

The logo for Hui O Ka Wai Ola, featuring the text in a dark blue, sans-serif font, arched over a stylized blue wave graphic.

Hui O Ka Wai Ola

Coastal Water Quality Report

2016 | 2018



Table of contents

Who we are	1
Why water quality	2
What we do	3
Where we sample	5
Findings	6
What you can do	8
Moving forward	9



Who we are

Photo: Alana Yurkanin

Hui O Ka Wai Ola (Association Of The Living Waters) is a partnership of The Nature Conservancy, Maui Nui Marine Resource Council, and West Maui Ridge to Reef Initiative that started a community-based program working with volunteers to regularly gather and generate quality-assured coastal water-quality data, and to provide this data to the Hawai'i Department of Health, other resource agencies, non-governmental organizations, researchers and the public. Our mission is to deepen the understanding of Maui's coastal water quality through science and advocacy to accelerate positive change.



Photo: Ananda Stone

More than 40 volunteers care deeply about the health of our ocean and are collecting quality data to support ocean-friendly management. Comprised of community member volunteers, scientists, supporters, and partner groups, we recognize the value of a clean ocean for all of Hawai'i's residents, visitors, and natural resources.

Our partner organizations



Mahalo to our supporters!





Photo: Alana Yurkanin

Hui O Ka Wai Ola believes that the quality of our water = the quality of life

Hawai'i's shoreline and coastal waters are an important gathering place for residents and visitors and a critical habitat for many marine species. When we surf, dive, and fish in clean water, eat healthy seafood, and enjoy an unpolluted beach we are benefiting from good water quality. Our health is tied to the health of the ocean, and the quality of our water equals the quality of life! Sediments, nutrients, and other pollutants from land-based sources can create chronic water quality issues that we can identify via monitoring. Testing nearshore water samples gathered along Maui's coastline allows us to identify and focus efforts in the places that need them most.

Hu'ea na kai i piha'a moe wai o uka

Washed to the sea is debris of upland streams.

Ka lepo ke kumu wai, e hua'i ana ka lepo kai

When the source of water is dirty, the dirt is carried to the sea.

'Ōlelo No'eau: Hawaiian Proverbs and Poetical Sayings, Mary Kawena Pukui

Fringing coral reefs, which surround much of Maui island, are fragile ecosystems susceptible to even the slightest changes in ocean parameters. Measuring coastal water quality helps us understand the nutrient, sediment, and ocean chemistry story of that area so we can better protect our reef ecosystems from harm and improve their resiliency against stressors. This is important because Hawai'i's coral reefs are a major source of food for local and global consumers, buffer coastlines and mitigate damage from storms and erosion, provide jobs and income to local economies in subsistence, commercial and recreational sectors, provide habitat, spawning and nursery grounds for marine species, and source essential nutrients for marine food chains. By caring for our coastal waters, we care for our coral reefs, special places, and natural resources on which we all depend.



What we do

Photo: Bruce Forrester

Filling an important need

Hawai'i's Department of Health (DOH) Clean Water Branch monitors coastal water quality at stations around the state and is encouraging more partnerships for quality assured monitoring. That's where we come in. Hui O Ka Wai Ola works with our volunteers to regularly gather data for 13 parameters, including nitrogen and phosphorous compounds, turbidity, and ocean chemistry indicators at 39 locations along Maui's leeward coast. All water quality samples are collected, stored, and processed in line with the Hui's [Quality Assurance Project Plan](#) (QAPP) and associated Standard Operating Procedures.

Our method

Teams of carefully trained volunteers carry out water-quality monitoring tasks and some laboratory duties, all under the supervision of the monitoring team leaders and project manager. Each team consists of at least two volunteers, who pick up the equipment from the regional lab and collect samples in knee-deep water at testing sites every three weeks. Sampling sessions last 2-3 hours in the mornings. Volunteers record monitoring and sample information on data sheets and chain-of-custody forms.

Nutrients (nitrogen and phosphorus)

Water samples are gathered, frozen, and shipped on ice to the SOEST Analytical Laboratory on O'ahu for analysis of nitrogen and phosphorous compounds. High levels of nitrogen and phosphorous can indicate pollution from wastewater, run-off from agriculture, landscaping and/or golf courses. Too much nitrogen can cause an increase in invasive algae and bioerosion, which is damaging to coral reefs. When we identify ocean areas with high levels of nutrients, we can address up-slope areas that are sources.



