



BLUE WATER TASK FORCE MAUI

WATER QUALITY REPORT

2022



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VOLUNTEERS & PARTNERS

The goal of Blue Water Task Force is to provide year-round water quality information to the public in order to supplement monitoring done by the Hawai'i Department of Health. This data is used to inform safe beachgoing and aquatic recreation on the island of Maui.

MAHALO to the Volunteers, Partners, and Supporters of Surfrider Foundation's Maui Chapter. Your support and commitment make this program possible. Special thanks to Pā'ia Youth and Cultural Center providing laboratory space in 2022.

MAUI BLUE WATER TASK FORCE VOLUNTEERS:

North Maui Samplers

- Greg Masessa (Coordinator)
- Kristina McHugh
- Marla Tonorud
- Susan Durham
- Tracy Paxton
- Ian Smith
- Beth Speith
- Monica Gussow
- Janeen Bittman
- Ylenia Mayen
- Laura McHugh

Hāna Samplers

- Mary Ann Kahana (Hāna Coordinator)
- Kathleen Flanders
- Mavis Oliveria-Medeiros
- Scott Crawford
- Claudia Kalaola
- Sam Akoi
- Hauoli Kahaleuahi
- Gabriel Guerriero

INTRODUCTION

The Blue Water Task Force (BWTF) is the Surfrider Foundation's volunteer water quality monitoring program that provides critical information to protect public health at our beaches.

The Maui Chapter launched its BWTF program in 2017. In 2022, the BWTF monitored a total of 20 sites on a monthly basis, with 16 sites along the North Shore and 4 sites in Hāna. Ma'alaea Bay was sampled 3 times after local surfers complained of itchiness and respiratory issues after surfing there.

Our BWTF Team is composed of trained volunteers who test samples for the presence of *Enterococcus*, a fecal bacteria that indicates the presence of human or animal waste in the water. Elevated levels of *Enterococcus* increase the likelihood that other pathogens that can make people sick may be present.

The goal of BWTF is to fill in monitoring gaps and quickly communicate with the public where it is safe to swim and where bacteria levels are elevated.

Water quality results are compared to the standards used by the Hawai'i Department of Health (HDOH) to make beach closure decisions. Known as the Beach Action Value (BAV), this threshold is set at 130 colony forming units of *Enterococcus* per 100mL sample (130 CFU/100mL).

The water quality information generated by the BWTF augments the data that the HDOH provides through its beach water quality monitoring program. HDOH services test only a specific number of beaches on Maui, primarily those with lifeguards and in popular tourist areas, while the BWTF covers a variety of areas popular with recreational users including surf spots and local bathing beaches.

Beachgoers should take precautions swimming, surfing, or recreating after heavy rain events for 24-48 hours. Do not enter brown water areas or where there is a warning sign for high bacteria levels.

Community members are encouraged to check water quality results before heading to the beach at [bwtf.surfrider.org/explore/51](https://www.bwtf.surfrider.org/explore/51). Current and historic data are available.



WHERE WE TEST

NORTH SHORE

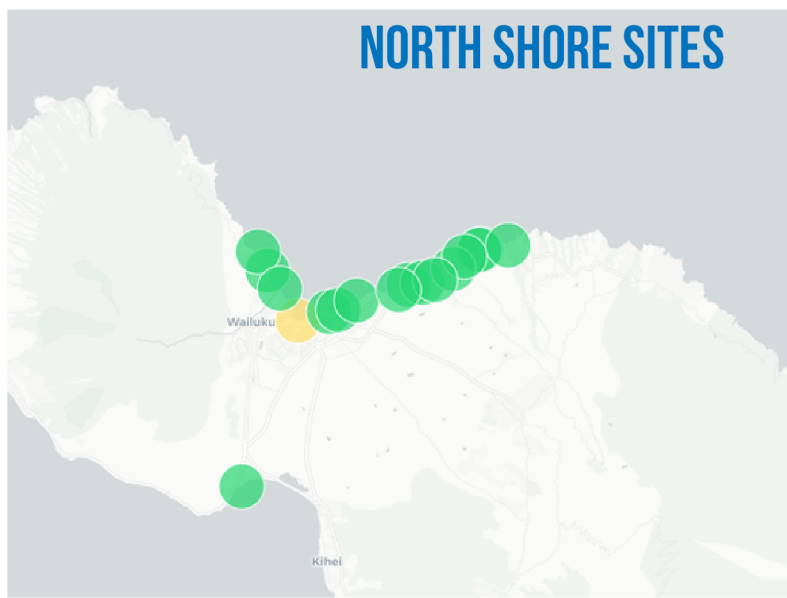
1. Māliko Bay
2. Ho'okipa Beach Park East
3. Ho'okipa Beach Park West
4. Kū'au Cove/Mama's Beach
5. Kū'au Bay/Tavares Bay
6. Pā'ia Bay
7. Kapukaulua/Baldwin Beach
8. Wawau Point/Baby Beach
9. Sugar Cove (Spreckelsville)
10. Kanahā Beach
11. Kanahā/Kalialinui Stream
12. Kahului Treatment Plant
13. Kahului Harbor
14. Wailuku Stream
15. Waiehu Stream
16. Waihe'e Beach Park
17. Ma'alaea Bay*

HĀNA

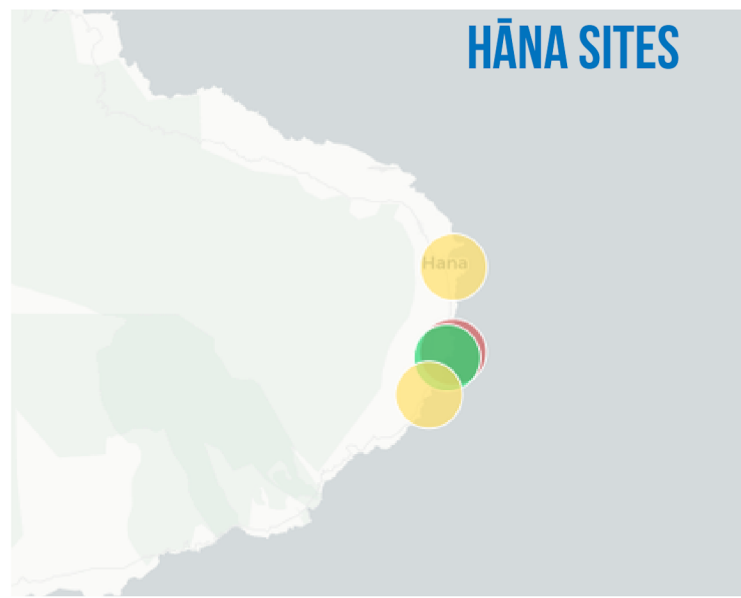
1. Hāmoa
2. Hāna Bay
3. Haneo'o
4. Waioka



NORTH SHORE SITES



HĀNA SITES



SITE DETERMINATION & SAMPLING

In 2022, trained BWTF volunteers sampled 21 sites. During this time period, 199 samples were collected, generating water quality information for recreational waters along the island's North Shore and in the East Maui community of Hāna. Samples are processed at the Pā'ia Youth & Cultural Center.

Our BWTF team maintains a regular four week interval between sampling and will sample both after rain events and during Brown Water Advisories (barring dangerous conditions). This ensures that the BWTF data set captures water quality information during both wet and dry conditions. This data allows us to gain a more comprehensive understanding of water quality conditions on Maui.

BWTF prioritizes sites to augment the sites sampled by the HDOH. The BWTF covers a variety of areas popular with local residents and recreational users including surf spots, boat launches, and local bathing beaches. The BWTF additionally tests potential freshwater sources of pollution that discharge onto the beach, like streams and stormwater outflows, as well as sites to determine if cesspool wastewater is a source of bacteria to coastal waters.

The BWTF team also periodically re-assesses its site selection. Sites that reveal good water quality and low bacteria levels, for example, may be replaced by sites that indicate more chronic pollution issues. Community concerns may also prompt the BWTF to prioritize new sites, such as the case with Ma'alaea in 2022.



2022 DATA SUMMARY

This report provides an analysis of water test results for 20 sites that were monitored in 2022 (16 on North Shore and 4 in Hāna). We did not include the three samples for Ma'alaea Bay as all results met state health standards. Our water quality results indicate that certain sites on Maui's North Shore frequently experience high bacteria levels that exceed state health standards (**Table 1**).

High bacterial counts indicate the presence of human or animal waste in these waters, which may threaten public and environmental health. The data is also important in identifying chronically polluted sites that should continue to be prioritized for ongoing monitoring, as well as potential investigation on behalf of the Department of Health.

**TABLE 1: PERCENT OF NORTH MAUI SAMPLES
EXCEEDING HEALTH STANDARDS (> 130 MPN/100ML)**

SITE NAME	TOTAL SAMPLES	MAXIMUM BACTERIA (MPN ENTEROCOCCUS/100ML)	% HIGH BACTERIA (>130 MPN/100ML)
Kapukaulua/Baldwin Beach	10	98	0%
Ho'okipa Beach Park E	11	41	0%
Kū'au Bay/Tavares Bay	10	62	0%
Kahului Treatment Plant	10	41	0%
Kanahā/Kalialinu Stream	11	10	0%
Kanahā Beach	11	121	0%
Waiehu Stream	11	20	0%
Waihe'e Beach Park	11	20	0%
Kū'au Cove/Mama's Beach	12	175	9%
Wawau Point/Baby Beach	11	175	9%
Ho'okipa Beach Park W	11	447	9%
Pā'ia Bay	11	545	9%
Sugar Cove	9	201	11%
Māliko Bay	11	765	18%
Kahului Harbor	10	2,400	20%
Wailuku Stream	11	4,366	27%

Table 1. Indicates the percentage of total samples taken at respective sites that exceeded HDOH health standards for *Enterococcus* bacteria (>130 mpn/100mL). Note that the number of total samples is not consistent across sites.

