

## Progress Report

Implementation & Development of Alaska Regional Coastal Ocean Observing System  
(AOOS) FY 2021-2025

**Award number:** NA21NOS0120094

**Period of Activity:** July 1, 2021 – December 31, 2021

**Principal Investigator:** Sheyna Wisdom

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### PROGRESS AND ACCOMPLISHMENTS

#### SECTION 1

#### High-Frequency Radars (HFRs)

High Frequency Radars (HFRs)		
Amount	Funding Area	Task
		Sustained operational funding and service delivery.
\$156,000.00	Core	H3012 UAF (Danielson) Arctic HFR
\$115,000.00	Core	H3013 UAF (Danielson) Bering HFR
\$114,286.00	Core	H3060 UAF (Danielson) Cook Inlet HFR
Status: Tasks on track for Arctic and Cook Inlet HFR; Delayed for Bering Strait HFR		
<b>Accomplishments:</b> <ul style="list-style-type: none"><li>- Bering Strait: The Wales Native Corporation granted permission to use their lands in August 2021 to locate a remote power module needed to operate one of the HFR sites.</li><li>Arctic: All three HFR sites were operational during the 2021 open water season.</li><li>- Arctic: All three HFR sites were operational during the 2021 open water season.</li><li>- Cook Inlet: All milestones are on track for 2022 site determination and deployment.</li></ul>		
<b>Issues:</b> <p>High COVID-19 case rates in Alaska, specifically in the Nome census area during 2021, hindered travel to the region, preventing the two Bering Strait HFR sites from being operational. Wales Native Corporation, who owns the land where the Wales remote power site will be located (Bering Strait), is assessing a fee of \$500/month for us to use their lands. A land use fee of this magnitude is unprecedented and was not included in the budget. With UAF F&amp;A costs, it will be \$9,300/year that is not covered in the current budget.</p>		

<b>Names of RA's existing and planned HFR stations</b>	<b>Status</b>	<b>Date of most recent antenna calibration</b>	<b>Date planned for next antenna calibration</b>	<b>Recapitalization needs</b>
SIMP (Simpson)	Operational 7/21 for open water season. Station regularly telemetering data to CORDC. Reactivation in July 2022.	4/2021	7/2022	HFR system (2013) coming to end of service life, replacement (\$150k)
PBRW (Point Barrow)	Operational 7/21 for open water season. Station has been regularly telemetering data to CORDC. Reactivation in July 2022.	4/2021	7/2022	HFR system (2003) end of service life (\$150k); 4 wind turbines for remote power module (\$20K); replacement batteries end of service life (\$35K); CODAR spare parts/components (\$25K)
WAIN (Wainwright)	Operational 7/21 for open water season. Station regularly telemetering data to CORDC. Reactivation in July 2022.	6/2019	7/2022	HFR system (2009) end of service life, replacement (\$150K); 4 Wind Turbines for remote power module (\$20k)
SHSH (Shishmaref)	Not operational in 2021 due to COVID-19 travel restrictions. Reactivation in July 2022.	9/2019	7/2022	Transmit antenna - prone to breakage (\$15K); CODAR spare parts/components (\$25K)
WALE (Wales)	Note operational in 2021. Site not relocated in 2021 due to COVID-19 travel restrictions. Reactivation in July 2022.	9/2019	7/2022	Transmit antenna - prone to breakage (\$15); Receiver antenna (\$20k)
Cook Inlet	Planning to install 2 HFRs in Cook Inlet summer 2022, sites TBD	NA	2022	NA

Names of RA's HFR IT Systems	Status	Recapitalization needs
UAF	Chukchi Sea (Arctic) HFR Data <a href="http://research.cfos.uaf.edu/hfradar/">http://research.cfos.uaf.edu/hfradar/</a> Bering Strait HFR Data <a href="https://research.cfos.uaf.edu/hfradar/bstrait/">https://research.cfos.uaf.edu/hfradar/bstrait/</a> AOS Data Portal <a href="https://portal.aos.org/#module-metadata/de91c282-01e2-11e2-ad19-00219bfe5678">https://portal.aos.org/#module-metadata/de91c282-01e2-11e2-ad19-00219bfe5678</a>	New Central Site Computer for UAF (\$3K)– Computer in Fairbanks that gathers data from all field sites and processes the surface currents that are sent to the IOOS data server and, subsequently, Axiom.

