Progress Report
Submitted **July 2023**
Empowering Ocean Stakeholders: Advancing the Pacific Islands Ocean Observing System (PacIOOS)
Award no. NA21NOS0120091

Period of Activity: January 1, 2023 – June 30, 2023
Principal Investigator: Melissa Iwamoto

I. Project Milestones

Milestone	Status	1/1/23– 6/30/23	7/1/23 – 12/31/23
GOVERNANCE AND MANAGEMENT SUBSYSTEM			
Maintain NOAA certification	Ongoing		
Hold annual Governing Council meetings in HNL	On track		Oct 2023
Hold annual Excom meeting in HNL	Complete	✓ May 2023	
Expand partnerships to promote & enhance regional observing	Ongoing		
OBSERVING SUBSYSTEM			
Sustain HFR stations; data online & assimilated into ROMS	Ongoing		
Update HFR station hardware	Delayed		
Conduct site visits for new HFR sites in Guam / Mariana Islands	Delayed		July 2023
Sustain 16 wave buoys across region; data & products online	Ongoing		
Deploy new wave buoy in American Samoa	On track		
Sustain Honolulu Pier 1 Weather Station	Ongoing		
Sustain Waikīkī Beach Camera	Ongoing		
Low-cost water level station in West Maui for wave run-up forecast	Delayed		Summer / Fall 2023
Sustain long-term WQ sensors (9); data & products online	Ongoing		
Sustain WQSPP sites and services; data and products online	Ongoing		
Pilot project with Turner C3 fluorometer and optical sensors	On track		
Sustain WQ coastal moorings (2); data/products online	Ongoing		
Sustain undergraduate mentoring/capacity building w/ moorings	Ongoing		
Deploy new WQ mooring in Kailua Kona Bay	Delayed		Permitting

MAPCO2 buoy and partnership in American Samoa	Ongoing		
Generate near real-time ocean profiles with animal tags	Delayed		Manufacturer
Establish efficient data dissemination for animal tag profiles	Delayed		Manufacturer
Maintain land-based "mote" stations for animal tag data collection	Ongoing		
Network building for Insular Pacific animal tagging capacity sharing	On track		
MODELING AND ANALYSIS SUBSYSTEM			
Sustain atmospheric model domains (HI, Mariana Islands, Samoa)	Ongoing		
Upgrade atmospheric models	On track		
Sustain existing wave forecasts (HI, Mariana Islands, Samoa)	Ongoing		
Develop, implement, validate unstructured SWAN grids for HI	On track		
Sustain Hale‘iwa Harbor Surge Forecast (Empirical)	Ongoing		
Advance development of Kahului Harbor Surge Forecast (BOSZ)	Delayed		Pending hires
Sustaining existing ocean model (ROMS) domains	Ongoing		
Develop new High(er) Resolution ROMS Forecasts for HI	Delayed		Computing
Develop new Palau / western Pacific ROMS Forecast (multiple scales)	On track		
Sustain Ala Wai plume forecast	Ongoing		
Sustain high sea level forecasts (HI, Guam, Am Samoa, Palau)	Ongoing		
Sustain Empirical wave run-up forecasts (HI, RMI)	Ongoing		
Sustain BOSZ wave run-up forecasts for West Maui	Ongoing		
Advance high sea level thresholds using citizen science photos	On track		
DATA MANAGEMENT AND CYBERINFRASTRUCTURE (DMAC) SUBSYSTEM			
Maintain PacIOOS DMAC infrastructure and data services	Ongoing		
Operate as a Regional DAC for the Pacific Islands	Ongoing		
Engage with IOOS DMAC, other RAs, etc. on DMAC and related issues	Ongoing		
Sustain ingest of large biological data sets & make accessible	Ongoing		
Advance the development of a Pacific Islands Region Acoustic Telemetry (PIRAT) Node	On track		

Hire a software and products developer	Complete	Feb 2023	
Continue to collaborate with other PacIOOS teams to provide necessary DMAC services, develop products, & address stakeholder and partner DMAC needs	Ongoing		
Capacity building training on data access and use (virtual)	Ongoing		
Expand web & product development services for partners/users	Ongoing		
ENGAGEMENT SUBSYSTEM			
Sustain communications & engagement across the region (hybrid & via local liaisons)	Ongoing		
Expand capacity sharing to include virtual meetings/webinars	Delayed		personnel
Regional tech transfer & capacity sharing	Delayed		personnel

II. Progress and Accomplishments

A. Core funding update

Amount	Funding Area	Task
$5,736,400	Core	Sustained operational funding and service delivery. Allocations to HFR include Year 1: $331,540; Year 2: $346,263.

