens Advisory Council and Kachemak Bay Research Reserve to expand the Cook Inlet Response Tool and provide training on its use for emergency responders and fish and wildlife managers; Marine Technology Transfer proposal with Tom Weingartner for a sea ice prediction system; Ocean Acidification Technology for Shellfish Farmers with NANOOS and other west coast RAs; and collaborations with NPRB Long-term Monitoring Program for the Seward Line (Hopcroft) and Chukchi Sea ecosystem mooring (Danielson).
- Three proposals submitted are still pending: two with the Marine Biodiversity Observing Network, one with UAF group on Arctic MBON and another with Axiom Consulting and other IOOS regions on data management for biodiversity monitoring; and one to NSF Data Infrastructure Building Blocks with University of Colorado.
- AOOS collaborated with partners to submit a series of research ideas in response to the Bureau of Ocean Energy Management's call for science recommendations prior to lease sales in the Beaufort and Chukchi Seas and Cook Inlet. One for Cook Inlet is expected to receive funding.
- Several unsuccessful proposals were submitted during this period: Expansion of STAMP Project for Regional Ocean Partnership Program solicitation (was not even reviewed!); NOAA Climate Office's Sectoral Applications Research Program (SARP) LOI with UAF and Alaska Center for Climate Assessment and Policy (ACCAP) to increase state and community capacity for short-term response and long-term planning related to coastal flooding events and saltwater intrusion into freshwater supplies; proposal with Mark Baumgartner to IOOS Marine Technology Transfer for whale monitoring using moorings; and NOAA FATE (Fisheries and the Environment) Program with Anne Hollowed and others from NOAA Fisheries

to use the eastern Bering Sea as a case study for developing analytic tools and spatial indicators for assessing climate impacts on marine fisheries.

*Observing Consortia:*

- Most of our observing activities are highly leveraged. Two examples are the ocean acidification moorings: AOOB contributes \$15k a year to a \$45k a year OA mooring consortium; and the Seward Line: AOOB contributes \$100k a year to a consortium that totals \$400k a year.

*Data Management Services for related programs:*

- Exxon Valdez Oil Spill Trustee Council’s Long Term Monitoring & Herring Research and Monitoring Programs
- North Pacific Research Board’s Gulf of Alaska Integrated Ecosystem Research Program
- Russian-US Long-term Census of the Arctic (RUSALCA) program
- Arctic Ecosystem Integrated Study (EIS)
- Distributed Biological Observatory (DBO) program
- Serve up oil & gas industry data on AOOB portal

**9.0 Special Report: Updates to RA Board Membership**

- Paul Webb replaced Paul Gill as the US Coast Guard board member. Carl Markon replaced Leslie Holland-Bartels as acting USGS representative, although Lyman Thorsteinson continues to serve as the designated rep. Paula Cullenberg replaced David Christie as Alaska Sea Grant representative. Denby Lloyd replaced Cynthia Suchman as North Pacific Research Board representative.
- We are still seeking a statewide tribal representative. See IOOB governance template below.

Region	Type of Governance	Distribution of Governance Board Membership								Total Number of Board Members
		Government				Non-Government			Foreign (all sectors)	
		State*	Local	Tribal	Federal	Research Institute	Industry	NGO**		
AOOB	MOU	4			4	7	2	2		19
CaRA	MOA	3				1	6	2		12
CeNCOOS	MOU	2			2	8		3		15
GCOOS	MOU	2			2	3	5	3		15
GLOS	501(c)(3)		1		3	1	4		1***	10
MARACOOS	501(c)(3)	2			3	8		2		15
NANCOOS	MOA	2		2	2	4	3	2		15
NERACOOS	501(c)(3)	5			2	6	4	1	2	20
PacIOOS	MOA	5			2	1	3	1	2	14
SCCOOS	MOU				1	7		1	2	11
SECOORA	501(c)(3)	2			1	13	6	3		25
ACT						4	1			5

\* includes Sea Grant and territorial governments  
 \*\* includes Fishery Management Councils  
 \*\*\* "bi-national" International Joint Commission

