Papahānaumokuākea Marine National Monument

RESEARCH Permit Application

NOTE: ***This Permit Application (and associated Instructions) are to propose activities to be conducted in the Papahānaumokuākea Marine National Monument. The Co-Trustees are required to determine that issuing the requested permit is compatible with the findings of Presidential Proclamation 8031. Within this Application, provide all information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Papahānaumokuākea Marine National Monument (Monument).***

ADDITIONAL IMPORTANT INFORMATION:

- Any or all of the information within this application may be posted to the Monument website informing the public on projects proposed to occur in the Monument.

- In addition to the permit application, the Applicant must either download the Monument Compliance Information Sheet from the Monument website OR request a hard copy from the Monument Permit Coordinator (contact information below). The Monument Compliance Information Sheet must be submitted to the Monument Permit Coordinator after initial application consultation.

- Issuance of a Monument permit is dependent upon the completion and review of the application and Compliance Information Sheet.

INCOMPLETE APPLICATIONS WILL NOT BE CONSIDERED

Send Permit Applications to:
NOAA/Inouye Regional Center
NOS/ONMS/PMNM/Attn: Permit Coordinator
1845 Wasp Blvd, Building 176
Honolulu, HI 96818
nwhipermit@noaa.gov
PHONE: (808) 725-5800 FAX: (808) 455-3093

SUBMITTAL VIA ELECTRONIC MAIL IS PREFERRED BUT NOT REQUIRED. FOR ADDITIONAL SUBMITTAL INSTRUCTIONS, SEE THE LAST PAGE.

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: Megan Donahue
Affiliation: Hawaii Institute of Marine Biology

Permit Category: Research
Proposed Activity Dates: 06/01/16 - 09/30/16 (exact cruise dates are to be determined)
Proposed Method of Entry (Vessel/Plane): R/V Hi'ialakai
Proposed Locations: Shallow reefs (10 - 60 ft depth) in forereef and lagoon habitats. Specific locations for the study will depend on cruise logistics.

Estimated number of individuals (including Applicant) to be covered under this permit: 2

Estimated number of days in the Monument: 30

Description of proposed activities: (complete these sentences):

a.) The proposed activity would…

measure the biomass density of moray eels in the NWHI relative to other fishes, using methods already developed in the MHI. Moray eels have been shown to have the greatest piscivory impact of demersal predators in the NWHI (Parrish 1986), yet their biomass is poorly captured by standard fish surveys. This effort will be the first to measure and compare moray eel densities across the Hawaiian Archipelago.

b.) To accomplish this activity we would ….

conduct an eel-specific survey consisting of 4 steps performed consecutively on an individual transect. The transect will be a cylinder of 15 meters in diameter (177 square meters). First, we will perform a standard visual fish survey to record total fish biomass. Next, we will search the transect specifically for eels. Lastly, bait will be deployed on the transect to draw out eels hidden from view. Data will also be recorded for covariates such as habitat complexity, rugosity, water flow, and benthic composition of each cylindrical transect. See response to Question #8 for more methodological details.

c.) This activity would help the Monument by …
creating a baseline estimate for moray eel biomass density in the NWHI. Almost no accurate data for eel abundances exist for the NWHI, except for a single rotenone collection that took place on a small area of reef (Parrish 1986). Piscivorous predators play important roles in structuring reef fish communities, and knowing the relative abundance of each trophic group is helpful when making management decisions. This study contributes to the comprehensive, pre-existing fish survey efforts by the NOAA CRED, by incorporating an estimate for a large, diverse family of fishes (Muraenidae) that are rarely documented by typical fish surveys. Further, this project seeks to determine the role of Hawaiian apex predators (specifically, large carangids) in controlling moray eel populatons. This project would further demonstrate the importance of the Monument in protecting apex predators, and provide an estimate what proportion of a pristine Hawaiian fish community is comprised of moray eels.

Other information or background:
Project Abstract:
Populations of apex predators have declined globally due to human activities. In the absence of sufficient top-down control, mid-level predators can increase drastically in number (termed “mesopredator release”), which may lead to a trophic cascade that severely impacts the bottom-level prey populations in an ecosystem (Pauly et al. 1998, Prugh et al. 2009). On densely populated, accessible coastlines of the Main Hawaiian Islands, few large piscivorous fish are observed (Friedlander and DeMartini 2002, Williams et al. 2008). Moray eels are piscivorous mesopredators that may have benefited from this lack of top-down control. However, due to their cryptic nature, moray eels are underestimated in visual fish surveys. Consequently, almost no accurate data is available on eel populations over space or time. Here, we propose to survey eels using bait deployment on a transect to obtain a more accurate eel density estimate. We use this method to examine how relative eel biomass density changes across a gradient of apex predator abundance. We hypothesize that the reduction of apex predators has led to a release of moray eels from top-down control, possibly due to fishermen targeting more desired fish species (DeMello 2004, Meyer 2007, Kittinger et al. 2015) over moray eels.