

Papahānaumokuākea Marine National Monument Permit Application Cover Sheet

This Permit Application Cover Sheet is intended to provide summary information and status to the public on permit applications for activities proposed to be conducted in the Papahānaumokuākea Marine National Monument. While a permit application has been received, it has not been fully reviewed nor approved by the Monument Management Board to date. The Monument permit process also ensures that all environmental reviews are conducted prior to the issuance of a Monument permit.

Summary Information

Applicant Name: David Hyrenbach

Affiliation: Hawaii Pacific University

Permit Category: Research

Proposed Activity Dates: June 1 2010 - May 31 2011

Proposed Method of Entry (Vessel/Plane): N.A.

Proposed Locations: Two sites are proposed: Midway Atoll and Tern Island, which are located along a North-South gradient of distance to the North Pacific Chlorophyll Front. While we seek samples from Midway Atoll & French Frigate Shoals, we DO NOT request access to these sites.

Estimated number of individuals (including Applicant) to be covered under this permit:

3

Estimated number of days in the Monument: None requested

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...

Study the incidence and amount of plastic ingestion in five petrel species and relate these patterns to geographic location (Midway Atoll versus French Frigate Shoals), age classes (chicks versus adults), and life-history characteristics (foraging modes, trophic level, diet). To this end, we will compare the following species: Wedge-tailed Shearwater (*Puffinus pacificus*), Christmas Shearwater (*Puffinus Puffinus nativitatus*), Bulwer's Petrel (*Bulweria bulweri*), Bonin Petrel (*Pterodroma hypoleuca*) and Tristram's Storm-petrel (*Oceanodroma tristrami*).

The analysis of two Tristram Storm-petrel chicks salvaged from French Frigate Shoals by USFWS personnel in 2008 and analyzed for plastic ingestion, revealed large numbers of plastic fragments and line in the stomach of these specimens, with 100 % incidence.

b.) To accomplish this activity we would

We will work with refuge staff at two study sites (Midway Atoll and French Frigate Shoals) to collect deceased chicks and adults for necropsy and lab analysis. Specimens will be stored frozen and delivered by ship to Honolulu. Specimens will be necropsied in the lab and the

stomach contents and tissue samples (for pollutant, diet and isotopic diet analyses) will be preserved for analysis.

Tissue analyses will include: (i) stomach contents, (ii) tissues for isotopic analyses (muscle, toe nails, feathers, liver), and (iii) specimens use in educational activities (e.g., necropsy lab, as part of a university seabird course). Hyrenbach already has a special purpose possession / salvage permit from USFWS (MB -180283-0), valid through 03/31/2011. (For reference, please refer to enclosed pdf copy)

c.) This activity would help the Monument by ...

Developing a standardized baseline of plastic ingested by petrels at these two NWHI colonies, comparable to our ongoing study in the MHI (Oahu). This information will be useful for future monitoring and health studies of petrel populations in the Monument, and will be applied to ongoing educational and outreach efforts to raise awareness about plastic pollution in the marine environment.

Other information or background: This research is part of a study to characterize plastic ingestion by petrels and to understand the individual and population-level effects of this marine debris . More specifically, we are interested in studying the general origin (post-user / industrial) and the mechanisms (color preferences, association with natural prey) by which certain pieces are chosen at sea. While it is widely known that surface feeding tubenose seabirds (order Procellariiformes) ingest and feed floating plastic fragments at sea to their chicks, previous studies have not addressed geographic and species-specific differences in the types and amounts of ingested debris. By comparing the results from multiple sites and species breeding in the Monument with colonies in the Main Hawaiian Islands, this study will start to test mechanistic hypotheses about the geographic and life-history factors influencing the plastic ingestion in North Pacific petrel populations.