High-Frequency Radars (HFRs)

Names of RA's existing and planned HFR stations	Status	Date of most recent antenna calibration	Date planned for next antenna calibration	Recapitalization needs
KAK (Kakaako)	System temporarily down.	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 have been conducted at KOK,		
KAL (Kalaeloa)	System operating as planned with data			The fence that supports the antennas on USFWS property is near end-of-life and will require approximately $80k to replace. Prior installation of the fence was a

	transmitted to CORDC.	KNA, KAK, and six other LERA systems globally and 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.	condition of site access permission from USFWS.
KAP (Kapolei)	System temporarily down.		
KKH (Keaukaha)	System operating as planned with data transmitted to CORDC.		
KNA (Ka‘ena)	System temporarily down.		
KOK (Koko Head)	System operating as planned with data transmitted to CORDC.		
PPK (Pepeekeo)	System operating as planned with data transmitted to CORDC.		
Ritidian, Guam (planned)	Final site identification on Andersen AFB was delayed by staff shortages, travel schedules, and new military developments in Guam.		N/A
Rota, CNMI (planned)	Site identification delayed due to		N/A

	staff shortages, travel schedules, and new military developments in Guam.		

Gliders and Other Uncrewed Systems (UxS)

Summary of glider activities over the reporting period: A glider mission was conducted from February - May and included more than 400 successful dives. Data were transmitted and ingested into the PacIOOS DAC in near-real time and data were made accessible to the ROMS modeling team through a seamless data pipeline. Unfortunately, the glider did not surface from what was planned to be its dive of the mission; it was not recovered. More details were provided in the PacIOOS progress report for our NA16 award.

Other Core Observation Activities

Governance and Management Subsystem

Summary: PacIOOS had a busy reporting period with the return of in-person meetings and travel, in addition to proposal writing, and project management and procurement for several projects. The value of and appreciation for in-person meetings and engagement was voiced repeatedly by staff and partners during this reporting period.

Accomplishments / successes:

- The PacIOOS director traveled to Guam to participate in a National Weather Service (NWS) Pacific Regional leadership meeting. This opportunity included the meteorologists-in-charge for Hawai‘i, American Samoa, Guam, Federated States of Micronesia, Republic of the Marshall Islands, and Palau, in addition to Pacific Region NWS managers and the national NWS director. Additional meetings with other PacIOOS partners on Guam strengthened existing relationships and identified potential new MOA partners and opportunities for new relationships.
- The PacIOOS deputy director had a productive trip to Guam and Palau, where he presented at the Conference on Island Sustainability and engaged with numerous existing and potential new MOA partners. The trip resulted in several new relationships that are poised to result in deployment of new Spotter buoys in Guam, support the on-going UNEP Palau project, and sign on several new MOA partners. Meanwhile, leveraging older relationships, the trip also led to identifying a new liaison for Palau.
- Members of the PacIOOS Governing Council Executive Committee gathered in Honolulu in May for their annual meeting. Members focused largely on internal organizational improvements centered around program evaluations and more effective governing council meetings, as well as priorities in American Samoa, CNMI, and Palau.

- The PacIOOS deputy director and Governing Council chair traveled to Washington D.C. for the IOOS spring meeting.

Problems / delays

- Numerous staffing / hiring challenges, primarily due to University HR, have resulted in protracted hiring processes.

Observing Subsystem

Summary: The teams are doing their best to keep the systems we have up and running. The wave buoy program also experienced an unprecedented number of unrelated buoy drifts. Meanwhile, we received continual reports from citizens, institutional partners (e.g., National Weather Service), and others expressing the value of our observing impacts and the detrimental effects that occur when assets are down.

