

**Progress Report**  
**Submitted January 2025**  
*Empowering Ocean Stakeholders: Advancing the Pacific Islands Ocean Observing System (PacIOOS)*  
Award no. NA21NOS0120091

Period of Activity: July 1, 2024 – December 31, 2024

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- I. Project Milestones. Shaded cells represent periods during which the activity is expected to occur. Text in a shaded column indicates the period during which the activity was completed or if the activity is delayed, the period during which the activity is expected to occur.

Milestone	Status	7/1/24 – 12/31/24	1/1/25 – 6/30/25
<b>GOVERNANCE AND MANAGEMENT SUBSYSTEM</b>			
Maintain NOAA certification	On Track		
Hold annual Governing Council meeting in HNL	Complete		
Hold annual Excom meeting outside HNL	Complete		
Partnerships to promote & enhance ocean observing in the region	On Track		
<b>OBSERVING SUBSYSTEM</b>			
HFR stations; data online & assimilated into ROMS	On Track		
Site selection and permitting for HFR in the Mariana Islands - in collaboration with UOG subaward	On Track		
Existing 20 wave buoys across region; data & products online	On Track		
Honolulu Pier 1 Weather Station	On Track		
Waikiki Beach Camera	On Track		
Deploy new water parameter instruments (CTD and ADCP) in Guam; data online - subaward with UOG	On Track		Q3
Long-term WQ sensors (9); data & products online	On Track		
WQSPP sites and services; data and products online	On Track		
WQ coastal moorings (2); data/products online	On Track		
Undergraduate mentoring/capacity building w/ moorings	On Track		
Generate near real-time ocean profiles with animal tags	On Track		
Establish efficient data dissemination for animal tag profiles	In Progress		
Maintain land-based "mote" stations for animal tag data collection	On Track		
Capacity building for Insular Pacific animal tagging	On Track		
Build capacity in regional communities for ciguatera sampling	On Track		
<b>MODELING AND ANALYSIS SUBSYSTEM</b>			
Maintain atmospheric models (HI, Mariana Islands, Samoa, RMI, Palau, FSM)	On Track		
Upgrade atmospheric models (Palau, Mariana Islands, RMI, FSM)	On Track		
Existing wave forecasts (HI, Mariana Islands, Samoa)	On Track		
Test and validate 14-day wave forecasts for Guam and CNMI	On Track		
New wave model forecasts for the Freely Associated States	On Track		

Develop, implement, and validate unstructured wave model grids for American Samoa	On Track		Q4
Maintain High sea level forecasts (9 locations: HI, Guam, Am Samoa, Palau)	On Track		
Maintain Hale'iwa Harbor 6-day surge forecast	On Track		
Maintain 6-day wave run-up forecasts	On Track		
Develop Kahului Harbor surge forecast (BOSZ)	On Track		
Set up multiple thresholds for Malakal, Majuro, Nawiliwili, Moku o Lo'e, Kawaihae, Hilo high sea level forecasts from citizen science photos	On Track		
Maintain BOSZ wave run-up forecasts for West Maui	On Track		
Maintain ROMS circulation model for HI, Mariana Is., Samoa Is., Western Pacific	On Track		
Expand HI ROMS model to include Papahānaumokuākea Marine National Monument	On Track		
Develop coupled physical / biogeochemical model for HI	On Track		
Expand operational ROMS server and software stacks	On Track	Q2	
<b>DATA MANAGEMENT AND CYBERINFRASTRUCTURE (DMAC) SUBSYSTEM</b>			
Maintain PacIOOS DMAC infrastructure and data services	On Track		
Operate as a Regional DAC for the Pacific Islands	On Track		
Ingest large biological data sets & make widely accessible	On Track		
Capacity building training on data access and use (virtual)	On Track		
Engage with IOOS DMAC, other RAs, etc. on DMAC and related issues	On Track		
Continue to collaborate with other PacIOOS teams to provide necessary DMAC services, develop products, and address stakeholder and partner DMAC needs	On Track		
Advance the development of a Pacific Islands Region Acoustic Telemetry (PIRAT) Node	On Track		
Form partnerships with current or prospective acoustic telemetry users in the region	On Track		
Build capacity for acoustic telemetry studies via workshops and equipment loan program	On Track		
Archive regional acoustic telemetry datasets in PIRAT database	On Track		
Grow Regional Ocean Data Sharing Initiative (RODSI) data products online to fill data gaps in Hawai'i and the U.S. Territories.	On Track		
<b>ENGAGEMENT SUBSYSTEM</b>			
Communications & engagement across the region	On Track		
Regional tech transfer & capacity sharing through local liaisons — subaward with MERIP	On Track		
Identify new MOA partners in the region	On Track		
Conduct user group / data services trainings	On Track		
Co-host Pacific Partnership capacity building workshop in the FSM	Delayed to Q3	Q2	
Conduct one-on-one partner meetings to develop ciguatera network	On Track		
Develop ciguatera network and stories online	On Track		
Ciguatera internship program at American Samoa Community College	On Track		
Assemble steering committee for the PIRAT node	Complete	Q2	

