

MEETING REPORT

BACKYARD BUOYS ALL-HANDS MEETING

February 19-20, 2025

Hosted By
Northwest Association of Networked Ocean Observing Systems (NANOOS)



*Photo: Overlooking Olympic Coast with Backyard Buoys coffee mug.
Photo by Sebastien Boulay.*

Report date: April 21, 2025

EXECUTIVE SUMMARY

The Backyard Buoys All-Hands Meeting was held at the Quileute Oceanside Resort and Akalat Conference Center in La Push, Washington (WA) on February 19-20, 2025. Backyard Buoys brings together geographically, academically, institutionally, and culturally diverse groups of partners: 1) three U.S. Integrated Ocean Observing System (IOOS) Regional Associations, 2) Indigenous partners in each region, 3) a proven ocean wave buoy developer, and 4) educational partners.

- **Alaska:** Alaska Ocean Observing System (AOOS), Alaska Eskimo Whaling Commission (AEWC), UIC Science, Alaska Native Science & Engineering Program (ANSEP), and Weston Solutions.
- **Pacific Northwest:** Northwest Association of Networked Ocean Observing Systems (NANOOS), Quileute Tribe, Quinault Indian Nation, Western Washington University (WWU), and University of Washington (UW).
- **Pacific Islands:** Pacific Islands Ocean Observing System (PacIOOS), Marshall Islands Conservation Society (MICS), National Park of American Samoa (NPSA), Hawai'i Sea Grant, Department of Ports and Harbors for Manu'a, Northern Marianas College, 500 Sails, Guam Coastal Management Program, Conservation Society of Pohnpei, Conservation International Hawai'i Program, and South Seas Consulting (New Zealand).
- **Sofar Ocean Technologies**

The goals of the meeting were to bring partners together from all the regions to share lessons learned from the first deployments and use of the data tools, exchange education efforts, and explore opportunities to bridge Indigenous Knowledge.



*Photo: Backyard Buoy team at the Akalat Conference Center in La Push, WA.
Photo by Dennis Wise.*

ORGANIZATION OF THE MEETING

The meeting agenda was developed to allow for sharing of knowledge across all regions in both structured and unstructured settings. The meeting included a welcome and closing drum circle led by the Quileute Tribal Council and a gift exchange with the American Samoan team.

The meeting included opportunities for each of the established Working Groups (Data Tools, Buoy, Education, Co-Design, and Communications) to share lessons learned and plans for the future. Technical presentations described lessons learned from the deployment of buoys in all three regions, including the use of data tools, mooring designs, and permitting. We also used the opportunity to take additional group shots and headshots of partners for the website. The agenda allowed substantial time for respectful dialogue on community members' concerns and needs (Appendix A).



*Backyard Buoy All-Hands Meeting Quileute Drum Circle.
Photo by Sheyna Wisdom.*



*Backyard Buoy All-Hands Meeting American Samoa Sharing.
Photo by Alice Bailey.*

PARTICIPANTS

PACIFIC ISLANDS

- Melissa Iwamoto, PacIOOS Director
- Jordan Watson, PacIOOS Deputy Director
- Sebastien Boulay, co-PI/South Seas Consulting
- Marcos Nobre, PacIOOS Website Developer (virtual)
- Nicole Guiles, PacIOOS Communications Specialist
- Ning Li, PacIOOS Wave Modeling Specialist
- Andreia Queima, PacIOOS Ocean Engineer
- Meagan Hattori, PacIOOS Engagement
- Dua Rudolph, Marshall Islands Conservation Society (MICS)
- Juddson Nelson, MICS
- Brendan “Keoni” Ketzo, MICS
- Keith and Crystal AhSoon, Ridge to Reefs American Samoa
- Pua and Ruth Tuaua, National Park of American Samoa (NPSA)
- Valentine Vaeoso, NPSA
- Jasmine Mendiola, Conservation Society of Pohnpei
- Voneric Boktok, PacIOOS Liaison, RMI
- Boaz Lamdrik, Majuro Atoll Local Government, RMI
- Sala McGuire, Department of Port Administration, American Samoa Government
- Tilali Scanlan, American Samoa community member, Graduate Student at WWU
- Edwin Reyes, Guam Coastal Management Program
- Camille Quichocho, Guam Coastal Management Program
- Emma Chong, Northern Marianas College, Saipan, CNMI
- Jun Coleman, 500 Sails, Saipan, CNMI



