

National Fish and Wildlife Foundation

Coral Reef Conservation Fund 2017 - Submit Final Programmatic Report (New Metrics)

Grantee Organization: Maui Nui Marine Resource Council

Project Title: South Maui Community Coastal Water Quality Monitoring Program (HI)

Project Period 6/01/2017 - 12/31/2018

Project Location Description (from Proposal) The project will occur along the south Maui, Hawai'i, coast from Ma'alaea to 'Ahihi-Kina'u Natural Area Reserve.

Project Summary (from Proposal) Expand federally accredited community water quality monitoring program to South Maui to help understand areas of land-based run-off to nearshore coral reefs. The project will outfit a laboratory in South Maui, Hawaii with water quality monitoring supplies and equipment, train leads and volunteers and begin coastal water quality sampling in a region with biologically important coral reefs.

Project Status and Accomplishments The principle research that conducted was the set-up and application of the Quality Assurance Project Plan (QAPP) for community-based coastal water quality monitoring to the South Maui coral reef area. The four steps of the project were completed: laboratory set-up, capacity building and training, implementation of data collection, data analysis and availability via our website and community outreach.

The large reefs of Maui Nui have been identified as the best place to focus management attention to save the coral reefs of the Hawaiian Islands in the face of climate change due to the likelihood that South Maui reefs are seeding the other reefs of Maui Nui. One of the largest of these reefs, at 1538 acres, is in Kihei, South Maui. Like many areas of Maui Nui, the reefs of South Maui are negatively impacted by poor water quality from land-based sediment and nutrients. The State of Hawai'i sets limits for pollutants that, when exceeded, inform us when our water quality is degraded. The Department of Health monitors coastal water quality at stations around the state, but with limited resources their monitors can't be everywhere. The South Maui Community Water Quality project expanded the quality-assured, community-based coastal water-quality monitoring program of Hui O Ka Wai Ola from West Maui to South Maui, encompassing the area Kihei reef. Following an approved Hawai'i Department of Health Quality Assured Project Plan, a South Maui water quality lab was setup and fully equipped with materials and supplies, 24 South Maui monitoring sites were selected, staff positions were filled and community volunteers were trained in proper monitoring techniques, and water quality samples began to be collected and analyzed on a regular basis at all sites. The water quality data obtained greatly increases the amount of information available concerning the condition of South Maui's coastal waters. The data was disseminated and made openly available to the State and general public to allow for better informed coastal-zone and watershed management.

The South Maui community now has the capacity to understand the condition of its coastal waters with a fully equipped water quality lab, a team of highly trained volunteer monitors, and monitoring sites with timelines. Where there once was a gap in existing coastal water quality data due to the limited capacity of the State monitoring program, now the community has the ability to help and augment the amount of water quality information available.

Since the start of this grant period 529 coastal water quality samples from South Maui have been analyzed for pollutants that can harm coral reefs. This data can be used to establish a current baseline for coastal water conditions, and help to inform us of when and where there is a problem.

Water quality data collected by this community-based program is quality-assured and accepted by the Hawai'i State Department of Health. The data is made readily available through various avenues to help our communities, County, and State decision-makers to make better informed decisions for coastal management strategies. With continued monitoring, the effect of management strategies can be measured against the established baseline and adjustments to strategies can be made to ensure beneficial impacts to reef ecosystems.

Lessons Learned The backbone to a large scale community-based water quality monitoring program is its volunteers. It cannot be stressed enough the importance of having dedicated, passionate volunteers and taking the time to cultivate and nurture that relationship. Water quality monitoring requires an investment in the volunteer monitors in the form of training time and finances for consumables and supplies. The result is

the need for long-term commitment to the program from volunteers, a position that by its very nature is non-committal. Volunteer retention is crucial. From the start it is important to instill a sense of ownership of the program in the volunteer. They are the champions of the program, making it happen day to day. Keep them involved, show them they are appreciated, show them they are having an impact, and make it fun.

When involving a large number of volunteers in a program, you need to be organized. Power is in partnerships, both financially and organizationally. This program could not have been successful without the strong foundation that the three partnering organizations built, with Maui Nui Marine Resource Council, The Nature Conservancy, and the West Maui Ridge to Reef Initiative each bringing different expertise, capacities and strengths. We learned through this project that while volunteer-led monitoring is effective, it is not free. A key aspect of our program was the ability to utilize the three partner organizations to be able to tap into various public and private funding opportunities. This allowed us to leverage NFWF funding and ensure that the program continues after the end of the grant period.