Expand PIRAT website and integrate with PacIOOS website and engagement	On Track		
Conduct partner engagement meetings to build the Regional Ocean Data Sharing Initiative (RODSI) network towards meeting data needs across the region.	On Track		

## II. Progress and Accomplishments

### A. Core funding update

Amount	Funding Area	Task
\$11,767,672	Core	Sustained operational funding and service delivery. Allocations to HFR include Year 1: \$331,540; Year 2: \$346,263; Year 3: \$414,239; Year 4: \$362,822

### High-Frequency Radars (HFRs)

PacIOOS continues to work with vendors for a final / acceptable cost estimate for a fence replacement around the Kalaeloa station, as well as working with USFWS on permitting.

In previous versions of this report, we described recapitalization needs for project components including data servers and the HFR service vehicle. We have removed these needs from the table below, as IOOS funds have been obtained through the BIL and those recapitalization activities will be reported under that award.

Existing and planned HFR stations	Status	Recapitalization needs
KAK (Kakaako)	System upgrades / repairs performed. System operating as planned with data transmitted to CORDC.	
KAL (Kalaeloa)	System upgrades / repairs performed. System operating as planned with data transmitted to CORDC.	PacIOOS is working with USFWS to permit a replacement fence for this site.

KAP (Kapolei)	System upgrades / repairs performed. System operating as planned with data transmitted to CORDC.	
KKH (Keaukaha)	System is currently down. Planning is underway for testing of antennae and electronics.	
KNA (Kaena)	System operating as planned w/ data transmitted to CORDC.	
KOK (Koko Head)	System upgrades / repairs performed. System operating as planned with data transmitted to CORDC.	
PPK (Pepe'ekeo)	System upgrades / repairs performed. System operating as planned with data transmitted to CORDC.	
Ritidian, Guam (planned)	Tx and Rx locations were scouted in January / February 2024. Several candidate locations were identified at Andersen Air Force Base (AAFB). An installation proposal has been developed but AAFB personnel have been delayed in responding.	N/A
Rota, CNMI (planned)	Tx and Rx locations were scouted in January / February 2024. A candidate location was identified on private land. An installation was developed and logistical details are being identified. Further negotiations will likely be necessary for lease of private land.	N/A

\* Regarding planned antenna calibrations: LERA HFR systems rely on antenna phase, not amplitude measures, and are extremely stable once cable and filter calibrations are performed, which is done at the time of installation. Extensive calibration exercises were conducted at KOK, KNA, KAK, and six other LERA systems globally; none required any processing correction. A reassessment of amplitude and phase for each system is anticipated to be done upon installation of upgraded/recapitalized component hardware.

## Gliders and Other Uncrewed Systems (UxS)

### Summary of glider activities over the reporting period:

PacIOOS completed two concurrent Seaglider missions off of Hawai‘i Island, spanning July to December and executing 1,300 successful data profiling dives. These data were served to the Glider DAC and coincided with two named storms in the vicinity of Hawai‘i (see success story below).

## Other Core Observation Activities

### Governance and Management Subsystem

**Summary:** PacIOOS had a busy reporting period submitting an IRA (subaward) and a BIL proposal, growing collaborations with regional partners, conducting the first remote (outside of Hawai‘i) executive committee meeting since pre-COVID, attending the IOOS fall meeting, and more.

### Accomplishments / successes:

- PacIOOS held its executive committee meeting in Pago Pago, American Samoa hosted locally by the National Park of American Samoa (NPSA). Meetings were held with the National Weather Service, National Marine Sanctuary of American Samoa, Port Authority, NPSA and its entire staff, and local Sea Grant staff.
- PacIOOS held its annual governing council meeting in Honolulu with local site visits and demonstrations by the U.S. Coast Guard Search and Rescue team and the Hawai‘i Pilots Association.
- PacIOOS welcomed the American Samoa Department of Port Administration as a new Memorandum of Agreement (MOA) partner. One of their staff, Harbormaster Pu‘amavae Ah-Mai, has also been appointed to the PacIOOS governing council, replacing National Park of American Samoa Superintendent, Scott Burch.
- The management team worked with CIMAR administrative staff to renew subawards for liaisons across the Pacific, University of Guam, and ecoLOGIC, LLC.

