

Progress Report
Developing the Pacific Islands Ocean Observing System (PacIOOS)
Cooperative Agreement # NA11NOS0120039
Performance Period: December 1, 2013 through May 31, 2014

Submitted by
Chris Ostrander
School of Ocean and Earth Science and Technology
University of Hawaii at Manoa
June 2014

1.0 Project Summary

The Pacific Islands Ocean Observing System (PacIOOS) is the Regional Association (RA) for Hawaii and the Insular Pacific region being developed 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 17-member Governing Council. PacIOOS has focused initial development on water quality sensing, ocean-state and forecasting, the provision of marine ecosystem information, prediction of coastal hazards, 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 will enhance development of observing and product suites in each of the aforementioned focus areas and will continue 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 six 6-month performance period of a 5-year award. Currently in Year 3 of the 5-year award, PacIOOS is operating with an annual budget of \$2,371,488.

2.0 Progress and Accomplishments

2.1 User Needs, Stakeholder Input and Partnerships

- New Signatories to the MOA:
 - o Republic of Marshall Islands Environmental Protection Agency
 - o Waikiki Aquarium
 - o Northern Marianas College
 - o Pohnpei NOAA Weather Station
 - o Pohnpei Surf Club
 - o Kosrae Conservation and Safety Organization
 - o Chuuk Conservation Society
 - o Micronesia Management and Marketing Enterprise

- Established formal partnership with Young Brothers, Limited to assist PacIOOS in vessel transport for wave buoy operations and maintenance.
- Participation in the BOEM Task Force, 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, NOAA Sentinel Site Program, and State of Hawaii Ocean Resources Management Plan (ORMP) Working Group and Policy Group.
- PacIOOS and the NOAA NWS continue to explore options to move PacIOOS forecasts into an experimental guidance product with hopes to transition them to operational capacity within AWIPS.
- Secured partnership and successfully completed an experiment with Conservation International and Hawaii Fish Trust to support project community coastal restoration project on Lanai seeking to reduce sedimentation of nearshore reefs.
- Hired the company, Strategies 360, to assist in evaluating effectiveness of our program organization and communication.
- Attend Pacific Islands Regional Planning Body (RPB) meetings and calls to promote PacIOOS data services role for the region.
- Chris Ostrander represented PacIOOS in Guam and Saipan to further relationships and discuss the future of our water quality sensor at the Lao Lao station.
- Heather Kerkering and Melissa Iwamoto traveled in the Hawaiian Islands to meet with current partners and establish new partners, including: (Big Island): UH Hilo, Pacific Islands Climate Science Center, EPSCoR, Pacific Aquaculture and Coastal Resources Center, NOAA Mokuapapa Ocean Center, DLNR, Kampachi Farms, Blue Oceans Aquaculture, UH Sea Grant Extension, and the Kohala Center; (Maui): Coral Reef Alliance, The Nature Conservancy, State Planning Offices, Hawaiian Islands Humpback Whale National Marine Sanctuary, Pacific Disaster Center, Department of Transportation – Harbors, and a number of Community Marine Managed Area (CMMA) groups; (Lanai): Conservation International and Hawaii Fish Trust.
- PacIOOS participated in a “Water Resources and Drought Dialog” workshop in RMI, sponsored by NOAA and USAID to support climate adaptation in the Pacific Small Island Developing States.
- PacIOOS continues two collaborative projects with the Hawaiian Islands Humpback Whale National Marine Sanctuary. We are providing geospatial and data expertise, space, and assistance for the Niihau Management Project. Additionally, our modelers provided ocean circulation information for a West Maui discharge study for the Sanctuary Management Plan.
- PacIOOS and the local Alliance for Coastal Technology program continue to partner to explore ocean acidification sensors and research.
- Discussions with PacIOOS and the US Navy (Pacific Command, PacFleet, and 3rd Fleet) focus on identifying areas for future collaboration and mutual benefit. An MOA between PacIOOS and the U.S. Navy is underway through the NOAA IOOS Office.
- PacIOOS is now serving citizen science water quality data through Voyager, an accomplishment appreciated by many of our partners.