2022 DATA SUMMARY

Table 2 provides an analysis of water test results four sites in Hāna that were monitored in 2022. These results indicate that Haneo’o frequently experiences high bacteria levels that exceed state health standards (**Table 2**). High bacterial counts indicate the presence of human or animal waste in these waters, which may threaten public and environmental health. The data is also important in identifying chronically polluted sites that should continue to be prioritized for ongoing monitoring, as well as potential investigation on behalf of the Department of Health.

**TABLE 2: PERCENT OF EAST MAUI (HĀNA) SAMPLES
EXCEEDING HEALTH STANDARDS (> 130 MPN/100ML)**

SITE NAME	TOTAL SAMPLES	MAXIMUM BACTERIA (MPN ENTEROCOCCUS/100ML)	% HIGH BACTERIA (>130 MPN/100ML)
Hāmoa Beach	6	10	0%
Hāna Bay	5	85	0%
Waioka	7	332	14%
Haneo’o Fish Pond	7	1,152	43%

Table 2. Indicates the percentage of total samples taken at Hāna sites that exceeded HDOH health standards for *Enterococcus* bacteria (>130 mpn/100mL). Note that the number of total samples is not consistent across sites.



KEY OUTCOMES

In 2022, eight sites (Kū'au Cove/Mama's Beach, Wawau Point/Baby Beach, Ho'okipa Beach Park West, Pā'ia Bay, Sugar Cove, Kahului Harbor, Wailuku Stream, and Māliko Bay) had at least one sample that exceeded state health standards. This was higher than in 2021 where five sites had at least one sample exceed.

Over the last two years, samples from Wailuku Stream, Māliko Bay, and Kahului Harbor have measured high bacteria levels that exceed the state health standard more frequently than the other sites tested. Kahului Harbor is located in an urban area and while the other two sites are located at the mouth of streams or rivers. Water quality conditions at these sites can likely be attributed to land-based runoff from upland areas that is carried by freshwater streams to the ocean.

Topping the list, for the second year in a row, is Wailuku Stream with 27% of samples exceeding health standards in 2022. This site also had the highest single bacteria reading last year of 4,366 Enterococcus mpn/100mL (the state standard is 130 mpn/100mL). The contributing watershed and nearby coastline has a particularly high concentration of cesspools. The chronic pollution documented by the BWTF at this site indicates the potential impact of sewage pollution.

2022 was the first year that water quality samples were collected in Hāna. Though sample size was limited, Haneo'o Fish Pond had consistently high bacteria levels. It is

likely that the fish pond has freshwater inputs & land-based sources of pollution contributing to high bacteria levels. Additional data from Hāna will allow us to develop a better understanding of water quality trends at these sites.

From our data, it is additionally clear that many locations have elevated levels of fecal indicator bacteria after rain events and during brown water events. Beginning in November, the rainy season is characterized by large storm events with heavy rainfall.

Particularly in the early part of the season, these storms serve to "flush" the island and can result in large amounts of water, sediments, wastewater, and pollutants flowing downhill into the ocean.

Families, ocean users, and the public should be aware of the poor water quality conditions in these freshwater flows and seek to avoid them. The public should be particularly aware after heavy rain events that lead to increased runoff and can prompt Brown Water Advisories. Even if you do not see a public notice posted, avoid brown water until conditions clear.

More exposed beaches and those that do not have direct freshwater inputs from streams or rivers generally test clean. These sites seldom show high bacteria levels because of the high volumes of water exchange and mixing that occurs at these sites. Bacteria at these sites, however, can be elevated after rainfall or other heavy storm events.

KEY OUTCOMES

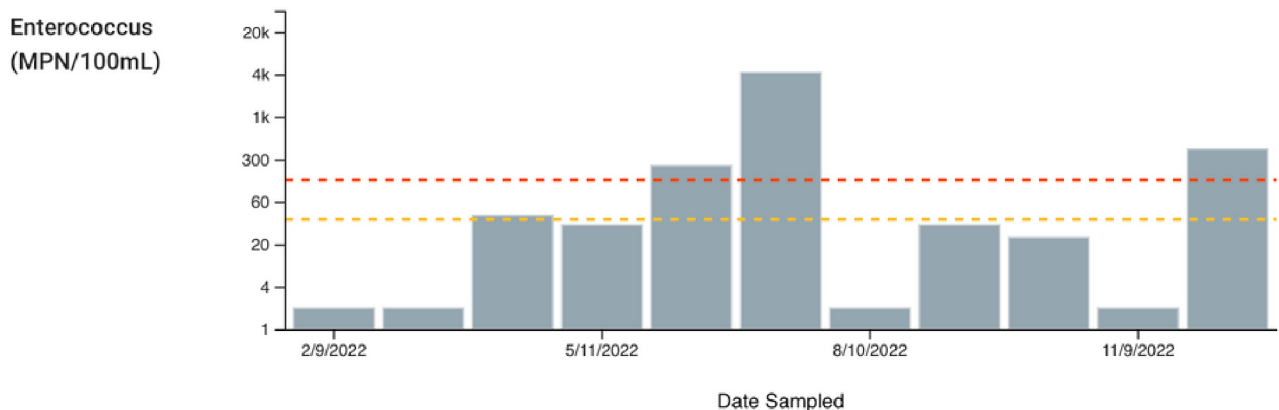
PRIORITY SAMPLE SITE: WAILUKU RIVER

Since 2017, BWTF monitoring has indicated high bacteria levels at the mouth of the Wailuku River and the surf spot Paukukalo. In 2022, 27% of the samples collected at this site exceeded health standards. Two important factors seem to contribute to the high bacteria readings. First, the Wailuku River site is located at the mouth of a river and thus receives high amounts of land-based runoff. Secondly, this area has a high density of coastal cesspools that likely contribute to high bacteria readings, particularly during heavy rain events.

27%

OF WAILUKU RIVER
SAMPLES IN 2022
EXCEEDED HEALTH
STANDARDS FOR
BACTERIAL COUNTS

Wailuku River Results



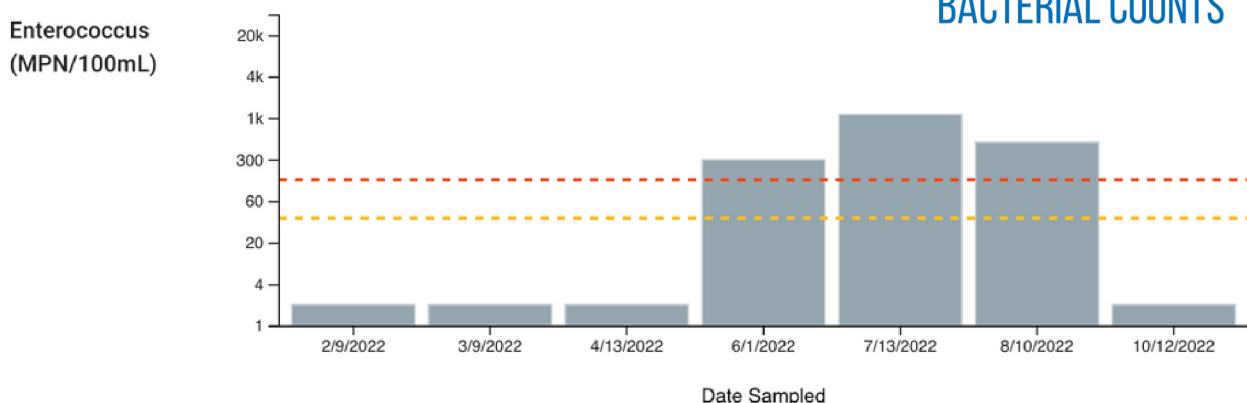
PRIORITY SAMPLE SITE: HANEO'O FISH POND

2022 was the first year that Blue Water Task Force water quality monitoring was conducted. 43% of the samples collected at this site exceeded health standards. This site is in close proximity to a handful of coastal cesspools that may contribute to high bacteria readings, particularly during heavy rain events.

43%

OF HANEO'O FISH POND
SAMPLES IN 2022
EXCEEDED HEALTH
STANDARDS FOR
BACTERIAL COUNTS

Haneo'o Fish Pond Results



SOURCES OF POLLUTION

While the causes of bacterial pollution are multi-faceted, water quality at the beach is influenced by stormwater, groundwater, wastewater, and animal waste.

CESSPOOLS, SEPTIC, & SEWER SYSTEMS

Maui has 12,200 cesspools that discharge 7.9 million gallons of untreated sewage each day. Upcountry Maui has a particularly high concentration of cesspools that drain into the surrounding watershed and eventually empty into the ocean. For homes or businesses that utilize cesspools, all the water that goes down the drain is stored in an underground pit. The wastewater then leaches slowly back into the ground, without treatment.

As a result, the State of Hawai'i passed Act 120 in 2016 that bans the construction of new cesspools. The following year, Hawai'i passed Act 125 mandating the upgrade of all existing cesspools by 2050.

Septic systems are slightly more advanced systems, yet both cesspools and septic systems contribute to water pollution.