Accomplishments / successes:

- Five nearshore sensors in Hawai‘i (4 O‘ahu, 1 Maui), and 5 additional sensors in the Insular Pacific (American Samoa, FSM (2), RMI, Guam) operated successfully.
- The water quality sensor partnership program (a sensor loan program) has two sensors deployed in the Federated States of Micronesia.
- The Turner C3 has been deployed twice to assess the relationship of wastewater pollution indicators with two different fluorescence excitation/emission wavelength pairs measured by the instrument. Spot sampling was conducted at multiple locations on O‘ahu alongside measurements of fecal indicator bacteria and nutrients, and the instrument was continuously deployed for 30 days in the Ala Wai harbor with 16 days of water sampling for fecal indicator bacteria, nutrients, Sucralose, and scanning fluorimetry.
- The wave buoy team continued to maintain and operate the existing PacIOOS array of wave buoys in Hawaiian Islands, Guam, CNMI, American Samoa.
- Wave buoy recoveries were successful after mooring failures in Guam, Waimea, Hilo, Kāne‘ohe, Barber’s Point, and the CNMI.
- Half of wave buoys have been recalibrated courtesy of CDIP.
- Buoys were successfully redeployed at Barber’s Point and Waimea.
- The Hawai‘i Community Tagging Project completed its tagging phase, with more than 300 sharks tagged with acoustic or satellite tags. Data will continue to be collected for 2-3 years, as tag batteries allow.
- Developed a program for acoustic tagging equipment loans in cooperation with the Animal Tracking Network in support of pilot tagging studies in the region.
- Contributed to the development of the IOOS National HAB Observing Network (NHABON).
- Curated relationships across the region toward development and expansion of a regional ciguatera network, including leveraging past work from the Caribbean.
- Two water quality coastal moorings are deployed and collecting data off Hawai‘i Island.
- Capacity building of three undergraduates with the Hawai‘i Island water quality moorings has continued; one student just finished his senior thesis.
- Community outreach has continued in South Kohala and Kailua-Kona for water quality buoys off Hawai‘i Island.

- The Waikīkī beach web camera was sustained to provide regular imagery, operationally, and as one of the pilot cameras for WebCOOS.

Problems/delays:

- The MAPCO2 buoy in American Samoa is operating, though some sensors are currently disabled while awaiting maintenance (battery change).
- New university rules for boat charter operations have led to delays in buoy installations and swaps.
- Supply chain and engineering issues have slowed expansion of shark tagging efforts.
- The data driver (DataTurbine) for real-time data acquisition from nearshore sensors is reaching its end of life and has required manual workarounds.
- Seven wave buoy drifts occurred this year, four in the span of one week. This was an unprecedented series of events that delayed redeployment of several buoys.
- Several sensor issues have caused data interruptions to the nearshore sensor and water quality partnership programs; problems were resolved.
- State of Hawa‘i FAD losses (with acoustic receivers) have impacted data collection for the Hawai‘i Community Tagging Program.
- University of Hawai‘i at Hilo’s research vehicle and vessel are out of commission for an extended period, leading to diminished response for buoy or other unanticipated emergencies; a new vessel will be purchased with some delay.

Modeling and Analysis Subsystem

Summary: PacIOOS modeling teams expanded several forecast grids, particularly in the western Pacific during this reporting period. Requests for our modeling services, particularly from the National Weather Service, also continue to increase.

Accomplishments / successes:

- Maintained WRF (atmospheric) forecasts of wind, rain, and air temperature for Hawai‘i, Mariana Islands, and Samoan Islands, with ongoing model upgrades.
- New 8-day WRF (atmospheric) forecasts were launched for the western and central Pacific (including Palau, the FSM, and the RMI) with 12-hour data assimilation.
- The 7-day wave forecasts (WaveWatch III and SWAN) have been maintained and operated on the PacIOOS server to provide daily wave forecasts for Hawai‘i, Mariana Islands, and American Samoan Islands on a daily basis.
- ROMS circulation models for Hawai‘i, Mariana Islands, Samoan Islands, and the western Pacific were maintained.
- Installed a new computing cluster to support ROMS models.
- 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.
- Set up the BOSZ model on a domain including Kahului Harbor, including various wave scenarios to facilitate next steps for a new harbor surge model.

