Semi-annual Program Performance Report for NA11NOS0120020
FY 2011 Alaska Regional Coastal and Ocean Observing System
For reporting period June 1, 2012 – Nov 30, 2013

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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 members Margaret Williams (World Wildlife Fund) and Robert Raye (Shell Oil).
- AOOS Data Management Advisory Committee met Sept. 20 in Anchorage to review recent progress by the data management team and discuss the 2014 work plan.

2.1.2 Participation in national IOOS activities
- McCammon attended IOOS (Integrated Ocean Observation System) and IOOS Association fall meeting at Scripps in San Diego Nov 5-7. She was elected treasurer of the IOOS Association.
- McCammon participated in meetings of the IOOS Joint Planning Working Group.
- 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 (NOAA) Alaska Regional Integrated Sciences and Assessments Program), member; NOAA's regional collaboration team, member; and Cook Inlet Regional Citizens' Advisory Council.
- McCammon continued to review revisions to the Alaska Regional Climate Assessment Technical Report and Alaska chapter of National Climate Assessment.
- AOOS partnered with Alaska Sea Grant to host sessions of the Alaska Marine Policy Forum on July 17, Sept 18, and Nov 13.
- Planning for the Community Based Monitoring Workshop with the Alaska Sea Grant Program is underway for April 1-2. A steering committee has been selected and draft agenda developed.

2.1.4 Partnerships and external affairs – national & international
- Ellen Tyler participated in a conference in Boulder, Colorado June 17-19 on integration of real-time sensor data to be used for adaptive management and real-time decision support. This workshop was part of the National Science Foundation's EarthCube initiative, which is developing cyber-infrastructure for integrated data management across various disciplines, agencies and end uses.
- McCammon co-chaired the coastal and ocean track at the Pacific Northwest Economic Region summit held in Anchorage July 16-18. Sessions included Alaska and Pacific Northwest experts on such issues as ocean acidification, marine debris, shipping, Arctic issues, and the National Ocean Policy.
- McCammon attended an Ocean Research Advisory Panel (ORAP) meeting in Arlington VA August 21-22.
- McCammon traveled to Reykjavik, Iceland June 10-14 to participate in several Arctic Council working groups addressing ecosystem based management.
- Rob Bochenek and Shane St. Clair from the AOOS data team participated in an IOOS DMAC and product development workshop in Silver Spring Sept 10-12 where they presented progress on an IOOS-funded Sensor Observation Service (SOS) technology development stack, and gave a demonstration on several AOOS data tools.
- McCammon attended a workshop September 10-11 in Minneapolis, hosted by the National Science Foundation, to discuss ways to further polar science by improving cyberinfrastructure tools, capacity and functionality.
- McCammon attended NOAA's OA Principle Investigator meeting held in Silver Spring on September 17. Participants spent a lot of time discussing how to leverage resources between AOOS and the IOOS regional associations.
- McCammon serves on the NAS Gulf Program Advisory Group, and attended meetings on July 24-25 in New Orleans and in Austin November 13-14. She also helped host an Alaska listening session on October 10.
- Ellen Tyler participated in the North Pacific Marine Science Organization (PICES) annual meeting and MONITOR work group meetings in

Nanaimo, B.C. October 11-17 where she delivered a presentation on behalf of AOOS Data Management Committee Chair Phil Mundy on his Chinook Salmon Run Timing Forecast, and attended a day-long workshop on modeling.

2.1.5 Program management, administration, fundraising and financial oversight
- The AOOS annual audit is nearing completion by the Alaska SeaLife Center.
- Proposals submitted:
  - 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. A full proposal was requested.
  - 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.
  - 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.
  - 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.
  - Marine Technology Transfer LOIs with Tom Weingartner and Mark Baumgartner; full proposals requested.
  - Ocean Acidification Technology LOI with NANOOS and other west coast RAs; full proposal requested.
- Draft contract with Alaska SeaLife Center for fiscal sponsorship underway.
- All new subawards completed except for UAF/Weingartner wave measurements in Beaufort Sea. That project delayed until 2014.

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). Cameras at three of the SnoTel locations were replaced.

