



## Midway Atoll: A Case Study in Plastic Ingestion

Plastic ingestion by albatross on Midway Atoll serves as an illuminating, and concerning, case study of marine debris plastic ingestion by mammals. Sometimes it is difficult to identify where birds ingest plastics, as birds close to human settlements may feed on plastics from landfills, dumpsters, and restaurant parking lots. Because Midway Atoll is far from such human settlements, the plastics ingested by birds living on the Atoll are almost certainly from marine debris. Furthermore, albatross do not feed on land, but rather are surface ocean feeders, so the plastic they ingest is even more likely to be marine debris rather than litter on land.

Midway Atoll is located about 1200 miles Northwest of Honolulu, Hawaii. It has been designated as the Midway Atoll National Wildlife Refuge (MANWR), encompassed in the newly designated, and second largest marine protected area in the world, The Papahānaumokuākea Marine National Monument. Laysan, Black-footed, and Short-tailed Albatross all breed on the island. Unfortunately, Pacific gyres transport and concentrate marine debris near Midway Atoll and albatross feeding grounds.

Albatross are surface feeders, eating squid, fish, and flying fish eggs. As plastic marine debris has become more prevalent in oceans, albatross have ingested more of it, mistaking the plastics for food. Furthermore, flying fish lay their eggs on floating materials in the ocean. In the past, these materials were natural, such as wood and pumice. Now it is more common for flying fish to lay their eggs on bits of floating plastic, which are then ingested by any albatross that consumes the eggs.

When albatross feed, they cannot digest squid beaks and fish otoliths (ear bones). This tough matter accumulates in their stomachs until they regurgitate it out as a "bolus." Plastic marine debris is now more and more commonly found in these boluses. Unfortunately, not all albatross can eliminate plastic they have ingested by regurgitating a bolus. Plastic often makes up more than half of the indigestible material in an albatross's digestive track. If the bolus grows too large or the plastic is sharp, ingested debris may stay in the bird and cause a blockage in the digestive tract, perforate the gut, result in a loss of nutrition (due to displacement of food), or cause a false feeling of being "full".