### Problems / delays

Delays with the university’s Office of Research Services, compounded with those from the eRA Commons system at NOAA have postponed the receipt of awards, approval / initiation / amendment of subawards, and general operational efficiency. These delays have been particularly problematic for purchasing and personnel costs associated with subawards and led to a yearlong delay in starting a graduate research assistant to a project at the University of Guam. Administrative staff within CIMAR and SOEST at UH helped to overcome some of these delays and some of the backlogs were overcome during this reporting period.

PacIOOS is also still awaiting NOAA's approval / acceptance of our Y4 descope submitted on 11-7-2024.

## Observing Subsystem

**Summary:** This reporting period saw the deployment/ redeployment of several wave and water quality buoys, in addition to Seagliders and shark tags. Meanwhile, the operational teams are preparing for expansions of web cameras and new wave buoy locations (e.g., coordinating with partners and initiating permitting).

### Accomplishments / successes:

- Five [nearshore sensors](#) in Hawai‘i (4 O‘ahu, 1 Maui), and 2 additional sensors in the Insular Pacific (American Samoa, RMI) operated successfully.
- The wave buoy team continued to maintain and operate the existing PacIOOS [array of wave buoys](#) in the Hawaiian Islands, Guam, CNMI, American Samoa, Palau, the Federated States of Micronesia, and the Marshall Islands.
- The PacIOOS team began coordinating the upcoming deployment of a new wave buoy in Palau.
- A new wave buoy was deployed off of Kosrae, FSM.
- Two new wave buoy locations have been identified (Palau and RMI), and permitting and logistics are underway for upcoming deployments.
- Two water quality coastal moorings were maintained on Hawai‘i Island.
- The Waikīkī beach web camera continued to provide regular imagery, operationally, for shoreline managers and as one of the pilot cameras for WebCOOS.
- Two members of the PacIOOS team attended the WebCOOS workshop hosted by SECOORA and conversations are on-going for determination of future camera locations.
- The MAPCO2 buoy in American Samoa is operating and transmitting data through continued partnership with the National Marine Sanctuary of American Samoa and the Pacific Marine Environmental Lab.
- The Shark Lab at the Hawai‘i Institute of Marine Biology deployed 2 more beta oceanographic tags, one on a blue shark and one on a tiger shark.
- All land-based motes (satellite tag relay stations) are functional.
- The PacIOOS team met with partners to discuss potential webcam deployments in American Samoa, Kaua‘i, and O‘ahu.
- PacIOOS completed two concurrent Seaglider missions off of Hawai‘i Island, spanning July to December and executing 1,300 successful data profiling dives. These data were served to the Glider DAC and coincided with two named storms in the vicinity of Hawai‘i (see success story below).

### Problems/delays:

- Staffing challenges in the FSM have stalled operations of the nearshore sensor deployments there.
- Wider (worldwide) distribution of ocean depth/temperature profiles remains hampered by technical difficulties at the Animal Tracking Network Data Assembly Center. Efforts are underway to address these issues.

## Modeling and Analysis Subsystem

**Summary:** PacIOOS modeling teams maintained a suite of their more recently expanded model domains while also preparing computational infrastructure for future expansions.

### Accomplishments / successes:

- Maintained WRF (atmospheric) forecasts of [wind](#), [rain](#), and [air temperature](#) for Hawai‘i, Mariana Islands, Samoan Islands, and the Western Pacific (Palau and portions of the FSM and RMI), with ongoing model upgrades. These model outputs are served to the NWS AWIPS system.
- The WRF modeling team is working with the NWS forecast offices in Guam, Samoa, and the Western Pacific (e.g., Palau and parts of the RMI and FSM) to provide updated 3D graphics for forecasts.
- The WRF team completed downscaling for several domains and time periods, including ENSO events on Guam and a 13 year assessment for offshore wind in Hawai‘i. Additional retrospective analyses were applied to Kona storms and the Maui fires.
- The WRF modeling team advanced their COSMIC data assimilation schemes to improve forecasts in the Hawaiian Islands.
- The 7-day [wave forecasts](#) (WaveWatch III and SWAN) were maintained to provide daily wave forecasts for Hawai‘i, Mariana Islands, and Samoan Islands.
- Conducted final validation of the CNMI & Guam unstructured SWAN 14-day forecast with buoy measurements.
- Completed the testing and development of the Palau unstructured wave forecast grid, which will be operational in early 2025.
- Maintained the [ROMS circulation models](#) for Hawai‘i, Mariana Islands, Samoan Islands, and the Western Pacific.
- Maintained the [Ala Wai Turbidity Plume forecast](#).
- Maintained the [6-day high-water level forecasts](#) in Hawai‘i, Palau, Guam, and American Samoa.
- Maintained the [wave run-up forecasts](#) for O‘ahu, West Maui, and the RMI.
- Maintained the [Hale‘iwa Harbor Surge forecast](#).
- The modeling team met with the Kahului harbormaster, and preparations are underway for deploying instruments necessary for development of a Kahului Harbor surge model.
- The ocean modeling (ROMS) team developed a new Central Pacific grid to support future modeling expansions.
- The ocean modeling (ROMS) team developed a new high resolution grid for Palau, which is undergoing final testing before operational release.
- The wave-driven coastal processes (Wave CPR) team updated the email warning system for 34 forecasts, as well as updated online (GitHub) accessibility for code.

