

State of Hawai'i
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Aquatic Resources
Honolulu, Hawai'i 96813

May 13, 2016

Board of Land and Natural Resources
Honolulu, Hawai'i

Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National Monument Research Permit to Dr. Megan Donahue, Hawai'i Institute of Marine Biology, University of Hawai'i, for Access to State Waters to Conduct Activities for the Characterization of Moray Eel Population Densities

The Division of Aquatic Resources (DAR) hereby submits a request for your authorization and approval for issuance of a Papahānaumokuākea Marine National Monument research permit to Applicant Dr. Megan Donahue, Associate Professor, Hawai'i Institute of Marine Biology, University of Hawai'i, pursuant to § 187A-6, Hawai'i Revised Statutes (HRS), chapter 13-60.5, Hawai'i Administrative Rules (HAR), and all other applicable laws and regulations.

The research permit, as described below, would allow entry and management activities to occur in Papahānaumokuākea Marine National Monument (Monument), including the NWHI State Marine Refuge and the waters (0-3 nautical miles) surrounding the following site:

- Nihoa Island
- Mokumanamana (Necker Island)
- French Frigate Shoals
- Gardner Pinnacles
- Maro Reef
- Laysan Island
- Lisianski Island, Neva Shoal
- Pearl and Hermes Atoll
- Midway Atoll
- Kure Atoll

The activities covered under this permit would occur between May 22, 2016 and May 21, 2017.

The Applicant has been permitted to conduct activities in the Monument in the past. Proposed activities are new, though similar methodology has been employed in studies conducted within the Main Hawaiian Islands.

INTENDED ACTIVITIES

The Applicant would conduct research activities to create a baseline estimate for moray eel biomass density in the Monument. Up to two individuals would conduct activities while on a research cruise on a separately permitted vessel. Activities would consist of temporarily placing

materials on submerged lands; discharging chum (made from a standardized recipe of 800 g of frozen mackerel blended with seawater and poured into and then wrapped inside of kalo (taro) leaves and ti leaves) into Monument; touching living or dead coral; attracting Monument resources; and swimming, snorkeling and SCUBA diving to support research activities.

Specifically, the Applicant's eel surveys would consist of four different steps performed consecutively on a single cylindrical transect. The cylindrical transect will be 15 m in diameter, in shallow reef habitats of 10 - 60 ft. depths. The first step would be a visual stationary point count fish survey to obtain biomass for all visible fish species within the cylinder over a 20 minute period. The second step would consist of a timed eel search within the cylinder between 10-20 minutes without the use of an attractant.

The third step would involve measuring the following covariates: Benthic composition and porosity; habitat complexity and rugosity; water flow and bait plume advection. Benthic composition would be determined by taking video of the seafloor. Habitat complexity and rugosity would be measured by laying a brass chain along the contour of the seafloor. Water flow and bait plume advection would be measured by discharging a fluorescein dye and recording the duration the dye is visible.

In addition, an acoustic doppler current profiler (ADCP) will be deployed to measure the current direction and velocity in the water column. The ADCP will be attached to a weighted frame with a rope (10 - 60 ft. length) and buoy for surface retrieval. The ADCP and its frame will be deployed in sandy substrate within 10 m of the transect at the beginning of the survey and retrieved upon completion of the survey.

Lastly, the Applicant would implement a baited transect to survey eel biomass. Three baited cameras (each with an attached rope (length dependent on depth) and small floating buoy, for retrieval) will be lowered onto the seafloor, positioned at thirds of the perimeter of the cylindrical transect. The baited camera consists of a GoPro attached to a small PVC frame (approximate dimensions: 24"x 16" x 14") with an attached baitbox (containing 400g of chopped mackerel) and 2 lb weight. In addition, 11 delayed-release chum packets will be deployed on the seafloor inside the transect cylinder. Any eels that would be attracted to the chum odor would be documented by the video cameras. For safety, no divers will be present in the water while chum or bait is present in the water. Thus, all deployed equipment will be retrieved (via buoy and rope) from the water surface by boat upon completion of the survey.

This activity would benefit the Monument by providing managers with data on the biomass and species richness of moray eel populations in the Monument. The activity would directly support the Monument Management Plan (MMP), Marine Conservation Science Action Plan, Activity MCS 1.2 – Continue monitoring of shallow-water coral reef ecosystems to protect ecological integrity. (PMNM MMP Vol. I, p. 123, 2008).

The activities described above may require the following regulated activities to occur in State waters:

- Drilling into, dredging, or otherwise altering the submerged lands other than by anchoring a vessel; or constructing, placing or abandoning any structure, material, or other matter on the submerged lands
- Discharging or depositing any material or matter into the Monument
- Touching coral, living or dead
- Attracting any living Monument resource
- Swimming, snorkeling, or closed or open circuit SCUBA diving within any Special Preservation Area or Midway Atoll Special Management Area

REVIEW PROCESS

The permit application was sent out for review and comment to the following scientific and cultural entities: Hawai'i Division of Aquatic Resources, Hawai'i Division of Forestry and Wildlife, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), United States Fish and Wildlife Service Hawaiian and Pacific Islands National Wildlife Refuge Complex Office, the Office of Hawaiian Affairs (OHA) and the PMNM Native Hawaiian Cultural Working Group. In addition, the permit application has been posted on the Monument Web site since March 2, 2016, giving the public an opportunity to comment. The application was posted within 40 days of its receipt, in accordance with the Monument's Public Notification Policy.

Comments received from the scientific community are summarized as follows:

Scientific reviews support the acceptance of this application.

The following questions were raised:

QUESTIONS:

- 1) Which research cruise does the Applicant intend to conduct the proposed activities?

The Applicant responded with:

We are discussing our planned operations with Randy Kosaki (Chief Scientists on the PMNM cruise) and Brett Schumacher (Chief Scientist on the NMFS-RAMP cruise) to see which cruise might be able to best accommodate this project. My lab has successfully participated on several previous RAMP and PMNM cruises, so we are hopeful that this project can be accommodated in the cruise planning.

- 2) How will the chum packets be deployed on the seafloor? I'm assuming since no divers will be present in the water while chum or bait is in the water, that they plan on dropping the chum packets to the seafloor from a tender vessel.

The Applicant responded with:

That is correct; these are shallow sites, and we avoid sites with high current conditions. This method has worked in the survey locations in the MHI.

3) The bait stations are to lure the eels out, but not to catch them?

The Applicant responded with:

Yes, the bait stations are to lure eels out, but not to catch them. They will be recorded on video.

4) On page 8, item “d”: What are the “rapidly biodegradable natural materials” that are going to be left behind? The chum packets of mackerel wrapped in kalo?

The Applicant responded with:

Yes, the “rapidly biodegradable natural materials” are homogenized chum packets wrapped in kalo.

5) No real concerns with this research, as DAR has already reviewed the methodology thoroughly because the Applicant received a Special Activity Permit (SAP) through DAR earlier this year for the same project (MHI component of project). Can the researcher provide information on the sample size (i.e.: how many times will the researchers conduct a baited transect and at how many locations at each island)?

The Applicant responded with:

While specific atolls and sites will be determined by cruise logistics, we expect to accomplish 3 surveys on each day of diving activity on the cruise. Assuming we have 3 days of diving activity on 5 atolls, then we expect to accomplish 45 site surveys (9 per atoll at 5 atolls) during the cruise. The actual number of sites and surveys will be determined by cruise logistics, but, realistically, will not exceed 75 sites.