**10. Special Report: Governance Activities and Accomplishments**

- AOS Board met in Anchorage December 10, 2013 to conduct board elections. The current board was approved for an additional one-year term.
- AOS Board met in Fairbanks March 14, 2014 to review and approve 2014 work plan and budget and do some strategic planning with University of Alaska researchers and administrators.
- One new board member received orientation.
- AOS Executive Committee met April 21, 2014 to conduct Executive Director Molly McCammon's annual performance evaluation.
- AOS Data Management Advisory Committee met September 20, 2013 to review recent progress by the data management team.
- AOS Data Management Advisory Committee met March 13, 2014 in Fairbanks with AOS research team to review recent progress by both teams.
- AOS annual audit completed by Alaska SeaLife Center.
- Draft contract with Alaska SeaLife Center for fiscal sponsorship still underway. AOS Board Subcommittee appointed to work through issues.

## **11. Special Report: Education and Outreach Activities**

### **11.1 Education**

- Supported COSEE Alaska partnership.
- Co-author on two journal articles led by COSEE Alaska.
- Co-hosted Communicating Ocean Sciences Workshop at AMSS in January.
- Supported the student poster process at the Alaska Marine Science Symposium (through COSEE)
- Conducted a science fair in the Lower Kuskokwim School District, and held a COSEE Ocean Sciences Fair within the Alaska State Science Fair (activities completed by COSEE).
- Contributed to Communicating Ocean Sciences Course at UAF (done by COSEE).
- Produced three virtual field trips (done by COSEE).

### **11.2 Outreach**

- Gave AOS overview and data portal presentations to the list of 16 audiences
  - Alaska Marine Conservation Council (live demo & meeting, August 2013)
  - Alaska Dept. of Transportation (live demo, October 2013)
  - Alaska Assoc. of Harbor Masters & Port Administrators (live demo, October 2013)
  - Bureau of Ocean Energy (live demo and meeting, July 2013)
  - Alaska Department of Environmental Conservation spill response (live demo and meeting, October 2013)
  - Alaska Department of Natural Resources - Division of Mining Land and Water (presentation, October 2013)
  - Inuit Circumpolar Council (live demo and meeting, September 2013)
  - NOAA Auke Bay Lab (live demo, November 2013)

- NOAA headquarters, Juneau (live demo, November 2013)
- North Pacific Fisheries Management Council - Ecosystems Committee (live demo via webinar, September 2013)
- R&M Engineering (live demo, November 2013)
- UAA's Institute for Social & Economic Research (live demo and meeting, October 2013)
- US Coast Guard, Juneau (live demo, November 2013)
- US Fish & Wildlife Service/Geographic Information Network of Alaska/Alaska Landscape Conservation Cooperatives – (live demo + webinar, November 2013)
- Alaska DOT quarterly design meeting (live demo, January 2014)
- USGS managers (live demo, February 2014)
- Continued to add content to AOS website, including news stories, top features, animations and new pages.
- Produced monthly Executive Director updates.
- Initiated bi-monthly e-newsletter to listserve of over 500 recipients.
- Had a communications audit conducted on AOS; developed plan for implementing recommendations.
- Produced press releases for the media on AOS-funded projects.
- Launched new AOS Facebook page that is updated several times per week.
- Regularly check Google Analytics to assess website and data portal viewership.
- Highlighting on weekly basis ocean observing events from past 10 years at the top of the AOS homepage in honor of AOS 10<sup>th</sup> Anniversary.
- Sponsoring Ocean Short Film Contest with \$1,000 grand prize (submissions due Sept 15 2014).
- Co-sponsored Anchorage Coastal Cleanup in June 2013.
- Partnered with ABSI LCC and AK CSC to present on downscaled climate projections and implications for vulnerability assessment via an Alaska Center for Climate and Policy webinar, December 17.
- Presented at a Harmful Algal Blooms (HABS) conference in Homer, Feb 11.
- Presented OA and HAB monitoring and research at a KBRR workshop on bivalve recovery in the Kachemak Bay and lower Cook Inlet March 11-12.
- Presented at Kodiak Science Symposium in April
- Presented information on community based monitoring to the Local Environmental Observer (LEO) network in February 2014.
- Gave overview to IARPIC funders implementation team on AOS process and activities in February 2014.