2.2.2 Pilot AIS dissemination of weather data
- Subaward to Marine Exchange of Alaska (MXAK).
- Final authority received from NOAA/NWS in September to commence transmitting environmental information received from Juneau and Homer AIS/WX sites to vessels over AIS network. Juneau AIS/WX transmitter receives and disseminates environmental data from 5 different weather stations in region.
- Six new weather sensor and reporting stations that presently or will in future

feed into AIS/WX transmitting sites were established during this period (Rocky Island, Point Retreat, Naked Island, Dutch Harbor Port and APL Dock in Dutch Harbor). All data received is shared with National Weather Service, National Data Buoy Center and AOOS, as well as fed to the maritime community via Marine Exchange web site and are accessible via pdas and smartphones.

- U.S. Government Project Sponsorship and Oversight for transmission of weather data over AIS network was shifted to Coast Guard in October 2013. Marine Exchange personnel met with Coast Guard R&D Center in New London, CT. to further develop capabilities and protocols for transmitting environmental and other safety data over AIS network.

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.
- Successfully deployed and maintained 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.
- All data made freely available and posted to NOAA IOOS National HFR Data Server in real-time, as well as on AOOS portal and project websites: www.chukchicurrents.com and http://dm.sfos.uaf.edu/chukchi-beaufort/

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

- Continued to operationally produce 48-hour numerical forecasts for area of interest two times daily (00 UTC and 12 UTC) for each of three model variants STD, MPH and 3KM.
- Continued to add verification sites (SNoTEL) to list and back-calculate statistics.
- Tested old and new variants in new WRF 3.4.1 environments. The two versions of WRF mostly produce quite similar results, in as much as the older parameterizations are supported in WRF 3.4.1.
- With other funding, developing a set of white-papers discussing "best practices" use of WRF-PWS data in Prince William Sound.
- As funding has ended while AOOS modeling strategy being developed, project is winding down with plans for producing at least one manuscript for peer-review.

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 and images, analysis and model output are published at AOOS web site. Model output from all three ROMS domains is ingested into AOOS data server once available.
- Another major accomplishment for past six months is publication of special issue of Continental Shelf Research for 2009 AOOS Prince William Sound Field Experiment. *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
- Yi Chao subaward. 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. Assessment underway.
- Discussions are underway to find a new local point person to service the two Seward stations as the current project lead is transitioning.
- The webcam tower in Kodiak was impacted by recent storm activity. Discussions are underway to establish a local point person to service this station.

2.3.2 Maintain Coastal Data Information Program (CDIP) wave buoy in Cook Inlet
- Buoy was redeployed in May and stopped transmitting in late November. It will be recovered in February in order to fix the unknown problem.

2.3.3 Produce electronic sea ice atlas
- Alaskan ice concentrations depicted in Danish Meteorological Institute Charts (1901-1956) digitized and incorporated into atlas.
- Whaling ship reports from Bering/Chukchi/Beaufort Seas for period 1850-1920 incorporated into atlas using polygon-based approach implemented by subcontractor W. Chapman (U. of Illinois) and V. Underhill (NSIDC).
- Algorithm for weighting different data sources and distributing information over prescribed spatial scales developed for data synthesis.
- User web interface developed and implemented on 1953-2012 prototype of full database, and tested by various UAF partners.
- Presentation on atlas given by J. Walsh at Navy Symposium on an Ice-Diminished Arctic, July 2013, Washington, DC.
- Potential users surveyed in July 2013 for input and feedback on tool design and functionality.
- Ice data already used with downscaled wind information and sea ice output from global climate models to develop a "shiny app", a user application in which frequencies of high-wind events occur (and will occur) without protective sea ice cover at Alaskan coastal locations.

2.3.4 Develop coastal flooding, storm surge and sea level rise products.
- Continued to work on collaborative strategy as follow-up to Western AK Coastal Hazards workshop held in May 2012, with next working group meeting planned for December 2013.
- Deployed wave buoy in Norton Sound using other funds to collect wave data.
- Contracted with ADNR to install short-term tide gauge to NOAA specs in Port Heiden with assistance from DGGS geologists and UAF intern. Gauge was operational over three week period in September 2013 and water level readings streamed in real-time on AOOS website.