Comments:

1) The Applicant should review the Boating and Diving BMPs for the Monument.

The Applicant responded with:

We have reviewed the Boating and Diving BMPs for the Monument to ensure that our activities are aligned with best practices to avoid interactions with protected species. On past cruises, when approached by curious monk seals that came within 50 yds, we have abandoned our dive activities and returned to the same site later to complete the work.

- 2) The Applicant should attempt to place the bait station in sandy areas if practicable, and to ensure that the stations are properly weighted to prevent them from drifting into corals or other sensitive benthic habitat.

The Applicant responded with:

The bait stations are placed on the bottom, specifically avoiding live coral. Our experience using this method in the Main Hawaiian Islands indicates that we have properly weighted the stations and have not observed them drifting into nearby corals.

- 3) No issue with the use of fluorescein dye in the water column. Common method, published studies have shown no toxic affect.

The Applicant responded with:

Thank you for the comment on fluorescein. We agree that this is a common method, and previously permitted activities in the PMNM have used fluorescein to characterize water movement.

- 4) It would be very helpful for community members if data and results from this research can be shared once it is completed.

The Applicant responded with:

We look forward to sharing our research activities with the community. As we have developed this research project, graduate student Julie Zill has been sharing the process on the blog on our lab website (www.donahuelab.com) and the lab FaceBook page (<https://www.facebook.com/DonahueLab/>). Julie has also reached out to members of the spearfishing community to better understand where and how spearfishing impacts eel abundance and behavior. As we have more formal results to share, we will be reaching out to the community. We will reach out to Brad Kaaleleo Wong to find the best avenues for sharing the results of our research.

Comments received from the Native Hawaiian community are summarized as follows:

Comments from the PMNM Native Hawaiian Cultural Working Group:

Commenter 1 - I have an uneasiness of chumming for eels if it is done a lot. Don't want to get any more learned behavior.

The Applicant responded with:

We share Commenter 1's concern about the potential for human interactions to change the behavior of eels. If we were repeatedly sampling the same sites, then I would also be concerned about the potential for learning. However, for our research, our sites are randomly selected and surveyed only once, so any individual eel will experience this baited transect only once; learning

is much less likely with only one exposure. In addition, in the PMNM, the likelihood of future interactions with humans is very low, considering large expanse of shallow reefs in the PMNM and the small number of people who have access. Perhaps of interest to this commenter: one aspect of our research is investigating the behavioral differences of eels in areas with high and low predator abundance. We expect that eels in the PMNM, where predatory sharks and jacks are abundant, will be more wary than eels in the MHI, where predators are far less abundant. If our hypothesis is correct, eels will be more wary at sites with higher predator abundance; this would suggest an indirect effect of fishing on eel behavior.

Commenter 2 - I would suggest that research be done on the cultural significance of puhi (eels) and the potential consequences of this study for Hawaiian families who identify with puhi and who may also identify puhi as an 'aumakua. There is traditional knowledge tied to a puhi that leaves their caves. Be mindful that there are potential consequences. There are great resources available in Hawaiian literature and within the Native Hawaiian community. I would also suggest that you continue to reach out to the Native Hawaiian community. It will enrich your research.

The Applicant responded with:

In response to Commenter 2, we look forward to learning from members of the Native Hawaiian community about the Hawaiian understanding of eels and the meaning of eel behavior. Our fundamental assumption is that eels are integral members of the reef community, that human activities influence eel abundance and behavior, and that these human-induced changes in eel abundance and behavior have consequences for the reef community. We expect that a Native Hawaiian perspective will enrich our understanding of the interactions between eels, humans, and the reef community. We will reach out to Brad Kaaleleo Wong to find the best avenues for dialog about our research.

[UPDATE: The Applicant has been in touch with Brad Kaaleleo Wong of the Office of Hawaiian Affairs. Brad has provided specific resources and contacts within the Native Hawaiian community. The Applicant will continue to follow-up with Brad as the research progresses.]

Comments received from the public are summarized as follows:

No comments were received from the public on this application.

Additional reviews and permit history:

Are there other relevant/necessary permits or environmental reviews that have or will be issued with regard to this project? (e.g., MMPA, ESA, EA) Yes No

If so, please list or explain:

- The proposed activities are in compliance with the National Environmental Policy Act.
- The proposed activities are in compliance with the National Historic Preservation Act.
- An informal review of all aforementioned activities following section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA; 16 U.S.C.

1855(b)) was completed on March 9, 2016 by NOAA National Marine Fisheries Service (NMFS) Pacific Islands Regional Office (PIRO) for the Habitat Conservation Division. NMFS PIRO concluded project activities would not adversely affect Essential Fish Habitat (EFH) given the implementation of the Best Management Practices that are in place for the Monument.

- A request to the National Marine Fisheries Service (NMFS) for a Section 7 informal consultation pursuant to the Endangered Species Act of 1973 is underway to analyze the effects of proposed activities within the Monument on protected species. The outcome of this consultation may require the Applicant to adhere to other NMFS-prescribed conditions. Such conditions would be reflected in the PMNM permit, prior to issuance.
- The Department has made an exemption determination for this permit in accordance chapter 343, HRS, and Chapter 11-200, HAR. See Attachment (“DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS AND CHAPTER 11-200 HAR, FOR PAPAHĀNAUMOKUĀKEA MARINE NATIONAL MONUMENT RESEARCH PERMIT TO DR. MEGAN DONAHUE, HAWAI‘I INSTITUTE OF MARINE BIOLOGY, UNIVERSITY OF HAWAI‘I, FOR ACCESS TO STATE WATERS TO CONDUCT ACTIVITIES FOR THE CHARACTERIZATION OF MORAY EEL COMMUNITIES UNDER PERMIT PMNM-2016-014”)

Has Applicant been granted a permit from the State in the past? Yes No
If so, please summarize past permits:

- The Applicant was granted permits for unrelated activities in 2011, 2012, and 2014 PMNM-2011-032, PMNM-2012-033, and PMNM-2014-024, respectively.

Have there been any a) violations: Yes No
b) late/incomplete post-activity reports: Yes No

Are there any other relevant concerns from previous permits? Yes No

STAFF OPINION

DAR staff is of the opinion that the Applicant has properly demonstrated valid justification for their application and should be allowed to enter the NWHI State waters and conduct the activities therein as specified in the application with certain special instructions and conditions, which are in addition to the Papahānaumokuākea Marine National Monument Research Permit General Conditions. All suggested special conditions have been vetted through the legal counsel of the Co-Trustee agencies (see Recommendation section).

MONUMENT MANAGEMENT BOARD OPINION

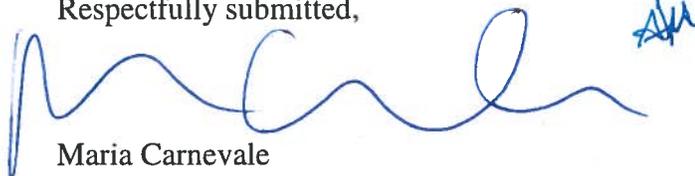
The MMB is of the opinion that the Applicant has met the findings of Presidential Proclamation 8031 and this activity may be conducted subject to completion of all compliance requirements. The MMB concurs with the special conditions recommended by DAR staff.