- Partnership with PMEL and PacIOOS demonstrated in DIC experiment along Oahu's south shore.
- Web-User Statistics since June 2013 progress report:
 - o Over 240 new contacts added to newsletter mailing list
 - o 156% increase in unique visitors to the website (155k total users during reporting period)
 - o Increase to 700 Total Page Likes on Facebook

2.2 Governance and Administrative Structure

- Elections are scheduled for June 2014 to replace 4 Hawaii-based and 2 Regionally-based representatives.
- PacIOOS hosted an Executive Committee meeting in February to review organizational structure, program evaluation, the strategic plan and priorities for FY14, and the process for aligning our operations to meet certification criteria and the next round of funding. The PacIOOS Executive Committee includes: SOEST/PacIOOS PI (chair); Liquid Robotics; Government of Guam; Hawaii Marine and Coastal Zone Advocacy Council (MACZAC); and College of Marshall Islands.
- Co-PI meetings are held frequently to engage and update all recipients of IOOS funding through the PacIOOS cooperative agreement.
- Continue to participate in national IOOS activities that provide direction on the development of PacIOOS.

2.3 Business/Operations Plan

- Operations and future plans continue to be informed by PacIOOS 5-year Strategic Operational Plan.
- Reallocated PacIOOS funds to discontinue funding of water quality instrumentation at two Oahu south shore stations. The decision was made with support from NOAA IOOS, NOAA OA, NOAA PMEL, and UH SOEST. The reallocation allowed other PacIOOS components to receive additional funds to continue their operations.
- Seeking strong partnerships on neighbor islands to assist with operations and maintenance of nearshore water quality stations and offshore wave buoys.
- Renewed relationships with NOAA PSC and NWS to continue the operations and maintenance of shared products.
- Continue to leverage funding and partnership opportunities with NOAA CSC, NOAA Coastal Storms Program, City and County of Honolulu, State of Hawaii, US Army Corps of Engineers, US Navy Pacific Command, EPSCoR, UH Sea Grant, and NOAA PMEL.

2.4 Planning, Design, and Implementation

- Recovered, redeployed, or swapped the following wave buoys: Maui, Lanai, Barbers Point, Ritidian, Saipan, Hilo, Kaneohe, and Mokapu.
- Expanded ROMS to American Samoa.
- Release of Hawaii Flash Flood Tool in collaboration with NOAA PSC and NOAA NWS. www.pacioos.org/flashfloodtool

- Release of new PacIOOS Sea Level Rise and Shoreline Change Tool, in collaboration with UH Manoa. The Tool is targeted to coastal planners.
- Discontinued water quality sampling at two south shore stations on Oahu (Kilo Nalu and Ala Wai).
- Discontinued water quality sampling at the Lao Lao station in Saipan due to burdensome maintenance requirements.
- Continuous operations and maintenance, and swapping of wave buoys throughout the Pacific.
- Developed a High Sea Level forecast for Koror, Palau and Apra Harbor, Guam.
- Expanded WW3 coverage to include the NWHI chain.
- Deployed two new water quality sensors: Kahalui, Maui and Wailupe, Oahu.
- PacIOOS wave forecasts validated daily with measurements from NDBC buoys.
- Multiple current meters and a pressure gauge deployed on the Big Island to improve physical understanding of the processes creating the surge in Hilo and to improve the accuracy of the surge forecast.
- Re-analysis of PacIOOS Wave Run-Up Forecasts along the North Shore of Oahu in order to improve forecast process for multiple locations along the coast.
- Kaena Point High Frequency Radio (HFR) operational. Extended coverage of real-time surface currents along west coast of Oahu.
- One of two Hilo HFR installations completed. Funding provided by NOAA Coastal Storms Program (CSP). Second system to be operational during next reporting block.
- Testing of prototype pop-up satellite tags capable of measuring oxygen concentrations throughout the water column. Initial test results look good.
- Continued tagging effort leveraged with State of Hawaii funding: 15 tiger sharks tagged off Maui. All implanted with acoustic transmitters; 8 equipped with fin-mounted 'SPOT' satellite transmitters. Data available on PacIOOS website.
- Continual service and maintenance of all water quality sensors (NSS) and buoys (WQB) throughout PacIOOS region.
- Trained new personnel on how to service, maintain, and download data from NSS in insular Pacific.
- Developed new Ala Wai Turbid Plume Forecast – partnership between PacIOOS water quality group and PacIOOS modeling group. Continued bottle sampling for model validation.
- As part of the IOOS Marine Sensor Innovation project, expanded ocean acidification capabilities with the first remotely deployable, prototype Dissolved Inorganic Carbon (DIC) analyzer, developed by NOAA PMEL. The buoy was deployed next to Kilo Nalu WQB in October. When operated in conjunction with pCO₂ monitoring equipment, mineral saturation state can be calculated in real time.
- Alliance for Coastal Technologies (ACT) pH sensors installed on Kaneohe Bay CRIMP buoys. CRIMP buoys are a collaboration between UH Sea Grant, NOAA PMEL, and PacIOOS (maintenance support).
- Manual water sampling next to DIC and ACT pH sensors to ground-truth data.