**Gliders and Other Uncrewed Systems (UxS)**

**Summary of glider activities over the reporting period:**

**Ecosystem Approach to Fisheries Management (EAFM) Glider**

**Status:**

All tasks and milestones are Completed or On Track. Original plan to conduct a Seward Line transect in July 2021 was postponed to field test and ready the EAFM glider for the paired winter International Year of the Salmon (IYS) Gulf of Alaska glider survey scheduled for February 2022.

**Accomplishments/Successes:**

Major hardware integration and software development for new fisheries acoustic instrumentation on the glider was achieved and tested during glider sea trials in September and December 2021. The EAFM Glider is now prepared to deploy as part of a paired glider mission (using two gliders) in support of the IYS Gulf of Alaska survey planned for February 2022. One glider will be deployed from R/V *Shimada* and the other will be deployed from Resurrection Bay (with the PIT tag detector, but not the active acoustics).

**Problems/Delays:**

The EAFM Glider (named *Shackleton*) was recently diagnosed with a broken tailfin, which includes the communications antenna. This should be replaced in time for the planned February 2022 IYS Gulf of Alaska survey.

**Other UxS activities of note (status/accomplishments, etc.):**

NA

**Chukchi Glider**

**Status:**

All tasks and milestones are Completed or On Track for University of Alaska Fairbanks (UAF), Oregon State University (OSU), and Woods Hole Oceanographic Institution (WHOI).

**Accomplishments/Successes:**

UAF - The Chukchi (Whale) Glider (named *Loki*) was deployed in the southern Chukchi Sea from the R/V *Norseman II* on July 11, 2021, approximately 100 km north of Wales, AK during Rebecca Woodgate's (University of Washington Applied Physics Laboratory [UW-APL]) Bering Strait cruise. Loki traveled in a

zig zag pattern from the deployment site to a pickup location 5 km from the beach in front of Utqiagvik, AK, and recovered on September 12, 2021. All science and passive acoustics functioned flawlessly during the deployment. Hydrographic data from the glider were displayed in real time on the AOOS data portal at: <https://portal.aos.org/#platform/d1373baa-68a2-50c5-8607-82e88225bb58/v2>, which is a new AOOS glider data reporting capability developed as part of the EAFM and IYS Glider projects.

OSU, WHOI - Real-time data and platform diagnostics were presented on the WHOI Website: Robots4Whales: [http://dcs.who.edu/chukchi0721/chukchi0721\\_unit\\_595.shtml](http://dcs.who.edu/chukchi0721/chukchi0721_unit_595.shtml) for the July - September 2021 Chukchi Glider deployment. Scientific abstracts on the results of the Chukchi Whale Glider program have been submitted to both the 2022 Alaska Marine Science Symposium and the American Geophysical Union's Ocean Sciences Meeting 2022.

**Problems/Delays:**

NA

**Other UxS activities of note (status/accomplishments, etc.):**

NA

**IYS Glider**

**Status:**

All tasks and milestones are Completed or On Track for UAF, UW, and Axiom Data Science (Axiom).

**Accomplishments/Successes:**

UAF, UW - Additional glider field trials were completed in Seward-Resurrection Bay during December 2021. The glider is now ready for scheduled deployment in February 2022 onboard the R/V *Shimada*. Axiom - An Ecometrics Dashboard prototype was presented to the glider PIs at UAF and UW for feedback in December 2021, and the Beta product version will be implemented during the February 2022 IYS paired glider deployment. Data streams include glider trajectory, current conditions, ocean parameter time series, and comparison of current conditions to World Ocean Atlas climatology across the profiles, to be reported through the dashboard in real time to the project website and the AOOS Data Portal.

**Problems/delays:**

NA

**Other UxS activities of note (status/accomplishments, etc.):**

NA

**Other Core Observation Activities**

**Summary of other Observation Activities over the reporting period:**

- **Ecosystem Moorings:** AOOS funds the support of four ecosystem moorings in Alaska (Chukchi Sea Ecosystem Observatory [CEO], Gulf of Alaska Ecosystem Observatory [GEO], and M2 & M8 in the Bering Sea. The CEO was deployed in fall 2021 (after a delay from COVID-19), fabrication for the 2022 deployment is underway. The GEO was deployed in July 2021; fabrication for the 2022 deployment is underway. New equipment for M8 was planned for 2021, but the cruise was delayed; the 2022 cruise is scheduled for September 2022. All tasks on track.
- **Wave Buoys:** AOOS currently one wave buoy operating in lower Cook Inlet. The Nome wave buoy was not deployed in the summer of 2021, but will be deployed in summer 2022. We also have plans to deploy a wave buoy in Bristol Bay in summer 2022. All tasks on track.