RECOMMENDATION:

That the Board authorize and approve a Research Permit to Dr. Megan Donahue, Hawai'i Institute of Marine Biology, University of Hawai'i, with the following special conditions:

1. This permit is not to be used for nor does it authorize the sale of collected organisms. Under this permit, the authorized activities must be for noncommercial purposes not involving the use or sale of any organism, by-products, or materials collected within the Monument for obtaining patent or intellectual property rights.
2. The permittee may not convey, transfer, or distribute, in any fashion (including, but not limited to, selling, trading, giving, or loaning) any coral, live rock, or organism collected under this permit without the express written permission of the Co-Trustees.
3. To prevent introduction of disease or the unintended transport of live organisms, the permittee must comply with the disease and transport protocols attached to this permit.
4. Tenders and small vessels must be equipped with engines that meet EPA emissions requirements.
5. Refueling of tenders and all small vessels must be done at the support ships and outside the confines of lagoons or near-shore waters in the State NWHI Marine Refuge.
6. If there is any Hawaiian monk seal or any other protected species in the area when performing any permitted activity, the activity shall cease until the animal(s) depart the area.
7. That the permittee provide, to the best extant possible, a summary of their Monument access, including, but not limited to, any initial findings to the DLNR for use at educational institutions and outreach events.

Respectfully submitted,



Maria Carnevale
State Co-Manager
Papāhānaumokuākea Marine National Monument

APPROVED FOR SUBMITTAL



SUZANNE D. CASE
Chairperson

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 populations. 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.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Donahue, Megan J

Title: Associate Researcher, Hawaii Institute of Marine Biology

1a. Intended field Principal Investigator (See instructions for more information):

Julie Zill, graduate student

2. Mailing address (street/P.O. box, city, state, country, zip): Hawaii Institute of Marine

Biology, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

For students, major professor's name, telephone and email address:

3. Affiliation (institution/agency/organization directly related to the proposed project):

Hawaii Institute of Marine Biology (HIMB), University of Hawaii at Manoa

4. Additional persons to be covered by permit. List all personnel roles and names (if known at time of application) here (e.g. John Doe, Research Diver; Jane Doe, Field Technician):

Megan Donahue, Applicant, graduate advisor, research diver

Julie Zill, Field PI, research diver

Section B: Project Information

5a. Project location(s):

- | | | | |
|--|-------------------------------------|---|-------------------------------------|
| <input checked="" type="checkbox"/> Nihoa Island | <input type="checkbox"/> Land-based | <input checked="" type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> Necker Island (Mokumanamana) | <input type="checkbox"/> Land-based | <input checked="" type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> French Frigate Shoals | <input type="checkbox"/> Land-based | <input checked="" type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> Gardner Pinnacles | <input type="checkbox"/> Land-based | <input checked="" type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> Maro Reef | | | |
| <input checked="" type="checkbox"/> Laysan Island | <input type="checkbox"/> Land-based | <input checked="" type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> Lisianski Island, Neva Shoal | <input type="checkbox"/> Land-based | <input checked="" type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> Pearl and Hermes Atoll | <input type="checkbox"/> Land-based | <input checked="" type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> Midway Atoll | <input type="checkbox"/> Land-based | <input checked="" type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> Kure Atoll | <input type="checkbox"/> Land-based | <input checked="" type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input type="checkbox"/> Other | | | |

Ocean Based

Remaining ashore on any island or atoll (with the exception of Midway & Kure Atolls and Field Camp staff on other islands/atolls) between sunset and sunrise.

NOTE: There is a fee schedule for people visiting Midway Atoll National Wildlife Refuge via vessel and aircraft.

Location Description:

Specific locations for the study will depend on cruise logistics. I will survey any suitably accessible reef habitat of 10 - 60 ft depth.

5b. Check all applicable regulated activities proposed to be conducted in the Monument:

- Removing, moving, taking, harvesting, possessing, injuring, disturbing, or damaging any living or nonliving Monument resource
- Drilling into, dredging, or otherwise altering the submerged lands other than by anchoring a vessel; or constructing, placing, or abandoning any structure, material, or other matter on the submerged lands
- Anchoring a vessel
- Deserting a vessel aground, at anchor, or adrift
- Discharging or depositing any material or matter into the Monument
- Touching coral, living or dead
- Possessing fishing gear except when stowed and not available for immediate use during passage without interruption through the Monument
- Attracting any living Monument resource
- Sustenance fishing (Federal waters only, outside of Special Preservation Areas, Ecological Reserves and Special Management Areas)
- Subsistence fishing (State waters only)
- Swimming, snorkeling, or closed or open circuit SCUBA diving within any Special Preservation Area or Midway Atoll Special Management Area

6. Purpose/Need/Scope *State purpose of proposed activities:*

The purpose of our proposed activities is to quantify the relative biomass and density of moray eels in the NWHI. Moray eels are important piscivores on NWHI reefs: in a gut content study by Parrish 1986 that used an ichthyicide (rotenone) on a NWHI reef, moray eels were determined to have the largest piscivory impact of all demersal fishes. Given that piscivores regulate prey fish populations and alter the structure of fish communities, it is important to understand what portion of the fish biomass is composed of moray eels. For the past decade, NOAA-CRED-RAMP has used visual fish surveys to extensively record the biomass abundance of reef fishes. However, these visual surveys inherently focus on conspicuous, diurnal reef fishes; the cryptic nature of moray eels typically excludes their observation, even in well-executed visual fish survey methods. Almost no accurate data exist for moray eel populations in the Hawaiian Archipelago: out of 120,350 individual fish records in NOAA-CRED's fish survey database, only 113 of those individuals were moray eels. This speaks to the enormous underestimation of this abundant and important piscivore. This study will complement the ongoing RAMP fish surveys by describing the biomass and species richness (including endemic eel species and species that are rare in the MHI) of moray eels in the NWHI. This information will help illustrate the unintended consequences of the reduction of apex predators on moray eels. Moray eel mesopredators may be experiencing release from top-down control in areas of low apex predator abundance, which may impact the population levels of their prey.

*Considering the purpose of the proposed activities, do you intend to film / photograph federally protected species? Yes No

For a list of terrestrial species protected under the Endangered Species Act visit:

<http://www.fws.gov/angered/>

For a list of marine species protected under the Endangered Species Act visit:

<http://www.nmfs.noaa.gov/pr/species/esa/>

For information about species protected under the Marine Mammal Protection Act visit:

<http://www.nmfs.noaa.gov/pr/laws/mmpa/>

7. Answer the Findings below by providing 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 Monument:

The Findings are as follows:

a. How can the activity be conducted with adequate safeguards for the cultural, natural and historic resources and ecological integrity of the Monument?

As a team of conservation biologists, we aim to conduct science with respect and minimal impact to the ecosystem which we work to conserve. All methods to be used within the Monument are

designed with this goal in mind, and we have taken care to minimize any potential negative impacts to the system. We have made sure that our study design is robust so that it will produce results useful to scientists and managers. We believe we have implemented every possible safeguard into our methods for the ecological integrity and natural resources of the Monument. We will not impact historic resources, as we will not be setting foot on land, nor will we touch any artifacts that we may discover underwater.

