Performance Progress Report
Developing the Pacific Islands Ocean Observing System (PacIOOS)
Cooperative Agreement #NA16NOS0120024
Performance Period: June 1, 2023 through November 30, 2023
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This report covers activities conducted during the fifteenth 6-month performance period of what is now an 8-year cooperative agreement with NOAA's approval of our second no-cost extension request. PacIOOS' estimated operating budget for the second approved no-cost extension from NOAA IOOS is $1,466,298.29.

I. Milestones

Milestone	Updated Expected Completion Date	Status
Deploy an array of oceanographic satellite tags on large pelagics in the Main Hawaiian Islands	April 2024	In progress
Run glider missions	May 2024	In progress
Deploy new wave buoys in the Freely Associated States	March 2024	In progress
Implement projects in the Pacific Islands Ocean Data Needs	May 2024	In progress
Conduct Outreach and Engagement and Build Capacity in the Insular Pacific	May 2024	In progress
Deploy new HFR stations on Saipan (CNMI) and Guam	May 2024	In progress

II. Progress and Accomplishments

ENGAGEMENT SUBSYSTEM

Conduct Outreach and Engagement and Build Capacity in the Insular Pacific
Contracts for two local Palauan staff at the Coral Reef Research Foundation to serve as PacIOOS liaisons were finalized. The Palau liaisons are helping to provide on-the-ground networking with local partners. The liaisons are connected with local resource management agency staff and are thus informed about local concerns like invasive species spread and the impacts of El Niño on local ecosystems (e.g., Jellyfish Lake, a critical economic driver for Palau tourism). This knowledge base has helped PacIOOS gain a broader and more specific understanding of local requirements.

Our FSM liaisons, based at the Conservation Society of Pohnpei, assisted the PacIOOS deputy director during his trip to Pohnpei and Kosrae for ocean observing workshops and partner engagement during November 2023 (more on this trip below).

Our Guam liaisons, based at the Micronesian Conservation Coalition, were tremendously helpful connecting our PacIOOS oceanographic instrumentation specialist with essential contacts for her trip to Yap in October 2023 (more on this trip below).

Our CNMI liaisons, based at Pacific Coastal Research and Planning, have been helping to identify potential locations for new observing assets in the territory as well as connecting the PacIOOS operations coordinator with key local partners.

Implement one or more projects in the Pacific Islands Ocean Data Needs report
During this reporting period, we successfully hired and onboarded two new staff members: a Regional Ocean Data Sharing Initiative (RODSI) Data Management Specialist (September 2023) and a RODSI Data and Products Developer (October 2023). Together, this team has already facilitated and implemented new data tools as requested by different island partners, including the Maui Fire Hub and a collaborative website for the Hawai'i Coral Bleaching Collaborative. Both projects will make data publicly available that have not been previously, but that are of high interest to communities in Hawai'i.

OBSERVING SUBSYSTEM

Deploy new wave buoys in the Freely Associated States
Reliable bathymetry continues to be a significant challenge for this effort, but the team has had notable success exploring creative options to identify suitable deployment sites in the locations to help meet the wave data needs of the region.

In October 2023, the PacIOOS oceanographic instrumentation specialist traveled to Palau, Guam, and Yap. In Palau, she worked with local partners/leads at the Palau National Weather Service Office (NWSO) and the Coral Reef Research Foundation to re-deploy the Ngaraard

wave buoy off the east coast of Babeldaob. In addition to helping to get the buoy safely back in the water collecting near real-time wave data, capacity building of the NWSO team was a major focus of this trip. After this trip, our local partners expressed a feeling that they can probably do the next re-deployment on their own, which is the goal.

In Guam, PacIOOS met with the NOAA Guam Weather Forecasting Office (WFO) to learn more about their requirements and data gaps to serve their area of responsibility, which includes all of the Western Pacific from Palau to the Marshall Islands.

In Yap, PacIOOS met with key partners for the proposed Waverider buoy North of Rumung, Yap, based on input from the NWS Guam and Yap staff as well as the limited available bathymetry. Our main local point of contact from the Yap State Office of Planning and Budget arranged a meeting with over ten key community and government stakeholders and partners, including the traditional Chief of Rumung, the Marine Law Officer, and the Senator of Rumung. There was a lot of excitement and offers to support the project. Logistical arrangements were also made during this trip, including where to ship and store the buoys and identifying which boats were available and suitable for the deployment. PacIOOS also successfully delivered a presentation to the entire Catholic school upon a last-minute invitation from the school director when he found out about the wave buoy project.

