

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:

Papahānaumokuākea Marine National Monument Permit Coordinator
6600 Kalaniana'ole Hwy. # 300
Honolulu, HI 96825
nwhipermit@noaa.gov
PHONE: (808) 397-2660 FAX: (808) 397-2662

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: Kelley Elliott

Affiliation: NOAA Office of Ocean Exploration and Research (OER)

Permit Category: Research

Proposed Activity Dates: July 1 through September 30, 2015. At the present time, four cruises are tentatively scheduled for the Hawaii/Johnston Atoll area: July 3 - July 24; July 31 - August 22; August 28 - September 3; and September 7 - September 30, 2015. These exact dates may shift slightly, but within the July - September timeframe.

Proposed Method of Entry (Vessel/Plane): Vessel, NOAA Ship Okeanos Explorer

Proposed Locations:

Cruise 1 (multibeam mapping): Waters deeper than 250 m around Middle Bank, Nihoa, Westpac Bank, Twin Banks, Keoia Seamount, Necker, and French Frigate Shoals.

Cruises 2 & 4 (multibeam mapping and ROV): Potential mapping and dive sites include waters deeper than 250 m around Middle Bank, Nihoa, Westpac Bank, Twin Banks, Keoia Seamount, Necker, French Frigate Shoals, Rogatien Banks (all), Gardner Pinnacles, Maro Reef, Laysan, North Hampton Seamounts, Kaiuli Seamount, Pioneer Bank, Lisianski, Bank 9, Pearl & Hermes, Gambia Shoals, and 4 unnamed seamounts south and east of Pearl & Hermes.

Cruise 3 will not be within PMNM.

Estimated number of individuals (including Applicant) to be covered under this permit:
60 (20 rotating scientists/technicians on 3 expedition legs)

Estimated number of days in the Monument: 50

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...

1) conduct additional multibeam and single beam mapping in PMNM where gaps are present in the existing coverage, 2) deploy a remotely operated vehicle (the Deep Discoverer ROV) to investigate the diversity and composition of important high density

deepwater communities in the monument, 3) use a sub-bottom profiler to obtain data to provide additional insight into the geologic history of PMNM's banks and seamounts, 4) conduct CTD casts at selected sites to collect water column data (i.e., temperature, salinity, dissolved oxygen, pCO₂, and sound velocity), 5) deploy expendable bathythermographs (XBTs) at sites selected each day to acquired sound velocity data for calibration of the multibeam sonars.

b.) To accomplish this activity we would
use NOAA Ship Okeanos Explorer (EX) as the platform for all of the above activities. The first of the three proposed cruises will involve multibeam sonar mapping between the eastern end of the monument at Middle Bank and the west side of Necker. This was not a focus area during the 2014 R/V Falkor cruises. Existing gaps in the 250-4000 m depth zone will be mapped using the EX's EM302 multibeam sonar, which is the same type of system used on the Falkor. The ship will map in this area for 6-8 days before exiting the monument south of Necker in transit to the Johnston Atoll Marine National Monument (PRIMNM).

The second and third cruises will involve the daily deployment of the Deep Discoverer ROV. Each ROV dive will be approximately 8 hrs long, followed by 16 hrs of transit to the next dive site. Multibeam sonar mapping will take place during the transits to continue to build upon previous mapping surveys. A split-beam sonar and subbottom profiler sonar are operated simultaneously with the multibeam. The multibeam is used to map broad swaths for bathymetry and water column feature detection (e.g. gaseous seeps), the split-beam gathers calibrated target strength measurements of biology in the water column and acts as a seafloor depth sounder, and the sub-bottom profiler provides data useful for interpreting sub-seafloor geology. During mapping operations, XBTs will be deployed every 4-6 hours (resulting in deployment of 106 to 218 XBTs total during the project period) or as needed to obtain accurate sound velocity profiles. The profiles are used to regularly re-calibrate the multibeam systems necessitated by constantly changing water column conditions. Routine re-calibration ensures accurate bathymetric data at every mapping site. ROV targets include seamount summits and flanks, rift zone ridges, drowned reef terraces, guyots (i.e., flat topped tablemounts), a submerged crater, submarine canyons, and other types of topography where high density deep water coral and sponge communities are likely to occur. All mapping and ROV work is proposed in water depths of 250m and deeper. CTD casts will also take place between ROV dives at selected sites where collecting the data is considered important to understanding the physical or chemical properties of the overlying water column.

