

Progress Report
Developing the Pacific Islands Ocean Observing System (PacIOOS)
Cooperative Agreement # NA11NOS0120039
Performance Period: December 1, 2015 through May 31, 2016

Submitted June 2016 by:
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1.0 Project Summary

The Pacific Islands Ocean Observing System (PacIOOS) is the Regional Association (RA) for Hawai‘i and the Insular Pacific region being developed and maintained as part of the national Integrated Ocean Observing System (IOOS). The primary goal of the work proposed under this award is to continue the development of an operational ocean monitoring and forecasting system that provides integrated, customized, and timely products that enable an ocean-literate and well-informed public and policy makers in the Pacific Islands. PacIOOS is being planned and implemented through the collective efforts of a consortium of users, signatories to the Memorandum of Agreement, and 18-member Governing Council. PacIOOS has focused initial development on ocean-state and forecasting, prediction of coastal hazards, water quality sensing, the provision of marine ecosystem information, and the development of integrated data visualization capabilities to inform marine spatial planning, operations, commerce, and recreation. Through the efforts proposed under this award, PacIOOS has enhanced development of observing and product suites in each of the aforementioned focus areas and continues to engage users, stakeholders, and system partners in the use, extension, education, and outreach of technical capacity, data visualization, and ocean information.

This report covers activities conducted during the last six 6-month performance period of Year 5 of a 5-year award, which has been extended with a no-cost extension until May 31, 2017. PacIOOS' operating budget for Year 5 is \$2,791,086.00.

2.0 Progress and Accomplishments

2.1 User Needs, Stakeholder Input and Partnerships

User Needs/Stakeholder Input

- Ongoing engagement with stakeholders throughout the PacIOOS region via regional liaisons based in the FSM, Guam, RMI, and American Samoa.
- Additional stakeholder meetings held on Maui, Majuro, Guam, Saipan, Pohnpei, and O‘ahu.
- Feedback informs continued strategic planning and decision-making.
- Continue to reach out to Young Brothers, Ltd. to determine how to best address their boat captains' needs regarding information inside the Lanai boat harbor.
- Continued discussions with of U.S. Navy captains on their data needs with regard to navigation at Pearl Harbor channel.

Partnerships

- PacIOOS has determined that while MOA partners are essential and important to our continued ability to meet stakeholder needs, moving forward, we are focusing more on the quality of such partnerships, rather than the quantity of them.
- New MOA partner: Republic of the Marshall Islands Ports Authority.
- Continued engagement with PacIOOS MOA partners.
- Formal partnership with the Young Brothers Community Support Program to assist PacIOOS in vessel transport for wave buoy operations and maintenance in Hawai‘i.
- Participated on the NOAA Pacific Island Regional Team (PIRT), NOAA Sentinel Site Program, NOAA Pacific Regional Outreach Group (PROG), NOAA Offshore Aquaculture Group, one NOAA American Samoa, NOAA Habitat Blueprint Program, and State of Hawai‘i Ocean Resources Management Plan (ORMP) Working Group.
- Continued collaboration with the Hawai‘i Office for Coastal and Conservation Lands and the UH Coastal Geology Group to address needs of the Hawai‘i Interagency Climate Adaptation Committee.
- Partnering with NOAA Habitat Blueprint team for West Hawai‘i to develop project page to inform the public on the efforts in the priority area and to enable access to related data.
- Continued discussions with Pacific Islands Regional Planning Body (RPB) on potential partnership with PacIOOS providing the data management backbone for the RPB.
- A PacIOOS-affiliated researcher participated in the 2nd Pacific Anomalies Workshop held at the University of Washington.

