# Optically-Based Evaluation of Stormwater as a Potential Source of Polychlorinated Biphenyls (PCBs) to Pearl Harbor, Hawaii

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## Challenge

Surface water contaminants of concern (COCs) are key drivers of environmental risk. However, traditional discrete surface water COC data are difficult to interpret.

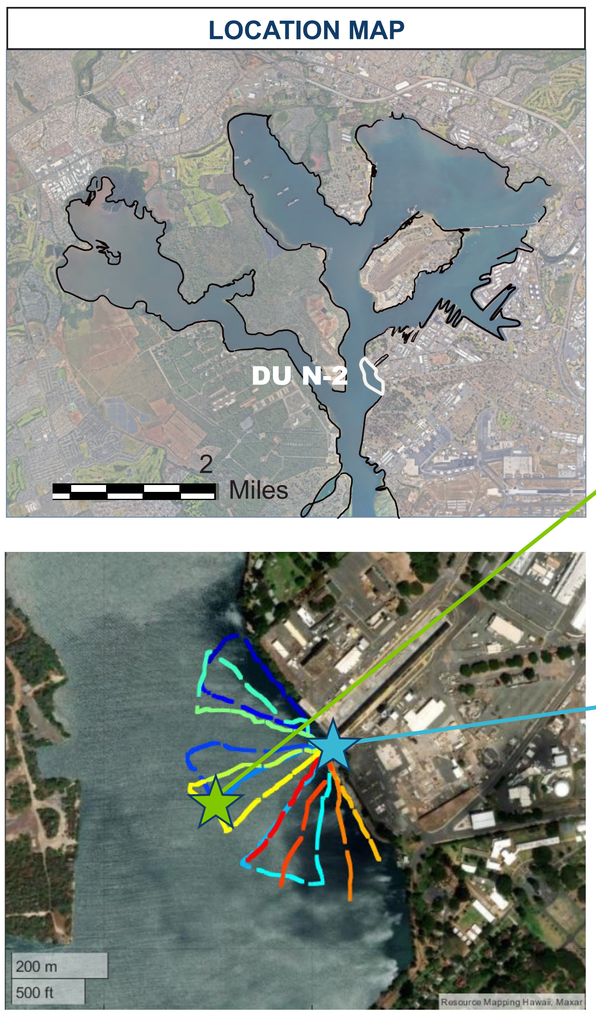
## Solution

**OPTICS (OPTically-based *In-situ* Characterization System)** provides COC concentration at scales that are generally unattainable through traditional discrete surface water sampling.

## Demonstrating OPTICS

Evaluations:

- Stormwater as a potential source of recontamination
- Contaminant plume characteristics from stormflow




*Oscar 1 Pier Outfall, Decision Unit N-2, Pearl Harbor Sediment Site, Oahu, Hawaii*

## Expected Benefits

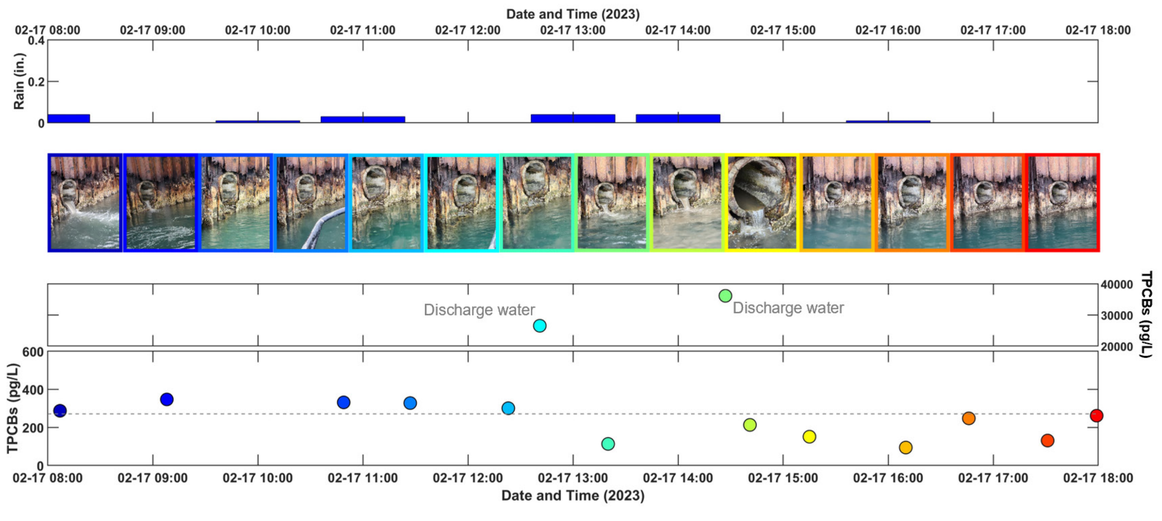
Understanding the mechanisms and pathways of PCB transport via stormwater is crucial for assessing the extent of contamination, identifying sources, and implementing effective management strategies to mitigate environmental impacts.

