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TITLE: Persistent organic pollutant concentrations in blubber of 16 species of cetaceans stranded in the Pacific Islands from 1997 through 2011

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ABSTRACT:

Persistent organic pollutants (POPs) are toxic man-made chemicals that bioaccumulate and biomagnify in food webs, making them a ubiquitous threat to the marine environment. Although many studies have determined concentrations of POPs in top predators, no studies have quantified POPs in stranded cetaceans within the last 30 years around the Hawaiian Islands. A suite of POPs was measured in the blubber of 16 cetacean species that stranded in the tropical Pacific, including Hawai'i from 1997 to 2011. The sample set includes odontocetes (n = 39) and mysticetes (n = 3). Median (range) contaminant concentrations in ng/g lipid for the most representative species category (delphinids excluding killer whales [n = 27]) are: 9650 (44.4?99,100) for ? DDTs, 6240 (40.8?50,200) for ? PCBs, 1380 (6.73?9520) for ? chlordanes, 1230 (13.4?5510) for ? toxaphenes, 269 (1.99?10,100) for ? PBDEs, 280 (2.14?4190) for mirex, 176 (5.43?857) for HCB, 48.1 (< 5.42?566) for ? HCHs, 33.9 (< 2.42?990) for ? HBCDs, 1.65 (< 0.435?11.7) for octachlorostyrene and 1.49 (< 2.07?13.1) for pentachlorobenzene. ? PCB concentrations in these Pacific Island cetaceans approach and sometimes exceed proposed toxic threshold values. Backward stepwise multiple regressions indicated the influence of life history parameters on contaminant concentrations when performed with three independent variables (species category, year of stranding, and sex/age class). No temporal trends were noted ($p > 0.063$), but sex/age class influences were evident with adult males exhibiting greater contaminant loads than adult females and juveniles for ? DDT, ? PCBs, ? CHLs, and mirex (p ? 0.036). POP concentrations were lower in mysticetes than odontocetes for many compound classes (p ? 0.003). p,p?-DDE/? DDTs ratios were greater than 0.6 for all species except humpback whales, suggesting exposure to an old DDT source. These POP levels are high enough to warrant concern and continued monitoring.

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