**Problems/delays:**

- Reliance on international organizations to support sensors can negatively impact PacIOOS data tools. For example, the water level gauge at Uliga Dock in Majuro, RMI, is maintained by the Australian Bureau of Meteorology, which removes control over maintenance issues.
- Delays in IT installation of new servers has also delayed forecast expansions for WRF and ROMS.

**Data Management and Cyberinfrastructure (DMAC) Subsystem**

**Summary:** PacIOOS DMAC infrastructure and data services were maintained, and we continue to operate as a Regional Data Assembly Center (DAC) for the Pacific Islands. The PacIOOS DMAC team continues to collaborate with other PacIOOS technical teams to provide necessary DMAC services, develop products, and address stakeholder and partner DMAC needs.

**Accomplishments / successes:**

- Maintained [management](#) of PacIOOS collected data and model forecasts via GeoServer, ERDDAP, TDS, and Voyager.
- All data appropriate for long-term archive are being sent to NCEI on a regular basis.
- The Pacific Islands Regional Acoustic Telemetry (PIRAT) Node finalized its steering committee with six members that provide technical and regional tagging data expertise.
- PIRAT secured commitments from five new data projects intending to submit data.
- A new [RODSI ERDDAP](#) (<https://prop.pacioos.org/erddap/>) has been established and while now broadly announced it is already improving data access for select users.
- The PacIOOS management and DMAC team are serving an advisory role with the Palau Office of Climate Change and their efforts to develop a website and Palau data portal.
- PacIOOS staff has continued to explore use of Amazon Cloud Services for website backup and data system support.
- New data management support provided through RODSI continues working with partners to develop automated data processing and archiving routines for low cost sensors (e.g., temperature loggers).
- Staff continue to work towards integration of Backyard Buoys Spotter Buoys into the PacIOOS ERDDAP and other data services to meet broader stakeholder needs. Data are now additionally accessible through a collaboration with Aqualink (e.g., [aqualink.org/sites/3678](http://aqualink.org/sites/3678)).
- Partners at Palau Community College have established weather and salinity measurement stations throughout Palau to better understand inundation / saltwater intrusion across Palau's coastal community agriculture plots. The DMAC team is ingesting these near real-time data and working with partners towards development of a project site and public dashboard. A preliminary mapping tool is under development (<https://prop.pacioos.org/map/palau>) and the data are being served through an ERDDAP (<https://prop.pacioos.org/erddap/>).
- In collaboration with the UH Sea Level Center, UH Sea Grant, and the Pacific Islands Climate Adaptation Science Center, an updated version of the American Samoa Sea Level Rise Viewer was launched with the latest LiDAR data layers.



**Problems/delays:**

- As new grids (including unstructured grids) are developed by our modeling teams, the DMAC team will have to work to handle and integrate the data in new ways, including having a full understanding of and sufficient capacity for storage needs.
- The DMAC lead continues to fill the role of system administrator in the absence of full-time support for this role.
- File / data format issues have prevented the oceanographic shark tag profiles from being fully ingested into the ATN DAC. This is a known issue and the tag manufacturer, Wildlife Computers, is working with ATN on a solution.
- Several projects have not been added to the PacIOOS website as we are in the midst of redesigning our Projects Page to better incorporate project partnerships and parallel activities.

**Engagement Subsystem**

**Summary:** Outreach and stakeholder engagement with partners is ongoing via email, phone calls, video conferences, and increasingly in-person activities. Increased staff capacity has supported more outreach events and preparations for more engagement in the forthcoming reporting period.