## What Is OPTICS?

OPTICS uses a suite of *in situ* optical and water quality sensors to provide high resolution observations as input to a regression model that is calibrated and validated with discrete water samples.

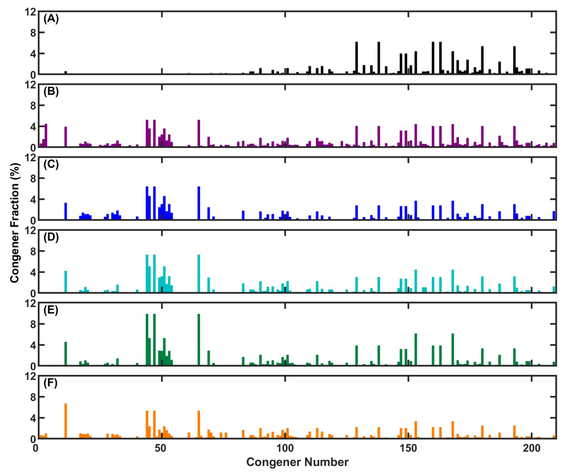
## Results

Oscar 1 Pier outfall discharge water total polychlorinated biphenyls (TPCBs) are two orders of magnitude greater than baseline conditions, providing strong evidence that the outfall is a source of contamination to the site.