- Contracted with ADNR to develop a coastal profile data repository to be housed at DGGS and accessible through AOOS data portal. General approach and layout has been developed.

2.4 Ecosystems/Fisheries and Climate Trends

2.4.1 Maintain Arctic Research Assets Map
- Student intern maintaining map.
- Developing letter of agreement with NSF Arctic Observing Viewer team to ensure minimum overlap.

2.4.2 Support sampling along Seward Line
- Subaward to University of Alaska Fairbanks (UAF). Sept 2013 Cruise successfully executed with all primary stations along Seward Line and within PWS sampled. [Minor "in between" station were not sampled along the Seward Line due to weather.]
- Average temperature in both mixed layer and upper 100m of Seward Line in September were 0.5°C colder than 15-year mean. Zooplankton biomass (as judged by settled volume) was below average for September.

2.4.3 Use AOOS glider for high-latitude observation node in Chukchi & test glider use for monitoring marine mammals
- AOOS glider deployed on July 31 equipped with CTD and Eco Puck. Recovered on Sept 10, with data collection ending on Sept. 2.
- New award to UAF/Woods Hole/University of Washington to test use of acoustic recorder (with an Arctic-specific call library) on glider to track marine mammals. Successfully deployed in Sept in Chukchi Sea on 7-day mission. Picked up mammal noises and industrial activity noise.

2.4.4 Support Distributed Biological Observatory
- Subaward to Unviersity of Alaska Fairbanks (UAF) for NE Chukchi mooring set up 18 October 2013.
- Submitted purchase order for ASL Acoustic Zooplankton and Fish Profiler (AZFP) and Sequoia LISST-100x particle size distribution sensor.
- Made plans for first deployment of mooring in summer 2014.
- Invited to submit NPRB Long-Term Monitoring proposal based on this mooring and AOOS-NPRB-UAF consortium

2.4.5 Maintain ocean acidification (OA) sampling along Seward Lin; support OA sensors on moorings in Chukchi, Gulf of Alaska and Bering Se; conduct OA monitoring at Alutiiq Shellfish Hatchery; and develop OA forecast for Gulf of Alaska.
- Subaward to UAF.
- Conducted September Seward Line cruise with expanded sampling.
- 5 moorings statewide equipped with surface and bottom sensor packages measuring pCO_2, pH, temperature, salinity, nitrate, oxygen, chlorophyll, and turbidity.
- OA monitoring system installed at Alutiiq Pride Shellfish Hatchery in Seward. System is online and monitoring pCO_2, pH, temperature, and salinity in real-time.

- Postdoctoral scientist Samantha Siedlecki has begun working on forecast model for GOA and has obtained existing ROMS coding and biological modules from Ken Coyle and Albert Hermann.

2.4.6 Test use of conductivity sensors at Cordova tide station
- Subaward to PWSSC. Conductivity sensor installed. The data were approved for distribution and is now available through AOOS and CO-OPS.

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 conductivity-temperature-depth (CTD) profiler surveys at mid-Kachemak Bay transect. Completed all monthly sampling plus additional surveys described below. November survey moved to first week of December due to bad weather conditions.
- Conducted seasonal CTD surveys at outer Kachemak Bay transect on 6 June, 19 July and 29 October 2013 (1 extra).
- Leveraged internships with three 2013 NOAA Hollings undergraduate scholars at Kasitsna Bay Laboratory to conduct intensive oceanographic and phytoplankton surveys to provide data on environmental triggers for development of non-toxic and harmful algal bloom species. Completed intensive survey of Kachemak Bay, including sub-bays, in June 2013.

2.5 Regional Ocean and Coastal Partnerships and Planning
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"
- Second round of large scale data ingestion was initiated during the reporting period. Data sets currently being processed include Shell Industry Sea Ice Characterization, NWS Sea Ice Forecasts, NOAA Arctic Shorezone, and ISER socioeconomic data sets in addition to several updates to existing data sets.
- 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 AOOS website, data portal & applications. Maintain & provide access to products developed in this project. Explore developing multi-regional products with other RAs.
- Several AOOS applications converted to HTML 5 mapping framework including Real Time Sensors, North Pacific Seabird Data System and Integrated Ocean Portal framework.
- Providence RI East Coast data center established and built. Portland data center functioning as primary data center. Geo-replication not established yet.

