

## IMPLEMENTATION & DEVELOPMENT OF ALASKA REGIONAL COASTAL OCEAN OBSERVING SYSTEM (AOOS): Year 2 Non-Core Work Plan

### **A. Governance and Management**

**NOTE:** *Governance and Management is covered in the Year 2 Core Work Plan.*

### **B. Statewide Engagement, Education, and Outreach**

**NOTE:** Many activities included in Engagement, Education, and Outreach are covered in the Year 2 Core Work Plan

**Goals:** To increase awareness of ocean and coastal issues in Alaska and partner agency missions, and to engage with stakeholders and respond to their needs for ocean and coastal observations and information products.

**Objectives:** AOOS will (1) facilitate stakeholder engagement and outreach activities and products, including with Alaska Sea Grant (ASG) and IOOS Outreach Committee and (2) seek to expand Diversity, Equity, and Inclusion (DEI) and use of local workforces.

**Activities:**

1. Hire Engagement and Outreach personnel using Harmful Algal Bloom (HAB), Regional Ocean Partnership (ROP), and the one-time add on for Regional Association (RA) funding lines.
2. Support AOOS website, Facebook, and publications.
3. Engage regularly with stakeholders.
3. Participate in IOOS Outreach Committee.
4. Partner with marine education and outreach partners to support education and curriculum materials.
5. Collaborate on workforce development initiatives with other IOOS regions, IOOS Program Office, and IOOS Association.
6. Support AOOS and IOOS Association/IOOS Program Office DEI initiatives.

**Milestones:**

- Hire new personnel.
- Create Outreach & Engagement Plan.
- Outreach and engagement activities conducted.
- DEI and workforce initiatives tracked with AOOS participation.

### **C. Statewide Data Management and Cyberinfrastructure**

**Goal:** To serve as the federally certified Alaska regional data assembly center and provide broad access to Alaska coastal and ocean data.

**Objectives:** AOOS' data contractor (Axiom Data Science) will (1) provide technical support for the AOOS cyberinfrastructure, data portals, and ingested data streams; (2) support the AOOS website and other programmatic websites; (3) collaborate with other regional, national, and international data initiatives; and (4) provide data management services to IOOS Program and other NOAA programs.

**Activities:**

1. Collaborate with other state, regional, national, and international data management activities.
2. Provide technical data support for national High Frequency Radar (HFR) network – *Axiom (Bochenek) HFR Range Series*.

3. Complete implementation of IOOS Regional Association use of ERDDAP as data source for Environmental Sensor Map (ESM) and maintain and enhance ESM, including for global data integration – *Axiom (Bochenek) ERDDAP & ESM.*

**Milestones:**

- AOOS DAC, ODE, datasets, and website supported.
- 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.
- HFR data access and usability increased.
- IOOS RAs increased ability to use ERDDAP.
- ESM updated.

**Metrics:**

- Product Usage Statistics - Monthly summaries of usage statistics for the data portal, website, and products (number of sessions, page views, etc.) using Google Analytics to be included in semi-annual reports.

**D. Statewide Modeling Analysis, Products, and Services**

**Goal:** To increase the utility of Alaska ocean and coastal observation data for user products, models and forecasts, and decision support tools.

**Objectives:** AOOS will (1) support and enhance existing models and data products; (2) develop new products and services; (3) serve as a modeling testbed; and (4) support regional ocean data sharing Initiatives (RODSI) using national ocean partnership program funding.

**Activities:**

1. Initiate new data products and applications, some of which are described under thematic products and services –*Axiom (Bochenek) ROP Data & Products.*
2. Expand the Alaska Modeling Testbed, especially for Cook Inlet Operational Forecast System (CIOFS) – *Axiom (Bochenek) CIOFS.*
3. Support RODSIs, including statewide data management capacity assessment.
4. Advance the coupling of the Global Extratropical Storm and Tide Operational Forecast System (Global ESTOFS) to the National Water Model (NWM) – *University of Notre Dame (Westerink) NWM Coupling.*

**Milestones:**

- New products and services developed.
- Alaska Modeling Testbed used.
- RODSI annual work plan supported.
- Quasi-operational University of Notre Dame (UND) shadow model implementation of Global ESTOFS v3.0 to NWM coupling

**E. Marine Operations**

**Five Year Goal:** To improve safety at sea for maritime, aviation and coastal operators, and emergency responders using real time data, information products, and decision support tools.

**Objectives:** AOOS will: (1) sustain existing assets and increase new weather and sea-state observations; (2) promote new observations to improve regional forecasts; and (3) share data and products through the AOOS data portals to support related decision support tools.

