

Performance Progress Report
Developing the Pacific Islands Ocean Observing System (PacIOOS)
Cooperative Agreement # NA16NOS0120024
Performance Period: June 1, 2021 through November 30, 2021

Submitted December 2021 by:
Melissa Iwamoto, Principal Investigator and Director
Pacific Islands Ocean Observing System
School of Ocean and Earth Science and Technology, University of Hawai‘i at Manoa

This report covers activities conducted during the eleventh 6-month performance period of a 7-year cooperative agreement. PacIOOS' estimated operating budget for the approved no-cost extension from NOAA IOOS was \$3,884,594.

1.0 Progress and Accomplishments

OUTREACH, STAKEHOLDER ENGAGEMENT, AND EDUCATION SUBSYSTEM

Conduct Outreach and Engagement and Build Capacity in the Insular Pacific; Target completion date: May 2023 **Status:** *Ongoing. PacIOOS has successfully partnered with the Micronesia Conservation Trust to develop and fill a new position that we are calling the Capacity Building Liaison Officer, based in Pohnpei, Federated States of Micronesia (FSM). Mr. Koden Lebehn was hired in September 2021. In this role, Koden will help build ocean observing capacity across Micronesia by training communities and interested agencies in the collection and analysis of oceanographic data. His first three months on the job were spent learning more about the PacIOOS program and the potential for ocean observing to help support various natural resource conservation and management efforts in Micronesia.*

Characterize the ocean data needs for the Pacific Islands Region (specific to the target audience of coastal resource managers); Target completion date: Spring 2022. **Status:** *In progress. The consultant (ecoLOGIC Consulting) has completed a policy analysis of management and policy decisions related to data sets and tools needed by coastal zone managers in Hawai‘i, American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam. The next step is to meet with the managers as a group to draft goals and action steps to address data challenges for priority management issues and determine next steps for implementation. The consultant is coordinating with PacIOOS and NOAA OCM staff to move this forward, and the plan is to gather the managers and liaisons in early January 2022 to proceed.*

Implement one or more projects in the Pacific Islands Ocean Data Needs report; Target completion date: May 2023 **Status:** *In progress. The report being developed by the consultant will guide the remaining implementation of the project, through the remainder of the award. In addition, one project that met some of the managers' needs articulated in early discussions has been completed. Beginning in August 2020, PacIOOS partnered with the USGS Western Geographic Science Center on a project to identify locations of current and future areas of coral*

reef resilience in Guam and American Samoa. This effort maps overlapping environmental conditions associated with reef resistance to change or recovery from disturbance. The objectives of this project were to: 1) identify the locations of conditions supporting coral reef habitat suitability and survivability under multiple future climate scenarios; and 2) engage with coastal managers to identify where resilience-based management strategies or restoration activities could be suitable. This project received funding from the Pacific Islands Climate Adaptation Science Center (PI-CASC). The GIS layers from the mapping analysis and virtual manager workshops are available for download on ScienceBase.gov, and PacIOOS is currently building an interactive web map to view individual layers and zoom to the target geography. A manuscript is also being developed for publication.

OBSERVING SUBSYSTEM

Re-deploy Ipan (Guam), Majuro (RMI), and Hanalei (Kaua‘i) Wave Buoys; Target completion date: November 2021 **Status:** *Partially complete; partially delayed. The Ipan and the Hanelei wave buoys were successfully redeployed in May 2021. The Majuro buoy, which went adrift in January 2021, remains out of the water. We are currently on standby for allowance to travel again to the Republic of the Marshall Islands (RMI) to redeploy the Majuro wave buoy; however, we are also exploring options for our PacIOOS liaison to support a wave buoy deployment. After being on the waitlist for over a year and undergoing a month-long quarantine, our liaison was allowed to travel back to Majuro after being stranded outside of the RMI since March 2020. <http://www.pacioos.hawaii.edu/waves-category/buoy/>*

Deploy new wave buoys in the Freely Associated States; Target completion date: May 2023 **Status:** *Delayed. The buoys for this objective have been purchased and received. One new hire for this objective has been identified, but we are awaiting approval of her visa application in order to be able to proceed with the work tasks associated with identifying sites. Even then, deployment may be hindered, depending on local capacity and ongoing travel restrictions.*