*Pacific Islands Team.
Photo by Dennis Wise.*

PACIFIC NORTHWEST

- Jan Newton, NANOOS Director
- Roxanne Carini, NANOOS Deputy Director
- Rachel Wold, NANOOS Engagement
- Troy Tanner, NANOOS Software Developer
- Dan Hannafious, NANOOS Friend
- Seth Travis, UW
- Alex Dioso, UW
- Nellie Ratliff, Quileute Tribe
- Jennifer Hagen, Quileute Tribe
- Jim Darmiento, Quinault Indian Nation
- Joe Schumacker, Quinault Indian Nation
- Sam Kastner, WWU
- Lizz Miller, Makah Tribe
- Tommy Moore, NW Fisheries Commission
- Chris Archer, UW-APL
- John Mickett, UW-APL
- Scott Mazzone, Quinault Tribal Fisheries Biologist
- Jackson Holtz, UW News Office
- Kiyomi Taguchi, UW News Office
- Dennis Wise, UW News Office



*Pacific Northwest Team.
Photo by Dennis Wise.*

ALASKA

- Sheyna Wisdom, AOOS Director
- Alice Bailey, AOOS Outreach
- Joni Spiess, AOOS Education
- Meghan Larson, Weston Solutions
- Karen Paradise, Weston Solutions
- Frederick Brower, AEW (virtual)



*Alaska Team.
Photo by Dennis Wise.*

TECHNOLOGY TEAM

- Sebastien Boulay, formerly of Sofar Ocean
- Duncan Mactavish, formerly of Sofar Ocean
- Jarrah Orphin, Sofar Ocean

CORE TEAM

- Jan Newton, PI/NANOOS
- Melissa Iwamoto, co-PI/PacIOOS
- Sheyna Wisdom, co-PI/AOOS
- Sebastien Boulay, co-PI/South Seas Consulting
- Roxanne Carini, NANOOS
- Jordan Watson, PacIOOS
- Meghan Larson, Weston Solutions



*Core Team.
Photo by Alice Bailey.*



***PI Team.
Photo by Alice Bailey.***



***Core Team Members show the Spotter buoy IS about the size of a basketball.
Photos by Alice Bailey.***

MAIN OUTCOMES OF THE WORKSHOP

As with the previous two workshops, the most important outcome was coming together to meet again and exchange ideas in-person! These in-person events highlight the value of face-to-face exchanges and relationship building, especially across disparate cultural backgrounds. The project's first in-person partners event in Utqiagvik, Alaska, in August 2022, was held before any buoys had been deployed and focused on what was needed for successful co-production with 35 team members from all three regions. Much of the discussion at the first meeting centered around the validity of the program and the potential benefits of the technology.

With the knowledge shared in that workshop, the team worked in 2023 to deploy buoys in each region, with two in the Pacific Northwest, one in the Pacific Islands, and 13 in Alaska. After a successful first season, the team held a second in-person partners event in Honolulu, Hawai'i, in February 2024 to share lessons learned with the 48 participants. The discussion at this second event centered on the successes of the partners and the realized benefits of the technology.

The project continued to progress with the release of the Backyard Buoys app, buildout of the website with numerous resources (www.backyardbuoys.org), and additional deployments in each region in 2024/early 2025 (two in Pacific Northwest, three in Pacific Islands, and 26 in Alaska). For the third and final in-person event under the National Science Foundation funding, the discussion was led by the community partners in discussing the benefits of the technology, the use of the data, and how to continue to expand and sustain this program. The transition from the co-PIs leading the discussions to the community partners leading them has been incredibly gratifying and illustrates the strength and beauty of a truly co-designed program.

Increasing safety at sea was the uniting factor among the participants, and the cultural diversity of this need is illustrated by the many points of origin of participants: American Samoa, Guam, Commonwealth of the Northern Mariana Islands, Republic of the Marshall Islands (Majuro), Federated States of Micronesia (Pohnpei), Hawai'i, New Zealand, California, Washington, and Alaska. Of particular importance was bringing together Indigenous people from the different regions to exchange knowledge about how this project is working for their communities. Despite the very different environments for each coastal community, there are many common concerns, needs, and solutions across the geographic scope of the project that were shared.