**Observational Assets and Activities:**

1. Make all University of Alaska Fairbanks (UAF) high-frequency radar equipment (HFR) be compliant with new Federal Communications Commission (FCC) licensing regulations. New licensing requirements state that all HFR sites governed by the laws of the United States need to broadcast within the radio frequency ranges listed in the Code of Federal Regulations (CFR) Part 90.103 – *UAF (Danielson) HFR Operators*.

**Milestones:**

- Retrieve/return/receive/redeploy HFR field equipment that needs modification to be compliant with FCC licensing requirements. This will occur on a schedule yet to be determined by CODAR Ocean Sensors.

**Products and Services:**

1. AOOS contribution to development of new decision support tools using CIOFS and Axiom’s Modeling Testbed – *Axiom (Bochenek) CIOFS* and additional external funding from NOAA National Centers for Coastal Ocean Science (NCCOS) and CIRCAC.

**Milestone:**

- Progress on development of new decision tools.

2. Initiate development of new mariners dashboard or app – in coordination with existing Whale Alert and MXAK – *Axiom (Bochenek) ROP Data & Products*.

**Milestones:**

- Decision on use of phone app or web-based dashboard.
- Prototype developed.

3. Develop Bering Strait Transboundary Incident Response Tool, using both US and Russian data, for planning, response, and restoration in the event of an incident (e.g., oil spills, disabled vessel) in the Bering Strait – Funded externally by World Wildlife Fund (WWF) and National Park Service (NPS) with RODSI support - *Axiom (Bochenek) ROP Data & Products*.

**Milestone:**

- Phase I of prototype tool is developed and reviewed by stakeholders.

## **F. Coastal Hazards**

**Five Year Goals:** To improve forecasts and planning for changing storms, waves and water levels, and sea ice conditions and their impacts on coastal communities and habitats; and to support the Alaska Coastal Mapping Initiative with nearshore mapping.

**Objectives:** AOOS will focus on (1) increasing water level and wave observations and nearshore bathymetry and (2) providing access to data and developing related products for decision-making.

**Milestone:**

- Ongoing engagement activities.

**Observational Assets and Activities:**

1. Develop Cook Inlet decision support tools to improve response planning and Ocean Acidification (OA) and Harmful Algal Blooms (HABs) – *Axiom (Bochenek) CIOFS*.

**Milestone:**

- Progress on development and presentation of decision support tools for inclusion in the AOOS data system.

## **G. Ecosystems, Fisheries, and Climate Trends**

**Five Year Goal:** To document and disseminate data about current and future ocean conditions, ocean and coastal ecosystem productivity and change, and climate trends.

**Objectives:** AOOS will: (1) build upon and leverage existing programs to support an integrated network of physical, chemical, biological, and community-based ocean and coastal observations in Alaska's Large Marine Ecosystems (LMEs) including the Gulf of Alaska (GOA), Bering Sea/Aleutian Islands, and Arctic, with a new focus on ocean sound; (2) partner with management agencies and partners to help maintain long time series data collection with new sensors and consistent data collection protocols; and (3) synthesize new and existing data and ensure that data are accessible and usable for priority information products and decision support.

### **Observational Assets and Activities:**

1. Demonstrate operational readiness of AUV-based ecosystem monitoring through a field program supporting the International Year of the Salmon – *UAF (Danielson) OMAO Glider*, *Axiom (Bochenek) OMAO Glider*, and *University of Washington (UW; Horne) OMAO Glider*.

#### **Milestones:**

- Successful glider survey conducted in 2023 in GOA and days at sea reported.
- Near real time eco-metrics dashboard developed.
- Contribute to support for mid-frequency species and noise data analysis from raw PAM data from 2020-21 DBO and M2 mooring deployments.

### **Products and Services**

1. Support ingestion and visualization of the AMBON seascape data and metadata that were created in Year 1 – *Axiom (Bochenek) ROP Data & Products*.

#### **Milestone:**

- Data and metadata ingested and made available on AOOS data portal.

2. Support ingestion and visualization of 2004-2018 Chukchi Sea trawl data that were rescued in Year 1 – *Axiom (Bochenek) ROP Data & Products*.

#### **Milestone:**

- Data and metadata ingested and made available on AOOS data portal.

3. Generate sea ice and currents forecast GIS for the Sea Ice for Walrus Outlook during spring walrus harvests – *Axiom (Bochenek) ROP Data & Products*.

#### **Milestones:**

- Weekly GIFS provided to the Arctic Research Consortium of the US (ARCUS) in March through June.

4. Provide training and assistance on the AOOS Data Portal to the Alaska Sea Grant (ASG) Education and Agents – *Axiom (Bochenek) ROP Data & Products*.

#### **Milestones:**

- 2-3 portal demonstrations per year
- Assist ASG agents with simple questions on portal

5. Maintain the Mariner's Dashboard for Prince William Sound, Cook Inlet, and Kodiak regions and implement improvements/expansion based on user feedback – *Axiom (Bochenek) ROP Data & Products*.