For example, when groundwater levels are high, or when a heavy rain occurs, untreated wastewater can leach out of cesspools and septic systems polluting both ground and surface waters. In fact, even when a conventional septic system, without advanced treatment capabilities is functioning 100% properly, the effluent that is discharged still contains nutrients such as nitrogen and phosphorus, which pollute both groundwater and surface waterways. Aging infrastructure, including sewer systems with cracks or leaks, may also contribute to water pollution.

STORMWATER

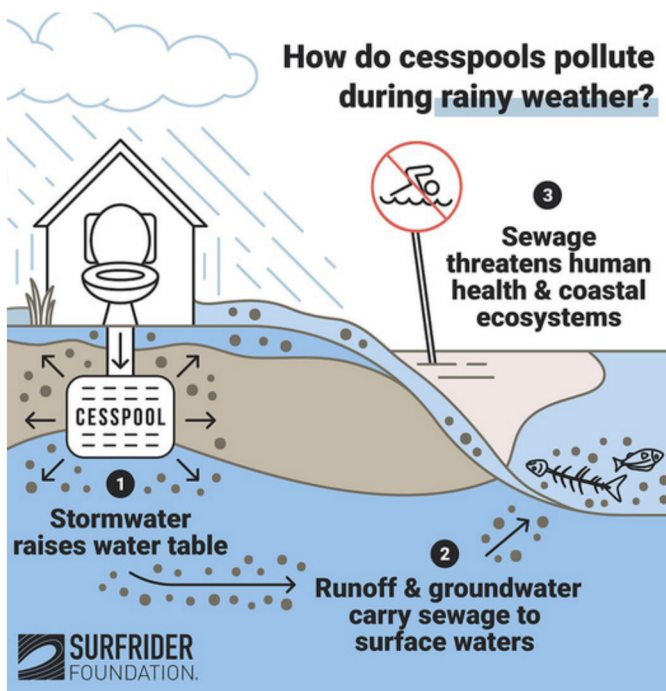
When water samples are collected during or just following a rain event, results are more likely to yield high bacteria levels due to stormwater runoff. Stormwater runoff occurs when rain hits hard surfaces, collects pollutants (animal waste, fertilizers, pesticides, car oil and dust) and carries them into our coastal bays and ocean. This can also be exacerbated by "sunny day runoff," when overuse of water, especially by mismanaged and misdirected irrigation, can create runoff that carries contaminated water to local waterways.

GROUNDWATER

Heavy rain and lunar cycles can also cause flooding and groundwater levels to rise. This can be particularly problematic in areas where residences and businesses are serviced by on-site wastewater systems (cesspools and septic systems) that leak and overflow when the ground is saturated.

ANIMAL WASTE

Enterococcus is abundant in the digestive tract of warm-blooded animals. Its presence in the water can therefore also indicate fecal pollution from animal sources. On Maui, feral pigs and cattle farms may contribute to elevated bacteria levels downstream at sites such as Māliko Bay. Pet waste or waste from feral pigs or cats can also elevate bacteria levels in coastal waters.



STOP SEWAGE POLLUTION

In 2021, Surfrider Foundation launched its [STOP Sewage Pollution program](#) to raise awareness about the impact of sewage spills and failing wastewater infrastructure on coastal water quality.

Sewage can contain bacteria, viruses & parasites that make people sick with gastrointestinal symptoms, rashes, flu-like symptoms, skin and eye infections and worse! Sewage discharges also pollute waterways with excess nutrients that wreak havoc on coastal ecosystems by fueling harmful algal blooms that put human health at risk, cause fish kills and smother coral reefs.

CESSPOOLS IN HAWAII

Cesspools are essentially pits or holes in the ground that receive wastewater, including untreated human waste, from homes or businesses. Cesspools do not provide any wastewater treatment but instead, temporarily hold onto household effluent and let it seep into the surrounding ground water.

With an estimated 88,000 cesspools, Hawai'i has one of the highest cesspools per capita the United States. Maui has 12,200 cesspools that discharge 7.9 million gallons of untreated sewage each day. This untreated sewage contributes to high nitrogen levels in ground and surface waters, and can contain pathogens that can make people sick.

Local flooding conditions caused by rising sea levels and extreme weather events makes this situation even worse. Connections to sewers and other advanced wastewater treatment systems are needed in order to stop the flow of pathogens and nutrient pollution into local waterways and to reverse the human health and ecosystem damage caused by these systems in many communities.

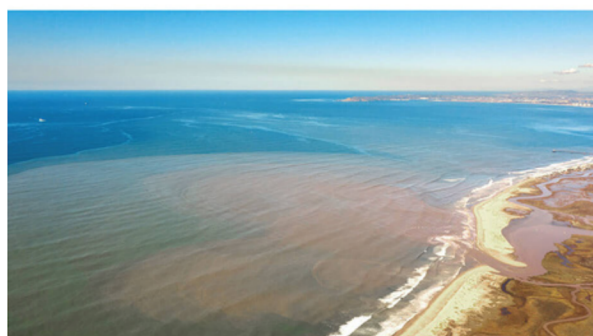
CONVERT YOUR CESSPOOL

If you're a homeowner with a cesspool, the most important way you can help STOP Sewage Pollution is by converting your cesspool. Visit the [Potty Portal](#) (developed by partner organization [WAI](#)) for numerous cesspool conversion resources. New and cheaper technologies for toilets and human waste management are also quickly improving. Take WAI's [Cesspool Homeowner's Quiz](#) to see which option maybe best for you.

HOW YOU CAN HELP

1. Convert your cesspool
2. Share your knowledge about the impacts of cesspools on water quality
3. Inspect and pump your septic tanks and cesspools regularly.
4. Don't use septic additives.
5. Only flush the three P's (pee, poop and toilet paper)
6. Don't pour cooking grease or oils down the drain.
7. Conserve water inside your home.
8. Soak up the rain and reduce runoff by directing roof downspouts into a rain barrel or vegetated area.

Over 20% of U.S. households are not serviced by sewers, but instead are connected to out-dated, individual systems like cesspools that do not treat wastewater.



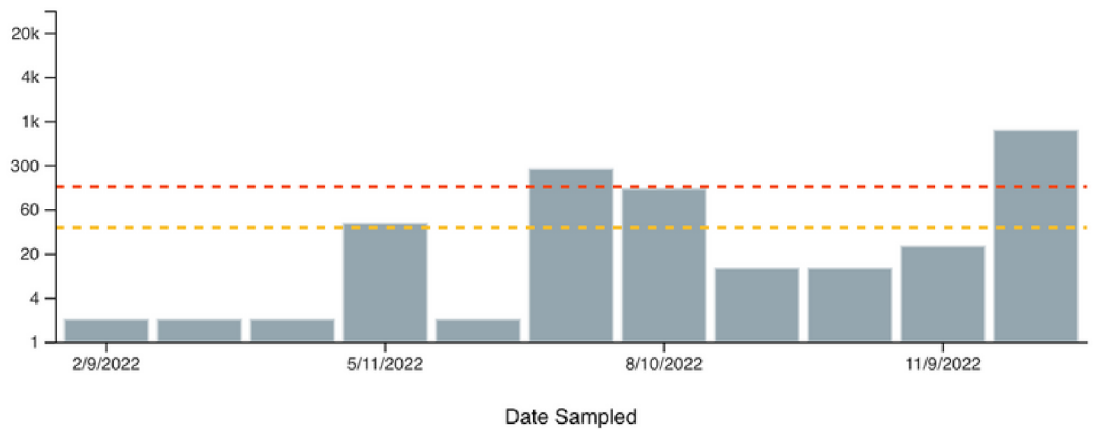
APPENDIX

NORTH SHORE



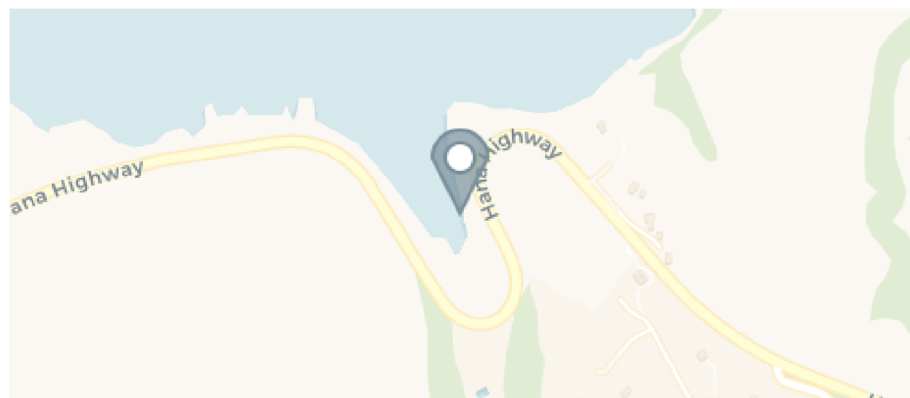
MĀLIKO BAY

Enterococcus
(MPN/100mL)



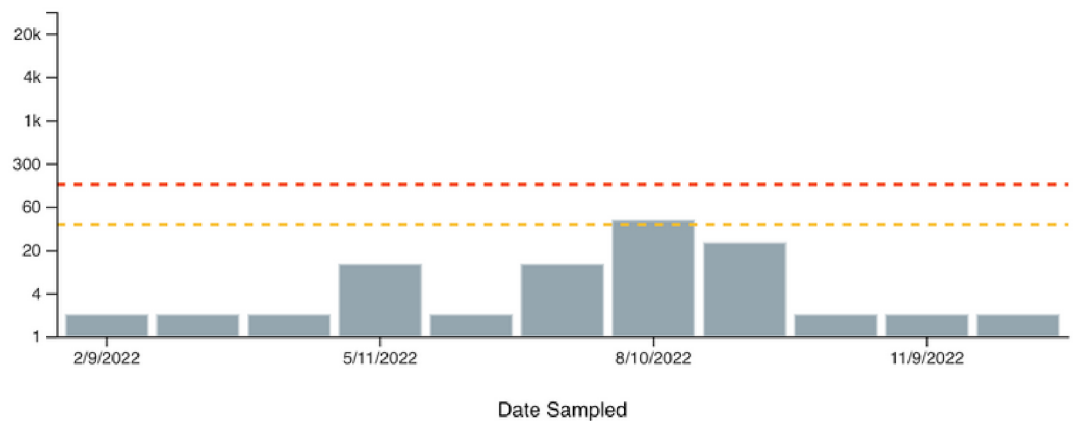
18%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.