- **Passive Acoustic Monitoring:** Turnaround of annual moorings was delayed until November 2021. Data are being analyzed. Preparation for fall 2022 cruise underway.
- **Ship-based Surveys:** AOOS funds several ship-based surveys in Alaska including the Seward Line, Kenai Fjords OTN, Lower Cook Inlet.
  - Seward Line: The 2021 survey was completed in September; the 2022 survey is planned for summer 2022. All tasks on track.
  - Kenai Fjords OTN: Acoustic receiver has been ordered, plan to test from small boat in summer 2022. Tasks on track.
  - Lower Cook Inlet Observing: Surveys were conducted in 2021 and planned for 2022.
- **Shore-based Surveys:** AOOS funds the support of shore-based projects across Alaska:
  - Coastal Hazards/Alaska Water Level Watch: Discussion at the 2021 Alaska Coastal & Ocean Mapping Summit in December 2021; update AWLW website; continue to update data to portal; install water level sensors in Alaska (plans to install in Kivalina, deering, Kotzebue, Whittier but were not because of COVID-19 and the delay of funding).
  - Water Level Installations: A site visit was conducted at Naknek in October 2021 - the GNSS data were submitted to OPUS. A site visit to the Dillingham station will take place in February 2022.
  - AIS Weather Stations: Updates or installations of new sensors at sites are planned for spring/summer 2022 due to COVID-19 restrictions in 2021.
  - PWS Weather & Fish Monitoring: Service of Snotel stations were completed in fall 2021. The conductivity sensor at the Cordova Tide station was maintained in fall/winter 2021. Plans for the winter acoustic array maintenance cruise are underway.
  - Valdez NWLON CTD: equipment has not yet been ordered because of delays in receiving DUNs number from SAM for award acceptance.
- **Data:**
  - The Sea Ice Atlas project is on track; the NSIDC sea ice concentration data were updated in November 2021 and new version of online visualization was updated in December 2021.
  - Work has not yet started on the Indigenous Sentinel Network due to delays with prime award with NPRB.
- **Water Quality:**
  - Seward Burke-o-Lator: Water samples collected at sites in Utqiagvik, Kotzebue, and Nome and shipped to AMPI by fall 2021. Samples are now being QA/QCed.
  - Sitka Burke-o-Lator: Two operators were sent to OSU for training; new supplies ordered. Additional training planned for February 2022.
  - Kodiak Burke-o-Lator: Data were collected at sites in Kodiak. Project on track.
  - OA Time Series: Samples from the 2021 NGA-LTER at the GAK1 site have been analyzed. The finalization of these data is underway. The GAKOA surface moorings will be turned around in March 2022. The surface moorings for M2 & M8 are planned for turnaround in early 2022. Project is on track.
  - OA ferry: No work has been completed on this project, the ferry is scheduled to begin sailing May 2022.

**Accomplishments/Successes:**

Shipboard cruises for moorings and other observation data were accomplished in summer/fall 2021, but some of the shore-based projects that required travel to communities were delayed due to COVID-19. Plans for 2022 are underway!!

**Problems/Delays:**

**Moorings:** A single CEO (Chukchi Sea Ecosystem Observatory) mooring was deployed in November 2021, but the CEO Tripod and eDNA sampler were not deployed in 2021. The October 2021 scheduled cruise was delayed due to pandemic-related issues in which the NOAA charter was cancelled at Dutch Harbor. A last-minute replacement cruise on R/V Sikuliaq allowed for deployment of only a single refurbished mooring, as we were unable to fly the Tripod and eDNA sampler out of Dutch Harbor to meet the R/V Sikuliaq due to their physical sizes. Plans are now to deploy the Tripod and the eDNA sampler at CEO in 2022

**Alaska Water Level Watch:** Travel was delayed because of COVID-19 and the funding not being received until August 2021 (too late in season).

**Administrative:** The greatest challenge we’ve had this year is getting the descope budget, budget narrative, and project work plan approved by the IOOS Program Office and Grants Management Division (GMD). We understand both offices are working to make information received/reported among all of the Regional Associations (RAs) consistent and useful for the overall program; however, we have all received mixed messages and inconsistent reporting requirements. This has resulted in not yet receiving an approved award from NOAA by this date (end of January 2022) for an award that started in July 2021. Fortunately, we have been able to provide our subawards with agreements and funding to be able to accomplish the work.

It is also important to note that as NOAA/IOOS starts to be more actively involved in citizen science and community-led data collection (particularly Indigenous-led research), we need to revise the thinking on how we value their time and information. We currently do not have a mechanism for sharing food easily; which is an integral aspect of cultural sharing. We also do not have an easy method to pay people for their time or knowledge; most individuals in small communities, particularly remote communities, have no means to obtain all the necessary documentation to be a subawardee. It is becoming increasingly challenging to practice effective engagement with indigenous communities with all of the Federal funding limitations.