Photo: Dana Reed



Photo: Bruce Forrester

Turbidity

We use a turbidity meter (Hach 2100Q turbidimeter) onsite to measure the clarity of the water. Sediment carried from the land to the ocean (by streams, flooding, storm runoff) can cause ocean water to become brown or murky. Sediment blocks sunlight from reaching reefs and can smother corals. When we find areas with high levels of turbidity, we can address upslope issues like land-clearing or overgrazing that caused sediment to flow into the ocean.

Ocean chemistry

We measure pH, salinity, dissolved oxygen (DO) and water temperature onsite using portable, handheld equipment (Hach HQ40D multiprobe). Changes in ocean chemistry can be caused by climate change and local factors. Salinity can be changed by freshwater flowing into the ocean. Water temperature can fluctuate by season and can also be caused by climate change. Ocean acidity can increase by warming ocean temperatures. Warmer water also holds less dissolved oxygen, which is needed for aquatic plants and animals to survive.



Photo: Bruce Forrester

All data collected by the Hui is made available to the public at HuiOKaWaiOla.com, PaclOOS, and Zenodo. The data has also been uploaded to the Environmental Protection Agency's STORET database for use by State and Federal agencies. For the first time, a volunteer-based citizen science water quality monitoring group's data has been included in the State of Hawai'i Clean Water Branch's Integrated Report to the EPA, "2018 State of Hawai'i Water Quality Monitoring and Assessment Report". We believe this data will allow for more effective management of nearshore waters and ultimately, healthier coral reefs. Additional details regarding sample collection, processing and analysis are available in the QAPP.



Photo: Bill Rathfon

Where we sample

We now monitor 39 sites!

Hui O Ka Wai Ola surveys the following sections of Maui's leeward coastline: West Maui (Honolua Bay to Pāpalaua), and South Maui (Haycraft Park to 'Āhihi Bay). All teams use identical equipment, calibration, and operating and handling procedures to sample a total of 39 sites across 40 miles.