Activities and Outcomes

Funding Strategy: Planning, Research, Monitoring

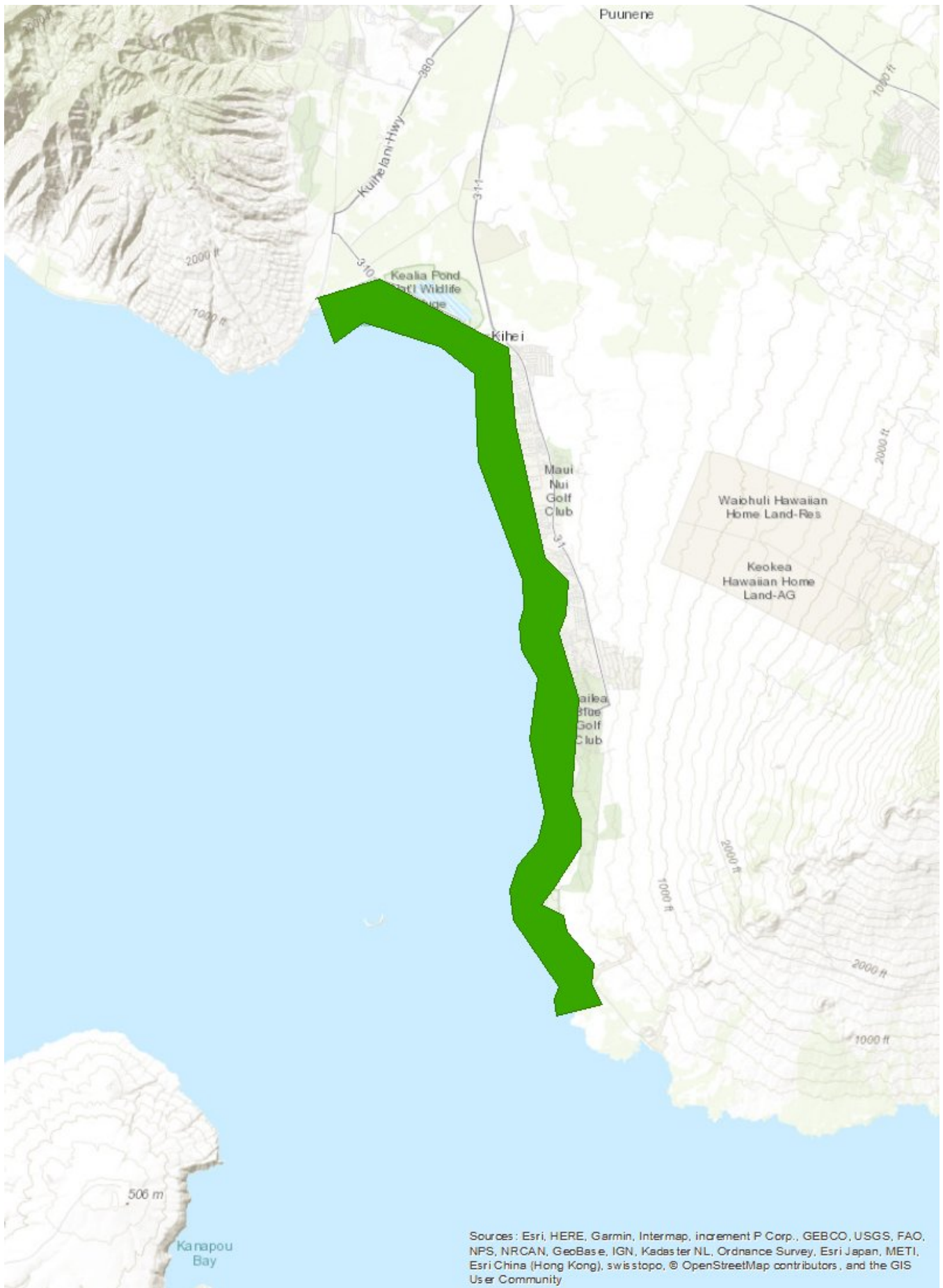
Metric: Coral - Research - # research studies completed

Required: Recommended

Description: Enter the number of research studies completed

Starting Value	0.00 # research studies completed
Value To Date	1.00 # research studies completed
Target value	1.00 # research studies completed

Note: The principle research that we completed was the set-up and application of the Quality Assurance Project Plan (QAPP) to South Maui coral reef area. This included completion of four steps: laboratory set-up, capacity building and training, implementation of data collection, data analysis and availability via our website and community outreach.