- Next generation HPC storage cluster deployed, tested and functioning in Portland Oregon. Not serving data yet. Mirror HPC storage cluster being configured in Providence.
- EstablishED agreement with CeNCOOS for coordinated cyber infrastructure development and scheduled teleconferences.

2.6.2 *Ingest prioritized datasets, support warehouse and archive functions & provide access through query and mapping tools*
- Next iteration of data ingestion has commenced for STAMP project (ISER, Climate Downscaled Products, Sea Ice Atlas, FEAST model, Arctic Marine Synthesis Update).
- Several data sets funded by AOOS consolidated and reviewed for ingestion, including Seward Line, GAK1 and Ocean Acidification datasets.
- Approximately 75 new sensors added to AOOS data system including stations from Copper Valley Telecom, Alaska Department of Natural Resources, Marine Exchange and Alaska Harbor Association.

2.6.3 *Continue ADF&G (Alaska Department of Fish & Game) partnership*
- 2013 Yukon River Chinook forecast powered by AOOS data feeds with complementary AOOS web reporting page.
- Support of in season management for 2013 Chinook salmon forecast in June.

2.6.4 *Deployed 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*
- Attended IOOS DMAC Annual Meeting and Data Summit in DC in September.
- Attended 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*
- IOOS SOS version 1.0 deployed and made available to RAs.
- NetCDF archive tool also developed and deployed.
- ncSOS and 52 north SOS tool also deployed.

2.6.7 *Develop new products and applications*
- Gulf of Alaska data portal released providing access to GOA datasets (models, sensors and GIS) in addition to project level data from Gulf Watch program.
- Arctic Research Assets Map updated and deployed in July.
- AOOS Arctic Portal deployed in July 2013 to support and showcase data aggregated through STAMP project.

2.6.8 *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*
- Currently supporting programs with Research Workspace application.
- Participating in monthly and other PI meetings as needed.
- Visualized RUSALCA data made available on AOOS portal.
- Gulf Watch Alaska project data exposed through AOOS catalog.

2.6.9 Serve up oil & gas industry data on AOOS portal
- Annex 1 and 2 data submitted to NODC archives.
- Data updates received and processed in August 2013.
- Data being served out through Research Workspace.
- Currently 47 users have requested access to industry-provided datasets.

2.7 Modeling & Analysis
2.7.1 Initiate statewide circulation model exchange & ensemble modeling
- Discussions underway to develop statewide modeling strategy. Planning and organizing modelers workshop at Alaska Marine Science Symposium in January 2014.

2.8 Communication, Education & Outreach
2.8.1 Support COSEE Alaska partnership
- Planning Communicating Ocean Sciences Workshop at AMSS in January.

2.8.2 Support AOOS 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.
- Developed template for ocean observing project pages for AOOS website.
- Contracted with Strategies360 to perform a 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.

2.8.4 Interact with stakeholders and partners
- Meeting of AOOS Beta Testers—AOOS and AXIOM hosted a demo and feedback session on July 11 to discuss options and determine a pathway forward as AOOS develops a new and improved real-time sensor map.
- Sea Ice User Survey – In June, AOOS conducted a Sea Ice Information user survey on behalf of sea ice information providers. The survey collected information on what types of online sea ice products people used, how often, and for what purpose. Results were shared with the providers and the IARPC sea ice team.
- Created and circulated informational flier for Bering Strait wave buoy to help inform potential users of real-time data resources.
- Met with World Wildlife Fund staff based in Norway and DC via webinar on August 14 to demonstrate AOOS Arctic Portal and learn more about WWF's ArkGIS portal. AOOS and WWF will be working to make use of synergies while strengthening the respective portals' objectives.
- AOOS staff and visiting IOOS director Zdenka Willis met with the director of the Alaska Tsunami Center Paul Whitmore on Aug 30 and toured the facility in Palmer to talk about opportunities for collaboration.