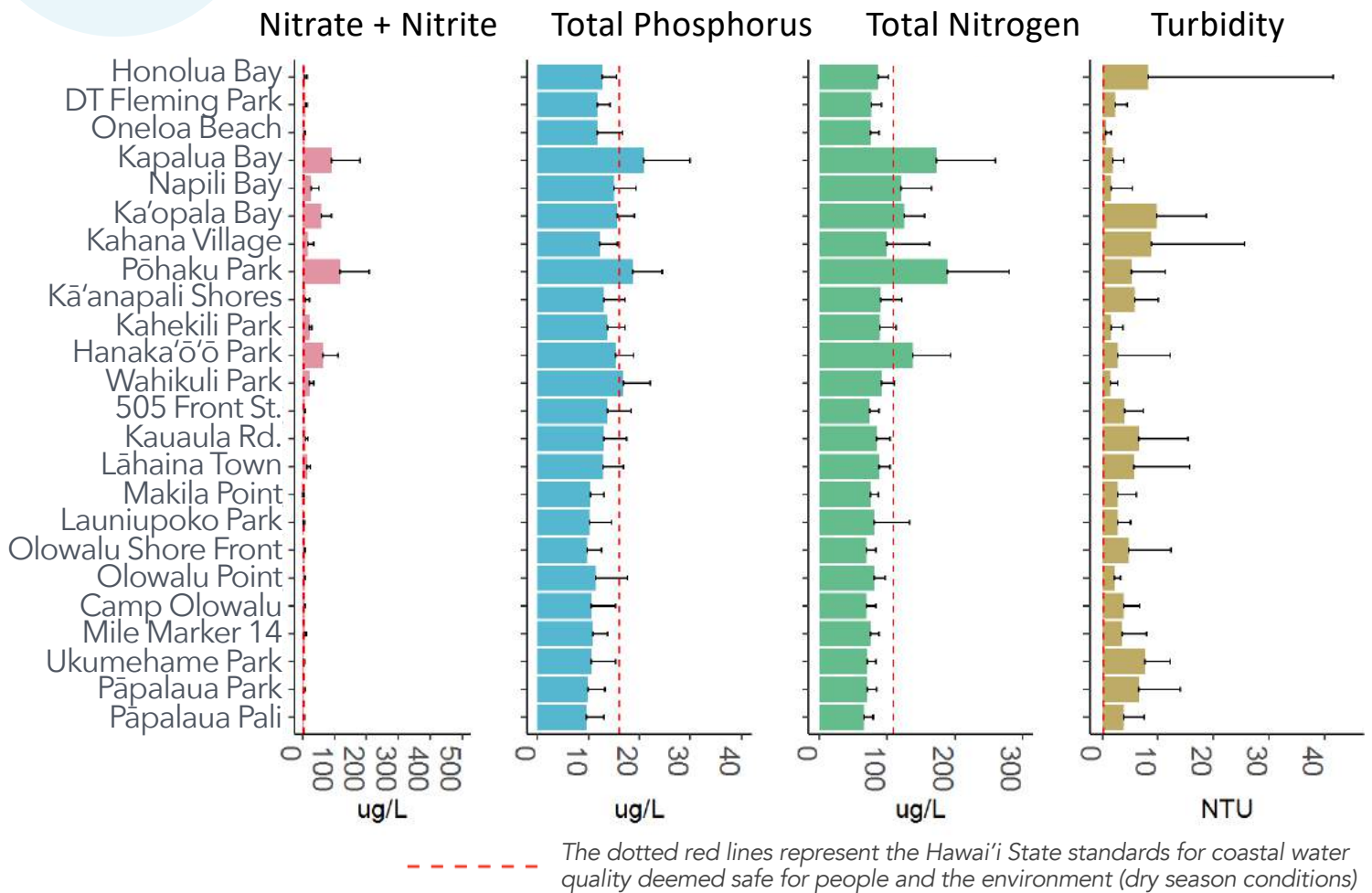
Our monitoring efforts document changes in water quality that may affect coral health, alerting our communities and decision-makers when the ocean needs our help. To visit an interactive map of our monitoring sites, please visit HuiOKaWaiOla.com.

Before the start of this program, some of the sampling sites selected had never been tested before, which means the Hui had no idea of what condition the water was in – impaired or otherwise. Hui O Ka Wai Ola has now collected and analyzed over 700 water quality samples from our West and South Maui sites since monitoring began in 2016.

In early 2018, the Hui was monitoring 48 sites, ten of which overlapped with DOH Tier 1 sample sites (grey tabs on map). In June, 2018, DOH began collecting for all parameters that Hui O Ka Wai Ola collects and more, allowing the Hui to discontinue monitoring at most DOH Tier 1 sites. The findings shared in this report are for all 48 sites initially monitored by Hui O Ka Wai Ola.