**SECTION 2**

IOOS, NOAA, Other Agency Funding		
Funding amount spent	Funding Area /Recipient	Task
Provided \$30,000	Axiom	<p><b>HFR - Products &amp; Data Management - Operationalize HFR Range Series file archiving through Research Workspace (in accordance with direction of IOOS Surface Currents Program Manager)</b></p> <p>Status: All tasks on track or not yet started.</p>

		Accomplishment: Axiom increased storage capacity of the data center to 60 TB and pilot website was created. Issue: No issues.
Provided \$270,000	HABs	<b>To further HABS understanding and prediction via a pilot project to "Continue the support of a full-time AHAB coordinator ..."</b> Status: All tasks on track. Accomplishment: Grew the AHAB network, continued monthly update meetings, coordinated sampling and research efforts, developed pilot community sampling program for HABs, performed outreach and engagement activities, began process of updating AHAB data portal Issue: No travel yet due to covid, potential travel in spring/summer 2022
Provided \$29,033	Axiom	<b>Marine Biodiversity Observation Network (MBON) - \$25,000 to support the MBON portal and \$4,033 to support unifying MBON-Animal Telemetry Network</b> Status: All tasks on track. Accomplishment: Five datasets ingested; four AMBON datasets formatted based on feedback; updates made by IOOS Matt Biddle; prototype for overlaying animals movement developed; and enhancements to metadata displayed. Issue: No issues.
Provided \$80,000	Axiom	<b>Maintain and enhance Data Access Service Software - ERDDAP</b> Status: All tasks on track. Accomplishments: RoadMap created in FY19; project brief prepared for IOOS Director in August 2021; Version 1.2 of metadata profile updated; Best Practices and Examples prepared; data ingesting monitoring dashboard created; improved user documentation (Metadata Profile, QARTOD guidelines, configuration); and created a staging version of the IOOS sensor map to test data ingestion process. Issue: No issues.
Provided \$50,000	Axiom	<b>Environmental Sensor Map and Global Data Integration</b> Status: All tasks on track. Accomplishment: Road map created for portal release schedule and plan for QC of sensor data, bi-monthly meetings with IOOS program office; enhancements to ESM; continued ingestion of real-time stations (45,000+ stations). Issue: No issues.
Provided \$3,000	Axiom	<b>Trello Subscription</b> Status: On track. Accomplishment: Operation of Trello Board for IOOS Program Office

		collaboration. Issue: No issues.
Provided \$50,000	Axiom	<b>Support for MBON data portal, FY21 SOW (unifying MBON-ATN)</b> Status: All tasks on track. Accomplishment: Five datasets ingested; four AMBON datasets formatted based on feedback; updates made by IOOS Matt Biddle; prototype for overlaying animals movement developed; and enhancements to metadata displayed. Issue: No issues.
Provided \$95,000	Axiom	<b>NOAA National Weather Service to support the Freezing Spray project - engage with the marine community while collecting data of appropriate quality to provide meaningful input into modifying or developing a new Freezing Spray Algorithm</b> Status: Not yet started. Accomplishment: None Issue: No issues.
Provided \$10,000	Axiom	<b>NOAA Alaska Regional Collaboration Team to support the Cook Inlet Operational Forecast System model validation and application development</b> Status: All tasks on track. Accomplishment: Receipt and ingestion of 27 TB of data from BOEM for 10-year hindcast model; steps taken to visualize 3D model output (codebase, interpolation, re-gridding); and design of web-based particle trajectory tool. Issue: No issues.
Provided \$75,000	Axiom	<b>OR&amp;R support for Axiom developer to improve GOODS and help with EDS THREDDS testing</b> Status: One task on track; one track not yet started. Accomplishment: Monthly meetings with ORR to scope requirements; demonstration of Python prototype to ORR in Dec 2021. Issue: No issues.
Provided \$20,000	AOOS	<b>NOAA National Centers for Coastal Ocean Science (NCCOS) funds to AOOS for HAB tools support</b> Status: On track Accomplishment: Axiom met with project partners, on scoping and technical specifications. Attempted to ingest hd5 files sent by NCCOS. Issue: minor issue with file type compatibility between NCCOS and Axiom; in the process of being resolved
Provided \$192,041	AOOS	<b>"Office of Marine and Aviation Operations (OMAO) support for glider operations/UxS Project"</b>