- Held virtual meeting with Peter Pulsifer from the NSF program "Exchange for Local Observations and Knowledge of the Arctic" on Sept 5. AOOS presented their Arctic portal and discussed data sharing, interoperability, and displaying traditional knowledge in web-based tools.
- Ellen Tyler presented ocean acidification research and monitoring in Alaska to the Alaska Shellfish Growers Association in Ketchikan on Oct 24.
- Molly McCammon presented on AOOS activities with a focus on ocean acidification and data products to the United Fisherman of Alaska board in Sitka on Oct 25.
- Organized steering committee to develop plans for 2014 AOOS 10th Anniversary events.
- Darcy Dugan conducted a number of presentations with demos to receive feedback on new AOOS Arctic and Gulf of Alaska Portals. Audiences included:
  - Alaska Marine Conservation Council
  - Alaska Dept. of Transportation
  - Alaska Assoc. of Harbor Masters & Port Administrators
  - Bureau of Ocean Energy
  - DEC spill response
  - DNR Division of Mining Land and Water
  - Inuit Circumpolar Council
  - NOAA Auke Bay Lab
  - NOAA headquarters, Juneau
  - North Pacific Fisheries Management Council - Ecosystems Committee
  - R&M Engineering
  - UAA's Institute for Social & Economic Research
  - US Coast Guard, Juneau
  - USFWS/GINA/Alaska Landscape Conservation Cooperatives (LCCs)

3.0 Scope of Work (Priorities for next 6 months, December 1, 2013 – May 30, 2014, and anticipated changes to SOW)

3.1 AOOS Regional Management
3.1.1 AOOS Board and Committees
- Full board meeting planned for Dec 10, 2013. Another slated for March 2014.
- Data Management Advisory group meeting planned for March 14, 2014.
- Complete orientation for new North Pacific Fisheries Management Council representative Duncan Fields.

3.1.2 Participate in national IOOS
- Participate in IOOS regional meetings in Washington DC March 4-6, 2014.
- Review ICOOS Act reauthorization legislation.

3.1.3 Partnerships and external affairs – in Alaska
- Begin planning for Community Based Monitoring Workshop with Alaska Sea Grant Program.

3.1.4 Partnerships and external affairs – national & international

- Participate in NAS Gulf Program Advisory Group meeting in Houston, Texas in February.

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 and wave buoy in CI
- Conduct annual maintenance.
- Fix and re-deploy wave buoy in CI.

3.2.2 Pilot AIS dissemination of weather data
- Conduct site surveys for potential Weather Sensors and/or AIS ATON installations at: Yasha Island, Gustavus, Port of Anchorage and Nikiski.
- Finalize a Partnership Advisory Team comprised of members of the Alaska Maritime Community: Commercial Fishing Community, Pilots Association, AMHS, Tug & Barge Community, and State/Fed Agencies.
- Research Tidal Current Profiling systems for possible integration into system.
- Develop Arctic solutions in conjunction with Cooperative Research and Development Agreement with Coast Guard R&D Center.

3.2.3 Provide public access to HFR data in Chukchi & plan for future HFR
- Winterize long-range High Frequency Radar (HFR) equipment at Point Barrow, Wainwright, Point Lay, and Cape Simpson.
- Discuss with CODAR Ocean Sensors a potential faulty thermal switch mounted on an HF amplifier that may require replacement.
- Complete logistics and permits for 2014 field season.

3.2.4 Maintain WRF wind model for PWS and CI
- Incorporate findings into PWSRCAC white papers, thus making highly technical data (i.e., model results) useful to a variety of users, from fishermen to tanker operators, to highly numerate scientists whose work focuses on Prince William Sound.
- Put all model data in a common format and build useful metadata.

3.2.5 Maintain operational ROMS model for GOA
- Ingest 5-year PWS ROMS retrospective simulation and analysis to AOOS DMAC for further analysis and distribution.
- Move PWS forecast system from JPL's old computer system to new RSS cluster computer in coming year.

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.

3.3 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

3.3.3Produce electronic sea ice atlas
- Hold webinar in December for select users to overview how user input was incorporated into tool.
- Conduct beta testing of atlas between Dec. 14, 2013 and Jan 15, 2014.
- Present poster on project at Alaska Marine Science Symposium in Anchorage, January 20-25, 2014.
- Present atlas as part of Alaska Center for Climate Assessment and Policy webinar series, slated for February 2014.