Findings

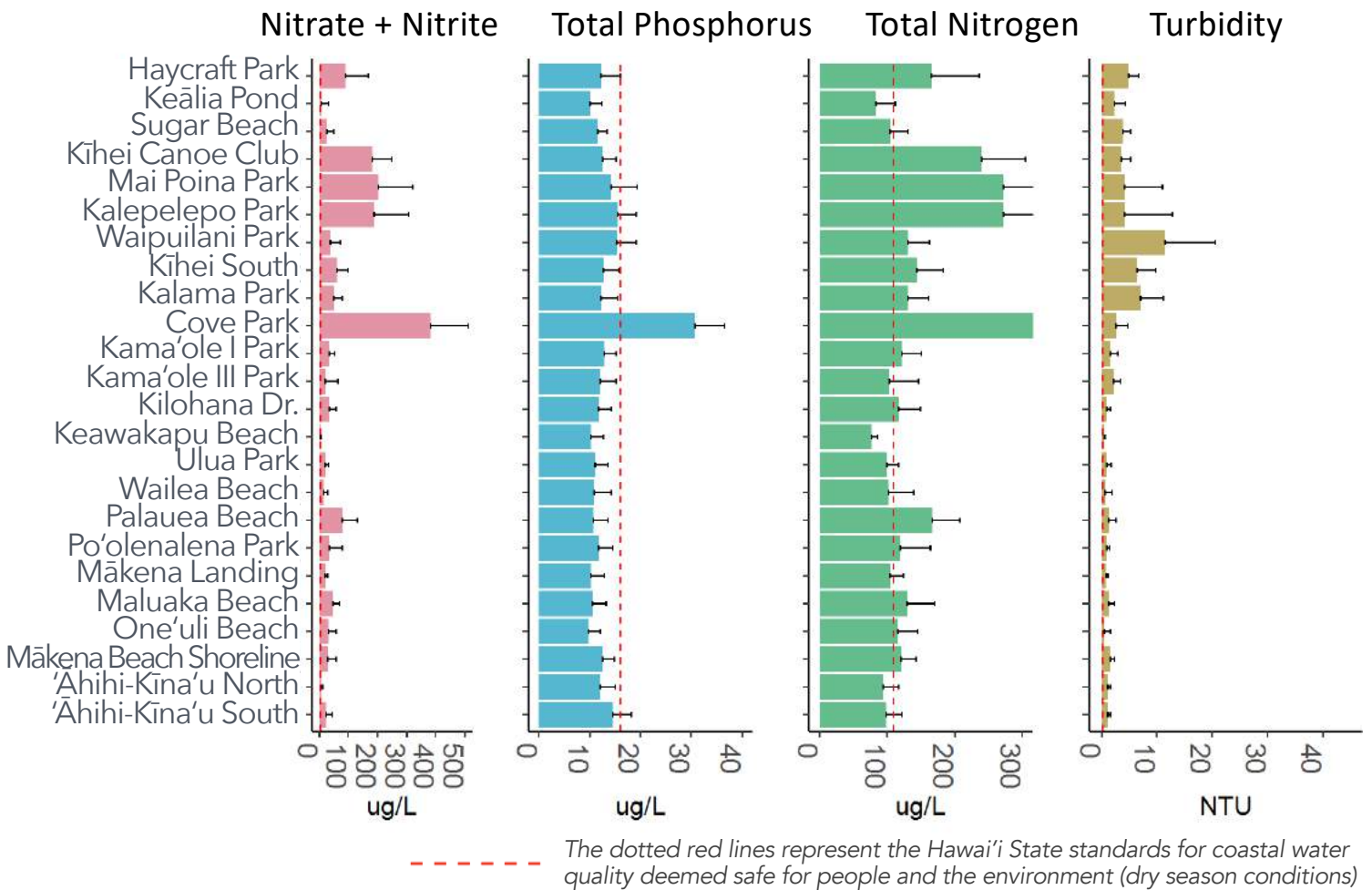
West Maui Findings (June 2016 – October 2018)



The primary water quality issue for West Maui is turbidity (water clarity) where all sites measured in this region exceed the Hawai'i State standard of 0.2 NTU (Nephelometric Turbidity Unit). This is likely due to the number of perennial and intermittent streams in West Maui near sites of fallow agriculture, erosion from invasive species, or development that transport loose sediment to the ocean, especially during large rain events. Our data helps identify and target the sites with the highest levels of turbidity, such as Ka'opala Bay (9.85), Kahana Village (8.81), and Honolua Bay (8.33), to explore methods of preventing sediment from entering these waterways. Several sites also have excessive nutrient levels, including Pōhaku Park, Kapalua Bay, Hanaka'ō'ō Park, Ka'opala Bay, and Napili Bay, where Pōhaku Park's nitrate + nitrite levels exceed the State standard by a factor of 33. While still a problem, these nutrient levels are relatively low when compared to South Maui.

Graphs are plotted using geometric means by site, which is similar to an average but tends to de-emphasize larger outliers. Black lines extending from the color bars indicate variability in measurements at those sites. For instance, a short line means data were relatively similar over time, so not much variation went into that average.