Every effort will be made to not touch living coral or break underwater natural structures. Baited cameras and an ADCP will be placed on sand or hard substrate that is not living coral. We will be physically present (on boat nearby, or in the water) whenever equipment is deployed in the water, hence entanglement of sea creatures or equipment loss is highly unlikely. We recognize that the moray eel is an 'aumakua sacred to the Hawaiian culture, and we emphasize that no moray eels or other living organisms will be collected, removed, harassed, or harmed during the study. All materials discharged into the Monument will be non-toxic, non-impactful, and rapidly biodegradable. Our collection of small water samples will not affect the natural resources in any measurable way.

b. How will the activity be conducted in a manner compatible with the management direction of this proclamation, considering the extent to which the conduct of the activity may diminish or enhance Monument cultural, natural and historic resources, qualities, and ecological integrity, any indirect, secondary, or cumulative effects of the activity, and the duration of such effects? Our proposed study is the type of research mandated by the Proclamation: "research designed to further understanding of monument resources and qualities... [and] will assist in the conservation and management of the monument". Our research contributes to the better understanding of monument resources by quantifying important undocumented piscivores that define its trophic structure; this will assist in the management and conservation of the Monument. As described above, our activities will not detectably diminish Monument resources, nor have any known effects on the ecosystem's resources. Our study design is minimally invasive, with no removal of Monument resources (except for water samples). The divers in our team are experienced in conducting fish and eel surveys and have been through intensive dive training. We have already successfully conducted eel surveys in Oahu coastal reefs, and our methods have been honed and made more efficient to minimize impact to the environment.

c. Is there a practicable alternative to conducting the activity within the Monument? If not, explain why your activities must be conducted in the Monument.

There are no practical alternatives to conducting this activity within the Monument. This project seeks to examine the differences in relative moray eel biomass across areas of high and low apex predator abundance. We have already begun to conduct eel surveys in the MHI; in order to assess the effects of large predator removal, it is necessary to have a baseline comparison with a pristine Hawaiian reef community. The NWHI are possibly the only location within the Hawaiian Archipelago that still has very high abundances of apex predators on shallow, relatively accessible reefs. Large carangids are of particular importance to this study because they compose a large portion of the fish biomass in the NWHI (Friedlander and Demartini 2002), and eels were found to be the largest component of their diet (Sudekum et al. 1991). Thus, it is likely that these apex predators exert a considerable amount of top-down control on eel

populations. However, Williams et al. 2008 found that even very small levels of fishing effort and human presence drastically decreased large carangid numbers. Thus, only the NWHI conceivably offers the very high level of apex predator biomass needed for this comparison. Of course, there are many differences between the NWHI and MHI besides apex predator biomass; we will characterize those differences quantitatively with satellite-derived data as well as in situ measures of benthic habitat.

d. How does the end value of the activity outweigh its adverse impacts on Monument cultural, natural and historic resources, qualities, and ecological integrity?

Our study's value will greatly outweigh its negligible adverse impacts on the Monument's resources. No plastics or gear will be permanently installed or left behind; only harmless, rapidly biodegradable natural materials would ephemerally remain. Our results will complement the important findings gained from NOAA-CRED's fish surveys in relation to differences in fish communities and trophic structures between the NWHI and the MHI. Our research will yield otherwise unknown information as to the effects of apex predator removal on moray eel populations, which would also benefit ecosystem managers in the MHI. Given that moray eels were found to have the greatest piscivorous impact of demersal fishes in the NWHI, it is imperative to discover how many moray eels exist in the NWHI and MHI relative to other reef fishes.

e. Explain how the duration of the activity is no longer than necessary to achieve its stated purpose.

Ecological field studies tend to produce variable results, due to the multitude of co-occurring environmental factors and processes in any natural system. To achieve an adequate sample size and produce reliable conclusions, we aim to conduct 3 surveys on each field day. We are confident that a cruise of approximately 30 days will produce the sample size (40-60 surveys) required to yield reliable results.

f. Provide information demonstrating that you are qualified to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.

Megan Donahue has been an AAUS certified scuba diver and NAUI instructor for 19 years. She has used diving for research, and trained others to dive on projects in the Gulf of Maine, California, and Hawaii, including research in other protected areas (e.g. the Channel Islands National Park). She has a PhD in Ecology from the University of California, Davis and has publications on marine ecology and spatial population dynamics. She has received permits to perform research in the Monument in 2011, 2012, 2013, and 2014. She was privileged to enter the Monument on the July-August 2011 cruise to study bioerosion rates in the Monument, and on the May 2010 cruise to work with Scott Godwin on invasive species surveys.

Julie Zill is the field PI for this application and graduate student of Megan Donahue. She has been SCUBA certified and trained in scientific field methods since 2006 and has been an AAUS certified scuba diver since 2010. She has conducted scientific diving research (with conscientiously minimal environmental impact) on reef communities in Bermuda, the Gulf of Mexico, French Polynesia, Hawaii, and the remote, federally protected marine reserve of Rocas

Atoll, Brazil. She is an experienced coral reef science diver having worked four years as a marine ecology field technician prior to graduate school.

g. Provide information demonstrating that you have adequate financial resources available to conduct and complete the activity and mitigate any potential impacts resulting from its conduct. Julie Zill and her research is supported by an NSF graduate research fellowship, as well as a variety of small research grants. Additionally, the Donahue Lab at HIMB has adequate finances to support this work. Further, this is a relatively inexpensive project in terms of supply costs and sample processing, and the required lab equipment is already available at HIMB.

h. Explain how your methods and procedures are appropriate to achieve the proposed activity's goals in relation to their impacts to Monument cultural, natural and historic resources, qualities, and ecological integrity.

Our methods are concisely designed to test our specific hypothesis, without exerting neither excessive nor insufficient effort in the field. Our survey sites choices will be guided by Monument staff and the vessel crew while aboard the R/V Hi'ialakai. We will avoid any sites of particular cultural significance, and focus our survey efforts in areas that will maximize the safety of the crew and efficiency of our proposed activity.

i. Has your vessel been outfitted with a mobile transceiver unit approved by OLE and complies with the requirements of Presidential Proclamation 8031?

We will be aboard R/V Hi'ialakai, which to our knowledge would be equipped with the required mobile transceiver unit.

j. Demonstrate that there are no other factors that would make the issuance of a permit for the activity inappropriate.

We cannot see any factors that would make the issuance of this permit inappropriate.

8. Procedures/Methods:

Our eel-specific survey consists of 4 steps performed consecutively on a single cylindrical transect. The cylindrical transect will be of 15 meters in diameter, in shallow reef habitats of 10 - 60 ft depths.

Step 1.) Visual stationary point count (SPC) fish survey

The first survey step will be the widely used SPC visual survey of reef fishes (following Ayotte et al. 2011), but modified in that the survey will be 20 minutes and in only a single 15-meter diameter cylinder. I will lay a 15m long transect tape along the seafloor, and record fish identity, quantity, and length estimates in order to obtain biomass for all visible fish species within the cylinder, using allometric weight relationships. This step will give total fish biomass for a comparison with eel biomass.

Step 2.) Timed eel search

The second step will be a thorough search of all available shelter within the cylindrical transect, while using a flashlight to illuminate dark potential hiding places. If an eel is not fully exposed, the eel head size will be used to allometrically estimate body size and biomass (Gilbert et al.

2005). The search will be timed, and will last at least 10 minutes but no longer than 20 minutes. This step will examine the detectability of eels without the use of an attractant.