2.5 DMAC

The PacIOOS data management group (DMG) is tasked with ensuring the data collected by PacIOOS is stored and accessible to users via standard services. In addition, the DMG develops tools and products based on the collected data. Accomplishments by the DMG during this reporting period include the following:

- Voyager Mobile became available in iTunes, February 2014.
- PacIOOS and NANOOS co-hosted a DMAC Webinar, “IOOS Biological Data Services” for the IOOS DMAC community.
- Development of new ‘Project Pages’ for partner organizations. The pages serve as a repository of ocean and coastal program and project data collected by researchers, NGOs, community groups, and partners throughout the Pacific for a service fee.
- Continue the development of the on Hawaii Tiger Shark Tracking page in partnership with Hawaii Institute of Marine Biology (HIMB) researchers funded by the State of Hawaii to display near real-time tracks and locations of tiger sharks tagged off Maui. <http://pacioos.org/projects/sharks/>
- An additional project page for the City and County of Honolulu Mamala Bay study is in progress.
- Release of new Ala Wai Plume Model on website.
- Continued enhancement of PacIOOS Voyager mobile.
- New data holdings added to the PacIOOS Voyager, our data visualization and download tool, include:
 - o Maui water quality citizen science data
 - o Cascadia RC dolphin and whale tracking
 - o Tsunami and Flood Zones
 - o Development of new map style selections
 - o Update in measurement tools
 - o ROMS for American Samoa
 - o Tiger Shark Tracker Update
 - o Hawaii Whale Tracking data
 - o Near Real-time USGS Rain and Stream Gauges
- The UH Coastal Geology Group provided PacIOOS with Sea Level Rise Scenario and Historical Shoreline map layers as part of a partnership to develop a tool that addresses requests by county planners. The Sea Level Rise/Shoreline Change tool provides easy access to shoreline change rates and potential impacts of sea level rise in relation to a particular parcel. The tool was finalized and released during this reporting period.
- Work continues on incorporating a Sensor Observation Service (SOS) into the PacIOOS suite of data services. The particular implementation is based on THREDDS OPeNDAP server (TDS), and PacIOOS has been working with both Unidata (TDS) and ASA (SOS) to enable this service. At present, PacIOOS has two test data sets being served by SOS. Once the service bugs are worked out, the plan is to add all the PacIOOS point measurements (near-shore sensors and water quality buoys) to this service.
- In collaboration with NOAA Hawaiian Islands Humpback Whale National Marine Sanctuary, developed an interface for targeted users to explore geospatial data related to the management of Niihau.
- Continue to enhance user interface and experiences on the web page.

- 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

- Google Analytics indicate a significant increase in new users and length of time spent on the website. Over the past year, the number of users increased 156%.
- PacIOOS played a significant role in AGU Ocean Sciences Meeting here in Honolulu. PacIOOS contributions included co-hosting the IOOS Exhibit, giving 4 presentations, presenting 10 posters, and co-leading one session.
- In collaboration with COSEE Island Earth, PacIOOS kiosks have been developed and shipped to multiple locations. There are currently 9 kiosks operating, with 4 added during this reporting period: Whaler's Village (Lahaina, Maui), Hawaii State Art Museum (Honolulu, HI); College of the Marshall Islands (Majuro); and Windward Community College Kiosk (Kaneohe). We are planning to place one on Kauai soon.
- Collaboration with UH Maui College to develop classroom activities using data available on PacIOOS Voyager, focusing on data relevant to student experiences and real-world decision-making.
- Presentations for numerous organizations, groups, and events, including NOAA PSC, Area Committee Meetings, Hawaii Ocean Safety Team, Waikiki Aquarium, and Lanikai Community Association, and the NOAA/USAID sponsored workshops in small Pacific Islands focused on climate adaptation.
- Exhibits at multiple local events, including AGU Ocean Sciences, Waikiki 100th Anniversary, HaSTA 50th Anniversary, Mauka to Makai Earth Day at Waikiki Aquarium, North Shore Ocean Fest, and a Technology Fun Fair.
- Continue to produce updated and relevant flyers and materials for workshops, conferences, partner meetings, and general outreach.
- Continue to publish and distribute monthly e-newsletters.
- Enhanced presence on social media, especially Facebook, Twitter, and Instagram.
- Collected and published success stories illustrating value of PacIOOS data, tools, and services.
- Increased public awareness and interest in PacIOOS with targeted, engaging press releases including:
 - o Saipan Wave Buoy Swap: Saipan Tribune, UH News, Marianas Variety
 - o High Resolution Forecasts from PacIOOS on Think Tech Hawaii
 - o Shark Tagging Video Coverage on Hawaii News Now, KHON2, KITV4, HPR
 - o Shark Tagging printed media including: Honolulu Star Advertiser (front page, 2 story), The LA Times, MauiNow.com, Honolulu Civil Beat, West Hawaii Today, The Wire, Wn.com, Fox12 Oregon, Hawaii Reporter, UH News