Problems/delays:

- Reliance on international organizations to support sensors impacts PacIOOS data tools. For example, the water level gauge at Uliga Dock in Majuro, RMI, was awaiting maintenance from the Australian Bureau of Meteorology for the first several months of the reporting period, but the service occurred and the operational models were resumed by April. The system remains somewhat glitchy.
- Moving a new ROMS computing cluster to a different IT facility delayed cluster installation and deployment of new grids and daily updates.
- Deployment of the low cost water level station for West Maui was delayed due to difficulties identifying a suitable location.
- Threshold upgrades for 6-day high sea level forecasts and additional harbor surge forecasts have been delayed due to a combination of factors, including difficulty finding qualified new hires.

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 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.
- Began serving a new ROMS domain for the western Pacific (including Palau) via PacIOOS data services and Voyager.
- Launched new Environmental Sensitivity Index and Marine Heatwave layers in PacIOOS Voyager
- All data appropriate for long-term archive are being sent to NCEI on a regular basis.
- PacIOOS hired a new Web Data / Product Developer, One Jae Lee.
- PacIOOS hired a graduate research assistant to support the Pacific Islands Regional Acoustic Telemetry (PIRAT) network.
- Added five new projects to the Pacific Islands Regional Acoustic Telemetry (PIRAT) Network.
- During this performance period, over 121,000 unique visits (via direct external access to our servers) accessed more than 15 million pages in our servers (TDS, ERDDAP) and transferred over 20 TB of data.
- Hired a new data products developer and have prepared an offer for another programer / developer.

Problems/delays:

- DataTurbine, our system for acquisition of real-time data from our nearshore sensor network, remains a challenge, but an oncoming data management specialist will be tasked with identifying improvements.
- As new grids (including unstructured grids) are developed by our modeling teams, the DMAC 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.

- Identifying collaborators / data contributors to the PIRAT network has been slower than expected.
- Delays by the university for approving position descriptions has stalled hiring.

Engagement Subsystem

Summary: Outreach and stakeholder engagement with partners is ongoing via email, phone calls, video conferences, and increasingly in-person activities. PacIOOS hosted and attended several in-person meetings during this reporting period.

Accomplishments / successes:

- PacIOOS has identified a candidate for an engagement coordinator. An offer is being prepared through the university HR.
- A group of six people from Guam and the CNMI traveled to the Hawai‘i Institute of Marine Biology for a week where they were trained on animal tagging techniques. The capacity building effort seeks to support tagging efforts and a Saltonstall-Kennedy project in Guam.
- A new PacIOOS liaison for RMI began in May 2023.
- A new PacIOOS liaison for Palau has been identified and paperwork is being finalized.
- PacIOOS continues to publish and distribute monthly e-newsletters to a total of 2706 recipients, with a 46% open rate. Highlighting PacIOOS data users and their specific use cases helps to illustrate the breadth of our stakeholders.
- During this reporting period, the PacIOOS website was visited by over 125K unique visitors and had more than 700k page views.
- PacIOOS’ Facebook page has more than 1,600 likes and 1,675 people following the page; PacIOOS Twitter has 608 followers.
- PacIOOS director, M. Iwamoto, presented wave buoy and modeling updates to the Pacific Region Managers Meetings on Guam (Feb 2023). It was also a fortuitous opportunity to facilitate an open discussion with all NWS offices in the Pacific Islands represented to discuss additional wave data needs.
- PacIOOS deputy director, J. Watson, participated in series of engagement activities during this reporting period, including:
    - a live demonstration of PacIOOS data services at a networking event for coastal zone managers at the Pacific Risk Management ‘Ohana (PRiMO) meeting in Honolulu (April 2023), where he made valuable connections with partners across the Pacific, particularly the FSM.
    - presenting with DMAC lead J. Potemra presented on PacIOOS data services at the Multi-Domain Awareness joint U.S.-Japan meeting held in Honolulu (June 2023). This task force intersects national security concerns across multiple aspects of the maritime domain (from climate change to traditional warfare).
    - a presentation on PacIOOS data services and the Backyard Buoys project for the Submerged Lands Summit in Guam (April 2023), hosted by the Guam Bureau of Statistics and Planning.
    - a presentation on PacIOOS data services and data access tools at the Conference on Island Sustainability in Guam (April 2023).