		<p>Status: All tasks and milestones are On Track for UAF, UW and Axiom</p> <p>Accomplishment: UAF, UW: Additional glider field trials were completed in Seward-Resurrection Bay during December 2021. The glider is now ready for scheduled deployment alongside the EAFM glider in February 2022 onboard the R/V Shimada. Axiom Data Science: An Ecometrics Dashboard prototype was presented to the glider PIs at UAF and UW for feedback in December 2021, and the beta version will be implemented during the February 2022 IYS glider deployment. Data streams for glider trajectory, current conditions, ocean parameter time series, and comparison of current conditions to World Ocean Atlas climatology across the profiles will be reported through the dashboard in real time to the project website and the AOOS Data Portal.</p> <p>Issue: UAF, UW, Axiom: No issues to report during this period.</p>
Provided \$244,444	Regional Ocean Partnership	<p><b>Regional Ocean Data Sharing Initiative</b></p> <p>Status: On track</p> <p>Accomplishment: Chukchi data rescue is in progress, held meetings with Community Advisory Panel and scientists to plan Bering Science Report, initiated work on two new data products with Axiom.</p> <p>Issue: no travel due to covid preventing full stakeholder engagement in Western Alaska</p>
Provided \$85,000	Ocean Acidification	<p><b>OAP allotment of FY21 project resources in support of the NOAA Ocean Acidification Observing Network (NOA-ON) GAKAO (PI Monacci, University of Alaska at Fairbanks)</b></p> <p>Status: Project on track</p> <p>Accomplishment: moorings are working and reporting</p> <p>Issue: Recovery of M2 was delayed as vessel cruise was cancelled due to covid. Vessel will be chartered in Jan or Feb 2022.</p>
Provided \$30,000	Ocean Acidification	<p><b>OAP allotment of FY21 project resources in support of the Alaska Ocean Acidification Network (PI Dugan, AOOS)</b></p> <p>Status: on track</p> <p>Accomplishments: held committee and researcher meetings, organized discussion series, developed pages for new website</p> <p>Issue: none</p>
Provided \$3,858	Ocean Acidification	<p><b>OAP allotment of FY21 project resources in support of Thresholds in a changing ocean environment: bioeconomic implications to inform decisions for Alaska's salmon fisheries (PI Dugan, AOOS)</b></p> <p>Status: no travel due to covid</p> <p>Accomplishments: working with project team on outreach</p> <p>Issue: no travel due to covid</p>

## Project Milestones

<b>MILESTONES &amp; DELIVERABLES</b>	<b>Complete</b>	<b>On-Track</b>	<b>Delayed</b>
<b>REGIONAL GOVERNANCE &amp; MANAGEMENT</b>			
Two (2) or more Board meetings held per year		X	
Semi-annual reports submitted on time (January 31, 2022 and July 31, 2022)		X	
Financial reports submitted on time		X	
Annual audit conducted		X	
<b>STATEWIDE ENGAGEMENT, EDUCATION, &amp; OUTREACH</b>			
Outreach and engagement activities conducted, including those with ASG		X	
Bi-monthly Alaska Marine Policy Forums held		X	
DEI and workforce initiatives tracked with AOOS participation		X	
<b>STATEWIDE DATA MANAGEMENT &amp; CYBERINFRASTRUCTURE</b>			
AOOS DAC, ODE, datasets, and website supported		X	
Staff collaborate with State, regional, national, and international data management initiatives, including follow up on recommendations from statewide data capacity assessment completed with prior funding		X	
HFR data access and usability increased		X	
IOOS RAs' ability to use ERDDAP increased		X	
ESM updated		X	
MBON and ATN datasets ingested into MBON data portal		X	
GOODS application updated using EDS THREDDS		X	
<b>STATEWIDE MODELING ANALYSIS, PRODUCTS, &amp; SERVICES</b>			
Ongoing support provided for existing models and products		X	
New products and services developed		X	
Iteration of climate signal dashboard/State of Alaska's Coasts and Oceans Report developed		X	
Alaska Modeling Testbed used		X	
RODSI annual work plan supported		X	
Statewide data management capacity assessment report developed		X	
Plan for upcoming pan-regional products developed		X	
<b>MARINE OPERATIONS</b>			
<b>Engagement Activities</b>			
Briefings to maritime stakeholders and organizations.		X	
<b>Observational Assets &amp; Activities</b>			
<i>1. PWSSC (Pegau) Weather &amp; Fish Monitoring</i>			
Eight (8) real time SNOTEL stations operating, maintaining, and providing real time data to the AOOS data portal		X	