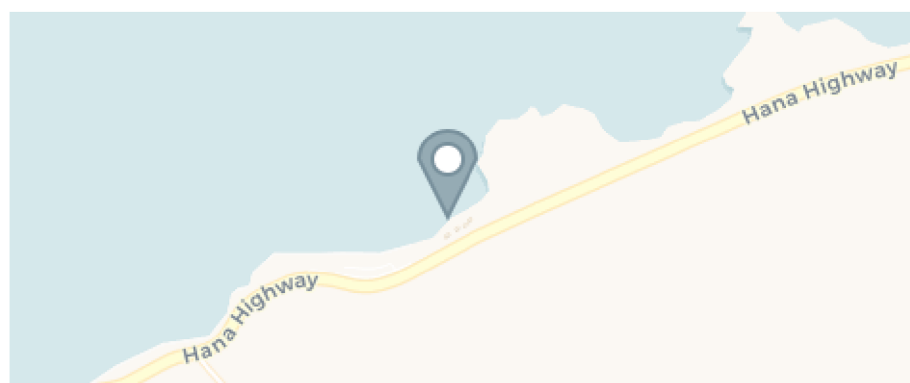
HO'OKIPA EAST

Enterococcus
(MPN/100mL)



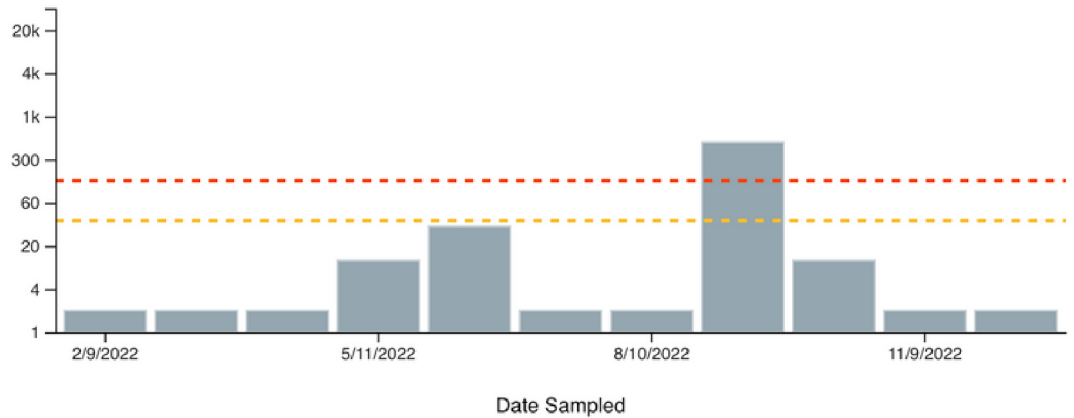
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OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
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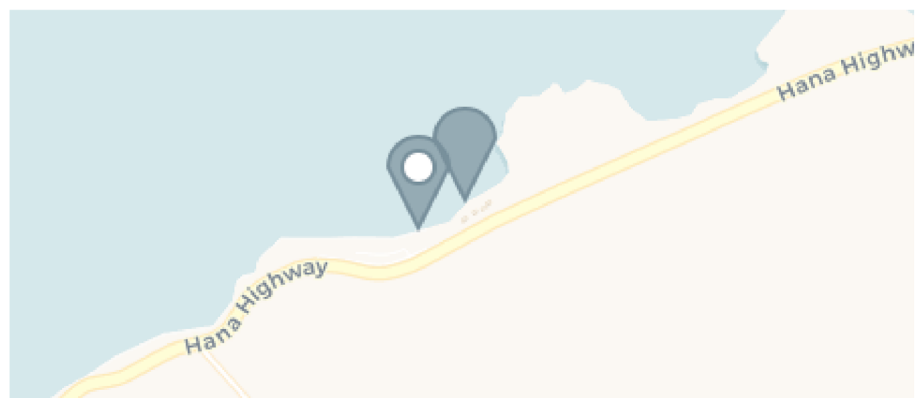
HO'OKIPA WEST

Enterococcus
(MPN/100mL)



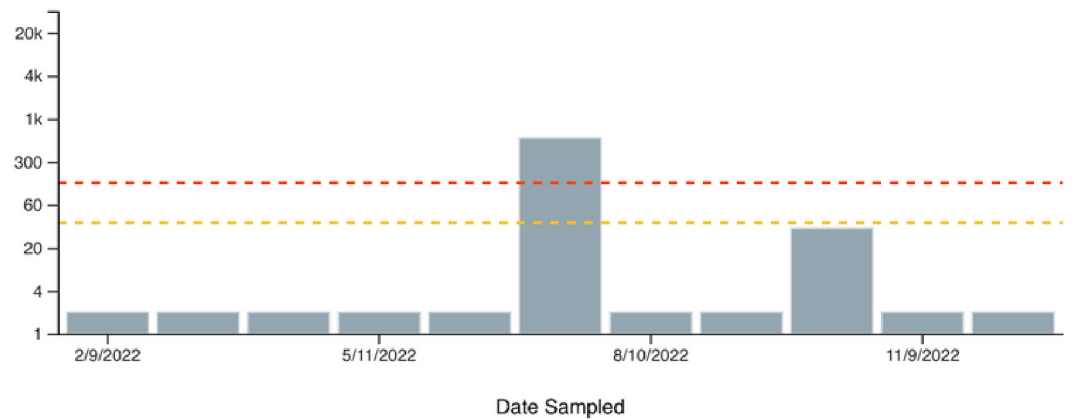
9%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.



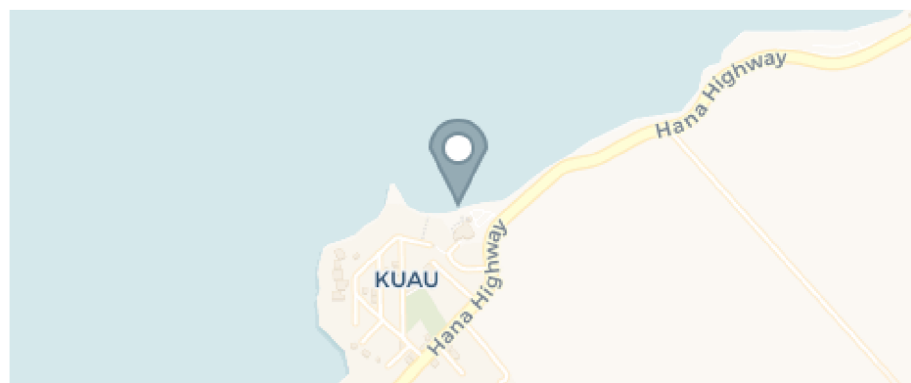
KŪ'AU COVE/MAMA'S BEACH

Enterococcus
(MPN/100mL)



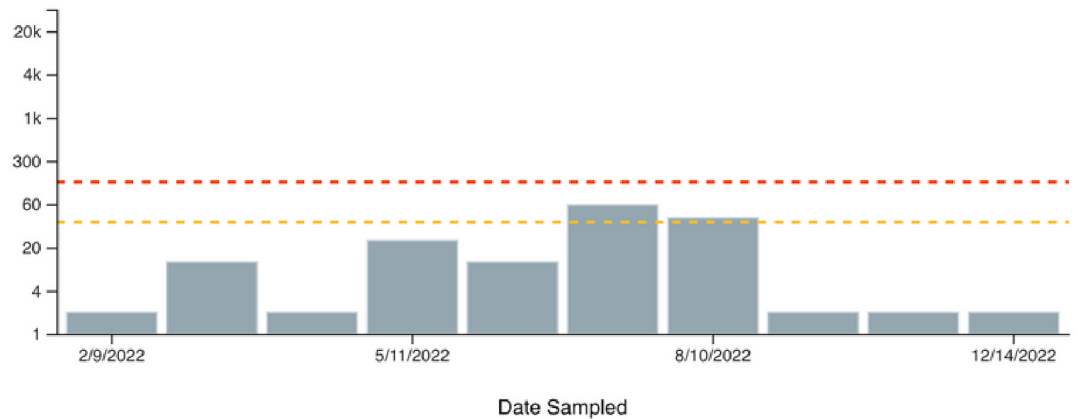
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OF SAMPLES EXCEEDED
HEALTH STANDARDS
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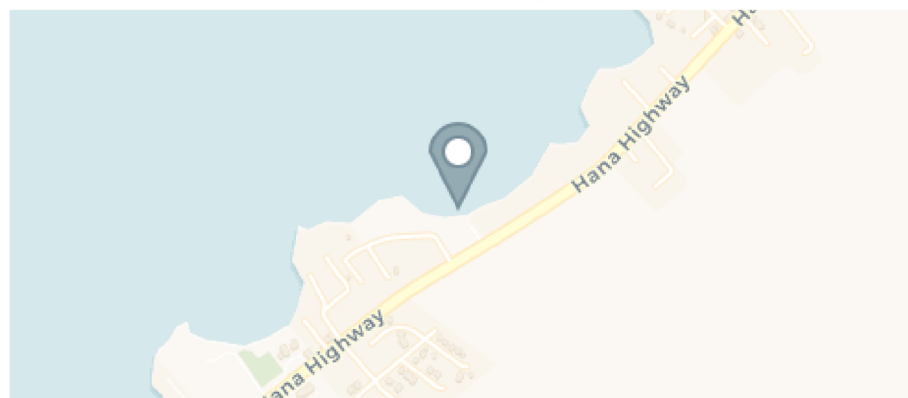
KŪ'AU BAY/TAVARES BAY