**Accomplishments / successes:**

- PacIOOS helped support the Marine Island Ecology Course, led by the Micronesia Conservation Coalition. This project is supported using core funds as part of the subaward with MERIP.
- PacIOOS continues to publish and distribute monthly e-newsletters to a total of 2,845 recipients, with a 48% open rate. Highlighting PacIOOS data users and their specific use cases helps to illustrate the breadth of our stakeholders.
- The PacIOOS website was visited by more than 250,000 unique visitors who loaded more than one million pages.
- PacIOOS established more regular social media efforts during this reporting period. PacIOOS' Facebook page has more than 1,600 likes and 1,700 people following the page; PacIOOS Twitter has more than 600 followers; PacIOOS Instagram has 493 followers.
- The PacIOOS website saw twice as many hits in a single day (December 22) versus the average daily hits for the rest of December due to the Eddie Aikau Invitational Surf Competition. PacIOOS provides the primary wave data for supporting this iconic and economically important event.
- Numerous engagement activities occurred through the Pacific Ciguatera Network (see non-Core funding update section below).
- Capacity building of undergraduates continued through the Hawai'i Island water quality moorings.
- PacIOOS engagement staff continue to be part of the IOOS Association DEIA Committee.
- Outreach presentations to Office of Fisheries and Aquaculture staff in Pohnpei, FSM, sought to improve understanding and stewardship of the wave buoy program.
- PacIOOS management and engagement staff attended the Territorial Climate Infrastructure Workshop in Honolulu in July. PacIOOS RODSI staff gave an invited

presentation during a geospatial capabilities workshop, and PacIOOS tools were highlighted by a keynote speaker during the opening plenary session. Side meetings were held with regional partners from Guam, the CNMI, and American Samoa.

- PacIOOS attended (by invitation) an NCCOS Marine Spatial Planning meeting in Guam, intended as an initial public discussion hosted by NCCOS and BOEM about data gaps and strategies for offshore wind development in the region.
- PacIOOS became an institutional member of the Pacific GIS and Remote Sensing Council (PGRSC) and was invited to present a webinar and co-teach a workshop at the annual PGRSC meeting (reported in more detail in the December 2024 progress report for PacIOOS Award # NA23NOS0120077).
- PacIOOS has grown their role in the FSM Pacific Partnership, a collaboration among NOAA's Global Ocean Monitoring and Observing (GOMO), PMEL, The Ocean Foundation, and several regional and local partners in the FSM. The goal of this partnership is to expand ocean observing capacity building in the FSM, and PacIOOS has served an increasing role in guiding and advising this collaboration, in addition to encouraging participation by additional local partners like the National Weather Service.
- The Backyard Buoys partnership has expanded to include several new community and agency partners, with imminent buoy deployments in American Samoa, Guam, and the CNMI. Meanwhile preparations are in motion for PacIOOS support of additional deployments in the RMI, Ulithi and Yap Atolls (FSM), and on O'ahu, Hawai'i. A new partnership with Aqualink has provided expanded data visualization and accessibility options (e.g., Majuro buoy - [aqualink.org/sites/3678](https://aqualink.org/sites/3678)).
- PacIOOS staff conducted a user engagement and data tools workshop in American Samoa in July. The half-day workshop included about 20 participants from numerous local agencies and affiliations and initiated continuing conversations with several partners.
- PIRAT Coordinator, T. Tinhan, facilitated the Party Wave Acoustic Telemetry Symposium at the American Fisheries Society conference in September. The session included 21 oral presentations and two panel discussions.
- PIRAT Coordinator, T. Tinhan, was an invited guest at an Ocean Tracking Network (OTN) workshop on data management in Halifax, Canada. The meeting focused on QA/QC and new capabilities for data ingestion and management from moving platforms.
- NOAA Pacific Islands Fisheries Science Center hosted a Hollings Scholar (Benji Theunissen) whose project used PacIOOS data layers to create new content for Science on a Sphere.