    - a presentation on PacIOOS coastal hazards (wave run-up, high sea level) and associated tools at the National Climate Outlook Forum in Palau (April 2023).
    - participating as an invited speaker at the Annual CoastWatch Meeting in Honolulu (May 2023) where he presented on PacIOOS data tools and potential synergies with the National Marine Fisheries Service data needs, particularly around bycatch.
- The report from an Ocean Observing Workshop held in Saipan, CNMI (October 2022) was finalized during this reporting period.
- M. Iwamoto and J. Watson continued to serve on the IOOS Associated DEIA working group.
- PacIOOS technicians Shaun Wriston and Andreia Queima represented the wave and nearshore sensor programs at the Mānoa Research Day (Feb 2023) at the Hawai‘i State Capitol.
- PacIOOS technician S. Wriston represented PacIOOS at the Wilson Elementary Career Day (Feb 2023).
- PacIOOS technician S. Wriston has led through group tours with different oceanographic programs as well as KUPU's Natural Resources Professional Development Program.
- PIRAT was awarded acoustic telemetry receivers from the U.S. Animal Telemetry Network for an acoustic telemetry equipment loan program to support pilot studies or short-term student projects.

Problems/delays:

- Departure of our communications coordinator in January delayed several engagement plans and redirected existing staff capacity.
- Delays by the university for approving position descriptions have stalled hiring.
- Vacancies in our liaison and capacity building teams in the RMI, FSM, and Palau have slowed some planned engagement in the Freely Associated States.

A. Non-core funding update

IOOS, NOAA, Other Agency Funding		
Funding amount spent	**Funding Area /Recipient**	**Task**
Provided: $488,844 (total for FY21 + FY22) Spent $0 Remaining: 100%	Regional Ocean Partnership	Task: Regional Ocean Data Sharing Initiative **Status:** Delayed, but getting on track. **Accomplishments:** *In the previous reporting period, the consultant (ecoLOGIC, LLC) completed a workshop report of recommendations for the region. A major conclusion of that report was the need to hire a data management specialist and a web and products developer to build a geospatial data portal that connects the Pacific region. The data management specialist position has been filled, with the new staff member starting in August 2023. A web and products developer has been identified and paperwork is being finalized for a job offer.*

		Meanwhile, PacIOOS is working with ecoLOGIC to move into a subrecipient partnership with more long-term responsibilities and milestones addressing the purpose of the funding in the Pacific Islands. This planned partnership will benefit the intended audience of coastal managers and will lighten the load of PacIOOS staff considerably. **Issue (if any):** The Pacific Islands were off to a slow start with this project due to a number of institutional challenges. But after working with OCM and ecoLOGIC, we are confident we are on the right track to make a notable difference with this funding.
Provided: $130,000 Spent: $47,605.42 Remaining: 63.38%	Harmful Algal Blooms (HABs)	Task: To further HABS understanding and prediction via a pilot project to support coordination across the region to bring together regional stakeholders with experts from other regions who are actively involved in addressing the issue of Ciguatera fish poisoning. **Status:** On Track **Accomplishments:** ● *Connected with colleagues from the U.S. Gulf Coast and Caribbean to collaborate on an application for NOAA MERHAB funding which would support capacity building for local analysis of ciguatoxins; the proposal was not successful, but the collaborations and feedback are valuable.* ● *Working with Hawai‘i Division of Aquatic Resources to conduct a focused study examining links between water quality and Gambierdiscus at a hot spot on the North Shore of Kaua‘i* ● *Developing a website for Pacific Ciguatera Network (includes ArcGIS StoryMaps and links to data and resources)* ● *Connecting with partners in the RMI (Marshall Islands Marine Resources Authority) and American Samoa (AS Community College, AS Ministry of Fisheries, Finafinau education group)* ○ *New Sea Grant Extension Agent in RMI (Andrew McInnis) is facilitating collaboration on the ground* ● *Working with Sea Grant communications and education team to develop materials to support outreach and education related to ciguatera poisoning in Hawai‘i and the USAPI (requested specifically for American Samoa)* ● *Presented results of pilot study in Hawai‘i at the Pacific Risk Management ‘Ohana Conference (April 2023), DAR Fishers’ Forum (May 2023), and Hawai‘i Conservation Conference (June 2023)*

		Issue (if any): Planning a workshop for colleagues and partners from USAPI and Caribbean but are delayed; working on integrating goals from Y1 with new expanded scope of Y2 (in progress) - aiming for early September.