Enterococcus
(MPN/100mL)



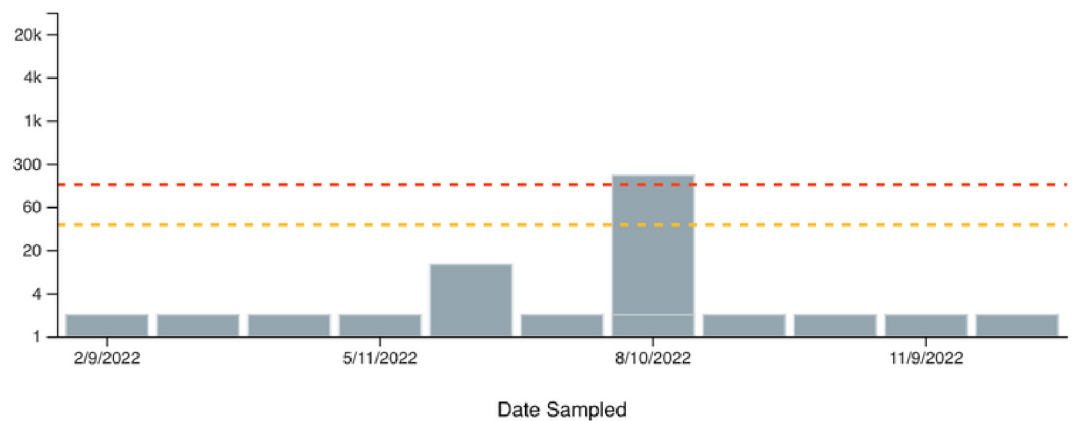
0%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.



PĀ'IA BAY

Enterococcus
(MPN/100mL)



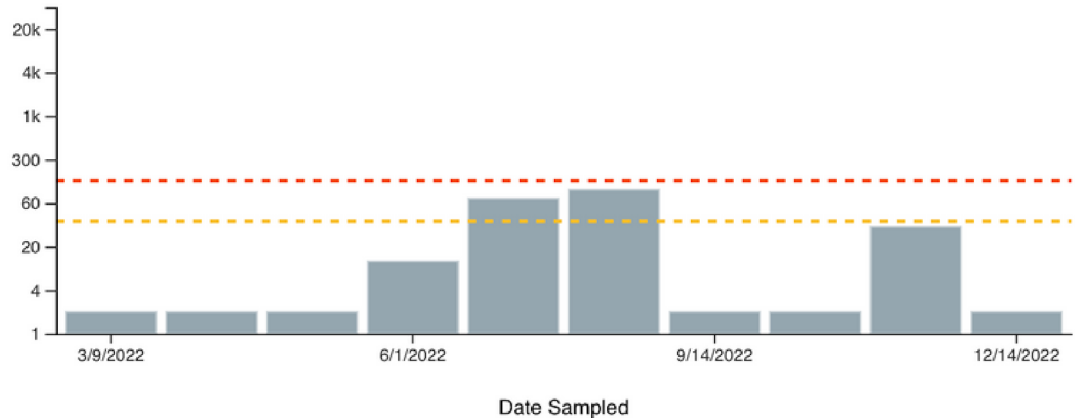
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OF SAMPLES EXCEEDED
HEALTH STANDARDS
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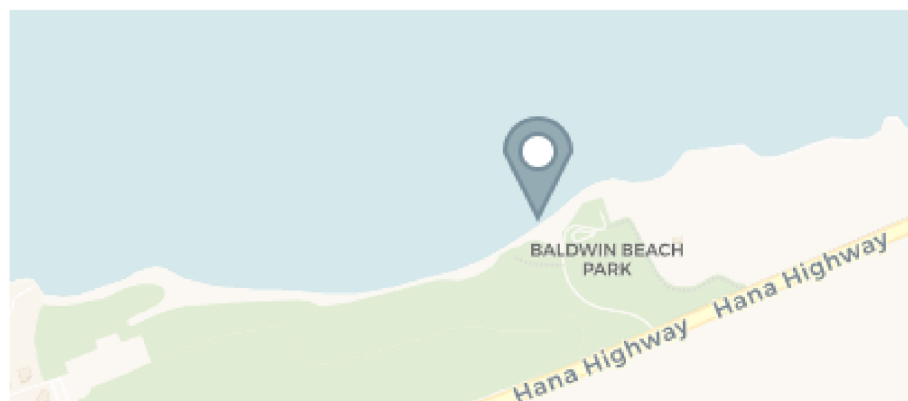
KAPUKAULUA/BALDWIN BEACH

Enterococcus
(MPN/100mL)



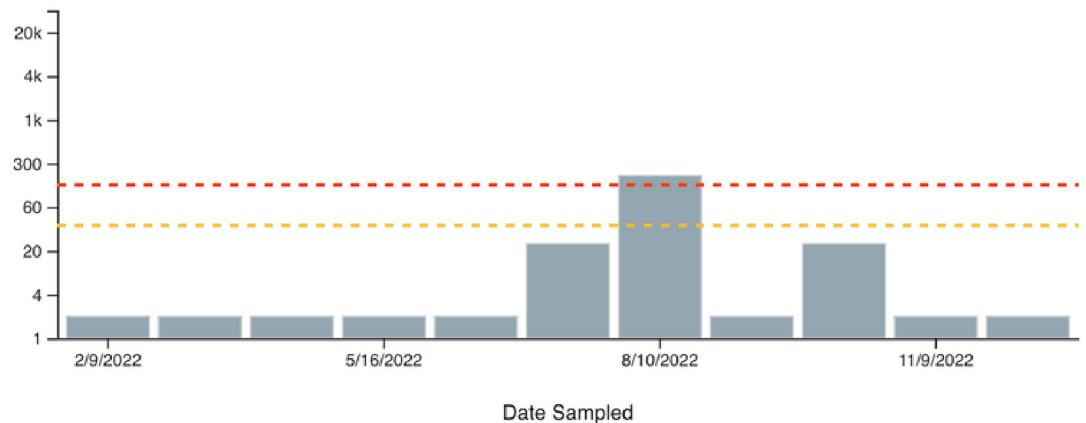
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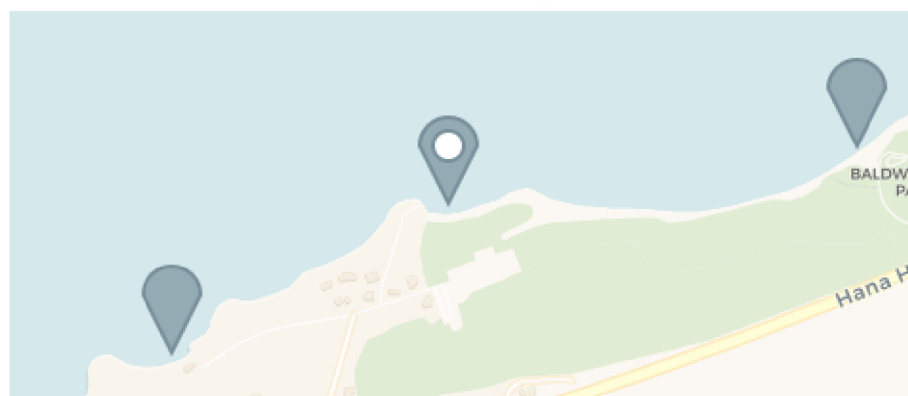
WAWAU POINT/BABY BEACH

Enterococcus
(MPN/100mL)