*Viewing the Backyard Buoys Dashboard.
Tilali Scanlan, Valentine Vaeoso, Jordan Watson, Pua Tuaua, Keith Ahsoon, Crystal Ahsoon.
Photo by Alice Bailey.*



*Education Activity. Dan Hannafious and Nicole Guiles.
Photo by Alice Bailey.*



*Buoy Mooring Activity. Chris Archer and John Mickett.
Photo by Dennis Wise.*



*Education Standards Presentation led by Joni Spiess.
Photo by Alice Bailey.*

Buoy Working Group Summary

- Jennifer Hagen (Quileute Tribe) shared that they were able to deploy two but have had to retrieve one from Canadian waters due to a Bomb Cyclone causing it to break free.
- Joe Schumaker (Quinault Indian Nation) shared that they were able to deploy in 2023 but had to retrieve it and have not been able to redeploy yet. The lesson learned is to have a spare hook on the anchor line so as not to lose the anchor line.

- Dua Rudolph (MICS) shared they were able to deploy one after a lot of work with communities. The temperature sensor has helped with monitoring coral health. Plan to move their initial buoy to the middle of the atoll and to deploy a second buoy just outside the lagoon. The use of weights like an engine block instead of anchors made it easier because getting materials to the islands can be challenging.
- Valentine Vaeoso, Pua Tuaua, and Keith Ahsoon (NPSA) shared that two buoys were deployed in American Samoa with locations chosen based on community needs. It has taken time for the community to understand that it is their buoy and their data. The Department of Port Administration is now very involved!
- Sheyna Wisdom (AOOS) shared that AEWG and UIC Science were not able to make this trip due to meeting conflicts. 26 buoys were deployed in 2024 with three new villages added from 2023. Overall, the deployments went well but there were some issues with the wrong lines (from buoy to float) and connection points being used, which caused the loss of seven buoys.
- John Mickett (UW) continues to work on cost estimates and summaries of mooring materials. It is important to find the balance of strong, but easy to handle.
- Action Items/Lessons Learned:
 - Check subscription for data transmission
 - Check for biofouling and/or ice on buoys that affect transmission
 - Works best to assemble mooring on land instead of on vessel
 - Make sure community people deploying are compensated for time and fuel
 - Interested in looking into what data mean for future trends

Communications Summary

- Reminder to share photos and stories with Communications Group
- Social media to share:
 - Website: <https://backyardbuoys.org/>
 - Facebook page: <https://www.facebook.com/BackyardBuoysData>
 - Facebook Private page: <https://www.facebook.com/groups/1383496715637508>
 - Instagram: <https://www.instagram.com/backyardbuoys>
- Action Items/Lessons Learned:
 - Continue to work on training videos and other materials for outreach
 - Need more promo videos (similar to the one with John Hopson)

Data Tools Summary

- Roxanne Carini (NANOOS) shared that the primary reason for the project was to keep people safe at sea and get the data into hands of people that can use it, including National Weather Service (NWS).
- Seth Travis (UW) shared how the data are “talking” from Sofar Ocean to ERDDAP to app and Regional Association data portals.
- Troy Tanner (UW) reviewed the app and new dashboard for how to get data into the app. This dashboard will be much easier to use to get data onto the app for all involved! There was some discussion on push notifications, including a bathymetry base layer, and adding temperature thresholds.
- Ning Li (UW) shared how the data can be useful for more than just the local user with NWS and other users.

- Frederick Brower (AEWC) shared that they look at data the night before to make plans, as well as when they are coming into a new location. He also shared that having wind speed would be helpful, but the buoys don't do as well with nearshore wind calculations (as they don't directly measure wind).
- Jennifer Hagen (Quileute) shared that they show other nearby wind data on a screen near the marina.
- Keith Ahsoon (Ridge to Reefs) shared that the buoys were just launched in the Manu'a Islands in early February, so they are still working with the communities on how the data can augment traditional knowledge.
- Dua Rudolph (MICS) shared how he worked with the community prior to deployment so they are excited to see how people are using the information. Will be sharing on Facebook.
- Action Items/Lessons Learned:
 - Add temperature thresholds into app
 - See if there is an easy way to track use of the app by location (# of devices vs. hits to figure out who is using the app)
 - Work on ways to track buoy using app or dashboard if buoy becomes loose
 - Concerned with exclusion of people that don't have smartphones. Continue to look into text-a-buoy and sharing of info on VHF radios.