3.3.4 Develop coastal flooding, storm surge and sea level rise products.
- Conduct working group meeting in December 2013.
- Assess plans for wave buoy in 2014.
- Submit National Geodetic Survey (NGS) OPUS solution of primary tidal benchmark position in Port Heiden for online publication.
- Submit to NOAA CO-OPS for validation and integration into National Geophysical Data Center (NGDC) 1-minute water level data from Port Heiden, Alaska tide gauge.
- Complete beta development, programming, and testing of digital Alaska coastal elevation profile repository.

3.4 Ecosystems/Fisheries and Climate Trends

3.4.1 Maintain Arctic assets map
- Expand to statewide.
- Update 2013 based on "what happened" rather than "what was planned."

3.4.2 Support sampling along Seward Line
- Several manuscripts in preparation for special issue in Deep-Sea Research.
- All data sets up to 2012 at AOOS/Axiom for incorporation into AOOS portal.
- Oral presentations at Alaska Marine Science Symposium & Ocean Sciences meeting in Honolulu planned.
- Next cruise: Early May

3.4.3 Use AOOS glider for high-latitude observation node in Chukchi & continue testing use of gliders for other uses
- Fly AOOS glider using other funding. Further test acoustic recorder/Arctic call library for use in tracking marine mammals.

3.4.4 Support Distributed Biological Observatory
- Take delivery of AZFP and LISST instruments for mooring and learn programming and operation procedures.
- Design and construct mooring floatation package to accommodate AZFP and vane assembly for LISST.
- Prepare for 2014 mooring deployment and submit NPRB LTM proposal.

3.4.5 Maintain OA sampling along Seward Line & OA mooring sensors

- Collect OA measurements on spring Seward Line cruise, Alutiiq Pride Shellfish Hatchery in Seward & 5 moorings.
- Continue processing mooring data in preparation for the Alaska Marine Science Symposium.
- Finish synthesis paper based on six years of data from the Seward Line cruises for submission to the Journal of Geophysical Research.

3.4.6 Test use of conductivity sensors at Cordova tide station
- Provide report describing operation of the conductivity sensor at the tide station along with a recommendation on expansion.

3.4.7 Support mooring array for biological monitoring
- Download data.

3.4.8 Conduct CTD surveys in Kachemak Bay and lower Cook Inlet
- Conduct monthly and seasonal CTD surveys.
- Provide CTD data to CSDL, AOOS and the National Oceanographic Data Center (NODC).

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, including social and economic data, and downscaled climate change projections.
- Hold April 2014 stakeholder workshop demonstrating new tool and discussion of future steps.

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.
- Deploy into production HTML 5 real-time sensor map and integrated mapping portal.
- Develop improved indexing of AOOS data assets so users can search by space, time and taxonomy.
- Deploy AOOS statewide portal and spatial filtering option.

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.
- Extend real time sensor portal to expose sensor archive and SOS backend.

3.6.3 Continue ADF&G partnership
- Continue to support and prepare for next salmon season.

3.6.4 Collaborate with other state, regional, national & international data management programs
- Develop proposals with UAF GINA and ACADIS (Advanced Cooperative Arctic Data and Information Service).

- 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
- Integrate QA/QC into sensor ingestion and storage.
- Develop common client interface.
- Initiate IOOS SOS scalability experiment

3.6.6 Develop new products and applications
- Continue to redevelop Ocean Portal Framework in HTML 5 to enable AOOS applications to run on iPad/iPhone.
- Explore data visualizations for Seward Line, ocean moorings and ocean acidification data.

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.
- Inspect 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 AOOS Research Workspace.
- Attend all PI meetings.

3.6.9 Serve up oil & gas industry data on AOOS 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
- Develop statewide modeling strategy for AOOS, launched with modeling workshop at the Alaska Marine Science Symposium in January 2014.

3.8 Communication, Education & Outreach
3.8.1 Support COSEE Alaska partnership
- Organize and run Communicating Ocean Sciences workshop at the Alaska Marine Science Symposium.