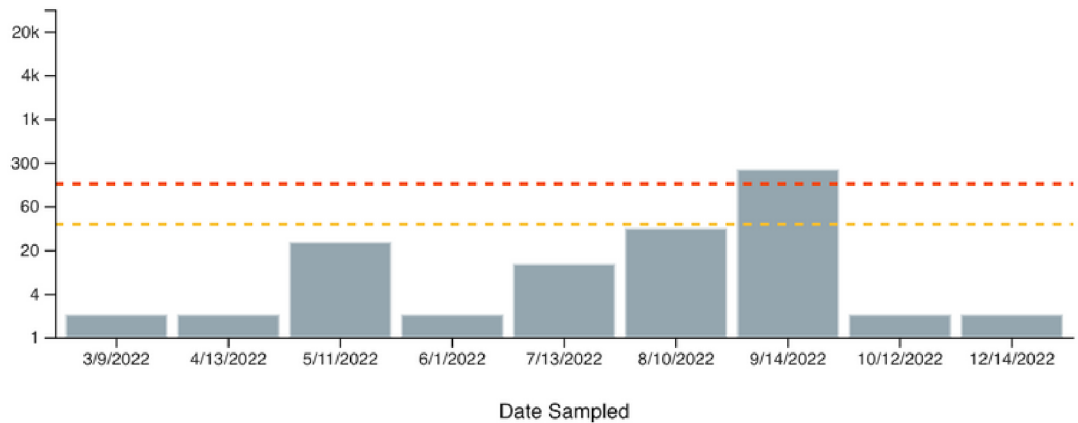
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OF SAMPLES EXCEEDED
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FOR BACTERIAL COUNTS
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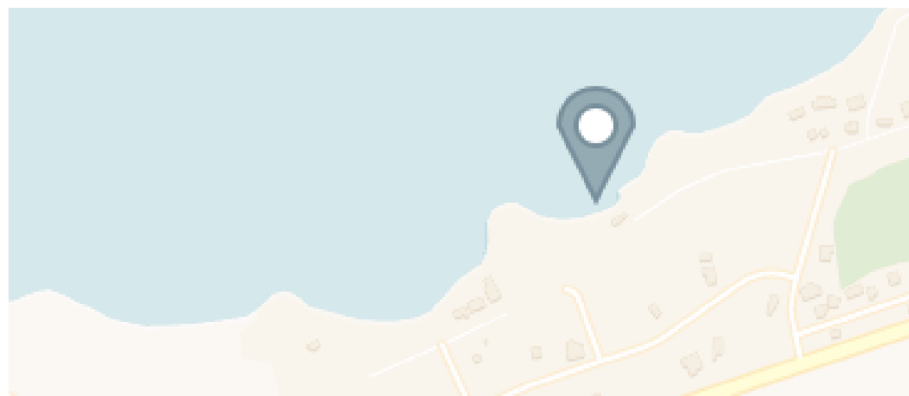
SUGAR COVE

Enterococcus
(MPN/100mL)



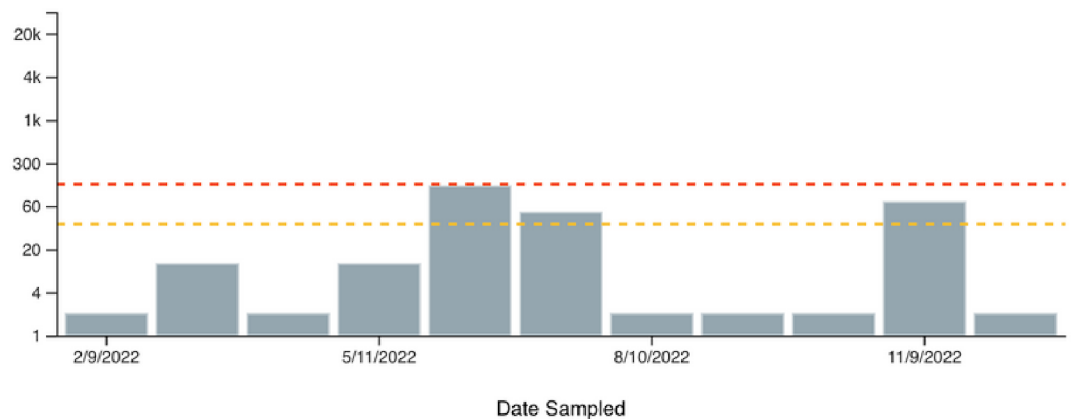
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OF SAMPLES EXCEEDED
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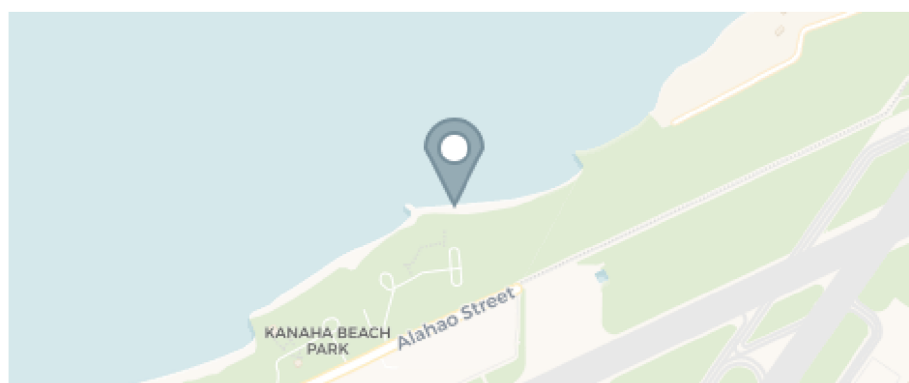
KANAHĀ BEACH

Enterococcus
(MPN/100mL)



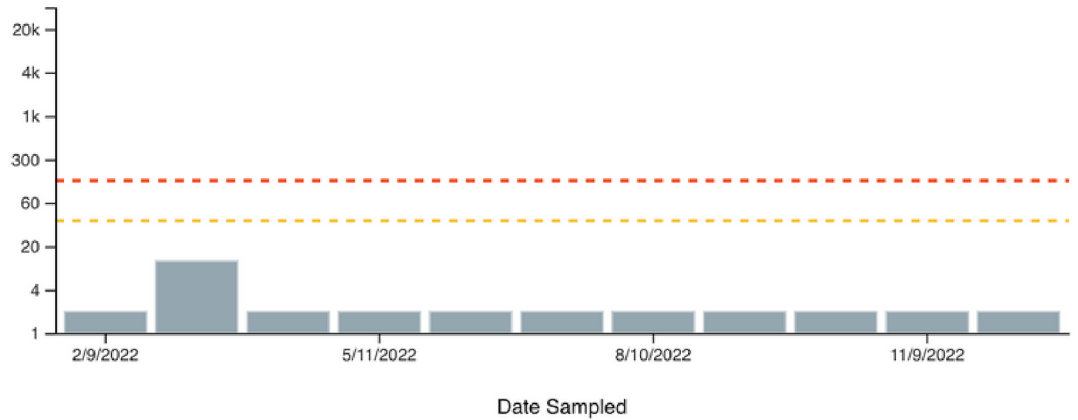
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OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.



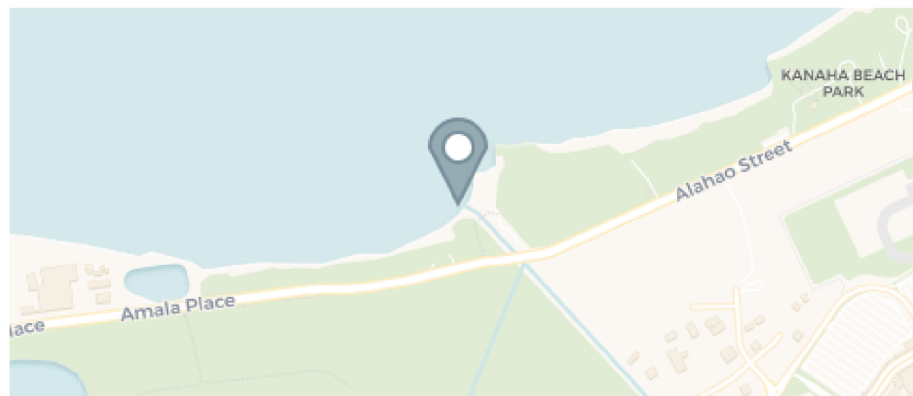
KANAHĀ/KALIALINUI STREAM

Enterococcus
(MPN/100mL)



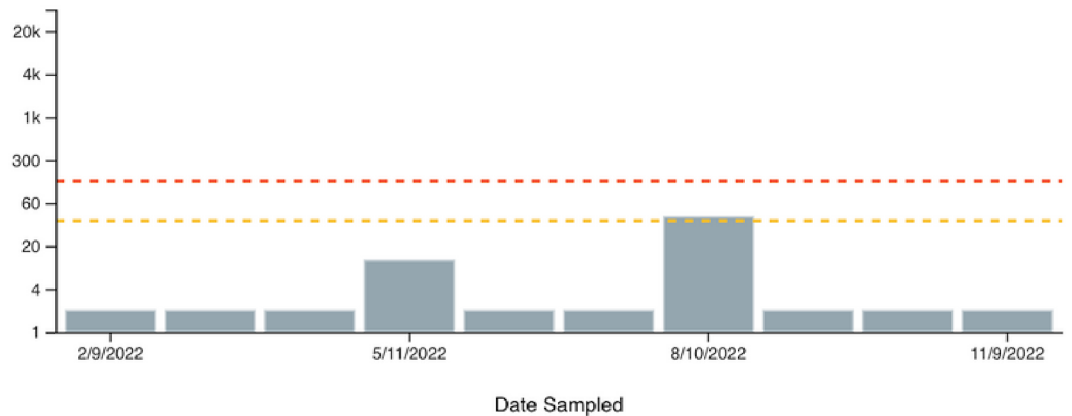
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OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.



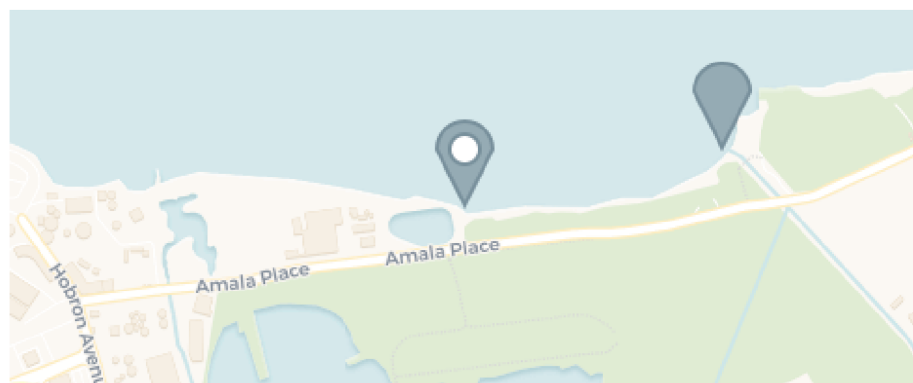
KAHULUI TREATMENT PLAN

Enterococcus
(MPN/100mL)



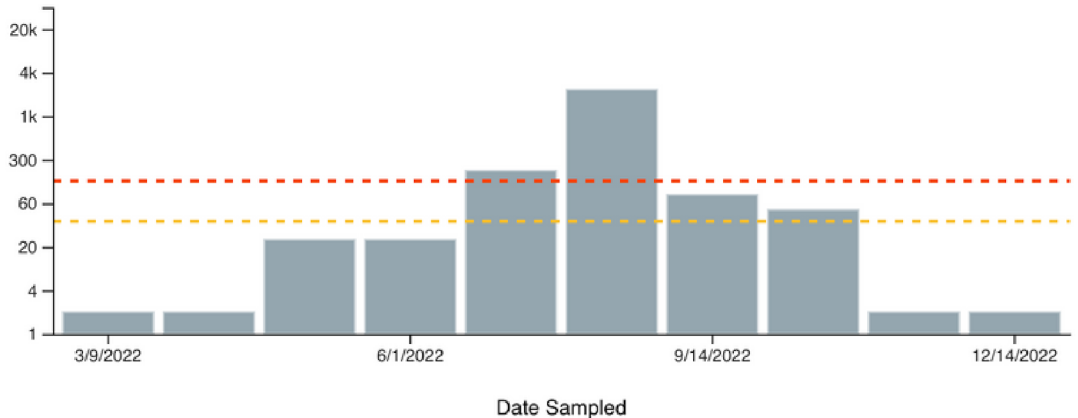
0%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.



KAHULUI HARBOR

Enterococcus
(MPN/100mL)



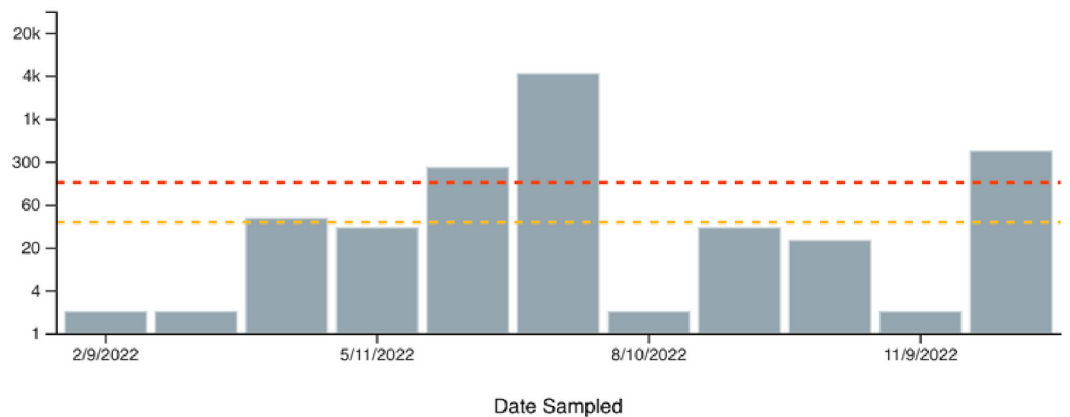
20%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
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AS INDICATED BY THE
RED LINE.



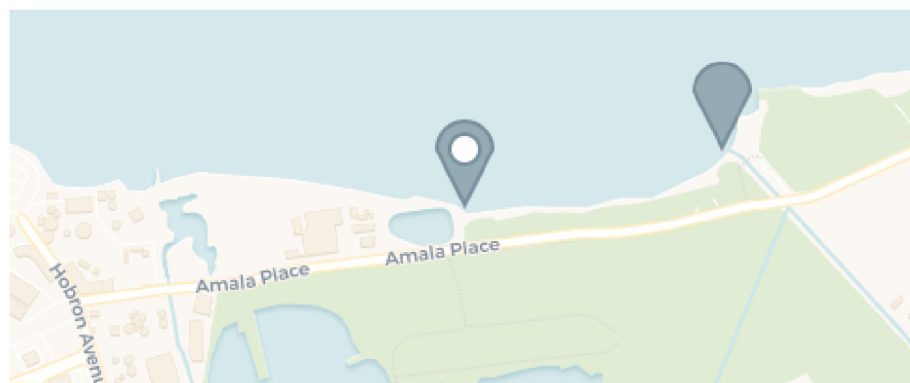
WAILUKU STREAM

Enterococcus
(MPN/100mL)



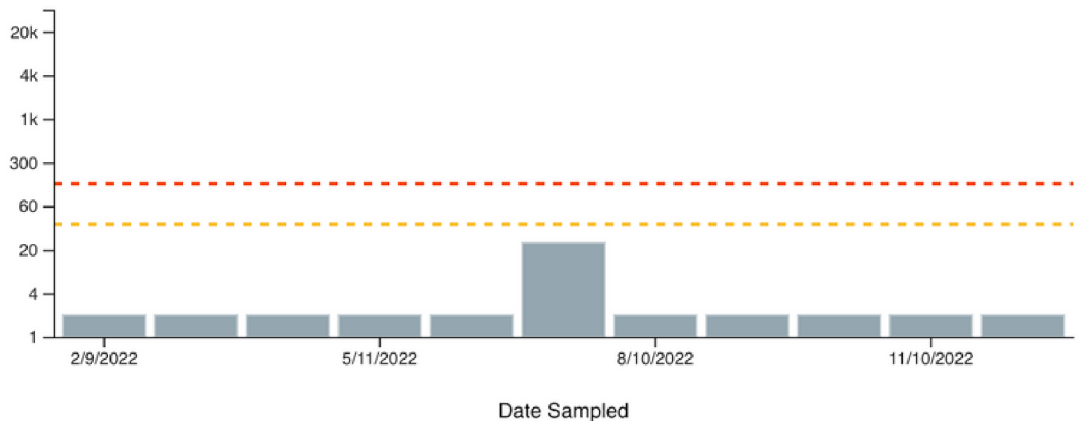
27%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.



WAIIEHU STREAM

Enterococcus
(MPN/100mL)



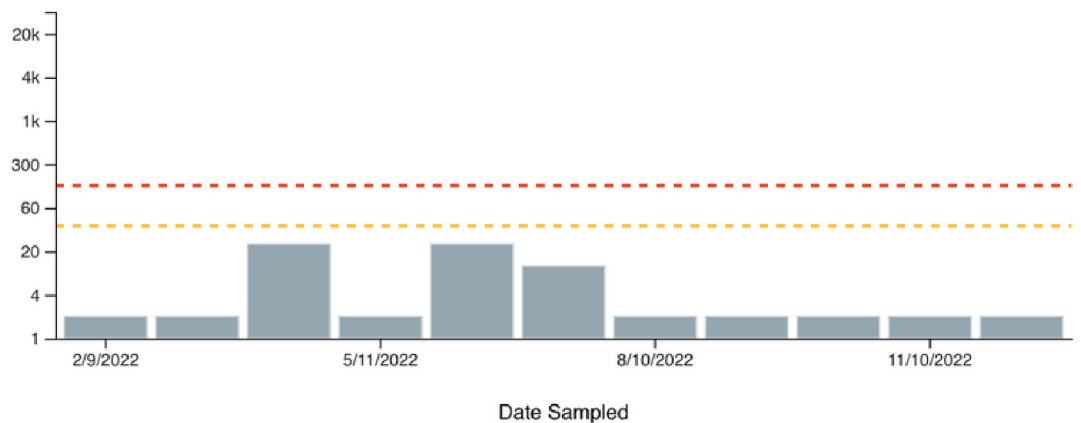
0%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.



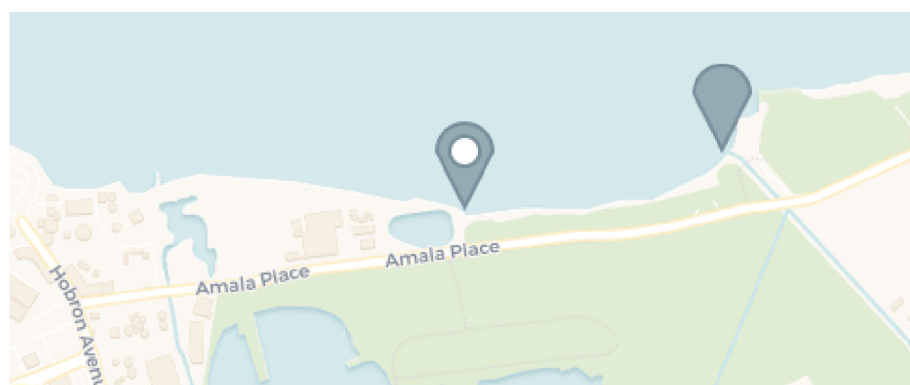
WAIHE'E BEACH PARK

Enterococcus
(MPN/100mL)



0%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.

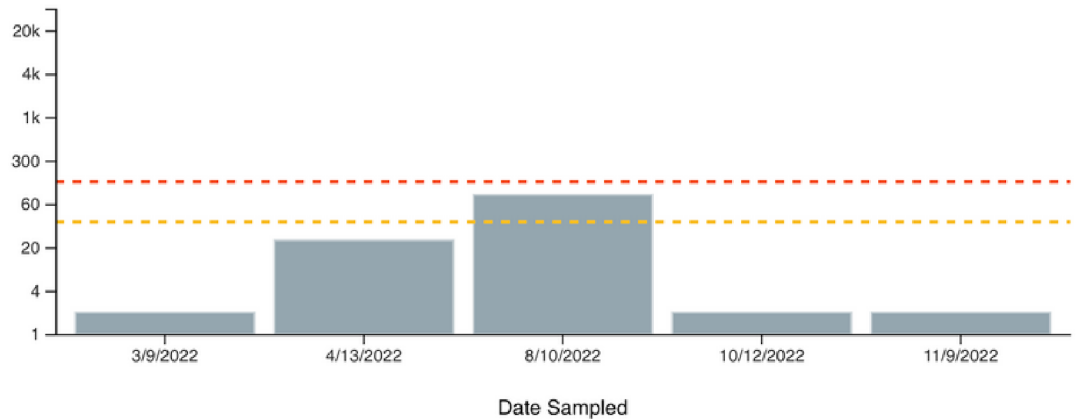


HĀNA



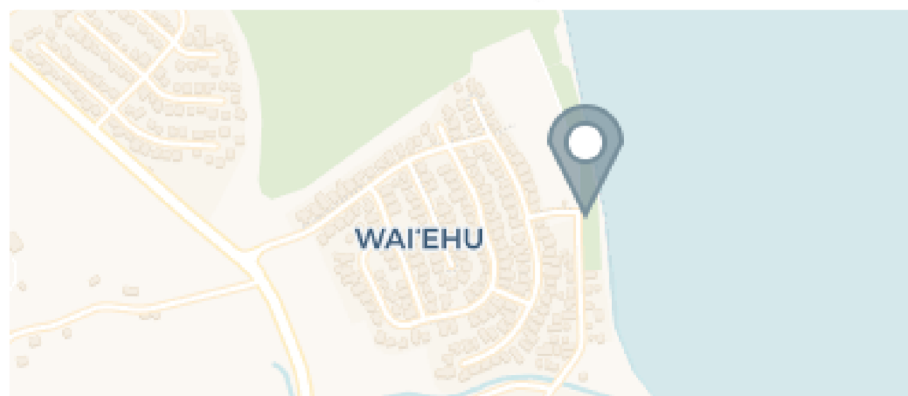
HĀNA BAY

Enterococcus
(MPN/100mL)



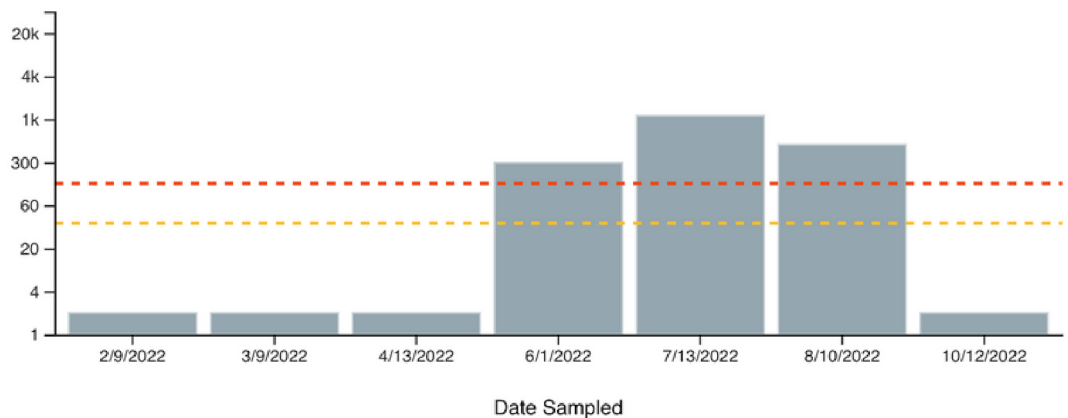
0%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.



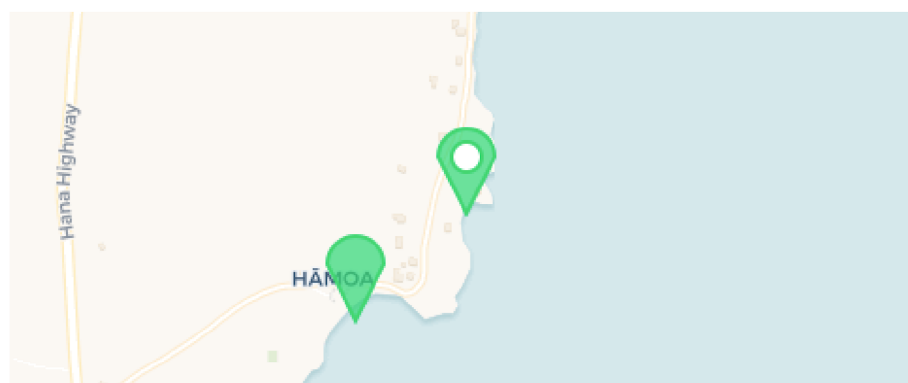
HĀNEO'O FISH POND

Enterococcus
(MPN/100mL)



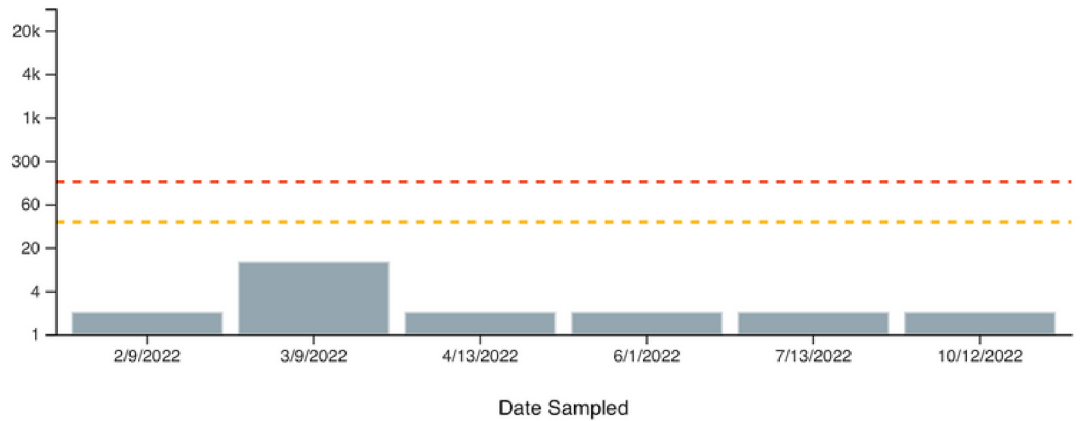
43%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.



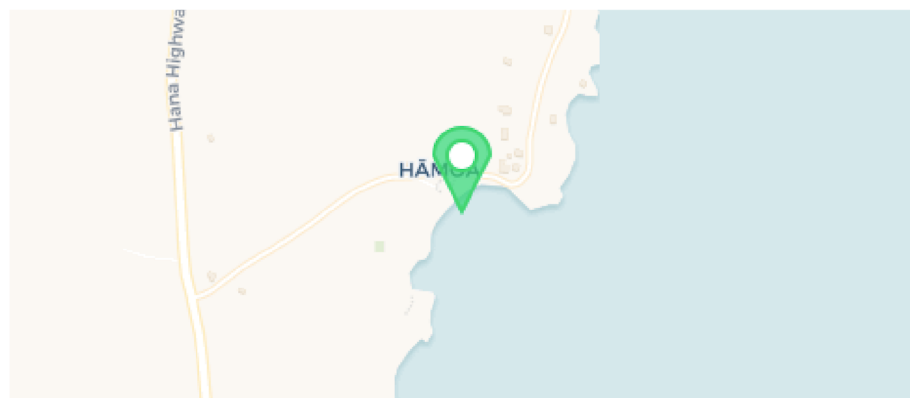
HĀMOA BEACH

Enterococcus
(MPN/100mL)



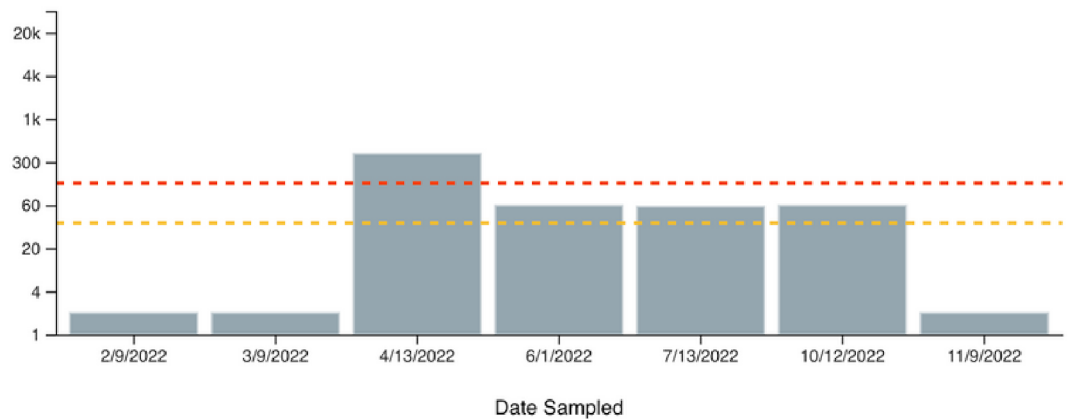
0%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.



WAIOKA POND

Enterococcus
(MPN/100mL)



14%

OF SAMPLES EXCEEDED
HEALTH STANDARDS
FOR BACTERIAL COUNTS
AS INDICATED BY THE
RED LINE.