Step 3.) Measurements of covariates

The observed fish biomass (in general) and moray eel biomass (in particular) are likely to be strongly affected by the level of habitat complexity, benthic community composition, as well as other site characteristics. The following potential covariates will be measured:

Benthic composition and porosity: Videos will be taken of the seafloor of the transect in order to estimate the quantity and sizes of holes in the substrate, as well as the composition of the benthos (e.g. % coral, % turf algae).

Habitat complexity and rugosity: The maximum and minimum water depth in the cylinder will be measured. A lightweight (<2 lbs total) 7.5 meter brass chain will be used to assess rugosity by gently laying it along the contour of the seafloor and measuring its length. Also, a subjective rating of 1-10 of the habitat complexity will be assessed by the observers.

Water flow and bait plume advection: To characterize the spread and residence time of the bait olfactant used in Step 4, I will release a small quantity of fluorescein dye in the center of the transect, and collect 60mL water samples after 60 seconds in each of the 4 cardinal directions from the center. These samples will be used for later spectrophotometric analysis of the reduction of the dye's concentration. I will also record the time until complete visual extinction of the dye. Fluorescein dye is a commonly used tracing dye that degrades in sunlight (Field et al. 1995), and its use has been previously permitted within the Monument (permit #PMNM-2015-05). Fluorescein dye is often compared to table salt in terms of its (non)toxicity, and no more than 70 g total of fluorescein disodium salt will be used. In addition to fluorescein dye, I will deploy an acoustic doppler current profiler (ADCP) to measure the direction and velocity of the water column. The ADCP is attached to a weighted frame with a rope and buoy for surface retrieval. The ADCP and its frame will be deployed in sand substrate within 10m of the transect at the beginning of the survey and retrieved upon completion of the survey.

Step 4.) Baited transect

Three baited cameras (each with an attached rope and small floating buoy, for retrieval) will be lowered onto the seafloor, positioned at thirds of the perimeter of the cylindrical transect. The baited camera consists of a GoPro attached to a small PVC frame (approximate dimensions: 24" x 16" x 14") with an attached baitbox (containing 400g of chopped mackerel) and 2 lb weight. In addition, 11 delayed-release chum packets will be deployed on the seafloor inside of the transect. The chum is made from a standardized recipe of 800g of frozen mackerel blended with seawater. The chum is poured into and then wrapped inside of kalo (taro) leaves and ti leaves. These chum packets will be stored in the -40C freezer on the ship. The function of these chum packets is to deliver chum to the seafloor (and not sea surface) within area of the transect. The eels become active upon detecting the chum odor, and then congregate at the baited cameras where their identity and size will be documented by the camera. Because it takes some time for the chum olfactant to permeate reef crevices, and for the eels to become active during the daytime, this part of the survey will last for 40 minutes duration. For safety, no divers will be present in the water while chum or bait is present in the water. Thus, all deployed equipment will be retrieved (via buoy and rope) from the water surface by boat upon completion of the survey.

Project safety:

The safety precautions of this project involving moray eels and fish chum/bait have been extensively considered in its planning and execution. Moray eels can be dangerous, as could sharks or other marine creatures attracted by a bait plume. For this reason, divers never pursue or handle moray eels, and no divers will be immersed in the water during nor after chum or bait has been released. All divers will wear wetsuits and Kevlar gloves, and carry underwater whistles (to alert others of potential danger) with them at all times.

NOTE: If land or marine archeological activities are involved, contact the Monument Permit Coordinator at the address on the general application form before proceeding, as a customized application will be needed. For more information, contact the Monument office on the first page of this application.

9a. Collection of specimens - collecting activities (would apply to any activity): organisms or objects (List of species, if applicable, attach additional sheets if necessary):

Common name:

No living specimens will be collected. Only water samples (<25 gallons total) will be collected for later spectrophotometry analysis.

Scientific name:

N/A

& size of specimens:

N/A

Collection location:

Water samples will be collected from each survey site.

Whole Organism Partial Organism

9b. What will be done with the specimens after the project has ended?

Water samples will be properly disposed of, following chemical lab safety protocols.

9c. Will the organisms be kept alive after collection? Yes No

N/A

• General site/location for collections:

Shallow reef habitats of 10 - 60 ft in water depth

• Is it an open or closed system? Open Closed

N/A

• Is there an outfall? Yes No
N/A

• Will these organisms be housed with other organisms? If so, what are the other organisms?
N/A

• Will organisms be released?
N/A

10. If applicable, how will the collected samples or specimens be transported out of the Monument?

Water samples will be stored in a refrigerator onboard and then carried off of the vessel in a cooler.

11. Describe collaborative activities to share samples, reduce duplicative sampling, or duplicative research:

This project has been presented and discussed at local scientific conferences, and we have actively searched for other researchers who may be conducting Hawaiian eel population studies. We are collaborating with scientists at NOAA-CRED to ensure that these eel-focused surveys are complementary to their ongoing work. We are fully willing to share our data and in-situ videos with NOAA-CRED scientists, as well as other scientists who may express interest, given appropriate Monument approval.

12a. List all specialized gear and materials to be used in this activity:

- Standard open-circuit SCUBA and snorkeling equipment
- Underwater flashlights
- Dive slates
- Hand-held GPS device (kept on small boat)
- Transect tape
- 7.5 meters of thin, lightweight brass chain
- Fluorescein dye (fluorescein disodium salt, >75g total)
- Vials for water sampling
- Acoustic doppler current profiler (ADCP) attached to a weighted frame with a rope and buoy for surface retrieval. Approximate dimensions: 60cm x 30cm x 30cm
- 3 baited cameras: Each consists of a GoPro attached to a PVC frame (approximate dimensions: 24" x 16" x 14"). The frame has an attached rope with a buoy on the end of the rope (for retrieval from boat). Also attached to the frame is a 12" x 4" baitbox, which will contain 400g of chopped mackerel.
- Leaf-wrapped packets of chum to be dropped on the seafloor: The chum is made of 800g of mackerel that has been blended with 1 cup of seawater to produce a liquidlike consistency. This chum is then poured into 2 large taro leaves, which is then wrapped inside of 2 ti leaves and frozen. In this manner, chum is delivered to the seafloor by plant-based materials that harmlessly and rapidly degrade. For safety purposes, divers do not enter the water after chum has been

released; hence, an environmentally-friendly non-retrievable method of chum delivery had to be devised. All bait, chum, and plant materials are frozen for weeks prior to their deployment.

12b. List all Hazardous Materials you propose to take to and use within the Monument:
No hazardous materials will be brought or used.

13. Describe any fixed installations and instrumentation proposed to be set in the Monument:

An ACDP will be deployed on a sand patch near our survey transect for only the duration of the survey. Three baited cameras will be deployed temporarily (approximately 40 minutes) on the seafloor on patches of sand, pavement, non-living coral, or rubble. A transect tape and a 7.5 meter long lightweight, brass chain will briefly and non-destructively be draped along the seafloor.

14. Provide a time line for sample analysis, data analysis, write-up and publication of information:

Video analysis, data analysis, and write-up and publication of results in a peer-reviewed journal will be completed within 1-3 years of the cruise. The results of our study will be made available to Monument managers and staff as rapidly as possible (within a year). These results will also be publicly disseminated at local and international scientific conferences, as well as at the Hanauma Bay seminar series.

15. List all Applicants' publications directly related to the proposed project:

Because this is a new project, we do not yet have publications from this project (though see citation for a public oral presentation of this project below). Please see attached CVs for other publications that are not directly related to this project.