<b>2. MXAK (Mauldin) AIS &amp; Harbor Safety</b>			
Ongoing maintenance provided for existing AIS weather stations		X	
New stations and sensors installed		X	
<b>3. Provide logistical and contractual staff support to help operate and maintain three existing Coastal Data Information Program (CDIP) wave buoys</b>			
Two (2) existing wave buoys operated and maintained on an ongoing basis		X	
One (1) new wave buoy in Bristol Bay installed, operated, and maintained		X	
Acoustic releases, antennas, and other mooring hardware purchased for wave buoys		X	
Contract(s) for regional buoy support scoped		X	
<b>4. UAF (Danielson) Arctic HFR, UAF (Danielson) Bering Strait HFR, and UAF (Danielson) Cook Inlet HFR</b>			
Chukchi and Beaufort Seas HFRs operated for open water seasons		X	
Two (2) Bering Strait HFRs operated for open water seasons. Third site in Bering identified and permitting begun		X	
Two (2) Cook Inlet HFR sites identified, permits obtained, and initial trial operations begun		X	
<b>Products &amp; Services</b>			
<b>1. MXAK (Mauldin) AIS &amp; Harbor Safety and Axiom (Bochenek) Core DMAC</b>			
Annual Arctic AIS updates provided for inclusion on the AIS Prioritizing Arctic Charting (PAC) and AOOS data portals		X	
<b>2. Axiom (Bochenek) Core DMAC: webcam network</b>			
Webcams operated and imagery available on AOOS data portal		X	
<b>3. Axiom (Bochenek) Core DMAC: shorezone</b>			
Shorezone updates available on AOOS data portal		X	
<b>4. Axiom (Bochenek) CIOFS and additional external funding from NOAA National Centers for Coastal Ocean Science (NCCOS) and CIRCAC</b>			
Progress made on development of new decision tools		X	
<b>5. Axiom (Bochenek) Core DMAC and Axiom (Bochenek) RODSI Portal &amp; Data Products</b>			
Develop mariners dashboard - decide on phone app or web-based		X	
Prototype developed		X	
<b>6. Axiom (Bochenek) RODSI Portal &amp; Data Products: Bering Strait Response Tool</b>			
Phase I of prototype Bering Strait Transboundary Incident Response tool developed and reviewed by stakeholders		X	
<b>7. Axiom (Bochenek) Freezing Spray</b>			
Environmental and ice observations gathered for model validation		X	
Prototype sea state reporting system developed		X	
<b>COASTAL HAZARDS</b>			
<b>Engagement Activities</b>			
Ongoing engagement activities with AK Water Level Watch, AK Coastal Mapping Initiative & others		X	

Observational Assets & Activities			
<i>1. ADNR (Overbeck) Coastal Hazard Projects</i>			
Coordinate AK Water Level Watch activities		X	
Operate and maintain community flood staffs, and up to nine (9) iGage and two (2) webcam coastal-change monitoring sites		X	
Monitor operation and maintenance of two (2) Hydroballs (purchased in prior years) for nearshore bathymetry surveys and report on survey progress		X	
<i>2. JOA (Wardwell) Water Level Tech</i>			
Subaward implemented for as-needed operations and maintenance of water level stations listed above		X	
Data handling and quality control for Naknek and Dillingham station data, providing data for display on the AOOS hosted AWLW data portal		X	
Products & Services			
<i>1. UAF (Walsh) Sea Ice Atlas</i>			
Annual upgrade to atlas		X	
<i>2. Axiom (Bochenek) Core DMAC: Arctic AIS database</i>			
Annual update to Arctic AIS database		X	
<i>3. Axiom (Bochenek) Core DMAC: AWLW data portal</i>			
Ongoing operation and maintenance of AWLW data portal, including adding new station data pages and updating functionality as needed		X	