ROV dives will be the primary focus of our operations within the monument. The purpose of many of the dives will be to investigate habitats identified during previous mapping expeditions (e.g. R/V Falkor, R/V Kilo Moana) where high density coral and sponge communities are likely to be present.

c.) This activity would help the Monument by ... taking the next major step in baseline characterization of deepwater areas within the monument. The acquisition of high-resolution seafloor mapping data is an essential precursor to making significant biological, geological, archaeological and oceanographic discoveries in the monument. To date, six dedicated mapping cruises have taken place in the monument (Kilo Moana 0206; Hi'ialakai 0501, 0508, and 0610; Falkor 140307,140502). The Falkor cruises were the first and only dedicated mapping expeditions since 2002. Though the Okeanos Explorer cruises will collect additional multibeam data to supplement previous work, the biggest benefit will be the high resolution video data collected with the ship's ROV systems. These dives will be the next step in a baseline habitat characterization and provide the first ever look at the deep water communities below 2,000 m. The dives will enable scientists and managers to have a better understanding of the diversity and distribution of deepwater habitats. We intend a subset of dives to occur adjacent to areas previously surveyed during submersibles, ROVs, and technical diving studies. Combining the datasets will allow a greater understanding of the vertical distribution of biota.

These data are both expensive and difficult to acquire in remote regions such as PMNM. A large research vessel and ROV generally cost ~\$42,000/day. The estimated cost of all three cruises is slightly under \$2 million. While a final decision has not been reached regarding the exact allotment of ship days between PMNM and JAMNM, a significant portion will be spent within PMNM, at a minimum cost to the monument. 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 and listen to the scientific dialogue in real time.

Other information or background:

The exploration involves non-invasive sonar and ROV surveys. To date, our office has a no physical sampling policy associated with ROV operations. However, due to high interest by several NOAA and academic scientists and managers, we request the permit include a provision to collect a small number of rock samples and biological voucher specimens at specific locations using the ROV manipulator. Okeanos Explorer is equipped with an EM302 multibeam sonar, EK60 single beam sonar, and Knudsen 3260 sub-bottom profiler. This is the same multibeam sonar that the R/V Falkor used in the monument last spring, and the same single beam sonar on NOAA Ship Oscar Elton Sette.

In addition, more details for each cruise is provided below:

- EX1504 Leg I – CAPSTONE NWHI & Johnston Exploration (7/3 – 7/24): Mapping cruise to address remaining priority areas in PMNM, and the majority of work in the vicinity of Johnston Atoll PRIMNM.

- EX1504 Leg II – CAPSTONE NWHI Exploration (7/31 – 8/22): A telepresence-enabled ROV cruise with full shore-based science participation focused on priority targets within PMNM.
- EX1504 Leg III - CAPSTONE Main Hawaiian Islands and Shepherd Seamount (8/28 - 9/3): Seven day NMFS supported telepresence-enabled ROV cruise with shore-based science participation around the Main Hawaiian Islands and Geologists Seamounts. We do not plan to work in PMNM during this cruise.
- EX1504 Leg IV – CAPSTONE NWHI & Johnston Exploration (9/7 – 9/30): A telepresence-enabled ROV cruise with full shore-based science participation. Conduct dives during transit into PMNM then move south to vicinity of Johnston Atoll PRIMNM. Significant ROV work will be conducted around Johnston before working back to Honolulu through PMNM.