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Final Programmatic Report Narrative

National Fish and Wildlife Foundation – Coral Reef Conservation Fund 2017

Project Title: South Maui Community Water Quality Program

Grantee: Maui Nui Marine Resource Council

NFWF Grant ID: 0302.17.057433

Award Period: 10/01/17 – 12/31/18

Reporting Period: 10/01/17 – 12/31/18

1. Summary of Accomplishments

The large reefs of Maui Nui have been identified as the best place to focus management attention to save the coral reefs of the Hawaiian Islands in the face of climate change due to the likelihood that South Maui reefs are seeding the other reefs of Maui Nui. One of the largest of these reefs, at 1538 acres, is in Kīhei, South Maui. Like many areas of Maui Nui, the reefs of South Maui are negatively impacted by poor water quality from land-based sediment and nutrients. The State of Hawai‘i sets limits for pollutants that, when exceeded, inform us when our water quality is degraded. The Department of Health monitors coastal water quality at stations around the state, but with limited resources their monitors can't be everywhere. The South Maui Community Water Quality project expanded the quality-assured, community-based coastal water-quality monitoring program of Hui O Ka Wai Ola from West Maui to South Maui, encompassing the area Kīhei reef. Following an approved Hawai‘i Department of Health Quality Assured Project Plan, a South Maui water quality lab was setup and fully equipped with materials and supplies, 24 South Maui monitoring sites were selected, community volunteers were trained in proper monitoring techniques, and water quality samples began to be collected and analyzed on a regular basis at all sites. The water quality data obtained greatly increases the amount of information available concerning the condition of South Maui's coastal waters. The data was disseminated and made openly available to the State and general public to allow for better informed coastal-zone and watershed management.

- The South Maui community now has the capacity to understand the condition of its coastal waters with a fully equipped water quality lab, a team of highly trained volunteer monitors, and monitoring sites with timelines. Where there once was a gap in existing coastal water quality data due to the limited capacity of the State monitoring program, now the community has the ability to help and augment the amount of water quality information available.
- Since the start of this grant period 529 coastal water quality samples from South Maui have been analyzed for pollutants that can harm coral reefs. This data can be used to establish a current baseline for coastal water conditions, and help to inform us of when and where there is a problem.
- Water quality data collected by a community-based program is quality-assured and accepted by the Hawai‘i State Department of Health. The data is made readily available through various avenues to help our communities, County, and State decision-makers to make better informed decisions for coastal management strategies. With continued monitoring, the effect of management strategies can be measured against the established baseline and adjustments to strategies can be made to ensure beneficial impacts to reef ecosystems.

2. Project Activities & Outcomes

Activities

A. Purchase supplies and equipment needed to set-up South Maui Lab

Utilizing experience from outfitting the West Maui laboratory we completed purchasing lab equipment and supplies, required calibration standards and chemicals, and field test equipment to process coastal water quality samples collected in South Maui. The complete outfitting of the new laboratory at the Hawaiian Islands Humpback Whale National Marine Sanctuary in Kihei was done in phases beginning with materials needed for in situ testing and training of volunteers in basic water quality monitoring techniques. The next phase involved materials needed for prepping and storing water samples that would be sent out for nutrient analysis processing. The third phase involved

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procuring the equipment necessary for processing *Enterococcus* samples. The Hui O Ka Wai Ola steering committee decided to forego monitoring of total suspended sediment (TSS) in South Maui. This was the result of their experience with monitoring for TSS in West Maui and the inability to draw clear conclusions from the resulting data of this parameter. In turn, the purchasing of sediment sample processing equipment for South Maui was foregone in lieu of focusing on the other monitored parameters which produce more useful data.