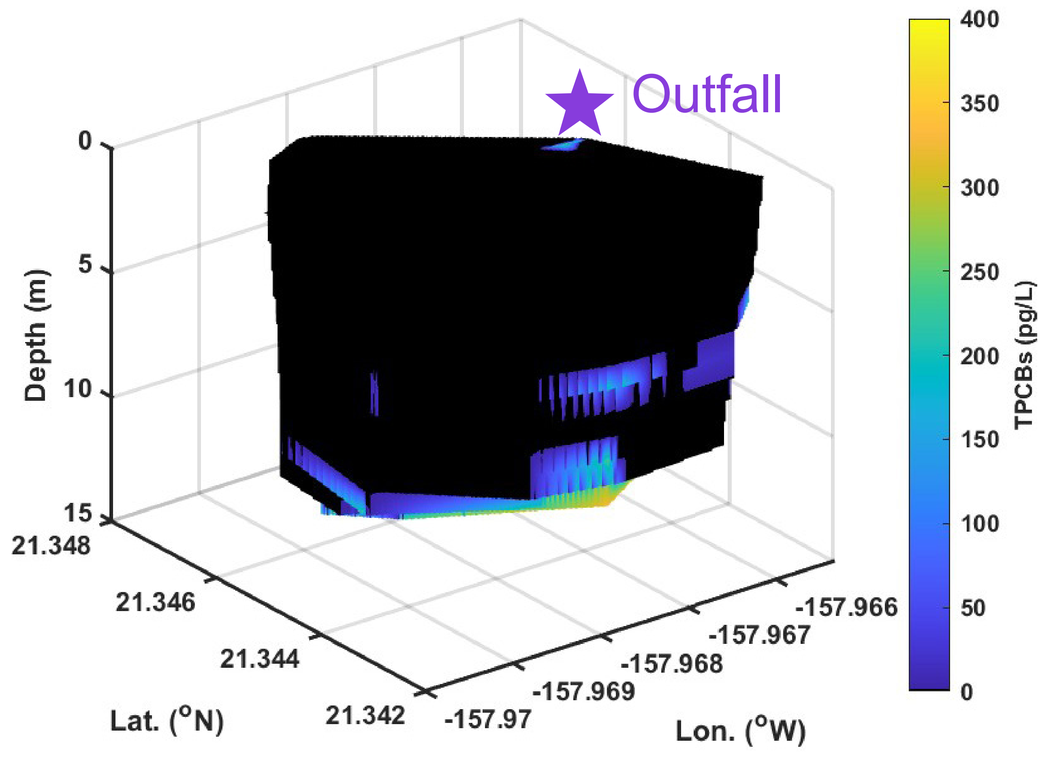



## Results

Elevated TPCBs are found in 10% of data collected in Decision Unit N-2 during stormflow.

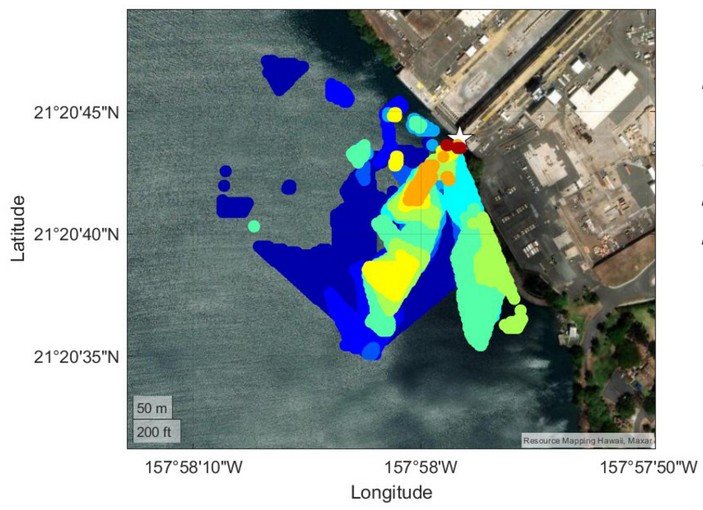



*Stormwater PCBs were characterized by heavier congeners, likely associated with particles. Surface water PCB samples collected throughout Decision Unit N-2 exhibited heavier congeners and lighter congeners that are typically associated with the dissolved phase. These lighter congeners could have originated from a different source(s) and/or been partitioned from the suspended phase.*

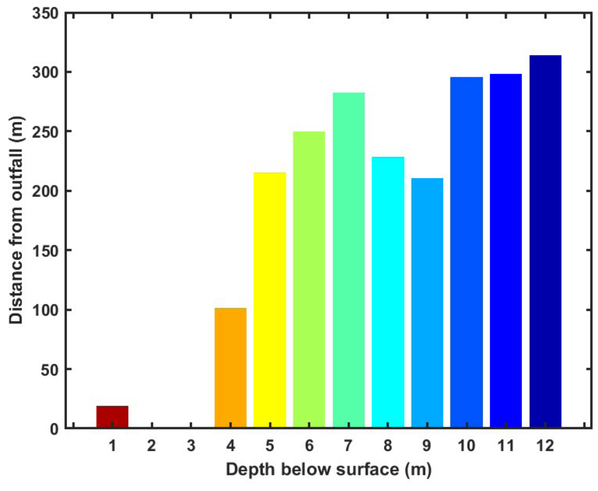



*OPTICS-modeled, spatially-resolved TPCBs illlustrating concentrations in exceedance of the one-third quartile.*

TPCBs are more dispersed at depth, suggesting that PCBs are discharged from the outfall, remain in suspension, and are dispersed elsewhere at the site before settling.




*Locations of data points where TPCBs are in exceedance (greater than the one-third quantile). Colors indicate depth of sampling from 1 m (red) to 12 m below the surface (blue).*




*Maximum distance between the location of TPCB exceedance and the outfall as a function of water depth.*

**View Publication**

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