

HydroCAT data from a post-urban fire water quality study in Lahaina, West Maui, Hawaii from Nov 2023 to Feb 2024

Website: <https://www.bco-dmo.org/dataset/1001844>

Data Type: Other Field Results

Version: 1

Version Date: 2026-06-26

Project

» [RAPID: Coral reef stress responses to an urban fire](#) (Reef stress urban fire)

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Abstract

These data include conductivity, temperature, pressure, pH, and DO measurements recorded by a Sea-Bird Scientific HydroCAT-EP V2. This dataset was collected as part of a coastal water quality study using sensors to measure salinity, conductivity, temperature, pressure, water flow direction and velocity, dissolved oxygen, pH, chlorophyll, and turbidity. Sensors were all deployed in West Maui in coral reef systems that were within and adjacent to the burn zone of the Lahaina fires. The temporal range of deployments in the project span from October of 2023 to October of 2024 with this dataset spanning from November of 2023 to February of 2024. The aim of these data is to understand the effects on coral reef health in response to the urban fires that occurred in August of 2023. Samples were collected by a collaborative effort of scientists Dr. Andrea K Kealoha, Dr. Craig Nelson, Dr. Eileen Nalley, and Dr. Nicholas Hawco.

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Coverage

Location: Lahaina, Maui, Hawai'i 20.878525, -156.683746
Spatial Extent: N:20.8863 E:-156.68669 S:20.8825 W:-156.68848
Temporal Extent: 2023-11-12 - 2024-02-01

Methods & Sampling

Sensors were deployed within the benthic reef system at the listed sites.

Sea-Bird Scientific HydroCAT-EP V2:

This instrument is factory calibrated prior to deployment. The sensors were configured using SEA-Bird's SeaCAT software to log at 20 minute intervals.

Data Processing Description

Quality control processing was carried out in python.

Data was plotted to calculate delta (the rate of change between each pair of data points)

Regions of bad data to exclude using the following criteria:

1. Sensor is out of the water (identified visually by sudden drop in pressure)
2. Rapid changes in temperature (large deltas, indicates sensor out of water)
3. Drastic sensor drift (Example: negative values, or regions of data over long periods of time with a slope)

BCO-DMO Processing Description

- Loaded data from "SBSHydrocat.csv.csv" into table "1001844_v1_lahaina-hydrocat" as CSV with row 1 as header; empty strings and "nd" treated as missing values
- Filtered rows to remove last 21 rows containing no values (those filtered out rows only had "Kahelili,20.8825,-156.68848"); kept only rows where timestamps (HST) is not null as a proxy for which rows didn't contain measurements.
- Renamed columns: timestamps (HST) -> timestamps, pressure (Dbar) -> pressure, Temperature (C) -> Temperature, Chlorophyll (ug/L) -> Chlorophyll, Turbidity (NTU) -> Turbidity, Salinity (PSU) -> Salinity, Oxygen (mg/L) -> Oxygen, O2sat% (%) -> O2sat, site.name -> Site_Name, sensor.site -> Site_ID; names updated to be consistent with project site list and Lahaina sensor deployment table
- Converted timestamps column from HST timezone to UTC, creating new ISO_DateTime_UTC column in "%Y-%m-%dT%H:%M:%SZ" format as datetime type
- Timestamp in HST retained, but renamed "timestamps" -> "DateTime_HST"
- Set types for all key columns: DateTime_HST and ISO_DateTime_UTC as datetime, Chlorophyll/O2sat/Oxygen/Salinity/Temperature/Turbidity/pH/pressure/lat/long as number, Site_ID/Site_Name as string
- Resolved conflict with site name and id conflicting, data submitter consulted upon final review to ensure accuracy of change. Replaced Site_Name value "Kahelili" with "Baby Beach" for rows where Site_ID == 'SEN_4' since SEN_4 other metadata indicated SEN_4 corresponds to Baby Beach (lat 20.8825, lon approximately -156.68846). Lat lons in the data were at Baby Beach not Kahelili so that was additional evidence of the correct site name change in the dataset.
- Some Site_IDs were missing. "SEN_4" for all rows where Site_Name == 'Baby Beach', consistent with the Lahaina site list information.
- Replaced Site_Name value "KahomaOutflowReef" with "Kahoma outflow reef" for consistent syntax across project data
- Output saved to "1001844_v1_lahaina-hydrocat.csv"

Supplemental files:

* Supplemental site and deployment tables formatted from listed information provided in the original dataset submission metadata section "Location." Added as lahaina_site_list.csv and lahaina_sensor_deployment.csv. These tables list all sites and deployments of the related datasets in the study.

Related Datasets

IsRelatedTo

Kealoha, A., Calil, P. H., Hawco, N. J., Masessa, G., Mattos, J., Nalley, E., Nelson, C. E., Summers, T., Swift, S., Peterman, J., Rohrbaugh, N., Tegler, L. (2026) **Sea and Sun Sensor data from a post-urban fire water quality study in Lahaina, West Maui, Hawaii from Nov 2023 to Feb 2024.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2026-06-26 <http://lod.bco-dmo.org/id/dataset/1001870> [[view at BCO-DMO](#)]

Relationship Description: Lahaina sensor deployment datasets conducted as part of the same study. These datasets all contain the same lahaina_site_list.csv and lahaina_sensor_deployment.csv tables which includes supplemental site and deployment information for all these related datasets.