B. Choose south Maui water quality sampling sites

The Hui O Ka Wai Ola steering committee, with leadership from the West Maui Regional Coordinator, Dana Reed, assessed the South Maui area, from Ma‘alaea Bay to ‘Āhihi-Kīna‘u Natural Area Reserve and selected 24 sites to monitor over the long term. The rationale for site selection under the QAPP is where: (1) intertidal sampling minimizes safety risks for the monitoring team; (2) we can integrate our physical-chemical water-quality data with the DOH bacteria data; (3) the sites are in well-mixed areas that are suitable for extrapolation to the subtidal coral-reef zone; (4) the sites are in high-use areas for contact recreation, and (5) recreational water-quality is an issue of concern in the community. As additional considerations, the committee selected sampling sites where reefs are negatively impacted by poor water quality and agencies/community groups are working to alleviate sediment and pollution from flowing into the ocean, data that represent ambient, nearshore conditions are scarce in comparison to that from point-source monitoring, but are critical for assessing ecological conditions and human-health risks, detecting trends, and informing coastal and watershed management decisions.

When monitoring in South Maui began, 21 of the 24 sites overlapped with DOH Tier 1-3 sites. At that time, DOH was not monitoring for nutrients at any of the tiers' sites, and was only irregularly monitoring at Tier 2 and 3 sites. The Hui steering committee felt strongly that regular nutrient monitoring was essential for environmental health and any if Hui data obtained was duplicative with DOH data it then could be compared for quality assurance purposes. In June 2018 when DOH began nutrient testing at all of their Tier 1 sites the Hui steering committee decided to discontinue Hui monitoring at four of the five overlapping DOH Tier 1 sites. At the time of this report, 17 Hui sites in South Maui overlap with DOH sites, mostly tier 2 and 3 sites without regular DOH monitoring or any nutrients. Only one site overlaps with a Tier 1 DOH site, and this is used for data quality assurance purposes.

C. Build capacity and regional leadership to expand monitoring

New site-level roles were filled for the expansion to South Maui. To build leadership capacity in South Maui, focused guidance and mentoring were provided by the Hui O Ka Wai Ola's West Maui Regional Coordinator, the Quality Assurance Officer, and West Maui Monitoring Team Leads. The essential roles to carry out the expansion of the water quality monitoring program to South Maui evolved with the project and changed from the original project submittal. The current roles that emerged and have been filled are: (1) Steering Committee, (2) Project Manager, (3) Quality Assurance Officer, (4) Team Leads, and (5) Volunteers. A description of each of the roles is as follows:

- (1) The Steering Committee (SC) consists of the Project Manager and staff of the partner organizations, and as of the writing of this report, includes Nui Marine Resource Council, The Nature Conservancy, and the West Maui Ridge to Reef Initiative. The SC has fundraising, communications, and technical subcommittees. The technical subcommittee also oversees data and quality assurance management. The SC oversaw the design and set-up, and coordinates with the Department of Health (DOH) and the analytical laboratory. As of the end of this grant period, the SC is meeting at least monthly to oversee operations in close coordination with the Project Manager.
- (2) The Project Manager's (PM) responsibilities include leading the entire monitoring operation for both South and West Maui, instructions, documentations, standard operating procedures (SOPs), labs, logistics, and trainings. This role was previously filled by MNRMC and TNC contractor Dana Reed of DB Consulting from 2016 – 2018. The full-time position was filled in 2018 – present by James Strickland as an employee of MNMRC.
- (3) The Quality Assurance (QA) Officer is responsible for data review, validation and verification, and for transmitting validated data to DOH and to publicly accessible data sources. The roles of Project Manager and Quality Assurance Officer are required by U.S. Environmental Protection Agency (EPA) for quality-assured

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monitoring programs. Corresponding DOH staff members provided guidance, approved changes in the QAPP, and checked data quality.

- (4) Team Leads are paid community members who run the monthly monitoring, two for each of the two project regions: West Maui and South Maui. They coordinate oversee volunteer monitoring techniques and sampling every three weeks, equipment, and sample storage and transport.
- (5) Volunteers conduct the on-site monitoring and lab processing. Four sets of sites are monitored every three weeks by groups of up to five volunteers, with a minimum of two volunteers needed to sample at each site in South Maui.

