

## **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:** March 01 - May 31, 2009 & March 01 - May 31, 2009 (2 years)

**Proposed Method of Entry (Vessel/Plane):** Plane

**Proposed Locations:** Three sites are proposed: Midway Atoll, Kure Atoll and Tern Island. We are collaborating with Cynthia Vanderlip (State of Hawaii DLNR), who in 2008 collected 25 bolus samples for each albatross species, to be used in this project. We seek access to two field sites (Midway Atoll & French Frigate Shoals), and the ability to deliver supplies and equipment to a third site (Kure Atoll).

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

3

**Estimated number of days in the Monument:** 8 months: 2 people (one at each site) for 1 - 2 months during 2 field seasons (2009 & 2010)

**Description of proposed activities:** (complete these sentences):

a.) The proposed activity would...

Quantify the amount (incidence, loads) and the types (plastic, Styrofoam, fishing line) of marine debris ingested by Black-footed and Laysan albatross. By integrating this information with similar data we are collecting from the Main Hawaiian Islands (Oahu and Kauai), we will test the hypothesis that colonies closer to the North Pacific Chlorophyll Transition Zone (a known area of marine debris concentration) are characterized by higher ingestion rates. We will apply these data to answer two management questions of relevance to the management of the Monument: (i) develop a baseline of plastic ingestion in these species to facilitate future monitoring of marine debris and population health impacts, and (ii) design a field study to investigate the impacts of plastic ingestion in albatross chicks using ultrasound imaging (please refer to pending Monument permit by Hyrenbach). Together these two studies will improve our ability to monitor plastic ingestion trends in North Pacific albatrosses, and will increase

our understanding of the mechanisms linking surface marine debris with ingestion by these far-ranging predators.

b.) To accomplish this activity we would ....

We will work with refuge staff at three study sites (Midway Atoll, Kure Atoll, French Frigate Shoals) to collect albatross boluses and deceased chicks for necropsy and lab analysis. Boluses will be dried in the air and stored for delivery by ship (or plane) and processing back in Oahu. Chicks will be necropsied in the colony and the stomach contents and tissue samples (for pollutant and isotopic diet analyses) will be preserved and returned to Oahu for lab analysis.

Tissue analyses will include: (i) stomach contents, (ii) tissues for isotopic analyses (muscle, toe nails, primary / body feathers, liver, intestine), 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) While the number of samples available is impossible to predict, we would like to collect up to 50 boluses and chicks per species per site (yearly total: 300 chicks, adults and boluses). Because only "high quality" boluses (fresh and unscavenged by crabs) will be analyzed for the monitoring study, the remainder will be used in outreach activities working with educators in Hawaii and California (see online products: <http://www.oikonos.org/projects/oceanstewardship.htm>). We recognize that the number of deceased chicks and adults may be considerably lower than this target, and will augment these samples with naturally-deceased adults from fisheries bycatch, provided by NOAA-fisheries and our colleague at Moss Landing Marine Labs (Hannah Nevins).

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

Developing a standardized baseline of plastic ingested by albatross chicks at three NWHI colonies, comparable to other similar studies at two MHI sites (Oahu / Kauai). This information will be useful for future monitoring and health studies of albatross populations in the Monument, and will be applied to ongoing educational and outreach efforts to raise awareness about plastic pollution in the marine environment. In particular, please refer to enclosed permit application for ultrasound-based studies of plastic ingestion in albatross chicks.

**Other information or background:** This research is part of a study to characterize plastic ingestion by albatross and to understand the individual and population-level effects of this ingested plastic on albatross chicks. 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 / 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 albatross populations. Please refer to the enclosed permit application for non-destructive ultrasound-based monitoring of plastic ingestion in live albatross chicks.