

**Assessing the Sunscreen Sheen: Determining the Presence and Persistence of  
Organic Ultraviolet Filters in the Waters of the Hanauma Bay Marine Life  
Conservation District**

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## ABSTRACT

Organic ultra-violet (UV) filters, the active ingredient in many commercial sunscreens, are known disruptors of chemical messaging systems in aquatic organisms that find their way into the environment via plastic and personal care product waste. The Hanauma Bay Marine Life Conservation District is home to myriad indigenous and endemic biota, and experiences 2,000 visitors a day, many of whom use sunscreen products containing organic UV filters. Efforts to mitigate visitor impact on Hanauma Bay include a mandatory educational video before gaining access to the beach and a weekly Tuesday closure. The purpose of this study was to investigate the change in concentrations of the sunscreen UV filters oxybenzone (BP3), octocrylene (OC), and avobenzone (BMDBM) in the surface waters of Hanauma Bay from shore to reef every 6 hours from 6:00-18:00 on the day before and the day after the weekly closure in August 2017. Analytes were extracted from environmental samples using reversed-phase solid phase extraction and analyzed using liquid chromatography/triple quadrupole mass spectrometry. Analyte recovery for method validation is as follows: BP3 74.2%, OC 75.4% and BMDBM 18.9%. As expected, concentrations were highest at shoreline and peaked at mid-day. The highest concentrations for BP3, AVO and OC were 444 ng/L, 54 ng/L and 210 ng/L, respectively. With the increasing attention to the risk that sunscreen chemicals may pose to corals and marine ecosystems, this data and further studies of their presence in the water column should be considered.