D. Build volunteer program and conduct training

Instruction modules based on West Maui monitoring program experience were developed and used to provide new volunteers with in-class and field training, as described in Section E below. The initial South Maui volunteers underwent full-day classroom and laboratory trainings, as well as in-field training. With the program established and grown to more than 40 trained volunteers in the field, new volunteers can more easily be trained one-on-one or in small groups. Some volunteer attrition is expected and natural over time as volunteers' availability or interest level change. We continuously accept and train a small number of new volunteers. At the time of this report, the Hui Project Manager and South Maui Team Leader were actively training 3 new volunteers for the South Maui program. The primary document used was the Hui O Ka Wai Ola Volunteers Handbook, most recently updated in September 2018 and available on the Hui website: <https://www.huiokawaiola.com/hui.html>.

For training new volunteers, modules included sample design, preparation, datasheets, sample collection, field measurements, post collection procedures, troubleshooting, safety protocol, and field data sheets. For group trainings, presentations and hands-on modules were used, and then modified over time. We did not include training in the use of the Enterolert system for monitoring *Enterococcus* in the current materials, as we found that the inclusion of *Enterococcus* in the suite of monitoring variables was too different from the other protocols. However, *Enterococcus* monitoring is included in the QAPP, and will be added to the monitoring protocols in early 2019. The Hui O Ka Wai Ola Volunteers Handbook, the QAPP and other materials have been made available to U.S. coral reef jurisdiction watershed coordinators, including American Samoa and Puerto Rico, and can be found on the Hui's website.

Volunteers were recruited through announcement of the program via: the MNMRC e-newsletter, social media, at MNMRC monthly public meetings, the National Water Quality Monitoring Council's Fall 2017 newsletter, MauiNow.com in February 2018, Maui News during November 2017 and May 2018, MauiTime 2017 Charity Gift Guide and more, and at the following community events: Ridge 2 Reef Rendezvous and Whale Tales.

E. Volunteer Training

A 12-hour new volunteer training took place at the Hawaiian Islands Humpback Whale National Marine Sanctuary Classroom. The course was designed for volunteers with no background in water quality sampling, including eight hours of class room presentations and four hours of hands-on exercises with the equipment needed to successfully sample. The new volunteer training was designed for volunteers of all skill and experience levels and included:

- Basic information: introduction, orientation, demonstrations, instruction on data management and debrief.
- Field sites: orientation and instruction on water-sample collection and processing, field-instrument use and data recording, field practice run.
- Laboratory: orientation and instruction on laboratory procedures, field instrument maintenance and calibration, laboratory practice run.

A 4-hour volunteer refresher and safety training was later held for current volunteers to review field work procedures and quality control requirements and safety protocols. As stated in section F above, additional new volunteers are now being trained in smaller groups or on a one-on-one basis as needed. There are currently 20 trained volunteers dedicated to South Maui in 4 monitoring teams covering 20 sites every 3 weeks.

F. Conducting water quality monitoring

This grant funding directly supported monitoring at 24 sites in South Maui. Monitoring began at the first 12 sites in early November 2017, and at the remaining 12 sites in February 2018. The Hawaii State Department of Health increased their number of monitored sites in June 2018 and we were able to decrease our total number of South Maui sites to 20. With this program expansion from West Maui to South Maui, the entire leeward coast of Maui is now being monitored by the Hui every 3 weeks at a total of 39 sites from Honolua Bay to ‘Āhihi Kīna’u. A total of 446 coastal water quality samples were collected and analyzed by South Maui Hui volunteers during the grant period.

The 12 water quality parameters measured at all Hui South Maui sites are listed in Table 1. These parameters correspond to most of the physical and chemical stressors recommended for monitoring by the US Coral Reef Task Force. Nitrogen and phosphorus can cause proliferations of benthic algae, which competitively exclude coral, and phytoplankton, which increases light attenuation. Turbidity is a direct measure of light attenuation. High water temperatures, low oxygen concentrations, and extremes in pH cause physiological stress in most coral-reef organisms. Salinity and silicate are both indicators of freshwater input, which is related in turn to inflows of land-based pollutants.

Table 1. Water quality monitoring parameters, instruments and monitoring-team roles.