2.2 Governance and Administrative Structure

- Hosted a Governing Council Executive Committee meeting in March in Pohnpei, Federated States of Micronesia to: 1) discuss updates and budgets; 2) develop and outline for a revised Strategic Plan; and 3) explore potential future collaborations and projects in the FSM.
- Continued engagement with co-PIs and all recipients of IOOS funding through the PacIOOS cooperative agreement.
- Participated in IOOS activities that provide direction on the development of PacIOOS.
- Increased engagement with PacIOOS Governing Council outside of annual meetings.

2.3 Business/Operations Plan

- PacIOOS 5-year Strategic Operational Plan continues to inform program efforts; have begun process to refine and update the Strategic Plan for 2018.
- Successfully collaborated with UH Sea Grant on a NOAA OCM regional resiliency proposal. PacIOOS support for the project is \$50,000.
- Successfully leveraged PacIOOS capacity to secure \$240,000 of ONR funding through the Hawai‘i Natural Energy Institute (HNEI) to receive fiscal support for the capitalization, operations, and maintenance of another wave buoy off O‘ahu and a couple of spare buoys to increase our asset uptime.
- Successfully collaborated with the University of Guam (UOG) EPSCoR proposal to deploy water quality sensors in Pago Bay to characterize the system and achieve EPSCoR goals and objectives. PacIOOS support for the project is \$72,800 for calendar year 2016.

- Tracked PacIOOS Performance Metrics for overview of progress and effectiveness.
- Continued to foster partnerships throughout the region to assist with operations and maintenance of nearshore water quality stations and offshore wave buoys.
- Continued to leverage funding and partnership opportunities with NOAA CSC, NOAA Coastal Storms Program (CSP), State of Hawai‘i, US Army Corps of Engineers, EPSCoR, US Navy, UH Sea Grant, and NOAA PMEL.
- Continued services contract with UOG Sea Grant for sensor maintenance and outreach.
- No-cost extension of services contract with Hibiscus for website redesign/development.
- Continued implementing consultant suggestions for improved communications.

2.4 Observing System Implementation

Ocean-State

- Combined page views of PacIOOS wave buoy pages from NDBC, CDIP, and PacIOOS websites total over 1.68 million during this reporting period. PacIOOS wave buoys accounted for over 2.76 million data requests and over 5 million RSS requests from NDBC during this reporting period.
- Continued to maintain an array of 13 wave buoys across the system. Recovered, redeployed, or swapped the following wave buoys: Kāne‘ohe (HI), Kaunalapau (HI), Hilo (HI), Aunu‘u (American Samoa), Ipan (Guam), Pauwela (HI), and Majuro (RMI).
- Continue to implement new back-up line with all new wave buoy moorings deployed.
- Hired a PacIOOS Oceanographic Research Instrument Associate, a new full-time position to support PacIOOS operations, primarily wave buoys.
- Continued to operate and maintain 7 HFR stations (5 on O‘ahu and 2 on Hawai‘i Island).
- Renewed the FCC experimental license for all Hawai‘i HFR stations, extended to 2021.
- Deployed over 45 drifting buoys provided by USCG, to calibrate the Chevron, Ka‘ena, and Kalaeloa HFR stations (O‘ahu west coast).
- Peer-reviewed paper by a PacIOOS-funded graduate student was published in the Journal of Geophysical Research on the comparison of the observations of sea surface currents following the arrival of the 2011 Tohoku tsunami with modeled currents.
- Two poster presentations and one oral presentation at the Ocean Sciences Meeting in New Orleans using PacIOOS surface current data.
- Three poster presentations and one oral presentation at the ORCA meeting in Wuhan using PacIOOS surface current data.

Forecasting

- Ongoing maintenance and operation of PacIOOS WRF, ROMS, and wave models.
- We have not yet been able to launch a PacIOOS glider run this fiscal year as planned due to hardware issues and a lack of available gliders from the UH Glider Facility.
- Finalized ingestion new Hawai‘i (Hilo) HFR data into ROMS models.
- Upgraded software and assimilation for ROMS models.
- Working on a reanalysis of ROMS models for 2013-2016.
- Developing an ensemble ROMS forecast to increase accuracy.

