

Quantifying marine debris and seabird communities in the North East Pacific at multiple spatial scales.

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Many species of surface-foraging seabirds ingest plastic at-sea during their vast foraging trips. Yet, very little is known about when and where these far-ranging predators collect this material, and about the patterns of co-occurrence between seabirds and marine debris at sea. Floating micro and macro plastic, is known to accumulate in regions of oceanic convergence such as the subtropical gyres. One of the most conspicuous and intensively studied areas of plastic accumulation, commonly referred to as the Eastern Garbage Patch, spans a vast area of the Northeastern Pacific Ocean.

We used a trans-pacific cruise from Honolulu to San Francisco during June-July 2008 to measure the distribution of marine debris concurrently with seabird distributions in order to determine the biogeographic affinities of seabirds and marine debris. Far ranging Procellariiform seabirds such as black-footed albatross were shown to overlap in distribution with debris concentrations within the subtropical gyre community. Small scale (10's km) relationships between seabird and plastic concentrations were not detected, however, associations with water masses were. Wedge-tailed shearwaters associate with the Hawaii community of birds and did not overlap with marine debris abundance, yet they are known to be impacted by ingested debris. In addition we used an August 2009 cruise from San Diego to the eastern garbage patch to further describe distribution and small scale patchiness of marine debris both within the gyre and across the edge through transitional waters. Highest abundances of marine debris were observed within the subtropical gyre region with the majority being small pieces that would be bioavailable for ingestion by seabirds. Plastic abundances showed patchiness on multiple scales from km's to 100's km. Studying the biogeographic associations of seabirds and plastic is key to interpreting plastic ingestion rates by these far-ranging predators.