In November 2023, the PacIOOS deputy director traveled to Pohnpei and Kosrae to help solidify local partnerships and connections for the buoy deployments off each island. The trip was also a perfect opportunity to collaborate and co-facilitate an "Ocean Science to Service" workshop with staff from The Pacific Community (SPC) and NOAA's Global Ocean Monitoring and Observing (GOMO) program. The SPC Climate and Oceans Support Program in the Pacific (COSPPAC) led discussions on the fundamentals of early warning systems with FSM partners and colleagues from local weather service offices, Office of Fisheries and Aquaculture (OFA), state government, the Pohnpei Tourism Office, and more. Other workshop topics included local issues and science related to waves, coastal inundation and wave run-up, tides, El Niño, coral bleaching events, and more. The workshop included four days of interactive sessions in Pohnpei and a one-day session in Kosrae. PacIOOS' participation in the workshop was aimed at bolstering local capacity, strengthening on-the-ground partnerships in the region, and updating local entities about the forthcoming wave buoy deployments planned for Pohnpei, Kosrae, and Yap.

Throughout the reporting period, the team finalized preparations for wave buoy deployment in Pohnpei. This included working with newly identified local partners (OFA and SPC) to obtain the necessary permissions from Pohnpei State, shipping and receiving all the deployment equipment, developing and printing local outreach materials requested by local partners (stickers and vinyl banners) to raise awareness of the buoy. Plans for deploying the buoy off Pohnpei in December 2023 are underway.

PacIOOS also helped our local partners at the Majuro Weather Service Office (WSO) to determine a location South of Kwajalein, RMI for a wave buoy the country purchased with UNDP funding. Majuro WSO is the lead on this effort, and PacIOOS is standing by to assist as requested.

Deploy new HFR stations on CNMI and Guam
PacIOOS has HFR systems for Guam and CNMI fabricated and ready for shipment to the region. Due to various challenges with site selection and last year's development of a larger U.S. military presence on Guam, PacIOOS has yet to move forward with HFR shipping or deployment. Additionally, the recent deleterious impacts of Super Typhoon Mawar added logistical and prioritization concerns for our partners in the region. During this reporting period, we resumed discussions with the U.S. Air Force and other landowners in the region to identify appropriate locations for the HFR systems on Guam and Rota. Plans are in place for PacIOOS staff and co-Investigator to travel to Guam and Rota in early 2024, to finalize site locations with key land owners (U.S. military and CNMI government) to move this project forward.

Run glider missions
PacIOOS continued and finalized discussions with SCOPE Principal Investigator Dr. David Karl from UH to take over the maintenance and piloting of four of his seagliders. PacIOOS is now working with Dr. Karl's long-term glider pilot expert to prepare for missions in the summer of 2024. Two of the four seagliders have been shipped to the University of Washington for calibration and refurbishment. We are working on plans to do the same with the remaining two seagliders. During the next reporting period, we also plan to resume discussions with Dr. Scott Glenn at Rutgers and other regional partners regarding the utilization of data from these seagliders to enhance tropical cyclone track and intensity forecasts for Hawai'i and potentially the Mariana Islands.

Deploy an array of oceanographic satellite tags on large pelagics in the Main Hawaiian Islands
Three of the most recent generation of "bathygraph" satellite-linked ocean profiling tags have been deployed on Tigers sharks off O'ahu for beta-testing. The tags are performing very well, so the team is confident that the manufacturer will resume commercial production and fulfill our tag order early in the next reporting period. The tracks from the three tags are viewable via the PacIOOS website (http://www.pacioos.hawaii.edu/projects/sharks/) and PacIOOS Voyager (e.g., bit.ly/3RJAWhR).

III. Problems and Challenges

Due to poor weather conditions, we have not yet been able to conduct the bottom survey planned in the SE of Kosrae, but a local boat has been identified and successfully gone through the UH certification process. We hope to conduct this effort early in 2024, when partners are back to work after the holidays.

Expansion of the U.S. military in the Mariana Islands has delayed our ability to identify sites for new HFR systems. We have made some progress in recent months, though, and hope the site visits in early 2024 will help solidify partnerships.

Continued technical glitches with the profiling animal tags significantly delayed delivery of the next generation of "bathygraph" tags. Recent deployments of the next generation of tags are

promising, though, and we are confident that the tags will be received before the end of the award.

IV. Budget Summary

The University of Hawai‘i Office of Research Services is currently unable to submit the semi-annual financial report for the period ending September 30, 2023. This report will be submitted in the new DOC financial system (GEMS/eRA Commons) by the April 30, 2024 extension. https://www.commerce.gov/ocio/programs/gems/important-information. Not including encumbrances, as of December 1, 2023, internal budget tracking shows expenditures of $14,548,799.18, representing a drawdown of 95.34% of the total federal funding for this award. Due to a few major operational and implementation shifts necessitated due to the extended impact of the pandemic in the region, we will need to request a re-budget and plan to submit the paperwork for this to NOAA in January 2024.