Coastal Hazards

- Continued maintenance of existing PacIOOS products, including operational code.
- Developed a sign-up process and automatic email notification system for all PacIOOS 6-day high sea level forecasts and wave run-up forecast tools; currently in beta testing with liaisons and key stakeholders
- Based on local stakeholder feedback/requests, refined Majuro and Kwajalein PacIOOS Wave Run-Up forecast tools to read in MLLW instead of MSL.
- Continued re-analysis of PacIOOS Wave Run-Up Forecasts along the North Shore of O‘ahu in order to improve forecast process for multiple locations along the coast.
- Continued field validation of high sea level and inundation forecasts by PacIOOS liaisons and volunteer observers. This highly useful information, including photos, is being used to build up a validation archive and to fine-tune the forecasts.
- Finalized an automated solution to monitor uptime for PacIOOS performance measures.
- Rebuilding the code for acquisition and editing (via a simplified GUI) of the sea level data acquired by the Pacific Tsunami Warning Center from its own gauges distributed in the main Hawaiian Islands (10 of which are not duplicated by NOS gauges nor are archived outside of Hawaii).
- Ship-based tsunami detection network effort now has 10 ships equipped with geodetic GPS installments to measure ship vertical positions to better than 10cm RMS. In addition, all 10 ships now have a satellite communications antennae to transmit the data in real-time to processing computers at UH.
- A beta version of the web interface for displaying the network status and ship vertical time series is now operational.

Water Quality

- Continual maintenance of all 13 water quality sensors (NSS) throughout region.
- Continual service of Hilo Bay water quality buoy (WQB) off Hawai‘i Island, and continued student projects associated with Hilo Bay WQB.
- Poster presentation at the Ocean Sciences Meeting in New Orleans on the potential climate change impacts in Hilo Bay based on water temperature, river flow, and phytoplankton dynamics.
- Received USACE permit for Pelekane Bay WQB. Currently working with USCG for next step.
- Participated in the Pacific Anomalies 2nd Workshop in Seattle.
- Retrofit of Pelekane buoy for deployment, including adding a new Storm3 data logger, sonde servicing and preparation for deployment.
- Continuing work to get Hilo Bay WQB onto PacIOOS Voyager.
- Entered two separate Memorandum of Understanding (MOU) agreements with partners to implement two pilot projects under the PacIOOS Water Quality Partnership Program.
- Both water quality partnership program projects were trained and briefed before they deployed a PacIOOS water quality sensor at their respective site. The projects are with the Coral Reef Research Foundation to monitor a mesotrophic reef in Palau, and with Dr. Kevin Rhoades in Pohnpei, FSM to measure water quality at a grouper spawning aggregation site.

- Collaborated with Conservation International Hawai‘i, UH researchers, and local community leaders on a peer-reviewed paper in *Collabra Journal* highlighting a study aiming to better understand the coastal ocean dynamics of a coral reef off Lāna‘i and measuring the efficacy of land-based sediment reduction efforts.
- Mentored undergraduate students that help maintain the PacIOOS NSS.
- Leveraged funding from UH Sea Grant, PacIOOS, and NOAA OAP to maintain existing MApCO₂ buoys off O‘ahu.
- Continued background synoptic (bottle) sampling of seawater at the MApCO₂ buoys.
- Data from the MApCO₂ buoys are available online at PMEL website and accessible via PacIOOS Ocean Acidification project page.

Ecosystems and Living Marine Resources

- Four additional shark tracks added to PacIOOS tiger shark tracking page (total now 28).
- PacIOOS-affiliated researchers completed the final report commissioned by the State of Hawai‘i Department of Land and Natural Resources to conduct quantitative modeling and analysis of movement patterns of tiger sharks around Maui. Additional tags and support provided by PacIOOS.
- Positional data from previously tagged sharks continued to be collected via Argos and land-based receivers.
- Inspections of sites for future installation of land-based receivers; systems received.
- Presentation at the Ocean Sciences Meeting in New Orleans on the shark-tracking efforts funded by the Ocean Technology Transition program in IOOS.

