A Brief Introduction to the Alaska Ocean Observing System: A Presence in the Arctic

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The Alaska Ocean Observing System (AOOS) is the IOOS Regional Association (RA) responsible for coordinating statewide monitoring for Alaska's nearly 44,000 miles of coastline and offshore environments. The Alaska coastline is larger than that of any of the other RA territories as well as the combined seaboard of the rest of the United States. AOOS is not only unique for its geographic scale, but also for being the only regional observing system that encompasses the Arctic. AOOS also nests within national and global observing networks, collaborates to build observing and forecasting capacity, delivers information to stakeholders and provides data management support to programs operating around the region, including international programs in the Arctic.

AOOS has three strategic priorities within its mission: 1) to sustain marine ecosystems and fisheries, and track climate change and trends; 2) to promote safe marine operations; and 3) to mitigate natural hazards and their impacts on coastal communities. Alaska is the canary in the coalmine with respect to climate change, as evidenced in the steady decline of Arctic summer sea ice extent and concentration, increased wildfires, thawing permafrost, increasing ocean acidification (OA) and ecosystem shifts. However, climate change is only one of the drivers currently affecting Alaska and the Arctic. Others include an upswing in marine traffic especially through the Bering Strait, groundbreaking industrial activities, escalating coastal erosion and inundation affecting many coastal subsistence communities, and the dramatic retreat of sea ice. These factors all heighten the need for sustainable, reliable and accessible marine information.

Work of this nature is challenging in Alaska, which has a largely remote coastline with limited infrastructure and few assets sitting ready to assist in emergency response situations, such as oil spills, shipping incidents, storm surges and coastal inundation events. From an observing standpoint, AOOS is collaborating with all entities concerned with marine systems to not only fill critical gaps in ocean and coastal monitoring data needs, but to foster collaborations between existing and new monitoring and research activities across all sectors, including private industry, academia, state and federal agencies, local communities and non-governmental organizations. AOOS works with already established and ongoing activities, and carefully balances the challenges of providing real-time observations in Alaska in order to use limited resources wisely. The mere size of the region alone requires extensive collaboration and leveraging with other programs to accomplish the AOOS mission.

To augment these efforts, AOOS pursues additional funding opportunities, and offers data management, synthesis and visualization services to other organizations, which enhances data sharing and integration into the AOOS website data portal while adding value to separate activities managed by other organizations. Similar to most projects in remote Alaska, many AOOS supported activities are successful due to these collaborations between multiple partners.

AOOS Observing Build-Out Plan for the Alaskan Arctic

As part of the national Integrated Ocean Observing System (IOOS) program, AOOS has developed a statewide 10-year observing build out plan as well as a more focused observing

strategy for the Alaskan Arctic, based on a decade of stakeholder and scientist input. The effort considers Alaska's stakeholder needs in a national context and outlines a bare bones implementation plan with potential for enhancements. The plan assumes existing federal assets, including availability of satellite data products, will continue, and that leveraging oil & gas industry assets will continue. Recent developments with the departure of Shell Oil from the Arctic are currently being assessed in terms of their impact on observing capability in the Arctic. AOOS funding supports key observing assets including shore-based radar stations, wave buoys, weather stations, ecosystem moorings, and ship and glider surveys.

AOOS Ocean Data Explorer and Arctic Data Portal

One key effort by AOOS since its inception has been to develop and provide the infrastructure necessary to support an operational observing system data network by building a centralized regional data assembly center (DAC) with web-based analytical and visualization tools and products. The AOOS Website (www.aoos.com) hosts not only AOOS funded data streams, but also serves as the data portal exchange for the entire region, serving data assets from international, federal, state, and regional governmental programs, research and observing activities conducted by private industry (oil and gas, shipping and fishing), non-governmental organizations and international research cooperatives, and community based observing groups including those incorporating traditional knowledge.

The AOOS website hosts the Ocean Data Explorer, a central portal that catalogs, archives, visualizes and integrates many different types of data from across the state, including real-time sensors observations, model forecasts, GIS layers, satellite data and high definition video footage. The Ocean Data Explorer currently provides access to all real-time environmental observations, over both land and sea. It serves as a one stop shop for environmental and oceanographic data, both current and historical. Providing access to the numerous data assets collected throughout the state is one of the hallmark products AOOS is well known for. A subset of this data system is contained in the Arctic Data Portal, accessible as well through the AOOS website. In addition to data access, the AOOS website hosts a secure data management and sharing system to support large-scale integrated research programs, and provides participating researchers a direct pathway for archiving and publicly sharing their data. The website also serves to archive and provide public access to private industry data as well.

Summary

The AOOS motto "*Eye on Alaska's coasts and oceans*" reflects the vision of a network of critical ocean and coastal observations, data and information products that aid our understanding of the status of Alaska's marine ecosystem and allow stakeholders to make better decisions about their use of the marine environment. For more information on the AOOS program, the website www.aoos.org provides a valuable resource to any entity working in the state and surrounding seas and oceans by providing access to numerous coastal and ocean and some terrestrial data assets, reference and literature resources and visualization products.