Deploy new wave buoy in American Samoa; Target completion date: November 2022 **Status:** *In progress. The buoy has been purchased and received, and initial discussions with partners have ensued after a delay due to staffing constraints. Next steps include expanded discussions with partners and stakeholders. Once we have the planned coordinates, we will submit the necessary permit applications.*

Deploy new HFR stations on Saipan (CNMI) and Guam; Target completion date: May 2023 **Status:** *In progress. The systems have been purchased and fabricated and are ready for shipment. Permitting efforts are in progress, but have been challenging due to restrictions on travel and site visits. We are in the process of developing a site plan for the military-based location to request access.*

For the new FCC permit requirements, we have built a system for testing FCC compliance and identified a lab to test them.

Run glider missions; Target completion date: May 2023 **Status:** *Currently on hold. The PacIOOS Seaglider facility has been set up, but staffing issues (see Section 3 below) have*

delayed getting the glider in the water to test and to run glider missions. We plan to begin glider runs off O‘ahu in late spring to early summer 2022. All necessary permitting applications will be submitted prior to operations.

DATA MANAGEMENT AND CYBERINFRASTRUCTURE (DMAC) SUBSYSTEM

Complete PacIOOS DMAC server migration; Target completion date: May 2022 **Status:** *In progress. DMAC staff completed the migration of the PacIOOS servers from a single server to a stack of servers running Virtual Machines (VM). This takes advantage of VM management and parse different services to different VM's, thus eliminating single points of failure. The team has successfully migrated the main services, i.e., the PacIOOS website, THREDDS, and ERDDAP. The final service to move was Data Turbine, which PacIOOS uses to manage real-time data from various in-situ platforms. The DMAC team also hired a subcontractor to conduct a thorough server evaluation, and the team is now more confident that we can recover more efficiently from a server failure. The next step is to have our staff go through training in early 2022 to learn how to better improve their interactions with our new Data Turbine.*

RESEARCH AND DEVELOPMENT SUBSYSTEM

Deploy an array of oceanographic satellite tags on large pelagics in the Main Hawaiian Islands; Target completion date: May 2022 **Status:** *In progress. Four tagged tiger sharks tagged off O‘ahu during the last reporting period continued to report position and ocean temperature profiles in near real-time into August 2021. The team did not tag additional sharks during this reporting period for several reasons. Primarily, we wanted to wait until protocols were in place that allow for near real-time dissemination of the ocean profiles, which will in turn allow them to be incorporated into ocean circulation and similar models. Although the ATN DAC is not yet capable of this function, PacIOOS' DMAC team is moving forward with this effort. Protocols are now established for automatic transfer of our ocean profiles from the manufacturer's (Wildlife Computers) data portal to PacIOOS. This will allow near real-time access to our ocean data from animal tags by our ROMS modeling team and others who are eager to take this to the next stage of testing for incorporation into their models. The last round of deployments to demonstrate the quality of the data and how they could be incorporated into local models. A manuscript is also in development describing the methods and showing a sample of the results. <http://www.pacioos.hawaii.edu/projects/sharks/>*

2.0 Scope of Work

No changes to the project scope of work are anticipated. Remaining objectives/deliverables are those included in the NOAA-approved no cost extension.

3.0 Personnel and Organizational Structure

PacIOOS Operations Coordinator is now on extended family medical leave from November 2021 – February 2022. The main impact on the objectives under this award is the resulting hold on the forward momentum of PacIOOS glider operations.

4.0 Budget Analysis

Spending for this award is on track with projected program expenditures. The University of Hawai'i Office of Research Services submitted a semi-annual financial report for the period ending September 30, 2021, through Grants Online. That report shows total receipts of \$12,257,186.09. As of December 1, 2021, internal budget tracking shows expenditures of \$13,110,091.88, representing a drawdown of 85.91% of the federal funding for this 7-year award.

Addendums

As recommended by the IOOS Office, addendums are not included with this progress report; they will be included with the progress report due in January for our new NA21 award.