

## **Apex marine predators and ocean health: Proactive screening of halogenated organic contaminants reveals ecosystem indicator species**

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### **ABSTRACT**

Despite decades-long bans on the production and use of certain chemicals, many halogenated organic compounds (HOCs) are persistent and can bioaccumulate in the marine environment with the potential to cause physiological harm to marine fauna. High lipid-rich tissue (e.g., marine mammal blubber) functions as a reservoir for HOCs, and selecting ideal indicator species is a priority for retrospective and proactive screening efforts. We selected five marine mammal species as possible indicators for the Southern California Bight (SCB) and applied a non-targeted analytical method paired with an automated data reduction strategy to catalog a broad range of known, known but unexpected, and unknown compounds in their blubber. A total of 194 HOCs were detected across the study species (n = 25 individuals), 81% of which are not routinely monitored, including 30 halogenated natural products and 45 compounds of unknown structure and origin. The cetacean species (long-beaked common dolphin, short-beaked common dolphin, and Risso's dolphin) averaged 128 HOCs, whereas pinnipeds (California sea lion and Pacific harbor seal) averaged 47 HOCs. We suspect this disparity can be attributed to differences in life history, foraging strategies, and/or enzyme-mediated metabolism. Our results support proposing (1) the long- and short-beaked common dolphin as apex marine predator sentinels for future and retrospective biomonitoring of the SCB ecosystem and (2) the use of non-targeted contaminant analyses to identify and prioritize emerging contaminants. The use of a sentinel marine species together with the non-targeted analytical approach will enable a proactive approach to environmental contaminant monitoring.

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