2.5 Data Management and Communications (DMAC)

PacIOOS data management group (DMG) ensures the data collected by PacIOOS are stored and accessible to users via standard services. In addition, the DMG develops tools and products based on the collected data. DMG accomplishments include the following:

- Almost 4,000 unique visitors (via direct external access to our servers) accessed more than 1,125,500 pages in our servers and transferred over 294 GB of data.
- Hired new student assistant to help with DMAC activities.
- Commenced discussions with NOAA PIFSC on potential to cost-share a DMAC staff to fill mutual needs across organizations.
- Continue to maintain the system and address data management issues as they arise.
- Continue close collaboration with PacIOOS management and communications.
- Continue meeting IOOS DMAC protocols.
- Finalized internal QARTOD implementation, as described in RICE certification MOA.
- Iterating collaboration with NCEI to finalize formats on data to be archived at NCEI.
- Continue migration of data services to newer machine.
- DMAC staff has been instrumental in transferring the data pages over to the new PacIOOS website and creating new tools and functionality in the pages.
- Continue with efforts to include real-time weather station data into PacIOOS data servers (e.g., Palau and Kāne‘ohe examples).
- Improved out geospatial server by integrating it with the PacIOOS metadata catalog, making the data layers more discoverable.

- Continuously work with data and technical staff in each of the focus areas to improve user experiences and access to products and data.
- All of DMG continues to work toward meeting all of the IOOS goals and requirements.

2.6 Education, Outreach and Public Awareness

PacIOOS Website/Brand Development

- During this reporting period, the PacIOOS website was visited by over 103,000 users and had more than 640,000 page views. Shark tracking and wave buoy pages continue to be the most visited pages on the website.
- To enhance the user-experience for web users, PacIOOS redesigned its website for a more user-friendly organization and presentation of content and data tools. During this reporting period, staff worked with an external contractor to finalize the overall design and structure; a content management system (Word Press) was developed and customized for PacIOOS' needs to feature real-time, forecast and historical data; scripts and codes for data tools were transferred to a different server and modified and enhanced for embedding into the new website; content was transferred, updated and enhanced.
- As part of a soft roll-out, new outreach materials were developed using the new branding and logo. The full release of the new branding will be paired with the launch of the website.

PacIOOS Social Media

- PacIOOS continues to enhance its presence on social media, in particular on Facebook and Twitter, with a post frequency of 1-4 posts per week.
- PacIOOS' Facebook account has more than 1,200 likes; Twitter followers are slowly increasing to more than 180.
- Popular posts included record-breaking wave heights at the Waimea wave buoy, the redeployment of the Majuro (RMI) wave buoy, and the shark study report release.

PacIOOS Communications

- Continue to publish and distribute monthly e-newsletters; distribute both as html and plain version to accommodate subscribers with .mil account.
- Over 70 new contacts were added to the newsletter mailing list, for a total of 1,425 recipients.
- Presentations for numerous organizations, groups and events, including at the Carbon Network Workshop, Ocean Science Meeting, 2016 Sustainability Conference, Second Pacific Islands Training Workshop on Ocean Observation and Data Applications.
- Continue to produce updated and relevant flyers and materials for workshops, conferences, partner meetings, and general outreach.
- Collected/published success stories, illustrating value of PacIOOS data and services.
- Development of "Ocean Observation Highlights" brochure to feature programs, tools and accomplishments.

- Increased public awareness and interest in PacIOOS with targeted, engaging press releases, resulting in media coverage in the Hawaii Tribune Herald, Talane News American Samoa, Micronesia Challenge Newsletter, Marshall Islands Journal.
- Press conference for release of tiger shark report (in collaboration with Department of Land and Natural Resources); preparation of informational video clip and press release; media coverage in countless local, national and international news outlets.
- Public Service Announcement on Marshall Islands' radio stations to raise awareness about wave buoy.