3.8.2 Support AOOS website and publications
- Produce winter 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 AOOS 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 AOOS tools to interested organizations and agencies.
- Develop comprehensive plan for AOOS 10th anniversary with help from steering committee. Begin implementing year-long set of activities.
- Resume 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: Products and Services
7.1 New or improved regional products or services
- GOA Data Portal – Instance of the AOOS Ocean Portal framework which packages real time sensor observations, operational models and GIS data layers into a single mapped based interface for use by the research community in the Gulf of Alaska. Also exposed project level data sets from the EVOS funded Gulfwatch program.
- AOOS Arctic Portal – Instance of the AOOS Ocean Portal framework which showcases Arctic models, remotely sensed datasets and GIS data packaged in a way to assist in facilitating discovery and planning in the Arctic. Expanded to include several new GIS and observational data layers including the Arctic Marine Synthesis.
- Developed search/catalogue interface for AOOS assets.
- Extended number of real time sensors being exposed through the AOOS Real Time Sensor Map.
- AOOS Arctic Assets platform has been extended with several thousand additional sampling effort descriptions for the 2013 summer field season.
- 12 new operational model/remotely sensed data sets have been established as additional real time import to the backend AOOS data system.
- Continued to cultivate a platform (Research Workspace) to support integrated research program. The tool provides a secure collaborative environment for scientists in geographically distributed agencies to share and document datasets.
- Supported access to Arctic Industry Data through the secured research workspace.

7.2 New or improved national products or services
- Further developed the SOS software stack based upon IOOS requirements and published code base for use by all RAs and the national IOOS office.

8.0 Special Report: Data Management

8.1 Progress towards standards-based foundation for DMAC capabilities

- AOOS has contributed heavily towards development of SOS 1.0 suite of specifications in addition to manifesting those specifications into the 52 North SOS Core, ncSOS and other modules of the IOOS SOS stack.
- AOOS has improved its gridded metadata documents exposed through its THREDDS (Thematic Realtime Environmental Distributed Data Services) server.

8.2 Demonstrated progress towards:

8.2.1 Open data sharing

- Developing and implementing the SOS 1.0 spec has greatly improved the ability of AOOS and other RAs to openly share sensor data sets. AOOS data management staff played a key role in authoring the IOOS SOS templates.
- AOOS data archive has increased its data and metadata holdings considerably and improved its user access tools. Larger amounts of data are much more accessible by the general public. AOOS website metrics show increased numbers of users who stay longer on the AOOS web portals.

8.2.2 Provision of data to WMO GTS

- Much of AOOS data is exposed through interoperability protocols and is also available to WMO GTS systems from the source that AOOS acquires it from.

8.2.3 Implementation of a service-oriented architecture

- Interoperability enhancements including load balancing for performance and increased quality of metadata for higher levels of discoverability.

8.2.4 Use of common vocabularies and identifiers

- Cf Conventions have been applied across gridded and sensor metadata. ITIS has been integrated into the Research Workspace to assist with taxonomic association of project metadata.

8.2.5 Improved use of metadata conventions

- Improved ncML and SensorML to be compliant with IOOS best practices.

8.2.6 Data storage and archiving

- Second generation AOOS HPC cluster is fully functioning with ~80 TBs of high performance disk capacity. East coast data center has been built but has not come on line yet for geo-replication.
- Initiated talks with NODC to develop semi-automated data and metadata transfer.

8.3 On-going program-level participation in:

8.3.1 Data management planning and coordination

- Participated in bi-monthly calls when they occur.
- Participate in several ad hoc working groups to strategize on key IOOS efforts such as metadata, SOS and vocabularies.
- Work directly with Derrick Snowden via ad hoc teleconferences assisting in developing IOOS core technical strategies.

8.3.2 IOOS maturity levels and certification standards

- Review and comment on current evolution of these requirements.

9.0 <u>Special Report: Observing Assets</u>

9.1   'Platforms of opportunity' used to support monitoring of ocean acidification
- AOOS funds OA sampling of an existing, ongoing oceanographic time series transect (Seward Line) in the northern Gulf of Alaska two times per year to quantify the physical and biogeochemical controls on OA.
- AOOS contributes funds to a consortium to support maintenance of OA sensors on existing moorings (funded by other programs in Bering Sea, Chukchi Sea, and Resurrection Bay in Gulf of Alaska.

9.2 Current inventory of all regional observing assets
- See updated Attachment A: 2013 RA Inventory for AOOS.