



# Backyard Buoy: Equipping Underserved Communities with Ocean Intelligence Platforms

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## Overview

Backyard Buoy empowers Indigenous and other coastal communities to collect and use ocean data to support their blue economy: maritime activities, food security, and coastal hazard protection. Innovations include a sustainable process for community-led stewardship of affordable ocean buoys and a web-based application that renders data easy to understand and bridges to Indigenous knowledge.

## Description

We bring together regional ocean observing networks of the U.S. Integrated Ocean Observing System (IOOS), underserved Indigenous communities, and a sensor company to work collectively to democratize local wave measurements and provide a solution to the existing hurdle of observing technologies that are too expensive to purchase and to sustain. Through co-design of an implementation and stewardship plan, as well as low-fidelity data servicing apps that we formulated in Phase I, we now stand ready to revolutionize status quo by using lower-cost tools and deepening the human and data connections that collectively will allow for an effective system that has a focus on the hyper-local scale – sorely lacking in the design of existing ocean observing systems – while assuring it is within a globally-connected network.

## Differentiators

Phase II of the project Backyard Buoy continues to advance the convergent

achievements of the Phase I effort to sustain ocean intelligence for wave observing in underserved Indigenous communities. During Phase II, the original Phase I cohort will continue to foster the original partnerships while adding new partners and collaborators to provide overall project management, expertise in Sofar wave buoy operations, training, data analysis, integrating Indigenous knowledge, wave and climate modeling, engagement, and education initiatives. The Phase II Indigenous communities engaged during Phase I will be the ultimate stewards of the observing platforms and observing initiatives within their own waters throughout the project and beyond. This means they will identify optimal locations for deployments and conduct the deployment and recovery tasks themselves (rather than sending a researcher to each community). This aspect is a switch from the typical ocean research model, where the communities are simply told what is going to happen in their community, without much consideration for their needs or broader goals.

## Road Map

Our team will achieve success through a combination of collaborative events, web-based tools for sharing information, and empowering communities to steward wave buoys in their region. Working Groups will be established to provide a shared forum for technical support and to identify expansion opportunities including groups for Buoy Operations, Data Tools, Educational Development, and Co-Design. One of the primary goals is the development of Community Research and Implementation Plans

(CRISPs) that will be used by community stewards to execute the Backyard Buoy project. CRISPs will be developed with a user-friendly web-based tool designed to encourage community involvement and will be available on the project website tailored for the Indigenous partners' needs. Low-bandwidth data tools such as Text-a-Buoy and a mobile app will be co-designed to provide the necessary real-time wave data. All partners will participate in the Summit on Integrating Indigenous Knowledge with Western Science in the summer of 2023. To grow community participation in the project, each region will develop educational materials and provide internship opportunities. Based on the CRISPs and Working Groups, an Ocean Best Practices document will be developed.

## Partnerships

We have a geographically, academically, institutionally, and culturally diverse groups of partners collaborating on the Backyard Buoys project. Phase II continues the partnership between 1) three U.S. IOOS Regional Associations; 2) Indigenous partners in each region; 3) a proven ocean float developer; as well as new educational partners.

- **Pacific Northwest:** Northwest Association of Networked Ocean Observing Systems (NANOOS), Quileute Tribe, Quinault Indian Nation, Western Washington University
- **Alaska:** Alaska Ocean Observing System (AOOS), Alaska Eskimo Whaling Commission, University of Alaska Fairbanks, Alaska Department of Natural Resources, Alaska Native Science and Engineering Program
- **Pacific Islands:** Pacific Islands Ocean Observing System (PacIOOS), Marshall Islands Conservation Society, National Park of American Samoa, Hawai'i Sea Grant, Conservation International Hawai'i
- **Sofar Ocean Technologies** (Sofar)
- **Project Management:** Weston Solutions, Inc.

## Intellectual Property

The Intellectual Property (IP) will be freely shared within and beyond the partners. IP will primarily consist of data delivery systems and web intake surveys. The ocean observing buoy systems to be deployed during Phase II of Backyard Buoys are already mature and commercially available products and are wholly owned and patented by Sofar.

## Additional Information

An additional benefit of getting wave buoys in the water at diverse and under-measured sites proposed here is the generation of data from highly-localized coastal areas available for large scale scientific research to improve climatologies and predictions, especially important in light of climate change. This is critical for effective advanced planning to ensure a safe blue economy for the communities. In Phase II, we propose to implement the buoys in all three regions, along with the data dissemination applications to result from our Phase I low-fidelity prototypes. We will also add an education and translation layer to engage the communities more fully and inspire a younger generation in ocean observation.



Successful deployment of instrumented seabed mooring and Spotter. (C. Gruben-Elias, Only Way Outfitting)