2.7 National and International Collaborations

- PacIOOS continues to participate in all IOOS and IOOS Association conference calls and workshops.

- Heather Kerkering remains a member of the Finance Committee of the IOOS Association Board. Chris Ostrander also remains a member of the board.
- Chris Ostrander continues to exercise his role in the IOOS Federal Advisory Committee.
- Chris Ostrander continues to serve on the Indo-Pacific Oceanography Reference Group (UNESCO-IOC).
- Chris Ostrander and Jim Potemra continue as members of the Advisory Committee for the Pacific Islands Global Ocean Observing System (PI-GOOS).
- Jim Potemra participates in all monthly DMAC conference calls, as well as the marine portal forum. Jim attended the IOOS DMAC and Product Development workshop in Silver Spring, MD in September.
- Heather Kerkering and Chris Ostrander represented PacIOOS at the annual IOOS Meetings in Washington DC.
- PacIOOS collaborated with west coast RAs and IOOS Association to coordinate an IOOS exhibit at the AGU Ocean Sciences meeting in Honolulu in February 2014.

3.0 SCOPE of WORK

3.1 User Needs, Stakeholder Input and Partnerships

- Continue to work with Pacific Regional partnerships and NOAA Pacific Regional Team.
- Continue to advocate for PacIOOS as a data provider for Pacific regional efforts.
- Develop tutorials and webinars focused on specific user groups and management questions.
- Visit Insular Pacific Islands. Planned visits: American Samoa, Marshall Islands.
- Increase engagement of insular Pacific stakeholders through Governing Council members and PacIOOS liaisons.
- Continue to explore options to move PacIOOS forecasts into NOAA NWS AWIPS.
- Forge more partnerships with community-based conservation and citizen science groups.
- Continue to increase signatories to the MOA.

3.2 Governance and Administrative

- Host Governing Council meeting in Honolulu in October 2014.
- Continue to participate in national IOOS activities that provide direction on the development of PacIOOS.
- Continue to meet frequently with PacIOOS PIs and focus area groups.
- Conduct PacIOOS administration and effectively staff the program.
- Refine MOA to meet the RICE certification requirements.

3.3 Business/Operations Plan

- Continue to refine an internal performance evaluation strategy in relation to PacIOOS 5-yr Strategic Operational Plan to help guide future proposals and establish priorities.
- Continue to identify and leverage funding and partnership opportunities with partners.
- Implement feedback and suggestions from Strategies 360 evaluation.
- Apply for RICE certification.
- Update Strategic Operational Plan and DMAC Plan.

3.4 Implementation Activities

- Wave buoy redeployments planned for Majuro, Marshall Islands and American Samoa.
- Wave buoy deployments on windward Oahu to support wave energy studies.
- Buoy swap planned for Mokapu in September.
- Assess the accuracy of ROMS for use in SAR/USCG cases.
- Use PacIOOS data to validate WW3 and SWAN models.
- Continued analysis of data for improving the PacIOOS wave run-rup forecast tool and adding new locations along the North Shore of Oahu.
- Continued data collection of harbor data to improve the PacIOOS harbor surge forecast tool in Haleiwa Harbor.
- Develop a harbor surge forecast for Hilo Harbor in partnership with USACE.
- Finalize installation second Hilo HFR at Pepeekeo (*awaiting USCG permits*). Funding for Hilo HFR provided by NOAA CSP.
- Installation of HFR at Kapolei, Oahu at Chevron Refinery (*awaiting permits*).
- Upgrades to HFR installations on Oahu, including more antennae, wind turbines, and Faraday shielding.
- Continued testing of prototype pop-up satellite tags measuring oxygen (on top marine predators).
- Continued participation in IOOS OTN Initiative with acoustic receivers.
- Increased number of tagged animals, especially off Maui, leveraged with State of Hawaii funding. Continue to provide near real-time shark tracks on PacIOOS website.
- Launch one glider run.
- Deploy two new Maui water quality NSS (*deployment dates pending in order to secure reliable partners for operations and maintenance*).
- Redeploy Kiholo Bay (Big Island) water quality buoy (*broke free; needs repair*).
- Deploy new YSI water quality buoy in Pelekane Bay (Big Island), purchased with EPSCoR funding.
- Continue participation in NOAA PMEL ocean acidification efforts, including hosting of data on Voyager.
- Participate in new Kilo Nalo underwater, cabled observatory process.