Education Summary

- There was a lot of excitement around the education work ANSEP/AOOS have done with K-8. Everyone loved the small wave buoy and the activities surrounding it.
- Joni Spiess (AOOS) discussed education standards and how to adjust to meet the needs of the Indigenous communities, to take it out of the classroom.
- Sam Kastner (WWU) shared how data from deployed buoys have been used in his marine and coastal science class.
- Action Items/Lessons Learned:
 - More visual educational info needed on website
 - Collaboration on mentorship, connecting students

Stewardship Plans Summary

- Important to stress that a stewardship plan is an iterative process, and needs to be vetted iteratively by the stewards/community.
- Including communities from the beginning has been very important – we are coming in asking where they want data and what their goals are, not just telling them what we are doing.
- Stewardship plans may look different for each community. Some might be mostly digital, while others might be more hard copies. In some cases, print-outs (e.g., maps for buoy locations) for discussion (and record keeping) are more effective and useful for discussions across partners.
- Each community has aspects of the stewardship plans in place, but they might not all be collated together. It might be helpful for each community to have a plan on how to track, document, and update various aspects of their stewardship plan.
- Action Items/Lessons Learned:

- Review recent drafts to explain what the stewardship plans are, what information they contain, and how they can be useful
- Update the questions to reflect changes in the program moving forward

Beyond NSF into NOAA Inflation Reduction Act (IRA)

- NSF funds extended to August 31, 2025, so will be ending. All three regions are moving to NOAA IRA funds that come to the Regional Associations.
 - AOOS: maintain funding to AEWC in the arctic, but expand to western Alaska. Funds also used for permitting/project management support.
 - NANOOS: maintain funding to Quileute and Quinault, but looking to expand (Makah) and into Oregon. Funds also used for continued data tools development.
 - PacIOOS: maintain funding to current communities and continue to expand. Funds also used to update and maintain the Backyard Buoys website.
- Discussion on non-Federal funding, but must be careful to maintain the data sovereignty.
- Also important to conduct outreach and education with Congressional delegation.

ACKNOWLEDGEMENT

Meghan Larson (Weston Solutions) provided tireless support and planning for the meeting. We also thank Dennis Wise (University of Washington) for taking portraits and meeting photos. The Quileute Tribe provided us shelter in the storm especially when the power was out, amazing and filling food, music and laughter. Thank you for being incredibly gracious hosts. We humbly thank all participants for sharing your gift of time and knowledge. We also acknowledge that the meeting was conducted on the traditional lands of the Quileute Tribe.

APPENDIX A

AGENDA

Backyard Buoys In-Person All-Hands Meeting
Quileute Oceanside Resorts and The Akalat Conference Center
330 Ocean Drive
La Push, WA 98350

HOSTED BY:
Quileute Tribe

MEALS COURTESY OF:
Cathy Salazar, Quileute Tribe

ARRIVAL DAY (Tuesday, 18 February 2025)
Fire Pit (weather permitting)

MEETING PURPOSE:
Recap progress to date. Share successes and lessons learned. Looking to the future. Discuss steps needed, both those started and those yet to come, to make Backyard Buoys sustainable well into the future.

ZOOM
INFORMATION: <https://us06web.zoom.us/j/83306027547?pwd=CPJL2TUOxKDvFWKautKaoazTSXzEAX.1>
Meeting ID: 833 0602 7547
Passcode: 367511

DAY 1: Wednesday, 19 February 2025

Time	Topic	Speakers
08:00 - 09:00	BREAKFAST	
09:00 - 09:15	Quileute Welcome	Jennifer Hagen & Quileute Tribal Council
09:15 - 09:30	Quileute Invocation	Quileute Tribal Council
09:30 - 10:30	Introductions & Ice-Breaker Activity <i>Share a photo, object, or narrative about your and/or your culture's connection with the ocean.</i>	Jan & Roxanne
10:30 - 10:45	BREAK - Refreshments	