Kealoha, A., Calil, P. H., Hawco, N. J., Masessa, G., Mattos, J., Nalley, E., Nelson, C. E., Summers, T., Swift, S., Peterman, J., Rohrbaugh, N., Tegler, L. (2026) **Temperature and dissolved oxygen from a post-urban fire water quality study in Lahaina, West Maui, Hawaii from Dec 2023 to Feb 2024.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2026-06-26 <http://lod.bco-dmo.org/id/dataset/1001818> [[view at BCO-DMO](#)]

Relationship Description: Lahaina sensor deployment datasets conducted as part of the same study. These datasets all contain the same lahaina_site_list.csv and lahaina_sensor_deployment.csv tables which includes supplemental site and deployment information for all these related datasets.

Kealoha, A., Calil, P. H., Hawco, N. J., Masessa, G., Mattos, J., Nalley, E., Nelson, C. E., Summers, T., Swift, S., Peterman, J., Rohrbaugh, N., Tegler, L. (2026) **Tilt Current Meter data from a post-urban fire water quality study in Lahaina, West Maui, Hawaii from Oct 2023 to Mar 2024.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2026-06-26 <http://lod.bco-dmo.org/id/dataset/1001896> [[view at BCO-DMO](#)]

Relationship Description: Lahaina sensor deployment datasets conducted as part of the same study. These datasets all contain the same lahaina_site_list.csv and lahaina_sensor_deployment.csv tables which includes supplemental site and deployment information for all these related datasets.

Parameters

Parameter	Description	Units
Site_Name	local name for site	unitless
lat	latitude. Note: value may vary slightly from the general site lat,lon provided in lahina_site_list.csv)	decimal degrees
long	longitude. Note: value may vary slightly from the general site lat,lon provided in lahina_site_list.csv)	decimal degrees
Site_ID	Site ID where sensor was deployed (see supplemental lahina_site_list.csv for more information about sites).	unitless
DateTime_HST	local date and time in Hawai'i Standard time (HST) time zone.	unitless
pressure	water pressure	Decibars (Dbar)
Temperature	water temperature	Celsius (degC)
Chlorophyll	chlorophyll concentrations	micrograms per liter (ug/L)
Turbidity	water turbidity	NTU
Salinity	seawater salinity	PSU
Oxygen	dissolved oxygen in seawater	milligrams per liter (mg/L)
pH	pH of seawater	unitless
O2sat	dissolved oxygen in seawater	percent (%)
ISO_DateTime_UTC	DateTime with timezone value in ISO8601 format (UTC time zone).	unitless

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Instruments

Dataset-specific Instrument Name	Sea-Bird Scientific HydroCAT-EP V2
Generic Instrument Name	Water Quality Multiprobe
Dataset-specific Description	This sensor is a multi-parameter water quality sensor which can log the following parameters; conductivity, temperature, pressure, pH, and DO. The pH sensor undergoes a calibration with three standardized pH buffers.
Generic Instrument Description	An instrument which measures multiple water quality parameters based on the sensor configuration.

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Project Information

RAPID: Coral reef stress responses to an urban fire (Reef stress urban fire)

Coverage: Lahaina, Maui, Hawai'i

NSF Award Abstract:

Maui's coral reefs support subsistence, recreational, and commercial fishing, particularly for the large Native Hawaiian population. In August 2023, hurricane winds and low humidity combined with the recent drought to cause an unprecedented fire in Lahaina, an urban coastal town on the island of Maui. The fire quickly burned over 2170 acres and 2200 structures, releasing ash, particulate matter and potentially toxic materials into the adjacent coastal waters. This project provides novel information on the ecological impacts of wildfires to coral reefs to aid in climate change adaptation and emergency response planning. Cultural perspectives and traditional knowledge of Native Hawaiian community members are incorporated throughout the research process. The project directly supports four students, including a Native Hawaiian student, to participate in activities including field work, data collection, analyses and interpretation, and communication of research results.

A wildfire in an urban city located adjacent to a coral reef is unprecedented but may become more common as expanding shoreline development intersects with potentially increased fire risk with climate change. The overall objective of this study is to examine the direct effects of urban wildfires and associated potential stressors - such as reduced water quality, acidification, hypoxia, and heavy metals - on coral reef ecosystem function and the potential for regime shifts favoring benthic algae instead of corals. Using the 2023 Lahaina wildfire as a case study, the project employs a "before-after control-impact" design to compare three west Maui reefs both affected and unaffected by wildfire, with special attention to the anticipated remobilization of organic matter, toxic compounds (e.g., polycyclic aromatic hydrocarbons) and metals following rain events in autumn. Physical and chemical water parameters will constrain the reef-scale carbon cycle and coral metabolism before, during and after runoff events to document the ecological responses to urban fire impacts. This project will support three Early Career Researchers, contribute toward research training for multiple graduate and undergraduate students, and provide valuable information about contaminants and water quality to a community that relies heavily on coral reef resources.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-2345201

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