3.5 DMAC

- Begin process of revamping PacIOOS website.
- Continue to add citizen science data and create relevant Project Pages for partners.
- Continue to add additional tiger sharks to Hawaii Tiger Shark Tracking project page, as data become available.
- Finalize and showcase Hawaii Flash Flood Tool, in collaboration with NOAA PSC.
- Finalize and release PacIOOS catalog web service.
- Continued expansion and addition of data into PacIOOS Voyager and Voyager mobile.
- Addition of NOAA SLR layers to Voyager.
- Continued improvement of utility and map styles for Voyager.
- Continue meeting IOOS DMAC protocols.

3.6 Education, Outreach and Public Awareness

- Present, with fellow IOOSians, at the Summit Session as part of the Restore America’s Estuaries and The Coastal Society conference.
- Continue working with COSEE to code and deploy the last of 10 kiosks. The final kiosk is designated to the NOAA Sanctuaries Center (Kauai).
- Continue to present and participate in local events (Waikiki Aquarium, Hawaii Conservation Conference, Kona IEA conference, NOAA Sentinel Site).
- Continue to provide and create electronic and printed outreach materials (newsletters, flyers, fact sheets, etc.).
- Continue to publish and distribute press release on compelling aspects of PacIOOS.
- Refine classroom activities using PacIOOS Voyager to raise awareness and enthusiasm for ocean data in secondary and undergraduate classrooms.
- Continue to identify and publish PacIOOS success stories.
- Target outreach efforts on specific agencies to help address PacIOOS goals.

3.7 National and International Collaborations

- RA Director retreat in Boulder, CO August 2014.
- IOOS Association meeting November 2014.
- Continued participation in IOOS Association, IOOS FAC.
- Meet with IMOS in Sept or October 2014 to discuss collaborations.
- PacIOOS and UH Center for Island, Maritime, and Extreme Environment Security (CIMES) collaborating with Liquid Robotics and USSI to develop, test, and deploy passive acoustic sensors for ship detection and tracking---with specific application to IUU fishing in the PacIOOS region.

4) Personnel and Organizational Structure

No changes in key scientific or management personnel occurred during this reporting period.

Upcoming changes include:

- Heather Kerkering, Director, departing from PacIOOS at end of October. Chris Ostrander will assume Director responsibilities.
- Replacement of Richard Coughlin, PacIOOS Geospatial Specialist, with new hire Kohei Miyagi. Initially, Kohei’s position will be shared with EPSCoR and his title will be “Cyberinfrastructure Technician.”

5) Budget Analysis

Spending is on track with projected program expenditures, with full draw down of funds anticipated by the conclusion of this 5-year funding agreement.

The University of Hawaii Office of Research Services submitted a semi-annual financial report for the period ending 3/31/2014, through Grants Online. That report showed total receipts of \$6,020,406.74.

As of May 31, 2014 internal budget tracking shows receipts of \$6,429,433.87, representing a draw down of 90% of the Federal funding for this award at the end of the performance period.

Semi-Annual Supplemental Information

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 Hawaii 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.

We are in continued contact with the PROP Secretaries regarding possible contributions PacIOOS can make toward PROP initiatives and for identifying areas of collaboration. Additionally, 3 of our Governing Council members from the islands of Hawaii, Guam, and American Samoa, are heavily involved in PROP planning. 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 (RBP) focused on CMSP. The Pacific Islands RPB recently met in May 2014 in Guam to sign their charter, review and approve their stakeholder engagement plan, discuss issues that CMSP can inform or guide in the Marianas, discuss spatially-oriented projects ongoing and slated to begin in the Pacific Islands, and develop actions and tasks in the Framework and Implementation Plan. We are in constant contact with the RPB and are in conversation with them on one of their Framework and Implementation Plan objectives: "Develop a data portal that includes ecosystem dynamics, habitat areas of particular concern, and essential fish habitat." It is highly likely they will look to PacIOOS to provide resources and serve as the data portal. The timeline for this development is Jan – Nov 2015.

