

North Pacific Marine Science Organization (PICES) Annual Meeting, 2019
Connecting Science and Communities in a Changing North Pacific
October 16–27, 2019
Victoria, BC, Canada



BIOPs: Towards seabird bioindicators of North Pacific plastic pollution

K David Hyrenbach¹, Lauren Chamberlain¹, Michelle Hester², Paula Hartzell³, Meg Duhr³, Jenn Lynch⁴

¹Marine Science Program, Hawai'i Pacific University, Waimanalo, HI, USA, khyrenbach@hpu.edu

²Oikonos Ecosystem Knowledge, Kailua, HI, USA

³U.S. Fish and Wildlife Service, Honolulu, HI, USA

⁴National Institute of Standards and Technology, Waimanalo, HI, USA

The BIOPs network studies plastic ingestion by North Pacific seabirds following three approaches: (1) assessing community-wide patterns; (2) developing local pollution metrics using species with restricted foraging distributions; and (3) comparing regional pollution using far-ranging species. In the Northwestern Hawaiian Islands, we necropsied 350 specimens of 16 species from French Frigate Shoals, and documented plastic ingestion in 11 species (69%), belonging to 7 families and representing 5 feeding guilds: albatrosses, tuna-birds, nocturnal petrels, plunge divers, and frigatebirds. Plastic ingestion varied within species, with chicks having significantly higher incidence and mass than adults. More recently, we focused on identifying potential regional bioindicators: Bonin Petrels from Midway, and Laysan / Black-footed Albatrosses from Kure Atoll. In particular, we contend that Bonin Petrels are ideal bioindicators for the central North Pacific due to: (i) their winter-time breeding, (ii) high plastic ingestion, and (iii) availability of naturally-deceased birds at colonies. An analysis of hatch-year (97.5% occurrence, n=40) and after-hatch-year (95.0% occurrence, n=40) birds revealed no significant differences in plastic incidence or loads between these two age classes. Overall, fragments were the most abundant plastic type by mass (HY:51%, AHY:58%), followed by line (HY:27%, AHY:23%), sheet (HY:22%, AHY:4%) and foam, which only occurred in AHY birds (15%). Bonin petrels ingested buoyant plastic, with low-density polyethylene accounting for most mass (42%), followed by polypropylene (14%), high-density polyethylene (14%), polypropylene/polyethylene (12%), polyethylene (11%), polystyrene (5%), and unknown (2%). These results underscore the value of seabirds as bioindicators and provide insights into the composition of floating plastic debris.