B. Non-core funding update

IOOS, NOAA, Other Agency Funding		
Funding amount spent	Funding area / recipient	Task
<p>Provided: \$988,364 (total for FY21 + FY22 + FY23 + FY24)</p> <p>Spent + Encumbered: \$294,143</p> <p>Remaining: 70%</p>	Regional Ocean Partnership	<p><b>Task:</b> Regional Ocean Data Sharing Initiative (RODSI)</p> <p><b>Status:</b> Delayed, but getting on track.</p> <p><b>Accomplishments:</b> The RODSI team, including subawardee ecoLOGIC, LLC, have made great strides this year with development and delivery of several data products that support Hawai'i Coral Bleaching studies, Maui fires recovery (e.g., <a href="https://storymaps.arcgis.com/stories/a2297753c0a6485490de6af36f9be8a8">https://storymaps.arcgis.com/stories/a2297753c0a6485490de6af36f9be8a8</a>), glider data operationalization, and sensor data management procedures. The team has spun up a RODSI ERDDAP server for centralization of data and co-led two workshops and a webinar with the NOAA Coastwatch team using ERDDAP, geospatial data, and PacIOOS data services.</p> <p>The team has also began to explore more strategic data gap and hosting needs through engagement with regional partners at the Territorial Climate Infrastructure Workshop (July), a NCCOS / BOEM hosted workshop on offshore wind in Guam (August), USACE National Shoreline Management Study meeting (November), NOAA Pacific Managers Meeting (December), and the PacIOOS Governing Council Meeting (December).</p>
<p>Provided: \$935,196 (FY22 + FY23 + FY24)</p> <p>Spent + Encumbered: \$133,836</p> <p>Remaining: 86%</p>	Harmful Algal Blooms (HABs)	<p><b>Task:</b> Develop the Pacific Ciguatera Network (PCN) to further HABS understanding and prediction via a pilot project to support coordination between regional stakeholders and experts from other regions who are actively involved in addressing ciguatera fish poisoning (CP).</p> <p><b>Status:</b> On Track</p> <p><b>Accomplishments:</b></p> <ul style="list-style-type: none"> <li>Co-mentored Hollings Scholar (University of New Hampshire undergraduate, Emma McGuire) to work with HI DOH and DAR to support ciguatera outreach and education in Hawai'i</li> <li>Supported UH undergraduate student (Talofa Fe'a) in summer research internship in collaboration with the NOAA National Marine Sanctuary of American Samoa (co-mentor Val Brown) through the NOAA EPP-MSI Scholarship program. She won Best Student Presentation at summer research symposium. Also supported Fe'a through her UH Honor's thesis project (completed December 2024) for which she won an award for research excellence.</li> </ul>

		<ul style="list-style-type: none"> <li>• Planning hire of a full-time post-graduate researcher based in American Samoa in Spring-Summer 2025 to support the PCN and to continue Talofa's work.</li> <li>• Supporting UH undergraduate student (Duke Paane) to work on his thesis project, examining links between ciguatera in Hawai'i and environmental variables, such as SST, wave energy, and eutrophication.</li> <li>• Hired program manager to support Hawai'i-based ciguatera research and PCN (Aug 2024 - Aug 2025)</li> <li>• Hired field support (Jon Ehrenberg - UHM graduate student and Justin Chan - UHM recent graduate)</li> <li>• Began dinoflagellate studies around O'ahu in collaboration with HI DAR and Hawai'i Pacific University (Matt Iachhei) to (1) examine epiphytic dinoflagellates from macroalgae; (2) determine abundance of dinoflagellates using microscopy and ID <i>Gambierdiscus</i> to genus level; (3) facilitate metabarcoding for species ID; (4) facilitate toxin analysis by collaborators at Dauphin Island Sea Lab.</li> <li>• Developing network with numerous community organizations in Hawai'i to plan for increased future engagement for education and outreach.</li> </ul> <p><b>Issue (if any):</b> Some delays with procurement (e.g., microscopes) and subaward approval process. Several contract and subaward processes are being prepared currently for implementation during the next reporting period.</p>
<p>Provided: \$100,000 FY24</p> <p>Spent + Encumbered: \$66,031 (not including IDC on encumbrance)</p> <p>Remaining: 34%</p>	Hurricane Gliders	<p><b>Task:</b> Support hurricane glider operations during the 2024-2025 hurricane season</p> <p><b>Status:</b> On Track</p> <p><b>Accomplishments:</b></p> <ul style="list-style-type: none"> <li>• Two glider missions were launched from O'ahu, traveling hundreds of miles and completing 1,300 data collection dives.</li> <li>• Glider missions coincided with two named storms (see success story below).</li> </ul> <p><b>Issue (if any):</b> An unidentified issue led to piloting challenges returning one of the gliders to Honolulu. The UH research vessel, RV Kilo Moana, was employed to successfully recover the glider far offshore, using more vessel charter funds than expected for recovery.</p>

### III. Project Challenges/Modifications

- The UH Office of Research Services has continued to be extremely short-staffed this year, leading to delays in accepting awards, approving subawards, and issuing accounting codes.