2.0 Efforts to leverage IOOS funding

- In early 2014, PacIOOS established a formal agreement with Young Brothers, Limited through a community support program. Young Brothers will assist PacIOOS in operations and maintenance of Hawaii-based wave buoys by providing vessel support.
- Conservation International is supporting the purchase of water quality equipment to continue a PacIOOS partnership on Lanai focused on understanding watershed dynamics and reef impacts.
- The wave buoy program in the Pacific is a collaborative effort made possible by funds from PacIOOS, the University of Hawaii (UH), and the Coastal Data Information Program (CDIP). 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 Kaneohe

buoys (Department of Energy). Two new wave buoys are targeted for Kaneohe Bay in the upcoming months. The assets help with NSF related projects on the Big Island and wave energy experiments in Oahu. We host the data and our users benefit.

- PacIOOS will be working in partnership with citizen water quality groups to maintain the 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 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 in Hawaii. We fund operations and maintenance.
- Installment of HFR at any 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 data in our Voyager and Explorer tools are provided by partner agencies. This saves PacIOOS from needing to perform additional ocean survey and observational work to provide valuable information to stakeholders. Our partners help us meet our stakeholder needs.
- PacIOOS will host the Hawaii Flash Flood Tool through a partnership with NOAA CSC and NWS. This brings attention and people to our program but is a project funded by NOAA and supported by NWS for emergency managers.
- PacIOOS is providing a SLR/Shoreline Erosion Tool for community planners and developers. This tool is the final result of numerous partners pooling and sharing resources, including UH Geology and Geophysics Department and NOAA Coastal Storms Program.
- PacIOOS now hosts a classroom lesson plan using real-time data from Voyager. The plan was created and vetted in partnership with UH Maui College.

3.0 Update to RA Governance board membership (required template included)

The online RA Governance board membership is updated.

PacIOOS is in the process of running 2014 elections to fill 4 Hawaii-based seats and 2 Regional-based seats.

The total number of MOA Signatories is 44.

4.0 Governance Activities and Accomplishments

- The Governing Council Executive Board met in March 2014 to discuss the program response to the FY14 descope request and to help prioritize activities for PacIOOS to be in a position to receive FY15 funding and apply for the next 5yr grant cycle.

- PacIOOS gained 15 new MOA Signatories since June 2013 with great assistance from existing Council members.

5.0 Education and Outreach Activities

PacIOOS held or participated in a number of outreach activities (presentations, live demos, and webinars). Many can be found here:

<http://oos.soest.hawaii.edu/pacioos/outreach/events/index.php>

For example:

- World Oceans Day 2013 Waikiki Aquarium
- Maui Ocean Awareness Training
- Guam Coral Reef Symposium
- Hawaii Conservation Conference
- PacIOOS Governing Council meeting and Partner Reception in Guam
- UH School of Ocean and Earth Sciences and Technology (SOEST) Open House
- Waikiki Aquarium 110th Anniversary
- Waikiki Aquarium's Earth Day Celebration
- Hawaii Ocean Resources Management Plan Working Group
- Hawaii Marine and Coastal Zone Advocacy Council (MACZAC)
- Hawaii Science Teachers Association 50th Anniversary
- Hawaii Technology Fun Fair
- PRiMO – Pacific Risk Management Ohana
- Meetings in Guam, CNMI, and Hawaii
- Mauka to Makai Earth Day event at Waikiki Aquarium
- Hawaii Technology Fun Fair
- Hawaii North Shore Ocean Fest
- 8th Annual Kewalo Basin Park Clean Up
- Lanikai Association and Conservation
- UH SOEST Anniversary Celebration

In this reporting period, PacIOOS focused mainly on outreach activities. With regards to education, PacIOOS worked in concert with UH Maui College to produce Lesson Plans using real-time data from Voyager: <http://oos.soest.hawaii.edu/pacioos/outreach/voyager/> and provided information to the Hawaii Science Teachers Association.

5.1 Update information contained in the Education and Outreach Tool

- Completed. Please see google shared inventory for responses.