Collaborative Efforts/Events

- Continue to run kiosks at University of Guam, College of Marshall Islands, Windward Community College, Kailua Sailboards & Kayaks, Maui Ocean Center, UH Maui College, Dolphin Quest (Kohala Coast, Big Island), Mokupāpapa Discovery Center (Hilo), and Kauai Community College.
- Exhibit at public outreach events Mauka to Makai at the Waikiki Aquarium.
- Continue collaboration with UH Maui College to use PacIOOS Voyager lesson plan as classroom activity for oceanography lab; focusing on data relevant to students and real-world decision-making.
- Water quality team continues to mentor undergraduate college students and high school students to support sensor program.

2.7 National and International Collaborations

- PacIOOS continues to participate in all IOOS and IOOS Association calls and meetings.
- Melissa Iwamoto served on the Executive Committee of the IOOS Association Board.
- Chris Ostrander also remains a member of the IOOS Association Board.
- Chris Ostrander continues to serve on the IOOS Federal Advisory Committee.
- Chris Ostrander continues to serve on the Indo-Pacific Oceanography Reference Group (UNESCO-IOC).
- PacIOOS leadership continues to engage with Pacific Islands Global Ocean Observing System (PI-GOOS).
- Jim Potemra participates in monthly DMAC conference calls and marine portal forum.
- Melissa Iwamoto and Chris Ostrander represented PacIOOS at the annual IOOS meeting in March in Silver Spring, MD.
- Multiple training presentations at the 2nd WMO/JCOMM Pacific Islands Data Buoy Cooperation Panel (DBCP) workshop, held in Noumea, New Caledonia.

3.0 Scope of Work (Remaining tasks to be completed during the no-cost extension, through May 31, 2017)

- Re-deploy Kauai Wave Buoy.
- Rebuild mooring and re-deploy Ritidian Wave Buoy.
- Integrate geospatial data into PacIOOS data services and into web-based products.
- Deploy an array of oceanographic satellite tags on sharks in the Main Hawaiian Islands.

- Deploy an array of land-based receivers for oceanographic satellite tags on sharks.
- Implement a real-time time-series analysis and display for ship-based detection of tsunamis.
- Conduct analysis of the time-series collected to date to determine data completeness, accuracy and robustness for ship-based detection of tsunamis.
- Run a 3-month glider mission for data assimilation into PacIOOS Regional Ocean Modeling System (ROMS).
- Purchase and deploy new filter sets on five high-frequency radio (HFR) stations.

4.0 Personnel and Organizational Structure

Melissa Iwamoto was promoted to Director of PacIOOS, effective February 1, 2016. There are currently no plans to fill the Deputy Director position.

5.0 Budget Analysis

Spending is mostly on track with projected program expenditures; however, due to some extenuating circumstances, including staff turn-over and vehicle availability limitations with the UH glider facility, some individual component spending has been delayed. In addition, funding for the 2-year NWS-supported project for ship-based tsunami detection and characterization was not received until June 2015. NOAA has approved a 12-month no-cost extension, through May 31, 2017. The tasks still to be completed under this no-cost extension are listed above in Section 3.0.

The University of Hawai‘i Office of Research Services submitted a semi-annual financial report for the period ending 3/31/2016, through Grants Online. That report showed total receipts of \$11,077,056.32.

As of 6/1/2016, internal budget tracking shows expenditures of \$11,708,779.34, representing a draw down of 95% of the Federal funding for this award.

Semi-Annual Supplemental Information (from June 1, 2015-May 31, 2016)

1.0 Regional Ocean Governance Organization

The Regional Ocean Governance structure within the PacIOOS region is the Pacific Regional Ocean Partnership (PROP). The U.S. Pacific Islands Region Governors of American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), Guam, and Hawai‘i established PROP in August 2012. Appointed members of the PROP have met only a few times and are in a relatively elementary stage compared to other regional ocean governance structures around the nation. To date there has been very limited opportunity for PacIOOS, and other partners outside the Governor’s offices, to contribute or participate in PROP.

In addition to the PROP, there is a Pacific Islands Regional Planning Body (PI RPB) focused on CMSP. The Pacific Islands RPB most recently met in March 2016, in Pago Pago, American Samoa. The PI RPB has divided its workload between three building blocks for successful development of the Pacific Islands Ocean Plan: capacity, data and tools, and stakeholder engagement. The meeting was structured to develop goals and related directives/

recommendations that will forge progress on these building blocks in the year ahead. PacIOOS continues to be engaged in the conversation for data hosting and data portals. The PI RPB is forming a working group that can also include non-governmental representatives, and the team has asked PacIOOS to join this working group. PacIOOS data management lead, Dr. Jim Potemra, will represent PacIOOS on this working group. The PI RPB has started working on a pilot project for American Samoa. At this stage, it is mostly a data collection and stakeholder engagement effort.

2.0 Efforts to leverage IOOS funding

- City and County of Honolulu provided PacIOOS with \$50,000 to manage and serve their oceanographic data, leveraging our data servers and viewers.
- In early 2014, PacIOOS established a formal agreement with Young Brothers, Limited through a community support program. In January 2016, Young Brothers continued this partnership for the 3rd year, to assist PacIOOS in operations and maintenance of Hawaii-based wave buoys by providing vessel support. This is a cost savings for PacIOOS of about \$8,000 per year.
- The wave buoy program in the Pacific Islands is a collaborative effort made possible by funds from PacIOOS, the University of Hawaii (UH), the Coastal Data Information Program (CDIP), and the US Army Corps of Engineers. The CDIP partnership alleviates our staff from managing the wave buoy data, saving both time and money.
- Partner programs purchased a number of the buoys we operate and maintain; for example, the Kona and Hilo water quality buoys (NSF-EPSCOR) and the Kāneʻohe buoys (Department of Energy). Two new wave buoys are targeted for Kāneʻohe Bay. The assets help with NSF related projects on the Big Island and wave energy experiments in Oʻahu. We host the data, and our users benefit.
- PacIOOS is partnering with a community stewardship group and informed ocean user volunteers to maintain the two Maui near shore water quality sensors.
- PacIOOS pays \$40K per glider expedition. The gliders we operate are part of a larger glider pool at UH, which is comprised of ten systems purchased by various programs. Data from each glider mission is available to all partners, meaning that PacIOOS has access to data from ~10 missions per year, while normally paying for only one.
- All HFR operations are a results of collaborative efforts between CIMES, PacIOOS, and UH. CIMES and UH provided much of the initial investment into the development of the HFR systems used on Oʻahu. NOAA Coastal Storms Program funded the initial investment and deployment of the two HFR stations on Hawaiʻi Island (Hilo). PacIOOS funds ongoing operations and maintenance.
- Installment of HFR at all of our sites is a result of collaborations with property owners. Depending on the site, we use space, electrical, and Internet access to operate the systems effectively. Example partners/sites include Kapiolani Community College, US Air Force, UH Medical facilities, and Chevron.
- The majority of the data holdings we serve are provided by partner agencies. This enables PacIOOS to provide valuable information to stakeholders without performing additional ocean surveys and observational work. Our partners help us meet our stakeholder needs.

