

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: Helen F. James

Affiliation: National Museum of Natural History, Smithsonian Institution

Permit Category: Research

Proposed Activity Dates: June 1, 2013 - August 31, 2015

Proposed Method of Entry (Vessel/Plane): NA

Proposed Locations: Midway, Laysan, and Tern Islands

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

Any staff of the National Monument and researchers conducting field work who are able to help salvage the remains of dead seabirds or guano for our project (our research team is not requesting to visit the Monument at this time) .

Estimated number of days in the Monument: NA

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...

We are requesting that staff and researchers working in the Monument salvage samples from seabird carcasses for our study. The samples will primarily consist of one wing from each bird. The wings, or, if possible, whole carcasses, will be prepared into museum specimens and sampled for our research project, which will use stable isotopes to make conclusions about the diet and foraging location of seabirds through the last 100 years.

In parallel with this stable isotope study, and to understand diet more fully, we would like permission to sample fresh seabird droppings. We are able identify prey species consumed by the birds based on short gene sequences of prey DNA preserved in the droppings. This technique relies on a shot-gun, next-generation genetic sequencing approach. We will request that the droppings be collected only after we have obtained funding for this work.

b.) To accomplish this activity we would

We would ask people, in the course of their activities in the Monument, to search for seabird carcasses, collect at least one wing or, in some cases, the entire carcass, and note the date, location, and age of the bird (if clear from the carcass). Collected materials will need to be sent to the Smithsonian Institution for processing and study. We seek a good statistical sample of both adults and hatch-year birds in order to conduct rigorous research. We will sex each individual, genetically, and confirm its age using wing feather and bone morphology. Samples for stable isotope analysis (small pieces of feather and bone) will be taken from the wings and processed at either the stable isotope biogeochemistry lab at Michigan State University or the University of Akron (run by Peggy Ostrom and Anne Wiley, respectively). The isotope data will allow us to interpret variation in foraging location and trophic level (i.e. vertical position in the food web) through time. For comparison, we will also analyze isotope samples from seabirds preserved in museum collections, collected throughout the last 100 years from similar locations in the NW Hawaiian Islands.

We also ask that fresh (i.e. wet) seabird droppings be collected for us. Genetic analysis of the droppings will be conducted at Robert Fleischer's Genetics Laboratory at the Center for Conservation and Evolutionary Genetics, Smithsonian Institution. The resulting data will allow us to identify prey species consumed by different seabird species during their breeding seasons in the NW Hawaiian Islands, including soft-bodied prey species that are not typically preserved in regurgitations or stomach contents.

As principal investigators, we can provide any needed training or instructions for researchers or Monument staff who are able to contribute to our project (e.g. training on how to separate a wing quickly and safely from a seabird carcass).

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

Our research will provide information on the diet and foraging locations of different seabird species that is potentially relevant to conservation management. We will perform a long-term study by incorporating museum specimens from the NW Hawaiian Islands, as well as modern samples, and our data will show if the foraging habits of seabirds have been significantly altered over the course of the last 100 years. The isotope data from modern birds will also provide a valuable baseline from which future changes in foraging habits can be assessed (i.e. by collecting isotope data from future breeding seasons). Finally, our identifications of seabird prey will provide detailed information on the food base used by the Monument's breeding seabirds.

Our data will fill a critical gap in knowledge by providing information on the diet of seabirds (during the breeding and non-breeding seasons) and how these diets may be changing through time. Our previous research on seabirds from the Main Hawaiian

Islands provides evidence that at least some species of Pacific seabirds may have undergone drastic shifts in their foraging habits following the onset of industrialized fishing. Through study of the seabirds in the Paphanaumokuakea Marine National Monument, we aim to understand whether human-induced changes in Pacific seabird foraging are widespread, and whether they are affecting seabirds of the Monument. Such changes (e.g. to the size and availability of prey) may have critical impacts on the population viability of Monument seabirds and on their conservation statuses.

In addition, museum specimens produced through this work will be available to future researchers.

Other information or background: