

# Maui Post-Fires Coastal Water Quality Monitoring Program

Surfrider Foundation

## Program Contact

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## Introduction & Program Goals

During the August 8th fire in Lāhainā, toxins and pollutants were immediately leaked from sunken boats and released into the air via smoke. The Lāhainā fire was unique given its proximity to the ocean, the age of the buildings that burned, and the large number of structures that were destroyed. Unfortunately, the ash that continues to cover the burnt area of Lāhainā Town is contaminated with toxins that are dangerous for humans.

A handful of research teams have obtained funding to test for fire contaminants in the ocean waters off of Lāhainā over the past few months. However, the focus has largely been on the impacts of this contamination on marine ecosystem and reef health, while a focus on human health impacts from recreation in near-shore waters has not yet been studied.

Surfrider has been advised that many of the ash-related contaminants tend to clump together with sediment and other organic material in the water and sink to the ocean floor. Storms, wave action and other physical disturbances, however, can resuspend this material into both the water and air causing people to be exposed to illness-causing toxins through inhalation, ingestion and dermal exposure.

Surfrider Foundation Maui Chapter's goal for collecting water samples near Lāhainā and along the west coast of the island is to get more information to the public regarding the safety of the water for recreational use. We are testing for Polynuclear Aromatic Hydrocarbons (PAHs) and heavy metals based on feasibility of testing, toxicity to humans, and likelihood of suspension in the water. We are also collecting samples to measure the fecal indicator bacteria enterococcus, as per the Maui Blue Water Task Force (BWTF). Learn more about our study design and the parameters we're testing for [here](#).

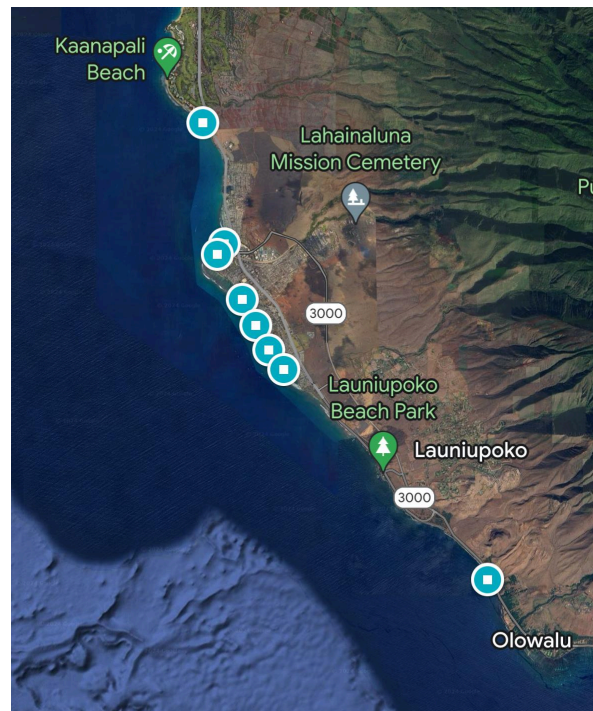
## STANDARD OPERATING PROCEDURES

All samples were collected in accordance with CDC recommendations for personal safety in a post-fire emergency zone, sampling guidance provided by Physis Environmental Laboratories, INC for the collection of water samples for analysis of Polynuclear Aromatic Hydrocarbons (PAHs) and heavy metals, and the Surfrider Foundation's [Blue Water Task Force SOPs](#) for collection of recreational water samples for fecal indicator bacteria. See detailed sampling and shipping instructions below.

Samples were analyzed for total and dissolved trace metals and mercury using EPA method 1640 and for PAHs using EPA method 625.1 in the [Physis Environmental Laboratory](#) located in Anaheim, California. PHYSIS is a California SBE-certified (DGS) accredited (ELAP#2769) private practice laboratory. Their QA/QC protocols are described [here](#) and a list of all analytes measured [here](#). Samples were analyzed for enterococcus bacteria in the Maui BWTF lab in Paia using [Standard Method 9230-D](#) with [IDEXX Enterolert/Quanti-Tray 2000](#).

## SAMPLING SITES

Hanaka'ō'ō beach park (Canoe Beach)	20.9103056	-156.6894444
Māla Tavern	20.887449	-156.685048
Māla Ramp	20.885373	-156.686429
Pāpalaua St	20.876911	-156.681359
Lāhainā Harbor	20.871933	-156.678624
505 Front St	20.86732	-156.67605
Shark Pit	20.86356	-156.67297
Olowalu surf spot	20.8239444	-156.6316389



## Site selection:

As the majority of fire related- contaminants tend to aggregate in sediment and have likely sunk to the ocean floor, the most probable source of any additional contaminant load into the ocean would be from runoff during storm events or resuspension during south swells. Sites that have close proximity to storm drains and streamflow were prioritized.

Below are the eight sites we sampled with brief justification:

Hanakao`o beach park (Canoe beach)- Northern flanking point

Māla Tavern- Storm drain that flows directly behind the tavern

Māla Ramp- Close proximity to Kahoma stream

Pāpalaua St- Close proximity to storm drain

Lāhainā Harbor- Sunken/burned boats releasing contaminants

505 Front street- Stream flow from Mokuhinia as well as the flooded garage

Shark Pit- Storm drain

Olowalu surf spot- Southern flanking point

In addition to hydrologic parameters that prompted selection of these sites, there is the added benefit of comparison to the other groups creating a more robust data set. Multiple organizations ([Maui Research Map](#)) are collecting data from these sites to evaluate other water quality parameters. This helps give sampling efforts more context and creates a more robust set of data.

# SAMPLE COLLECTION & SHIPPING INSTRUCTIONS

## Sampling Kit Checklist

- coolers & ice pack
- sampling bottles (sterilized and sent from PHYSIS laboratories)
  - 1L WM Ambers for Organics (2 x 1L Ambers per sample)
  - 1L HDPE Double Bagged Seawater (1 x 1L HDPE double bagged)
  - 250mL Ambers for Mercury (1 x 250mL Amber)
- Personal Protective Equipment:
  - Waders
  - Thick rubber cleaning gloves
  - N95 mask
  - Protective eye gear
- sampling data sheets ([link](#))
- pen or pencil
- permanent marker for labeling sample bags
- hand sanitizer/ soap
- At least two gallons of rinse water
- Sampling pole
- Sampling buckets
- Tide chart (online)

## Sampling Instructions

1. Wear PPE while sampling (waders, mask, gloves)
2. Remove all bottles from the cooler and place in a separate bag. Keep four out.
3. Leave a layer of bubble wrap at the bottom of the cooler.
4. Place heavy duty trash bag into cooler and fill with 1 lb of ice.
5. Label all four bottles on lids and on masking tape on the side.
6. Leave cooler sample bottles on clean, elevated surface.
7. Enter ocean until knee deep and rinse the bucket three times before taking sample.



8. Make sure to go to 6 inch depth and if incoming wave, take sample after the white water.
9. Bring bucket back to truck and carefully pour water into the four sample bottles
10. Place filled sample bottles back in bubble wrap and into the black trash bag with ice in the cooler.
11. Rinse truck bed, clean gloves, wash hands

*\*if any part of skin is exposed to ocean water while sampling, immediately wash with soap and rinse water. If any ocean water is ingested while sampling, immediately rinse the mouth with rinse water. If eyes are exposed to any ocean water while sampling, rinse eyes immediately with rinse water\**



### **Shipping instructions:**

1. Use plastic coolers provided by Physis Labs
2. Layer bubble wrap on bottom of cooler
3. Put any glass bottles in their own bubble wrap sleeve and use the tape on the top of the bag to seal it.
4. Put 1 or 2 trash bags into the cooler and fill the trash bags with the bubble wrapped samples.
5. Put some wet ice (preferred over blue ice) into the bag around the filled bottles.
6. When full tie a knot on the trash bag to keep the ice and samples in.
7. Close lid and shake cooler - you should have zero to little movement inside. If not,
8. then open and repack more securely. Recheck by shaking again.
9. Tape up cooler using packing tape around both depth and height of cooler 3X.
10. Take cooler(s) to a courier and have it labeled and shipped. Preferred Couriers: FedEx, UPS, On Trac.
11. To keep samples cool we Request you Ship Overnight for Delivery ~10:30am.
12. Saturday Delivery must be expressly ordered and double-check Sat. Del. selected on Bill.
13. Ship To:  
Attn: Sample Logistics  
Physis Labs  
1904 E. Wright Circle  
Anaheim, CA 92806  
714 602-5320 x212