Zill, J. 2015. "Mesopredator release: moray eels inconspicuously predominate heavily fished reefs". 40th Univ. of Hawaii Albert L. Tester Symposium, Honolulu, HI. Apr 8-10. Oral presentation.

Literature cited:

Ayotte, P.M., McCoy, K.S., Williams, I.D., Zamzow, J.P. 2011. Coral Reef Ecosystem Division standard operating procedures: data collection for Rapid Ecological Assessment fish surveys. [Internet]. Pacific Islands Fisheries Science Center. p. 24 p. Available: http://www.pifsc.noaa.gov/library/pubs/admin/PIFSC_Admin_Rep_11-08.pdf.

DeMello, J. 2004. Commercial marine landings from fisheries on the coral reef ecosystem of the Hawaiian Archipelago. In: Proc. of American Fisheries Society Symp: 160-173.

Gilbert, M., J. Rasmussen, and D. Kramer. 2005. Estimating the density and biomass of moray eels (Muraenidae) using a modified visual census method for hole-dwelling reef fauna. *Env. Bio. Fishes* 73(4): 415-426.

Field, M.S., Wilhelm, R.G., Quinlan, J.F. and Aley, T.J., 1995. An assessment of the potential adverse properties of fluorescent tracer dyes used for groundwater tracing. *Environmental Monitoring and Assessment*, 38(1), pp.75-96.

Friedlander, A., and E. DeMartini. 2002. Contrasts in Density, Size, and Biomass of Reef Fishes between the Northwestern and the Main Hawaiian Islands: The Effects of Fishing Down Apex Predators. *Mar Eco Prog Ser* 230: 253-264.

Kittinger, J.N., Teneva, L.T., Koike, H., Stamoulis, K.A., Kittinger, D.S., Oleson, K.L., Conklin, E., Gomes, M., Wilcox, B. and Friedlander, A.M. 2015. From reef to table: Social and ecological factors affecting coral reef fisheries, artisanal seafood supply chains, and seafood security. *PloS one*, 10(8), p.e0123856.

Parrish, J., J. Norris, M. Callahan, J. Callahan, E. Magarifuji, and R. Schroeder. 1986. Piscivory in a coral reef fish community. In: *Contemporary studies on fish feeding, vol 7*. Junk, Dordrecht, The Netherlands: 285–297.

Meyer, C. G. 2007. The impacts of spear and other recreational fishers on a small permanent marine protected area and adjacent pulse fished area. *Fisheries Research*, 84(3), 301-307.

Pauly, D., V. Christensen, J. Dalsgaard, R. Froese, and F. Torres. 1998. Fishing down marine food webs. *Science* 279(5352): 860-863.

Prugh, L., C. Stoner, C. Epps, W. Ripple, A. Laliberte, and J. Brashares. 2009. The Rise of the Mesopredator. *BioScience* 59(9): 779-791.

Williams, I., W. Walsh, R. Schroeder, A. Friedlander, B. Richards, and K. Stamoulis. 2008. Assessing the importance of fishing impacts on Hawaiian coral reef fish assemblages along regional-scale human population gradients. *Environmental Conservation* 35(3): 261-272.

With knowledge of the penalties for false or incomplete statements, as provided by 18 U.S.C. 1001, and for perjury, as provided by 18 U.S.C. 1621, I hereby certify to the best of my abilities under penalty of perjury of that the information I have provided on this application form is true and correct. I agree that the Co-Trustees may post this application in its entirety on the Internet. I understand that the Co-Trustees will consider deleting all information that I have identified as "confidential" prior to posting the application.

Megan J. Dowling
Signature _____ Date 2/9/16

SEND ONE SIGNED APPLICATION VIA MAIL TO THE MONUMENT OFFICE BELOW:

NOAA/Inouye Regional Center
NOS/ONMS/PMNM/Attn: Permit Coordinator
1845 Wasp Blvd, Building 176
Honolulu, HI 96818
FAX: (808) 455-3093

DID YOU INCLUDE THESE?

- Applicant CV/Resume/Biography
- Intended field Principal Investigator CV/Resume/Biography
- Electronic and Hard Copy of Application with Signature
- Statement of information you wish to be kept confidential
- Material Safety Data Sheets for Hazardous Materials

Papahānaumokuākea Marine National Monument Compliance Information Sheet

1. Updated list of personnel to be covered by permit. List all personnel names and their roles here (e.g. John Doe, Diver; Jane Doe, Field Technician, Jerry Doe, Medical Assistant):

Julie Zill, Field PI, Diver
TBD, Diver

2. Specific Site Location(s): (Attach copies of specific collection locations): See question 3, below.

3. Other permits (list and attach documentation of all other related Federal or State permits): Our sampling locations depend entirely on cruise logistics. Therefore, we request flexibility to visit sites throughout PMNM, which are encompassed in the coordinates below; all sites will be 20m or less in depth.

Island/Atoll	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
Kure	-178.1970649	28.55825236
Kure	-178.1962359	28.29958376
Kure	-178.4598788	28.29958376
Kure	-178.4607079	28.55742329
Midway	-177.1963822	28.3741997
Midway	-177.1972113	28.13377055
Midway	-177.5280086	28.13459962
Midway	-177.5280086	28.3741997
PHR	-176.0885098	28.04643026
PHR	-175.6328916	28.04539945
PHR	-175.6328916	27.70729364
PHR	-176.0895406	27.70626283
Lisianski	-173.6729257	26.25150771
Lisianski	-173.6729257	25.83942708
Lisianski	-174.2309516	25.83942708
Lisianski	-174.2309516	26.25150771
Laysan	-171.4790012	25.9602718
Laysan	-171.4772523	25.65596666
Laysan	-171.9791809	25.65771554

Laysan -171.9791809 25.96202068
Maro -170.1813322 25.69968867
Maro -170.1795833 25.21524889
Maro -171.0050547 25.21524889
Maro -171.0050547 25.69968867
Gardner -167.7483232 25.26070709
Gardner -167.7508705 24.34878019
Gardner -168.3622181 24.35132747
Gardner -168.3647654 25.26070709
FFS -165.9346585 23.94630966
FFS -165.9346585 23.56421738
FFS -166.4568513 23.56421738
FFS -166.4568513 23.94630966

3a. For each of the permits listed, identify any permit violations or any permit that was suspended, amended, modified or revoked for cause. Explain the circumstances surrounding the violation or permit suspension, amendment, modification or revocation.

NA

4. Funding sources (Attach copies of your budget, specific to proposed activities under this permit and include funding sources. See instructions for more information): This project is part of Julie Zill's thesis research. The Donahue lab already has all of the minor equipment necessary for the project. Julie is an NSF Graduate Research Fellow, so her time is being supported on that fellowship.

5. Time frame:

Activity start: May 22, 2016
Activity completion: October 31, 2016

Dates actively inside the Monument:

From: May 22, 2016
To: June 15, 2016

Describe any limiting factors in declaring specific dates of the proposed activity at the time of application: These dates assume that we will participate on the PMNM Mesophotic cruise from May 22- June 15..

Personnel schedule in the Monument: Julie Zill (Field PI, Diver) will participate in all permitted activities. She will be working the other four divers listed to complete the research activities; these four divers are also scheduled to participate in the mesophotic cruise.