### IV. Publications

- Publications and Reports
  - A. Feloy, K., Powell, B. S., & Friedrich, T. (2024). Remote impacts of cyclonic eddies on productivity around the Main Hawaiian Islands. *Journal of Geophysical Research: Oceans*, 129(10), e2023JC020670.
  - B. B. Nalley, E. Ciguatera Poisoning in the Pacific Islands. Report for the IWG-HABHRCA National HAB and Hypoxia Assessment. October 2024.
  - C. Azouri, A., Roeber, V., Guiles, M.D., Merrifield, M., Becker, J. and Luther, D.S., 2024: Computations of energetic nearshore waves: Are weakly dispersive phase-resolving models telling the same story? *Coastal Engineering*, 194, 104625. <https://doi.org/10.1016/j.coastaleng.2024.104625>
  - D. Cocquel, P.H., Milhami, F.Z., Moguen, Y. et al., 2024: Serre–Green–Naghdi Equations with Optimized Dispersion Properties Through a Modified Auxiliary Elliptic Equation. *Water Waves* 6, 521–546. <https://doi-org.eres.library.manoa.hawaii.edu/10.1007/s42286-024-00100-7>
- Notable Presentations
  - A. Azouri, A., Guiles, M. D., Roeber, V., Li, N., Tognacchini, C, Mihami, F.-Z. and D. S. Luther, 2024: Advances in phase-resolved modeling for mapping and forecasting of wave-driven coastal phenomena, 38th Int. Conf. Coastal Eng. (ICCE 2024), Sep. 8-14, Rome, Italy.
  - B. Mihami, F.-Z., Roeber, V., Azouri, A, Tognacchini, C., and D. S. Luther, 2024: Development of an optimized Boussinesq-type model for operational assessment of wave-driven flooding, 38th Int. Conf. Coastal Eng. (ICCE 2024), Sep. 8-14, Rome, Italy.
  - C. Tognacchini, C., Azouri, A., Mihami, F.-Z., Li, N., Roeber, V., Guiles, M., and D. S. Luther, 2024: Phase-resolving modeling and observations of nearshore wave transformations in a complex reef environment, 38th Int. Conf. Coastal Eng. (ICCE 2024), Sep. 8-14, Rome, Italy.
  - D. Nalley, E. “Understanding ciguatera poisoning in Hawaii at the US API.” CIMAR Symposium, 11/20/2024. Honolulu, HI.
  - E. Fe’a, T. La Uluulu Metāfolau: Exploring the risk of ciguatera poisoning in American Samoa. CIMAR Symposium (poster), 11/20/2024. Honolulu, HI.
  - F. Friedrich, T. “Future projections of compound extreme events around the Main Hawaiian Islands.” CIMAR Symposium (poster), 11/20/2024. Honolulu, HI.
  - G. Flament, P. “The Generic High Frequency Doppler Radar: progress report and recent developments.” International Radiowave Operator Group Conference, 9/4/2024. Plymouth, UK.

- Student theses / dissertations
  - A. T. Fe‘a Undergraduate Thesis. La uluulu Matafolau: Exploring the Risk of Ciguatera Poisoning in American Samoa. Dec. 2024.
  - B. D. Johansen presented his senior Capstone project on water quality monitoring during an undergraduate symposium in Hilo, Hawai‘i. Dec 2024

## **V. Product Delivery:**

See PacIOOS.org for data products. No new products delivered during this reporting period.

## **VI. Certification Updates**

- No new updates

## **VII. Education, Media Engagement, and Outreach**

For coverage of PacIOOS in the media, please refer to: [www.pacioos.hawaii.edu/media/](http://www.pacioos.hawaii.edu/media/) and find our newsletter archive at: [www.pacioos.hawaii.edu/newsletter/](http://www.pacioos.hawaii.edu/newsletter/). Educational, or outreach materials related to this award are recorded within the master google [document](#) managed by IOOS.

Outreach activities include:

- M. Hattori and J. Watson. “PacIOOS Data Products and Services.” Stakeholder Workshop at American Samoa Community College. 7/12/2024. Pago Pago, American Samoa.
- A. Queima and J. Mendiola. “PacIOOS wave buoys in the Federated States of Micronesia.” Pohnpei Department of Public Safety outreach to fisheries enforcement officers. 7/30/2024. Pohnpei, FSM.
- A. Queima and J. Mendiola. “PacIOOS wave buoys in the Federated States of Micronesia.” Office of Fisheries and Aquaculture staff outreach. 7/30/2024. Pohnpei, FSM.
- A. Queima. “PacIOOS wave buoys in the Federated States of Micronesia.” Governor’s Office presentation to Kosrae mayors. 8/2/2024. Kosrae, FSM.
- A. Queima. “PacIOOS wave buoys in the Federated States of Micronesia.” Kosrae High School. 8/2/2024. Kosrae, FSM.
- L. Kaiser. “Geospatial Capabilities of PacIOOS: Information, Tools, and Services.” Territorial Climate Infrastructure Workshop. 8/2/2024. Honolulu, HI.
- J. Watson. “Pacific Islands Ocean Observing System.” Invited Presentation to Surfrider Honolulu Chapter. 8/7/2024. Honolulu, HI.
- H. Shi. and L. Kaiser. “Introduction to NOAA CoastWatch & PacIOOS: Training Course to Access and Use Data for Ocean and Coastal Applications.” Pacific GIS & Remote Sensing Council Webinar. 9/5/2024. Virtual.
- M. Iwamoto. “Enhancing Decision-Making in the Pacific Islands.” Cooperative Institutes Administrators Meeting. 9/11/2024. Honolulu, HI.