<i>4. Axiom (Bochenek) CIOFS and NOAA (Holderied) Lower CI Observing</i>			
Make progress on development and presentation of Cook Inlet decision support tools for inclusion in the AOOS data system		X	
<i>5. ADNDR (Overbeck) Coastal Hazards Project and Axiom (Bochenek) Core DMAC: Hydroball data</i>			
Monitor display and use of Hydroball data		X	
<b>ECOSYSTEMS, FISHERIES, &amp; CLIMATE TRENDS</b>			
<b>Engagement Activities</b>			
Engage with program partners to support their efforts in responding to rapidly changing marine ecosystem		X	
<b>Observational Assets &amp; Activities -</b>			
<i>Focus Area 1. Sustain Long ecosystem time series</i>			
<i>1. UAF (Hopcroft) Seward Line</i>			
Three (3) successful cruises conducted		X	
<i>2. NOAA (Holderied) Lower CI Observing</i>			
Monthly and quarterly cruises conducted		X	
<i>3. UAF (Danielson) Chukchi Glider, Woods Hole Oceanographic Institute (WHOI; Baumgartner) Chukchi Glider, and Oregon State University (OSU; Stafford) Chukchi Glider</i>			
Annual survey conducted and days at sea reported		X	
<i>4. UAF (Danielson) EAFM Gliders</i>			
Fall and winter glider surveys conducted in the GOA and days at sea reported		X	
Real time data dashboard developed and operational		X	
<i>5. UAF (Danielson) OMAO Glider, Axiom (Bochenek) OMAO Glider, and University of Washington (UW; Horne) OMAO Glider</i>			
Successful glider survey conducted in winter 2022 in GOA and days at sea reported		X	
Near real time eco-metrics dashboard developed		X	
<i>6. PWSSC (Pegau) Weather &amp; Fish Monitoring and PWSRCAC (Sorum) Valdez NWLON CTD</i>			
Ongoing operational support for CTD in Cordova		X	
Purchase and deployment of new CTD in Valdez		X	
<i>Focus Area 2. Support ecosystem mooring build-out plan by enhancing existing or new moorings</i>			
<i>7. UAF (Danielson) Eco-Moorings and NOAA (Stabeno) M2 &amp; M8 Moorings</i>			
Purchase new equipment for GEO and CEO moorings, including second benthic camera as part of AMBON		X	
Purchase nutrient sensors for Bering Sea moorings		X	
Support field logistics, operations and maintenance of in-use instrumentation at GEO and CEO		X	

<i>Focus Area 3. Support sound and acoustic moorings to begin build-out of an ocean soundscape</i>			
<i>8. PWSSC (Pegau) Weather &amp; Fish Monitoring</i>			
Service 6 acoustic arrays ins PWS Ocean Tracking Network and provide access to data		X	
<i>9. WTF (Horning) Kenai Fjords OTN</i>			
Install and maintain new acoustic tracking receivers in Kenair Fjords as part of OTN		X	
<i>10. NOAA (Berchok) DBO &amp; M2RW Soundscapes</i>			
Contribute to support for mid-frequency species and noise data analysis from raw PAM data from 2020-21 DBO and M2 mooring deployments		X	
<i>Focus Area 4: Support for community-based ecosystem observations</i>			
<i>11. CTDs for ASG Troller Study</i>			
Equipment purchased for fishing vessels once project receives external funding		X	
<i>12. UW (Parrish) Coastal Seabird Surveys</i>			
In-person and virtual trainings for COASST Alaska community observing participants		X	
Ongoing annual data and metadata ingestion into historical COASST database in AOOS data portal		X	
<i>13. ACSP (Divine) Indigenous-led Monitoring</i>			
Axiom to provide technical data management advice to Indigenous Sentinels Network			
<b>Products &amp; Services</b>			
<i>1. UAF (Mueter) Chukchi Data Rescue, Axiom (Bochenek) RODSI Portal &amp; Data Products</i>			
Trawl data and metadata ingested and made available on AOOS data portal		X	
<i>2. Axiom (Bochenek) Core DMAC: Yukon River Chinook salmon run timing forecast</i>			
AnnualYukon River Chinook salmon run timing forecast made available on the AOOS data system		X	
<i>3. Axiom (Bochenek) RODSI Portal &amp; Data Products: Beluga portal</i>			
Update and enhance Cook Inlet Beluga Ecosystem portal		X	
<i>4. Axiom (Bochenek) RODSI Portal &amp; Data Products: Permitting Portal</i>			
Datasets identified and gathered, and prototype Permitting Portal developed		X	
<i>5. Axiom (Bochenek) RODSI Portal &amp; Data Products: American the Beautiful</i>			
Relevant datasets Identified, gathered, and ingested into AOOS data portal for display of existing protected Alaska waters		X	
<i>6. Host ATN Data Center (funded externally by IOOS and ONR)</i>			
Visualizations of Alaska tagged animals included in AOOS data portal		X	
<i>7. Axiom (Bochenek) Core DMAC: COASST data</i>			
Annual update to data products		X	
<i>8. UAF (Walsh) Bering Sea Science Report</i>			
2-3 Bering Sea Science Reports developed		X	

<i>9. Axiom (Bochenek) RODSI Portal &amp; Data Products: Bering Region Portal</i>			
Updated Bering Region Data Integration Portal		X	
<b>WATER QUALITY</b>			
Engagement Activities			
1. Ongoing OA network support and outreach activities		X	
2. Ongoing AHAB support, outreach activities, and development of Action Plan		X	
OA Observational Assets and Activities and Products and Services			
<i>1. UAF (Monacci) OA Mooring Time Series</i>			
Monthly water samples collected at GAKOA and GAK01		X	
Annual platform and sensors turned around at GAKOA and GAK01		X	
Spring and fall platform and sensors turned around at Bering Sea M2		X	
<i>2. UAF (Monacci) M2 &amp; GAK Moorings</i>			
Annual platform and sensors turned around at GAKOA and GAK01		X	
Spring and fall platform and sensors turned around at Bering Sea M2		X	
Data processed and ingested into IOOS Partners Across Coasts Ocean Acidification (IPACOA) and AOOS data portals		X	
<i>3. APMI (Hetrick) Seward Burke-o-Lator, NOAA (Long) Kodiak Burke-o-Lator, SEATOR (Whitehead) Sitka Burke-o-Lator</i>			
Continuous Burke-o-Lator data collected and uploaded to the IPACOA and AOOS data portals		X	
Analysis of discrete community samples at the Seward Burke-o-lator		X	
<i>4. UW (Mordy) OA Ferry</i>			
Annual servicing of onboard OA instrumentation on Columbia		X	
<i>5. Support entry of priority OA data into the AOOS data portal</i>			
Annual OA State of Science Updates and annual IEA summary		X	
HAB Observing Assets and Activities and Products and Services			
<i>1. Develop pilot community HAB sampling program</i>			
Samples collected from three (3) communities and increased lab capacity in at least two (2) regional/local labs		X	
<i>2. ACF (Poe) Community Samplers</i>			
Process for direct individual payment tool developed and proof of system viability		X	
<i>3. Test use of HABscopes and domoic acid (DA) field test kits</i>			
DA kits distributed to five (5) communities (including Bering Strait region and North Slope communities)		X	
Ten (10) HABscopes purchased and distributed to communities and beginning development of algorithm for Alaska species detection		X	
<i>4. Axiom (Bochenek) AHAB Portal, Axiom (Bochenek) SST model, and Axiom (Bochenek) Core DMAC</i>			
AHAB data portal supported and data entry submission tool developed		X	
HAB risk product developed		X	

5. Axiom (Bochenek) RODSI Portal & Data Products, Axiom (Bochenek) AHAB Portal, and Axiom (Bochenek) Core DMAC: mariculture siting tool			
Regular updates to mariculture siting tool		X	

### **Project Challenges/Modifications**

- Delay of receiving the final descope award has delayed our ability to move forward with many other tasks because of the back and forth. However, we recognize the need to be more consistent across RAs and are pleased to be part of the method to revise the process.
- Travel restrictions and prevalence of virtual conferences continues to hamper our ability to engage effectively with our stakeholders.

### **Publications**

- Nothing to report in this reporting period.

### **Education, Media Engagement, and Outreach Materials**

- Due to delays in the FY21 descope approval process there are no items to report for this period.

### **Product Delivery**

- No products developed during this time. Because we have a new Executive Director, we have focused on getting her up to speed with all the current products before adding new ones.

### **Certification Updates**

- No changes to certification website, no changes to employees, and no changes to bylaws this reporting period.

### **Budget Summary**

- The oldest ASAP TAS BETC accounting lines are always drawn first unless otherwise directed.
- Project invoicing was delayed due to delays in the descope approval process.
- AOOS does not have asset purchases to report at this time.
- There were no changes in key scientific, technical or management personnel, not included in certification.
- There were no changes to the AOOS organizational structure.
- There was no travel to report at this time.
- There are no plans to initiate a new partnership (contract or subaward) during the next reporting period.



<b>Budget Summary</b>				
<b>Cost Categories</b>	<b>Funding Provided</b>	<b>Funds Spent</b>	<b>Unspent funds remaining</b>	<b>Remaining %</b>
<b>Personnel</b>	513,858	-	513,858	100%
<b>Fringe</b>	143,880	-	143,880	100%
<b>Travel</b>	41,321	-	41,321	100%
<b>Equipment</b>	49,500		49,500	100%
<b>Supplies</b>	47,493	-	47,493	100%
<b>Contractual</b>	713,111	272,216	440,895	62%
<b>Other</b>	2,581,849	187,585	2,394,264	93%
<b>Total Direct Charges</b>	<b>4,091,012</b>	<b>459,801</b>	<b>3,631,211</b>	<b>89%</b>