6. Indicate (with attached documentation) what insurance policies, bonding coverage, and/or financial resources are in place to pay for or reimburse the Monument trustees for the necessary search and rescue, evacuation, and/or removal of any or all persons covered by the permit from the Monument: All divers are requested to carry DAN insurance in addition to UH Worker's Compensation that will cover any diving related injury or an accident that occurs while on a diving research cruise.

7. Check the appropriate box to indicate how personnel will enter the Monument:

- Vessel
 Aircraft

Provide Vessel and Aircraft information: NOAA R/V Hi'ialakai

8. The certifications/inspections (below) must be completed prior to departure for vessels (and associated tenders) entering the Monument. Fill in scheduled date (attach documentation):

- Rodent free, Date:
 Tender vessel, Date:
 Ballast water, Date:
 Gear/equipment, Date:
 Hull inspection, Date:

9. Vessel information (NOTE: if you are traveling aboard a National Oceanic and Atmospheric Administration vessel, skip this question):

Vessel name:
Vessel owner:
Captain's name:
IMO#:
Vessel ID#:
Flag:
Vessel type:
Call sign:
Embarkation port:

Last port vessel will have been at prior to this embarkation:

Length:

Gross tonnage:

Total ballast water capacity volume (m3):

Total number of ballast water tanks on ship:

Total fuel capacity:

Total number of fuel tanks on ship:

Marine Sanitation Device:

Type:

Explain in detail how you will comply with the regulations regarding discharge in the Monument. Describe in detail. If applicable, attach schematics of the vessel's discharge and treatment systems:

Other fuel/hazardous materials to be carried on board and amounts:

Provide proof of a National Oceanic and Atmospheric Administration (NOAA) Office of Law Enforcement-approved Vessel Monitoring System (VMS). Provide the name and contact information of the contractor responsible for installing the VMS system. Also describe VMS unit name and type:

VMS Email:

Inmarsat ID#:

* Individuals MUST ENSURE that a type-approved VMS unit is installed and that its automatic position reports are being properly received by the NOAA OLE system prior to the issuance of a permit. To make sure your VMS is properly configured for the NOAA OLE system, please contact NOAA OLE at (808) 203-2503 or (808) 203-2500.

* PERMITS WILL NOT BE ISSUED TO INDIVIDUALS ENTERING THE MONUMENT VIA VESSEL UNTIL NOAA OLE HAS CONTACTED THE MONUMENT PERMIT COORDINATOR WITH A 'POSITIVE CHECK' READING.

10. Tender information:

On what workboats (tenders) will personnel, gear and materials be transported within the Monument? List the number of tenders/skiffs aboard and specific types of motors:

Additional Information for Land Based Operations

11. Proposed movement of personnel, gear, materials, and, if applicable, samples:

NA

12. Room and board requirements on island: NA

13. Work space needs: NA

DID YOU INCLUDE THESE?

- Map(s) or GPS point(s) of Project Location(s), if applicable
- Funding Proposal(s)
- Funding and Award Documentation, if already received
- Documentation of Insurance, if already received
- Documentation of Inspections
- Documentation of all required Federal and State Permits or applications for permits

DAVID Y. IGE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

May 13, 2016

TO: Division of Aquatic Resources File

THROUGH: Suzanne D. Case, Chairperson

FROM: Maria Carnevale
Papahānaumokuākea Marine National Monument

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKO A KALUHIWA
FIRST DEPUTY

JEFFREY PEARSON
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHO'OLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS AND CHAPTER 11-200 HAR, FOR PAPAHA NAUMOKU A KEA MARINE NATIONAL MONUMENT RESEARCH PERMIT TO DR. MEGAN DONAHUE, HAWAII I INSTITUTE OF MARINE BIOLOGY, UNIVERSITY OF HAWAII I, FOR ACCESS TO STATE WATERS TO CONDUCT ACTIVITIES FOR THE CHARACTERIZATION OF MORAY EEL POPULATION DENSITIES UNDER PERMIT PMNM-2016-014.

The following permitted activities are found to be exempted from preparation of an environmental assessment under the authority of Chapter 343, HRS and Chapter 11-200, HAR:

Project Title:

Papahānaumokuākea Marine National Monument Research Permit to Dr. Megan Donahue, Associate Professor, Hawaii'i Institute of Marine Biology, University of Hawaii'i, for Access to State Waters to Conduct Activities for the Characterization of Moray Eel Population Densities.

Permit Number: PMNM-2016-014

Project Description:

The research permit, as described below, would allow entry and activities to occur in Papahānaumokuākea Marine National Monument (Monument), including the NWHI State waters from May 22, 2016 through May 21, 2016.

The Applicant would conduct research activities to create a baseline estimate for moray eel biomass density in the Monument. Up to two individuals would conduct activities while on a research cruise on a separately permitted vessel. Activities would consist of temporarily placing materials on submerged lands; discharging chum into the Monument; touching living or dead coral; attracting Monument resources; and swimming, snorkeling and SCUBA diving to support research activities. This activity would benefit the Monument by providing managers with data on the biomass and species richness of moray eel populations in the Monument. The activity would directly support the

Monument Management Plan (MMP), Marine Conservation Science Action Plan, Activity MCS 1.2 – Continue monitoring of shallow-water coral reef ecosystems to protect ecological integrity. (PMNM MMP Vol. I, p. 123, 2008).

The proposed activities are in direct support of the Monument Management Plan's priority management needs 3.1 – Understanding and Interpreting the NWHI (through action plan 3.1.1 Marine Conservation Science). This action plan specifies to “marine research, characterization, and monitoring designed to support an ecosystem-based approach to protection and management” (Activity MCS-1.2: Continue monitoring of shallow-water coral reef ecosystems to protect ecological integrity, PMNM MMP Vol 1, p. 123). It also notes that monitoring data can help scientists understand causes of change. Activities to support marine conservation science, including community composition and change studies such as those to be carried out by the permittee, are also addressed in the Monument Management Plan (MMP) Environmental Assessment (EA) (FONSI, December 2008). This EA summarizes that understanding the populations change could be helpful to forecast, prepare for and mediate potential threats to populations within the Monument (PMNM MMP Vol 2, p. 171).

Consulted Parties:

The permit application was sent out for review and comment to the following scientific and cultural entities: Hawai'i Division of Aquatic Resources, Hawai'i Division of Forestry and Wildlife, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), United States Fish and Wildlife Service Hawaiian and Pacific Islands National Wildlife Refuge Complex Office, the Office of Hawaiian Affairs (OHA) and the PMNM Native Hawaiian Cultural Working Group. In addition, the permit application has been posted on the Monument Web site since March 2, 2016 giving the public an opportunity to comment. The application was posted within 40 days of its receipt, in accordance with the Monument's Public Notification Policy.

Exemption Determination:

After reviewing HAR § 11-200-8, including the criteria used to determine significance under HAR § 11-200-12, DLNR has concluded that the activities under this permit would have minimal or no significant effect on the environment and that issuance of the permit is categorically exempt from the requirement to prepare an environmental assessment based on the following analysis:

1. All activities associated with this permit; including the measuring of bioeroder rates and community composition; have been evaluated as a single action. As a preliminary matter, multiple or phased actions, such as when a group of actions are part of a larger undertaking, or when an individual project is precedent to or represents a commitment to a larger project, must be grouped together and evaluated as a single action. HAR § 11-200-7. This permit may involve an activity that is precedent to a later planned activity, i.e. the continued characterization of moray eel population densities; the categorical exemption determination here will treat all planned activities as a single action.