- H. Shi. and L. Kaiser. “Introduction to NOAA CoastWatch & PacIOOS: Training Course to Access and Use Data for Ocean and Coastal Applications.” Half-day Workshop, Pacific GIS & Remote Sensing Council Annual Conference. 11/26/2024. Suva, Fiji.
- J. Watson. “Overview of PacIOOS” to the International Visitor’s Leadership Program. 11/7/2024, Honolulu, HI.

### VIII. Budget Summary

- There were no delays in invoicing or payment.
- No equipment purchases were made during this progress period.

Table of invoices for the entire award during the reporting period:

Cost Categories	Funding provided	Funds spent + encumbered	Funds remaining	Remaining %
Personnel	5,201,866.00	3,152,324.99	2,049,541.01	39%
Fringe Benefits	1,535,861.00	884,347.31	651,513.69	42%
Travel	532,805.00	297,838.08	234,966.92	44%
Equipment	182,413.00	101,057.00	81,356.00	45%
Supplies	501,175.00	379,781.82	121,393.18	24%
Contractual	1,560,342.00	563,173.69	997,168.31	64%
Other	919,000.00	694,555.49	224,444.51	24%
Total Direct Charges	10,433,462.00	6,073,078.38	4,360,383.62	42%
Indirect Charges	3,357,770.00	1,965,917.58	1,391,852.42	41%
Total Amounts	13,791,232.00	8,038,995.96	5,752,236.04	42%

### IX. Success Stories

Success Story	Brief Description	Contact
Operational forecasts aid response to a ship grounding in Samoa	The Head of Ocean Sciences from the New Zealand Met Service contacted the modeling leads for both the WRF and the ROMS models supported and served by the PacIOOS team. Both of these models were used operationally to support the New Zealand Navy’s response to a vessel grounding offshore of independent Samoa in October ( <a href="http://www.nzdf.mil.nz/media-centre/news/hmnzs-manawanui-crew-and-passengers-rescued-after-ship-runs-aground-in-samoa/">www.nzdf.mil.nz/media-centre/news/hmnzs-manawanui-crew-and-passengers-rescued-after-ship-runs-aground-in-samoa/</a> ). The Ocean Sciences Head, Dr. Rafael Soutelino, thanked our researchers for the open access and availability of these model outputs as critical for their operations.	Jordan Watson / Brian Powell (ROMS) / Yi-Leng Chen (WRF)
American Samoa Sea Level Rise Viewer in action.	Applications of the updated American Samoa Sea Level Rise (SLR) Viewer have been reported by individuals as well as government agencies. The American Samoa Port Authority has reportedly used the tool to determine where to place new port infrastructure such as their new Pago Pago	Jordan Watson

	Ports building, as well as for their Pago Pago airport runway and terminal planning. Meanwhile, a private citizen in American Samoa reported using the tool during a property negotiation to demonstrate the long-term security / risk of his property relative to SLR.	
PacIOOS tools used in successful rescue of lost kayaker	In October, a kayaker was lost at sea off of O‘ahu, activating the US Coast Guard (USCG) Search and Rescue Optimal Planning System (SAROPS). SAROPS ingests PacIOOS ROMS data (which rely on HFR data in this particular search area) through the EDS and uses these data, among others, to generate search grids. Using the predicted search grids, the lost kayaker was found and returned to their family (news footage: <a href="https://hawaiinewsnow.com/2024/10/18/mother-says-teenage-kayaker-still-recovering-after-being-stranded-ocean-overnight/">https://hawaiinewsnow.com/2024/10/18/mother-says-teenage-kayaker-still-recovering-after-being-stranded-ocean-overnight/</a> ).	Jordan Watson
Tropical cyclone glider missions	(Also included in Dec 2024 Progress Report for Award no. NA23NOS0120077) This year saw PacIOOS’ first effort to support tropical cyclone forecasting in our region. We executed two concurrent glider missions that coincided with two named tropical systems (Hone and Gilma) threatening the State of Hawai‘i. A visualization ( <a href="https://youtu.be/QuI_zHTFDcM">https://youtu.be/QuI_zHTFDcM</a> ) of the glider tracks (grey lines with terminal blue and red dots) and the storm tracks illustrates the spatial and temporal overlap of the glider data with the weather systems. The Seaglider missions also demonstrated an internal success story as the regional ocean data products developer worked with the PacIOOS operations coordinator to ensure the ingestion of glider data in near real-time to the glider DAC, as well as generate custom visualization products (e.g., the video above) to communicate with partners and to disseminate data as efficiently as possible.	Jordan Watson / Chip Young