III. **Project Challenges/Modifications**

- Hiring this year was very difficult with increased wage expectations, worker shortages, and restrictions from UH on remote work, which has become an increasingly valued option for employees. Approval by UH for position descriptions has become increasingly challenging and has led to further delays.

IV. Publications

A. Publications and Reports
- Camilla Tognacchini published her thesis, "Wave Energy Transformations in a Complex Reef Environment: Observations, Modeling and Applications"

B. Notable Presentations
- Molly Scott (HCTP) presented, "The Hawai‘i Community Tagging Program" at the International Conference on Fish Telemetry in Sete, France (June 2023)
- T. TinHan presented on the PIRAT Network at the International Conference on Fish Telemetry in Sete, FR (June 2023)
- Tara Owens (Hawai‘i Sea Grant) and Assaf Azouri (PacIOOS/UH) presented "PacIOOS Launches Wave Flooding Tools for West Maui To Support Community Preparedness and Resilience" at the Pacific Risk Management ‘Ohana (PRiMO) Meeting in Honolulu, HI (April 2023).
- Kimball Millikan presented, "The Pacific Islands Ocean Observing System (PacIOOS) wave-measuring buoy" to the Department of Ocean and Resource Engineering at the University of Hawai‘i (Feb 2023)

V. Education, Media Engagement, and Outreach Materials

- For coverage of PacIOOS in the media, please refer to: *http://www.pacioos.hawaii.edu/media/*

VI. Product Delivery:

- The team has been working with NOAA NWS Pacific Island Regional Headquarters to get PacIOOS atmospheric and wave models for the territories directly into their AWIP systems for the regional forecast offices. The wave models are now fully integrated.
- New data layers added to PacIOOS Voyager included an environmental sensitivity index, a marine heatwave layer, and a Saildrone layer.
- New internal data and Voyager layers included the Seaglider mission and the new ROMS western Pacific grid (forecast)

VII. Certification Updates

- The PacIOOS communications coordinator left her position and we are in the process of rehiring.

VIII. Budget Summary

- There were no delays in invoicing or payment.

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

Cost Categories	Funding provided	Funds invoiced	Un-invoiced funds remaining	Remaining %
Personnel	$2,803,855	$1,356,696	$1,447,159	52%
Fringe Benefits	$819,490	$383,591	$435,899	53%
Travel	$121,209	$96,461	$24,748	20%
Equipment	$115,223	$101,057	$14,166	12%
Supplies	$265,195	$177,839	$87,356	33%
Contractual	$228,400	$695	$227,705	100%
Other	$346,814	$261,974	$84,840	24%
Total Direct Charges	$4,700,186	$2,378,313	$2,321,873	49%
Indirect Charges	$1,655,058	$820,331	$834,727	50%
Total Amounts	**$6,355,244**	**$3,198,644**	**$3,156,600**	**50%**

I. Success Stories

Success Story	Brief Description	Contact
Hawai‘i Community Tagging Program wraps up tagging phase	The Hawai'i Community Tagging Program (HCTP) is a collaborative research program focused on the use of advanced telemetry technologies to elucidate shark movement behavior and habitat requirements. The objectives of the HCTP are geared towards filling data gaps identified as critical for implementation of effective conservation strategies for shark populations impacted by commercial fisheries. This work depends on the efforts and local ecological knowledge of the fishing community to deploy tags, collect data and pursue practical, sustainable solutions to mortality mitigation. The HCTP has completed the tagging phase of its work	Molly Scott and Melanie Hutchinson

	with more than 300 sharks tagged, primarily silky and oceanic whitetip sharks! Every few months, we will continue to download the data from acoustic receivers that record the presence of tagged sharks as they swim past. More than 200,000 shark detections have already been recorded by acoustic receivers, and more than 150 fishers were trained in tagging (about 40-50 have tagged regularly).	

End Report