Variable	Instrument	Monitoring-team role
Water temperature	Digital thermometer on multimeter	Measurement
Salinity	Salinity sensor on multimeter	Measurement & calibration
pH	pH sensor on multimeter	Measurement & calibration
Dissolved oxygen	DO sensor on multimeter	Measurement & calibration
Turbidity	Turbidimeter	Measurement & calibration
Nitrate+nitrite	Laboratory analyzer	Sample collection for lab analysis
Ammonium	Laboratory analyzer	Sample collection for lab analysis
Total nitrogen & phosphorus	Laboratory analyzer	Sample collection for lab analysis
Silicate	Laboratory analyzer	Sample collection for lab analysis
Phosphate	Laboratory analyzer	Sample collection for lab analysis
<i>Enterococcus</i>	Fluorogenic test (Enterolert)	Measurement or sample collection for lab analysis

Water temperature, salinity, pH and dissolved oxygen are measured in the field with high-precision sensors. Turbidity is measured on-shore in grab-samples with a turbidity meter. Nitrogen, phosphorus and silicate in-field filtered samples are measured by the Analytical Laboratory, University of Hawai‘i at Mānoa. The Analytical Laboratory runs certified standards and participates in international, inter-laboratory comparisons to ensure high analytical accuracy. The laboratory supports several long-term monitoring programs run by federal and state agencies and community groups.

All the equipment and supplies for monitoring *Enterococcus* were purchased within the grant period and monitoring for this parameter in South Maui began in March 2019. The Project Manager has begun establishing procedures for enterococcus monitoring and training the first team of South Maui volunteers in its methods. This additional monitoring parameter will follow a phased approach, being added to a few sites at a time to ensure quality control in collection and processing of the sample.

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G. Provision of data

Hui O Ka Wai Ola data was made available on four public platforms: the Hui project website (<https://www.huiokawaiola.com/>), the DOH website (<http://cwb.doh.hawaii.gov/CleanWaterBranch/WaterQualityData/default.aspx>), PacIOOS Voyager (<http://www.pacioos.hawaii.edu/voyager/>), and Zenodo (<https://zenodo.org/record/2562379#.XJ7KlaRug2w>). Data is posted on the Hui O Ka Wai Ola website as soon it is quality assured. On average, the website receives 200 unique visitors each week. SC members manage the many questions and data requests on the website related to the Hui and water quality on Maui. DOH maintains water-quality data that are easily accessible by the public with a simple search engine based on island, site and date-range. PacIOOS Voyager is a free, interactive, online mapping experience on the Google Maps platform, and Zenodo is permanently citable for future research. We also share raw data with those that request it via the website.

We participated in several outreach events to reach out to Maui residents and others statewide with an interest in water quality and coral reefs. In 2017 and 2018 we hosted a table with hands-on water quality monitoring activities at the annual Ridge to Reef Rendezvous event. Dana Reed and James Strickland presented the work of the Hui to Megan Jones' University of Hawai'i Maui College Sustainability class in 2018. Hui data was utilized by the NOAA Ocean Color Project to co-locate data calibration sites and shared to the US Coral Reef Task Force Watershed Working Group in the context of understanding water quality impacting coral health in Ridge to Reef watersheds. The Hui is in the draft stages of creating a "Coastal Water Quality Report 2017-2018" that will reflect the programs growth during the first two years as well as report on findings from the data over that period of time. This report is expected to be completed and made publically available by mid-2019.

Outcomes

1) **Expand the capacity for monitoring coastal water quality to South Maui watersheds connected to reproductively important coral reefs with quality-assured, community-based programs (Short-Term)**

The South Maui Coastal Water Quality project was successfully transferred and expanded the quality-assured, community-based approach innovated in the West Maui program. South Maui now has a complete water quality monitoring program that is quality assured and approved by the state. There is now an equipped water quality lab, designated sites with verified safe entry points, mobile sampling kits, multiple teams of trained and dedicated citizen-scientists, and a small water quality staff. The program is highly visible and embraced by the community which should prove to ensure its continuation into the future.

We continue to facilitate the transfer of this approach to other coral reef areas by providing all project information on the Hui O Ka Wai Ola website (www.huiokawaiola.com). This successful program expansion demonstrates the value of quality-assured, community-based monitoring in South Maui and can help other coastal communities to adopt the same approach.

