

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: Dr. Nicole Raineault

Affiliation: Ocean Exploration Trust

Permit Category: Research

Proposed Activity Dates: September 10 to October 15 2018

Proposed Method of Entry (Vessel/Plane): Vessel

Proposed Locations: Naifeh seamount and 9 un-named seamounts located within the expansion area north of Gardner Pinnacles and Necker Island.

Estimated number of individuals (including Applicant) to be covered under this permit:
48 total (31 science and operations, 17 ship's crew)

Estimated number of days in the Monument: 18

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...

This oceanographic expedition will involve mapping and subsequent remotely operated vehicle (ROV) dives on enigmatic seamounts located in a poorly explored area of the Papahānaumokuākea Marine National Monument (PMNM). The objectives are to determine how and when these seamounts formed and to document the biological communities that presently live on them. Mapping data and rocks collected during the dives will be used to test the hypothesis that these seamounts were formed by the poorly understood process of arch volcanism. This hypothesis was developed as a result of their enigmatic location and lineation which is parallel to the Hawaiian ridge. The seamounts are located between the Musicians seamounts and the Hawaiian ridge and may be important to the connectivity between these two areas. The ROV dives will survey these seamounts for the present of deep high density coral and sponge communities similar to those found in the Musicians and on rift zone ridges on some of the Hawaiian banks. Finally, the transits between PMNM and Honolulu provide the opportunity to explore commercially important fisheries habitats located on Middle Bank and Kaula Rock.

b.) To accomplish this activity we would

Use the Exploration Vessel (E/V) *Nautilus* and team of scientists, engineers, and educators to explore these areas. The first step in most cases is to use the ship's EM302 30 kHz multibeam echosounder and 3.5 kHz sub-bottom profiler to map the seamounts and other unmapped areas of seafloor. Next we would use the two 4000 m-rated ROVs to explore the seamounts. The ROVs are equipped with high definition video cameras, lights, a CTD and O2 sensor, and sampling devices. Representative biological and geological samples be taken with the ROV manipulator or suction (slurp) tool. Water samples (niskins) will be used for chemical and eDNA analyses.

In addition, the ROV cruises will likely provide tremendous education and outreach opportunities for PMNM. Due to high-speed ship-to-shore satellite communications, anyone with an internet connection will be able to watch the ROV video, listen to the scientific dialogue, and ask questions that the shipboard team will answer in real time.

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

This project has a very important primary science objective, which is to determine if these seamounts could have formed from the poorly understood process of arch volcanism. If our hypothesis is correct, these seamounts will be the second known location where this process has occurred. How it took place here will likely be different than that found in the main Hawaiian Islands, where it did not result in the formation of large volcanoes. The Central and Western Pacific have a huge number of seamounts, whose origin and distribution are extremely complex. Furthering the understanding of a poorly known volcanic process will provide a significant contribution toward solving this enormous puzzle since arch volcanism likely occurred elsewhere from the Hawaiian Islands but the sites simply haven't been recognized to date.

This project also has applied science objectives that are consistent with a number of NOAA Mission priorities. NOAA's long-term Healthy Oceans goal requires studies that will improve our understanding of ocean ecosystems in order to develop management measures to ensure sustainability in the face of both human and climate change impacts. The majority of the dives and mapping conducted during this project will take place within the poorly explored expansion area of the Papahānaumokuākea Marine National Monument (PMNM). The findings from the project will have direct and immediate benefit to monument staff in informing their efforts to protect deepwater habitats in the central Pacific. Furthermore, this study expands on the findings of the 3-year NOAA CAPSTONE project of the existence of large-scale high-density coral and sponge communities throughout the Central and Western Pacific. These communities each have a unique composition of species and support a very large number of associated invertebrates. Even though a modest number of these communities were discovered, how and where they form is still poorly understood.

The discovery and characterization of more of these unique communities will address this priority and is also consistent with another of the NOAA Mission Priorities: the improved understanding of ecosystems to inform resource management decisions. What is known about these communities is that many are located in the Prime Crust Zone (PCZ) and on Mn-crust substrate at depths that will be targeted by the deep-sea mining industry in the near future. It is imperative to gain a much better understanding of these communities prior to the onset of

commercial mining activities in order to ensure well informed management decisions can be made. The discovery of more of these communities within PMNM provides valuable information on the resources the monument is protecting, and furthermore provide proxy data on unprotected and vulnerable Mn crust communities throughout the Pacific.

Other information or background:

Ocean Exploration Trust, a non-profit organization, owns and operates the E/V *Nautilus*. We have been conducting scientific exploration of the world's oceans since 2009, while also focusing on using the latest technologies to enhance our exploration and communication efficiencies. A third part of our mission is to conduct extensive outreach and educational opportunities on each cruise through our *NautilusLive.org* website and student interns who sail as part of the team. This cruise is funded by the NOAA Office of Ocean Exploration and Research.