10:45 - 12:00	Buoy Working Group <ul style="list-style-type: none"> • <i>Field report from 2024 & plans for 2025</i> • <i>Mooring diagram updates & explanations</i> 	Jennifer, Joe, MICS, Valentine, AEW rep <i>(8' per person)</i> John/Chris for PNW, Andreia for PacLOOS, AEW rep <i>(10' per region)</i>
12:00 - 13:00	LUNCH	
13:00 - 14:30	Buoy Working Group (continued) <i>Sharing Practical Lessons Panel:</i> <ul style="list-style-type: none"> • <i>How did you know your buoy needed to be cleaned; cleaning the buoy and mooring line?</i> • <i>How did you run your deployments (pre-assembled or assembled at sea/dock)?</i> • <i>Lithium battery safety, checking connections for corrosion?</i> • <i>How are folks recruiting more participants?</i> 	MC: Jan Panelists: MICS, Pu'a, Jennifer, AEW rep <i>(5' intros, then moderated questions/discussion)</i>
14:30 - 15:00	Outreach & Communications Working Group <ul style="list-style-type: none"> • <i>Website overview</i> • <i>Social media updates</i> 	Alice, Meagan, Nicole
15:00 - 15:15	BREAK - Refreshments	
15:15 - 16:00	Co-Design Working Group <ul style="list-style-type: none"> • <i>Review online resources: Deployment/Recovery guide, Mooring Components Lists, Costs estimates, SD Card how-to, etc.</i> • <i>Describe resources in process</i> • <i>Make a list of remaining desired resources</i> • <i>Update on CRISP information collection tool</i> 	Roxanne & Melissa
16:00 - 16:15	Recap Day 1 & ADJOURN	
16:15 - 17:00	Breakout Activities (optional, self select) <ul style="list-style-type: none"> • <i>Mooring juncture wrapping - John/Chris</i> • <i>Demo of Mini-buoy with accelerometer education/outreach - Nicole/Meagan</i> • <i>Ask Sofar: How to use the dashboard? Smart Mooring options? - Jarrah</i> 	
17:00 - 18:00	Free time	
18:00	GROUP DINNER - Akalat Center	
19:00	Quileute Drum Circle - Akalat Center	

DAY 2: Thursday, 20 February 2025

Time	Topic	Speakers
08:30 - 09:00	BREAKFAST	
09:00 - 09:15	Agenda review Call for sharing impact statements / stories	Jan Sheyna
09:15 - 10:30	Data Tools Working Group <ul style="list-style-type: none"> • <i>Data Pathways Overview</i> • <i>BB Data Server Status & Quality Controls</i> • <i>How can BB data be used to improve/assess regional forecast models and better understand ocean conditions?</i> 	Roxanne, Seth, Ning
10:30 - 10:45	BREAK - Refreshments (<i>Visit Data Tools or Project Reflections Table</i>)	
10:45 - 12:00	Data Tools Working Group (continued) <ul style="list-style-type: none"> • <i>BB Dashboard for sharing buoy fleet info</i> • <i>Data Use Panel</i> <ul style="list-style-type: none"> ○ <i>Who is using the data and how are they finding it?</i> ○ <i>How did people use the data this year?</i> ○ <i>How are folks reaching more data users?</i> • <i>Other Discussion Items:</i> <ul style="list-style-type: none"> ○ <i>Custom wave data pages - what types of graphs or data visualizations would users want to see (e.g., on AOOS, NANOOS, PacIOOS pages)</i> 	Troy (15') MC: Sebastien Panelists: MICS rep, AEWC rep, Quileute rep (5' intros, then moderated questions/discussion)
12:00 - 13:00	LUNCH (<i>Visit Data Tools or Project Reflections Table</i>)	
13:00 - 13:30	Sharing Quotes, Statements & Reflections about the Project	Sheyna
13:30 - 15:30	Education Working Group <ul style="list-style-type: none"> • <i>Education Standards: Demonstration and discussion of how to apply education standards to a BB education/outreach product</i> 	Moderators: Meagan & Nicole Education Standards: Joni

	<ul style="list-style-type: none"> ○ <i>How can assessing education standards on BB outreach products help new partners adapt materials to their region/purposes?</i> ● <i>Case study: WWU student project - data sharing, acknowledgements, research question development, sharing results</i> ● <i>Fireside chat: Exploring collaborative pathways that center Indigenous wisdom and community voices in community engagement and education</i> 	<p>Case Study: Sam</p> <p>Fireside Chat Participants: PacIOOS partners, Joe and other NANOOS partners, AOOS partners</p>
15:30 - 15:45	BREAK - Refreshments (<i>Visit Data Tools or Project Reflections Table</i>)	
15:45 - 16:30	Beyond NSF - IRA expansion plans	Jan, Melissa, Sheyna
16:30 - 17:00	Recap Day 2 & Identify Action Items	Jan
17:00	ADJOURN	
17:00 - 18:00	Free time	
18:00	GROUP DINNER - Akalat Center: Turkey gravy; mashed potatoes; glazed carrots; cranberries; dinner rolls; apple and pumpkin bars	