2) **Improved ecological health for coral reefs and other coastal ecosystems through well-informed coastal management in South Maui (Long-Term)**

The establishment of the South Maui water quality monitoring program allows for the creation of a water quality baseline for the area. This baseline can be used to inform management decisions intended to protect coastal ecosystems. Augmenting the sparse data produced by agency monitoring with quality-assured data from community based monitoring reduces uncertainty in decision-making, and reduces the risk of degradation.

We are confident that this outcome remains achievable in the long-term, based on many examples where data from community-based monitoring programs have been used in coastal management policy- and decision-making, and the outcome has been improved ecological health (e.g., derwentestuary.org.au).

3) **Significantly increased data available to DOH and to the public (Medium-Term)**

The Hui continues to maintain its excellent relationship with the State of Hawaii Department of Health. For the first time, a volunteer-based citizen science water quality monitoring group's data has been included in the State

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of Hawai'i Clean Water Branch's Integrated Report to the EPA "[2018 State of Hawaii Water Quality Monitoring and Assessment Report](#)". The Hui can be found listed in "Appendix A: Data Sources" of this document, one of just eight sources providing water quality data for the entire state. In June 2018, influenced by the community support shown for water quality data through the Hui, the DOH was able to receive funding to increase the number of sites it monitors. This represents the power of partnerships and community support, ultimately resulting in a win-win for Maui's people and environment. In response to this, the Hui was able to reduce its total number of sites from 48 to 39, allowing for funds to be utilized elsewhere in the program.

Before the start of this program, some of the sampling sites we selected had never before been tested, which means we had no idea of what condition the water was in, impaired, healthy or otherwise. At the time of this report, 526 water quality samples from South Maui have been analyzed. To pair with this, West Maui, with separate funding and a 1.5-year head start over South Maui, has now had 1043 samples analyzed, for an entire program total of 1569 water quality samples. This great achievement was made possible through the power of partnerships and the financial support of the National Fish and Wildlife Foundation, Maui County Office of Economic Development, and the North Beach West Maui Benefit Fund. With more than two years of data for some Hui sites, we can now begin to have a full picture of the state of water quality in these areas.

3. Looking Beyond the Grant

Lessons Learned

The backbone to a large scale community-based water quality monitoring program is its volunteers. It cannot be stressed enough the importance of having dedicated, passionate volunteers and taking the time to cultivate and nurture that relationship. Water quality monitoring requires an investment in the volunteer monitors in the form of training time and finances for consumables and supplies. The result is the need for long-term commitment to the program from volunteers, a position that by its very nature is non-committal. Volunteer retention is crucial. From the start it is important to instill a sense of ownership of the program in the volunteer. They are the champions of the program, making it happen day to day. Keep them involved, show them they are appreciated, show them they are having an impact, and make it fun.

When involving a large number of volunteers in a program, you need to be organized. Power is in partnerships, both financially and organizationally. This program could not have been successful without the strong foundation that the three partnering organizations built, with Maui Nui Marine Resource Council, The Nature Conservancy, and the West Maui Ridge to Reef Initiative each bringing different expertise, capacities and strengths. We learned through this project that while volunteer-led monitoring is effective, it is not free. A key aspect of our program was the ability to utilize the three partner organizations to be able to tap into various public and private funding opportunities. This allowed us to leverage NFWF funding and ensure that the program continues after the end of the grant period.

Dissemination

As mentioned in Section G and Outcome 3, the Hui disseminated its water quality data via various publically available websites and was included in the 2018 State of Hawai'i Clean Water Branch's Integrated Report. Hui members shared information about the program itself and the results of the data at community water quality monitoring start-up events, and multiple other opportunities. All program-related materials and documents were made available at www.huiokawaiola.com.

Next Steps

The continuation of the monitoring program beyond the end of the grant period is needed to provide an adequate water quality baseline for the South Maui region, and to gather document changes in water quality in the future. This baseline provides both a picture of current water quality over an established period of time, as well as something with which to gauge future shifts in water quality against. Once established, the baseline can and should be utilized by individuals and agencies to better inform management actions and decisions resulting in improved reef health and resiliency.

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In 2018 the Hui steering committee created a 5-year strategic plan outlining the future direction of the program, which includes youth engagement and expansion of the monitoring program to East Maui. This will result in a more complete picture of water quality conditions potentially affecting coral reef health around the island, and help to bring awareness and support for coastal water quality health from the greater Maui community.

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