- Successfully leveraged existing data management capacity within PacIOOS to collaborate with UH Sea Grant on a NOAA OCM regional resiliency proposal. PacIOOS support for the project is \$50,000.
- Successfully leveraged PacIOOS capacity to secure \$240,000 of ONR funding through the Hawai‘i Natural Energy Institute (HNEI) to receive fiscal support for the capitalization, operations, and maintenance of another wave buoy off O‘ahu and a couple of spare buoys to increase our asset uptime.
- Successfully leveraged PacIOOS water quality expertise to collaborate with the University of Guam (UOG) EPSCoR proposal to deploy water quality sensors in Pago Bay to characterize the system and achieve EPSCoR goals and objectives. PacIOOS support for the project this calendar year is \$72,800.

3.0 Update to RA Governance board membership

The online RA Governance board membership is updated via Google Docs.

<https://docs.google.com/a/noaa.gov/spreadsheets/d/1mZobsUEw1ZV7Fo2BGaTFoMnIH7OpwaNH7y-d0xPsu9G4/edit?usp=sharing>

PacIOOS will hold 2016 elections in July 2016 to fill 6 seats on the PacIOOS Governing Council. The total number of MOA Signatories is now 53.

4.0 Governance Activities and Accomplishments

PacIOOS held a Governing Council meeting in October 2015 in Honolulu to discuss program priorities, evaluation, and to begin discussions for the next 5-year proposal.

PacIOOS held an Executive Committee meeting in March in Pohnpei, Federated States of Micronesia to 1) discuss updates and budgets; 2) to strategize specific aspects of the future direction of PacIOOS; and 3) to increase the understanding of the challenges and opportunities of within remote islands in the Pacific Islands region.

PacIOOS gained 2 new MOA Signatories since May 2015. Rather than simply increasing numbers of MOA partners, we are now focusing on acquiring new strategic MOA partners.

5.0 Education and Outreach Activities

PacIOOS held or participated in a number of outreach activities (presentations, live demos, webinars, hands-on activities etc.).

Many can be found here: <http://pacioos.org/outreach/events/events.php>

- 2015 North Shore Ocean Fest (June 2015)
- 9th Annual Kewalo Basin Park Clean up (June 2015)
- World Ocean’s Month series at the Waikiki Aquarium (June 2015)
- Teacher Training Workshop on Majuro, RMI (June 2015)
- Climate Change Observations Workshop, New Caledonia (June 2015)
- Kapiolani Community College Career Mixer (July 2015)
- NOAA’s Marine Planning Portal Network on Citizen Science Data (August 2015)

- Family Night at the Waikiki Aquarium (August 2015)
- Marine Educator’s Night (October 2015)
- PacIOOS Governing Council Meeting (October 2015)
- SOEST Open House (October 2015)
- Pacific Anomalies Science and Technology Workshop (January 2016)
- Carbon Network Workshop at Waikiki Aquarium (February 2016)
- PacIOOS Governing Council Executive Committee meeting and Partner Reception in Pohnpei, Marshall Islands (March 2016)
- Ocean Science Meeting (March 2016)
- 9th Annual Mauka to Makai Earth Day event at Waikiki Aquarium (April 2016)
- 2016 Island Sustainability Conference in Guam (April 2016)
- Second Pacific Islands Training Workshop on Ocean Observation and Data Application (May 2016)
- Hawaii Ocean Resources Management Plan Working Group (monthly)
- Meetings in Guam, CNMI, Marshall Islands, Palau and Hawaii

PacIOOS focused mainly on the ongoing redesign of the PacIOOS website, and participated in priority outreach events. With regards to education, PacIOOS continues to work with the University of Hawaii Maui College to develop classroom activities using data available on PacIOOS Voyager, focusing on data relevant to student experiences and real-world decision-making. UH Maui College continues to run these activities in the Introduction to Oceanography lab. PacIOOS also hired a new student assistant to support communications and outreach efforts.

5.1 Update information contained in the Education and Outreach Tool

Completed. Please see Google Docs shared inventory for responses.

https://docs.google.com/a/noaa.gov/spreadsheets/d/1xsgY6Qz1ldwsotma1nmRLWVsJne5BWnt0J6qQZi9_Xk/edit?usp=sharing