Improving Ocean Data Access for Indigenous Coastal Communities

The Northwest Association of Networked Ocean Observing Systems (NANOOS) is collaborating with partners in the Pacific Northwest, the Pacific Islands, and Alaska to improve access to ocean data for Indigenous coastal communities through a new project funded by the National Science Foundation's (NSF) Convergence Accelerator program.

Indigenous coastal communities have depended on ocean resources over millennia, but climate change is creating a more unpredictable ocean by influencing waves, sea level, temperature, and other factors, profoundly impacting remote coastal communities.

The goal of the project is to get oceanographic data into the hands of Indigenous communities in a way that takes advantage of existing, lower cost wave buoy technology and enables sustained community-led stewardship of the buoys. Through co-design, the team aims to revolutionize the status quo by providing new tools and new connections that will focus on securing wave data at the hyper-local scale.

"When I show local fisherman the number of oceanographic sensor moorings that we have in our region I am almost always asked if any of them have wave height," said Jennifer Hagen, Marine Biologist and Marine Policy Advisor for the Quileute Tribe. "Often our harbor entrance is considered 'rough bar' by the local US Coast Guard, and thereby restricted, however conditions away from the direct influence of the Quillayute River and where Quileute Treaty fisheries exist can be quite different. Wave data for our region would not only enhance the ability of fishers to decide if conditions are within their boats' safety parameters but also help the Quileute tribal community to better understand conditions that affect coastal erosion processes."

Collaboration is key to developing solutions

Three regional systems of the U.S. Integrated Ocean Observing System (NANOOS in the northwest U.S., PacIOOS in Hawai'i and the U.S. Pacific Islands, and AOOS in Alaska); Sofar Ocean, a low-cost buoy and sensor company; and Indigenous partners from the Washington coast (Quileute Tribe and Quinault Indian Nation), Pacific Islands (villages in the Marshall Islands and American Samoa via the Marshall Islands Conservation Society and the National Park of American Samoa), and Alaska (11 whaling villages in the Arctic) will collectively work to develop solutions to overcome existing hurdles of observing technologies that are too expensive to purchase and too expensive to sustain when conducted in isolation.

In the initial phase of the project, partners will work to assess coastal community needs and determine how existing lower-cost Sofar Ocean Spotter wave buoy and Smart Mooring technologies can address those needs. Working together, they will develop community-owned stewardship programs that can maintain the buoys into the future in partnership with the regional ocean observing systems, utilizing the strengths of the regional systems to serve data to remote communities in ways that work for them.

The new collaboration embraces new, lower-cost technologies and utilizes the power of local ownership for maintaining ocean observations that are critical to serve the blue economy worldwide. The Indigenous communities in turn will provide feedback on the utility of the

technologies as well as offering input on ocean conditions from centuries of local observations. The co-designed approach is in line with the focus of NSF's Convergence Accelerator: advancing use-inspired solutions into practical applications that address large-scale societal challenges.

Erwin 'Joe' Schumacker, Marine Resources Scientist for the Quinault Indian Nation, shared how the wave data could help the village of Taholah: "The village of Taholah is very remote with one road in and out. That road needs constant repair and is an example of failing infrastructure that the Quinault Indian Nation is dependent on. Taholah residents also suffer increasingly frequent breaches of a protective sea wall during storm events resulting in flooding of portions of the village. Wave buoy data offshore would add a layer of protection to regional weather forecasts that could alert residents to potential breach events. Nearshore wave data will help prepare for and mitigate impacts from a changing environment that threatens the livelihood and homes of Quinault tribal members."

In addition to providing localized data for coastal communities, the data will be available for large-scale scientific research to improve understanding and prediction of coastal dynamics, especially in a changing ocean.

If funded for phase two of the accelerator program, the team's work will broaden participation and networking to more communities and further adapt innovative technologies and techniques. This effort would also serve to address goals of the UN Decade of Ocean Science for Sustainable Development to "promote a more targeted and effective information flow as well as innovative ways of conducting and using ocean science."

More about NSF's Convergence Accelerator

National-scale societal challenges cannot be solved by a single discipline. Instead, these challenges require convergence: the merging of innovative ideas, approaches, and technologies from a wide and diverse range of sectors and expertise. Launched in 2019, the NSF Convergence Accelerator builds upon basic research and discovery to accelerate solutions toward societal impact. The most recent program is focused on the networked blue economy, and trust and authenticity in communication systems. Other projects funded by the NSF Convergence Accelerator can be found here.