2. The Exemption Class for Scientific Research with no Serious or Major Environmental Disturbance Appears to Apply. Chapter 343, HRS, and § 11-200-8, HAR, provide for a list of classes of actions exempt from environmental assessment requirements. HAR §11-200-8.A.5. exempts the class of actions which involve “basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource.” The proposed removal activities here appear to fall squarely under the exemption class #5, exempt item #2 as described under the Exemption List for the Department of Land and Natural Resources list published in June 5, 2015 as “non-destructive data collection and inventory, including field, aerial and satellite surveying and mapping.” This exemption class has been interpreted to include “surveys, new transect lines, recording, and sampling”, such as those being proposed. As discussed below, no significant disturbance to any environmental resource is anticipated in the moray eel population density and characterization studies. Thus, so long as the below considerations are met, an exemption class should include the action now contemplated.

To minimize the potential of disease introduction or transfer during field sampling and diving activities, the Applicant would follow Monument Best Management Practice (BMP) 011 – Disease and Introduced Species Prevention. For sample storage and transport, the applicant would follow Monument BMP 006 – General Storage and Transport Protocols for Collected Samples. The Applicant would also follow Monument BMP 004 – Boat Operations and Diving Activities to eliminate any adverse impacts of protected marine species during boating and diving activities.

3. Cumulative Impacts of Actions in the Same Place and Impacts with Respect to the Potentially Particularly Sensitive Environment Will Not be Significant. Even where a categorical exemption appears to include a proposed action, the action cannot be declared exempt if “the cumulative impact of planned successive actions in the same place, over time, is significant, or when an action that is normally insignificant in its impact on the environment may be significant in a particularly sensitive environment.” HAR § 11-200-8.B. To gauge whether a significant impact or effect is probable, an exempting agency must consider every phase of a proposed action, any expected primary and secondary consequences, the long-term and short-term effects of the action, the overall and cumulative effect of the action, and the sum effects of an action on the quality of the environment. HAR § 11-200-12. Examples of actions which commonly have a significant effect on the environment are listed under HAR § 11-200-12.

Although this study of eel biomass in PMNM is new, the Applicant’s methodologies such as transect surveys and water sampling have been used in the Monument before, with no deleterious impacts. With this in mind, significant cumulative impacts are not anticipated as a result of this activity, and numerous safeguards further ensure that the potentially sensitive environment of the project area will not be significantly affected. All activities will be conducted in a manner compatible with the management direction of the Monument Proclamation in that activities do not diminish Monument resources, qualities, and ecological integrity, or have any indirect, secondary, cultural, or cumulative effects. The joint permit review process did not reveal any anticipated indirect or cumulative impacts, nor did it raise any cultural concerns, that would occur as a result of these activities. The cultural review revealed that eels are well-documented in Hawaiian literature

and the Applicant will utilize these resources, along with the contacts provided by OHA, to further enrich this project.

The proposed project would be supported by the NOAA ship R/V HI'IALAKAI (PMNM-2016-006), from May 22 – June 15, 2016. Table 1. lists approved activities taking place aboard the HI'IALAKAI. Table 2. lists additional activities that are anticipated to take place concurrently within the Monument, both approved and pending.

Table 1. Concurrent Projects Aboard NOAA SHIP HI'IALAKAI

Permit	Purpose and Scope	Location
PMNM-2016-006 NOAA Ship HI'IALAKAI	The permit allows NOAA Ship HI'IALAKAI entry into PMNM. Personnel aboard the vessel will be permitted under separate permits.	All locations
PMNM-2016-001 Co-Trustees' Permit	Activities covered under the Co-Trustees' permit will also be taking place in PMNM during spring 2016 (i.e. deployment of restoration field crews, monk seal camps, etc).	All locations
PMNM-2016-016 Pearce (proposed)	The Applicant would be shadowing researchers in their activities and documenting the environment of PMNM through writing and photography for the publication of an article in Hana Hou! The Magazine of Hawaiian Airlines.	French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Atoll, Midway Atoll, Kure Atoll

Table 2. Concurrent Projects in PMNM

Permit	Purpose and Scope	Location
PMNM-2016-001 M/V SEARCHER (approved)	The permit allows NOAA Ship M/V SEARCHER entry into PMNM. Personnel aboard the vessel will be permitted under separate permits.	All locations
PMNM-2015-017-A1 Springer (approved) M/V SEARCHER	The Applicant will be using traditional ecological knowledge to examine intertidal ecosystems activities.	Nihoa, Mokumanamana, Gardner Pinnacles, French Frigate Shoals
PMNM-2015-026-A1 Bird-Toonen (approved) M/V SEARCHER	The Applicant will be conducting intertidal biodiversity survey activities.	Nihoa, Mokumanamana, Gardner Pinnacles, French Frigate Shoals

Permit	Purpose and Scope	Location
PMNM-2016-008 Parrish-Garrett (approved)	The Applicants will be conducting shark removal activities in order to benefit Hawaiian monk seal populations.	French Frigate Shoals
PMNM-2016-011 Surgent (approved)	The Applicant will be using photography, A/V recordings, and marine debris collections, to document her work with the Hawaiian Monk Seal Research Project to create a body of artwork about PMNM.	French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Atoll, Midway Atoll, Kure Atoll
PMNM-2016-009 Kahapea-Tanner (proposed) SSV MAKANI OLU	The Applicant would be documenting the activities of the Ola I Ke Au a Kanaloa Voyage through photography and filming for education, outreach, and fundraising purposes.	Nihoa Island, Mokumanamana
PMNM-2016-010 Kahapea-Tanner (proposed) SSV MAKANI OLU	The Applicant would be leading a group of Native Hawaiian Youth in the use of traditional seafaring methods and Native Hawaiian cultural practices.	Nihoa Island, Mokumanamana

The culmination of these permits, and their disparate activities, occurring throughout the Monument, is not anticipated to have significant cumulative impacts. The M/V SEARCHER is also expected to be in the Monument during this time frame facilitating the intertidal biodiversity cruise with approved activities by Springer (PMNM-2015-017-A1), Bird-Toonen (PMNM-2015-026-A1). Rubinoff (PMNM-2016-018) is also proposing to conduct moth research activities from the M/V SEARCHER. The Applicant's proposed research activities will have neither spatial overlap, nor any overlap of target species, with other research activities occurring in the Monument within the same time period. This project is currently the only research activity proposed to take place in shallow reef areas (0-60 ft. depth), whereas other proposed and recently permitted research activities would take place in the intertidal zone and terrestrial areas.

Since no significant cumulative impacts or significant impacts with respect to any particularly sensitive aspect of the project area are anticipated, the categorical exemptions identified above should remain applicable.

4. Overall Impacts will Probably be Minimal and Insignificant Any foreseeable impacts from the proposed activity will probably be minimal, and further mitigated by general and specific conditions attached to the permit. Specifically, all conservation and management activities covered by this permit will be carried out with strict safeguards for the natural, historic, and cultural resources of the Monument as required by Presidential Proclamation 8031, other applicable law and agency policies and standard operating procedures.

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Conclusion. Upon consideration of the permit to be approved by the Board of Land and Natural Resources, the potential effects of the above listed project as provided by Chapter 343, HRS and Chapter 11-200 HAR, have been determined to be of probable minimal or no significant effect on the environment and exempt from the preparation of an environmental assessment.

Suzanne D. Case
Board of Land and Natural Resources

Date