#### **Milestones:**

- Maintain Dashboard

6. Continue development and maintenance of the Bering Region Data Integration Portal - – *Axiom (Bochenek) ROP Data & Products.*

**Milestone:**

- Updated Bering Region Data Integration Portal.

7. Develop a low-bandwidth data product as directed by a stakeholder – *Data Products (TBD).*  
A contractor would be identified to create a low-bandwidth data product.

**Milestones:**

- Identify contractor through competitive selection process
- Create prototype of low-bandwidth data product
- Receive feedback from stakeholder

## **H. Water Quality**

**Five Year Goals:** To understand, document and respond to current and future changes in the quality and productivity of Alaska’s marine waters and to develop Alaska’s capacity for ecological forecasting.

**Objectives:** AOOS will focus on (1) supporting the Alaska HAB and Alaska OA networks; (2) sustaining and enhancing OA and HABs monitoring; and (3) developing decision support tools for stakeholders.

**Engagement Activities:**

1. Support Alaska OA Network director, working groups and stakeholders, and provide representation in OA Information Exchange and Coastal Acidification Network coordination – *AOOS staff with OA Program funding.*

**Milestone:**

- Ongoing network support and outreach activities.

2. Support AHAB network, development and implementation of the AHAB network Action Plan, and outreach and engagement activities and represent AOOS in the national HAB Observing Network – *AOOS staff with HABON funding.*

**Milestone:**

- Ongoing AHAB support, outreach activities, and development of Action Plan.

3. Support continued Skipper Science workshop, a partnership program developed in 2021, an opportunity for managers and scientists to work with the fishing industry and two OA vulnerability assessment workshops – *ACF (Poe) Marine Stakeholder Workshops.*

**Milestones:**

- Hold one Skipper Science workshop
- Hold 1-2 OA workshops
- Compensate participants

**OA Observational Assets and Activities and Products and Services:**

1. Support sustained maintenance and operation of OA infrastructure at sites GAKOA and M2 – *UAF (Monacci) M2 & GAK Moorings.*

**Milestones:**

- Annual platform and sensors turned around at GAKOA and GAK01
- Spring and fall platform and sensors turned around at Bering Sea M2
- Data processed and ingested into IOOS Partners Across Coasts Ocean Acidification (IPACOA) and AOOS data portals

2. Host a State of the Science Workshop and Community Sampling in Anchorage, AK in response to monitoring needs identified in the Interagency Working Group of Ocean Acidification (IWG-OA) monitoring prioritization plan.

**Milestones:**

- Host workshop in Anchorage, AK during the Alaska Forum for the Environment in February 2023.

**HAB Observing Assets and Activities and Products and Services:**

1. Develop pilot community HAB sampling program including support to increase laboratory capacity for analyzing HAB samples (including use of qPCR) – *AOOS staff using HABON funds.*

**Milestone:**

- Samples collected from three (3) communities and increased lab capacity in at least two (2) regional/local labs.

2. Implement the process for direct individual payment tool for community samplers developed in Year 1– *Alaska Conservation Foundation (ACF; Poe) Community Samplers.*

**Milestone:**

- Finish management of payments to the original 4 communities (Kodiak, Larsen Bay, Unalaska, St. Paul)
- Get feedback from new communities
- Onboard new samplers from new communities

3. Expand use of HABscopes and domoic acid (DA) field test kits – *AOOS staff using HABON funds.*

**Milestones:**

- DA kits distributed to five (5) communities (including Bering Strait region and North Slope communities)
- Ten (10) HABscopes purchased and distributed to communities and beginning development of algorithm for Alaska species detection.

4. Support the use of a HABs data platform used by regional Tribal organizations and the NOAA Phytoplankton Monitoring Network to record the data – *O&E (Whitehead) HABs Database.*

**Milestones:**

- Identify the regions that will be provided access to the database platform.
- Provide access to and training on the use of the database to regional samplers

5. Support AHAB data portal and data ingestion, develop data entry submission tool, coordinate HAB data input into NOAA IEAs/Ecosystem Status Reports (ESRs), develop prototype sea surface temperature (SST) model visualization to determine *Alexandrium* bloom risk, and maintain mariculture siting tool – *AOOS staff using HABON funds, Axiom (Bochenek) AHAB Portal.*

**Milestones:**

- Delivery of central data sharing platform to consolidate AHAB data across regions
- Maintain and enhance AHAB data portal
- Scope requirements for developing central, statewide data entry interface for regional phytoplankton and toxicity community monitoring data.
- Submit final data to NOAA NCEI

- Maintain prototype SST product to determine *Alexandrium* bloom risks