South Maui Findings (November 2017 – October 2018)



South Maui's major water quality issue is excessive nutrients. Nutrient levels in both West and South Maui are likely from legacy agriculture practices, where large-scale sugarcane and pineapple production utilized fertilizers and other nutrient-laden soil amendments for over 100 years, which continue to make their way to coastal waters via runoff, streams, and underground seepages. When nutrients are in excess, they encourage an overgrowth of algae in the ocean, and can disrupt the chemical balance and overall health of coral reef ecosystems. Nearly every site monitored in South Maui was in excess of at least one State standard for nutrients (measured in micrograms per liter (ug/L)). Cove Park has the highest nutrient readings on Maui, measuring more than 100 times the State standard for Nitrate + Nitrite, almost double the standard for Phosphorus, and nearly 3 times the standard for Nitrogen. Injection wells from sewage treatment plants, cesspools, and leaks from waste-water transport systems are also a component in nutrient readings. Unlike West Maui, turbidity is less of a problem since South Maui receives very little rainfall and only has Waikapū Stream, which deposits into Keālia Pond before reaching the ocean.



Photo: Bruce Forrester

What you can do

To help improve water quality along Maui's coastline and in areas that are special to you, here are a few ideas!

Help Us Save Maui's Coral Reefs

- \$25** Water quality testing supplies for one site
- \$50** Lab testing for one water quality sample
- \$300** Water quality monitoring at one site for a month
- \$4000** Water quality monitoring at one site for a year



Photo: James Strickland III

Help us keep this program alive!

Even though this is a volunteer-based program, there are still significant expenses, including our precious and vital staff members, testing supplies and maintenance, sample processing, and program expansion. To help keep our program alive, you can:

- 💧 **Adopt a beach for water quality testing.** Visit mauireefs.org/membership-and-giving/adopt-a-beach/ to learn more.
- 💧 **Volunteer!** Contact james@mauireefs.org
- 💧 **Donate!** Consider sharing your treasure at huiokawaiola.com/join-us
- 💧 **Share our Data** with change-makers at huiokawaiola.com/data

Meet the Hui's Project Manager!

James Strickland III, Hui O Ka Wai Ola's Project Manager, is responsible for the day-to-day aspects of running our ocean water quality program, and guides the program towards goals set by the Hui's Steering Committee. He handles volunteer outreach and training, works in the field and lab with our sampling teams, maintains lab equipment and inventory, and upholds the project's quality standards.



Photo: Bruce Forrester

Moving forward

Hui O Ka Wai Ola is the first citizen science based water quality monitoring program of its kind in Hawai'i. The Hui has contributed over two years of coastal water quality data for change-makers and watershed managers to use for future decisions about where and how to manage for improved coastal water quality and coral reef health. The program has paralleled State-collected data protocols and developed standards available for groups in Hawai'i and beyond to adopt in creating similar programs.

The data are being used to:

- 💧 Justify additional research projects and monitoring efforts to better understand Hawai'i's water quality issues and their root causes
- 💧 Strengthen partnerships with DOH
- 💧 Create an army of citizen science volunteers and inspire advocacy

Next steps

- 💧 Influence water quality related decision-making at the County and State levels
- 💧 Lessen the effects of land-based pollution on coral reefs
- 💧 Support other groups interested in replicating this effort



Photo: Bruce Forrester

For more information, please visit HuiOKaWaiOla.com or contact HuiOKaWaiOla@gmail.com





Mahalo!

Thank you to the following for your generous support and involvement in Hui O Ka Wai Ola:

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National Fish and Wildlife Foundation, Napili Bay and Beach Foundation, Maui County's Office of Economic Development, Makana Aloha Foundation, North Beach-West Maui Benefit Fund, Inc., Hawai'i Tourism Authority, Pride of Maui, Lush Fresh Handmade Cosmetics – Charity Pot, 100 Women Who Care – Maui, The EACH Foundation, DWJ Smith Family Charitable Fund, Austin Family DAF, Brad and Sherry Eichhorst Gift Fund, Hawaiian Paddle Sports, Maui Classic Charters, Barbara Savitt, Maui Ocean Center, Honua Kai-West Maui Community Fund, Inc.

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Volunteers

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Sincerely, Hui O Ka Wai Ola:

Partners

Maui Nui Marine Resource Council
The Nature Conservancy
West Maui Ridge to Reef Initiative

Steering Committee & Project Management Team

Alana Yurkanin, Amy Hodges, Bill Rathfon, Bruce Banker, Cathy Maxwell, Dana Reed, Emily Fielding, James Strickland, Kim Falinski, Larry Stevens, Mitch Brown, Robin Newbold, Tiara Stark, Tova Callender. Alumni: George Burnette, Megan Edgar, Sofia de la Sota.