

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

May 22, 2015

Board of Land and Natural Resources
Honolulu, Hawai'i

Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National Monument Research Permit to Kelley Elliott, NOAA Office of Ocean Exploration and Research, for Access to State Waters to Conduct Bathymetric Mapping Activities

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 Kelley Elliott, NOAA Office of Ocean Exploration and Research, 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 including the NWHI State Marine Refuge and the waters (0-3 nautical miles) surrounding the following sites:

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

The activities covered under this permit would occur between July 1, 2015 and June 30, 2016.

The Applicant and the proposed activities are a renewal of work previously permitted and conducted in the Monument. Though the Applicant for this permit is new, the P.I., Christopher Kelley, has conducted similar activities in the Monument in 2009, 2013, and 2014.

INTENDED ACTIVITIES

The primary purpose of the proposed project is to map the seafloor (i.e. produce bathymetric maps) of the Monument using multibeam and single beam sonar as well as utilize the Deep Discoverer ROV (Remote Operated Vehicle) in areas deeper than 250m. The ROV will target seamount summits and flanks, rift zone ridges, drowned reef terraces, 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. The Applicant will attempt to map presently unmapped portions of the seafloor including a focus on the eastern end of the monument at Middle Bank and the west end of Mokumanamana. This area was 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.

Understanding the topography of these areas is an important precursor to making significant biological, geological, and oceanographic discoveries in the Monument. These data would directly contribute to the generation of bathymetric maps to be used by other researchers in addition to providing high resolution video data collected through the ship's ROV systems. Examples of other research these data would be useful for include: physical oceanographic modeling of internal tides, investigations into reef evolution, subsistence and sea level changes using fossil reef terraces, identification of geologic features such as seamounts and rift zone ridges, and deciphering the geologic mechanism for the formation of islands.

Once collected, these data would be merged with existing bathymetric mapping data to create an updated synthesis of the seafloor in the Monument available through a variety of web venues.

Vessel support for the proposed activities would be from the NOAA Ship OKEANOS EXPLORER (Application currently in review, PMNM-2014-025 for the Applicant Mark A. Wetzler). The activities would take place on three cruises (July 3 to June 24th, 2015; July 31 to August 22, 2015; and September 7 to September 30, 2015) for a total of fifty (50) days in the Monument. Up to sixty (60) individuals would be covered under this permit to perform these activities.

The proposed activities have been performed in both the Monument (in 2014, via the R/V FALKOR) and marine sanctuaries prior to this permit application. No negative effects of instrumentation involved in the proposed bathymetric mapping activities have been observed. The project would take place in waters deeper than 250m around the locations listed.

The activities proposed by the Applicant directly support the Monument Management Plan's priority management need under the Marine Conservation Science Action Plan (MCS) Activity MCS-1.3: Map and characterize deep-water habitat (defined as waters more than 30 m depth).

All mapping and ROV operations are expected to be in depths of 250m and deeper, and will not include work within state waters. Permission to conduct CTD rosette operations in state waters is being requested.

In terms of collecting specimens, the Applicant requests to collect two (2) rocks and five (5) deepwater coral/sponges per dive site. Only biological specimens suspected of being new species or new records for Hawaiian waters will be targeted. Rocks will be analyzed to determine age and lava type to determine the late Cretaceous age of their collection sites. Coral and sponge specimens will be split between Bishop Museum and the Smithsonian to ensure access to multiple researchers

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, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), United States Fish and Wildlife Service Pacific Islands NW Refuge Complex Office, and the Office of Hawaiian Affairs (OHA). In addition, the permit application was posted on the Monument Web site on March 11, 2015 and the revised application was posted on March 16, 2015, 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:

The following concerns were raised. Applicant responses are noted below.

QUESTIONS:

1. *Who will have access to images taken? And can results be shared with the Papahānaumokuākea Native Hawaiian Cultural Working Group (CWG) and broader public?*

All underwater and topside images taken by the program will be made publicly available within 90 days of cruise completion. A subset of images and video will be publicly available online immediately during the course of the expedition from the expedition website hosted on <http://oceanexplorer.noaa.gov>. ANYONE, including the Papahānaumokuākea Native Hawaiian CWG and the broader public will be able to access these online.

2. *If new locations/areas of interest/new species are found, can they be included in the CWG nomenclature naming process?*

OER has never previously been involved in naming new feature, areas of interest, or species discovered during our operations. While we cannot make this a requirement for scientists who participate in our cruises because they participate

voluntarily, we will request and encourage all scientists and students who participate as volunteer members of the science team to adhere to the Papahānaumokuākea Native Hawaiian CWG naming process for any new species or features discovered. Furthermore, if we are made aware of scientists in the community looking to describe and name a new species or feature using data acquired during one of our cruises, we will inform them of the Papahānaumokuākea Native Hawaiian Cultural Working Group nomenclature naming process.

Thanks to telepresence, the activities conducted by Okeanos Explorer and live video from the ROV are open to the broad science community and general public online, so it is possible for discoveries to be made by scientists and others who are not funded by OER, who are not affiliated with our program, and who are not a part of our Expedition science team. The vast majority of scientists who participate in our expeditions are volunteers. Because they are volunteers and because all of the data is open and available to anyone, we cannot require scientists and others who have access to the data and real-time video from the ship to adhere to any specific naming process or convention.

COMMENTS:

1. *Overall, this permit was very thorough and detailed. They did also acknowledge the cultural sensitivity of PMNM and the potential impact to marine mammals, which appear to be low but possible. I do however, wonder of the impact from sonar mapping to other marine organisms.*

There is much less information available about the effects of sound on marine animals other than mammals. There is very little scientifically peer reviewed data on the effects of high intensity sounds on fish and invertebrates. The vast majority of fish species studied cannot hear sounds above 0.5-1.5 kHz, while it is thought that invertebrates don't hear sounds per se but rather detect the pressure detected by sound, typically at frequencies well below 3 kHz. Since our sonars will be emitting sound at much higher frequencies (3.5-60 kHz), we do not believe they will have any adverse effect on these other animals. We are not aware of any study demonstrating negative impacts on fish and invertebrates associated with the types of scientific sonars used on the Okeanos Explorer.

The available scientific evidence also suggests that any significant negative impacts of intense sounds on fish would be associated with exposure very close to the sound source and for longer durations. Since fish in the ocean can freely swim away from a survey ship, and the ship is passing through an area briefly, no negative impacts on fish and invertebrates should be reasonably expected from the work proposed in the permit.

2. *An MOA or MOU between this effort and Bishop Museum for handling or curating any opportunistic specimens would be good to see.*

The primary goal of the NOAA Office of Ocean Exploration and Research's Okeanos Explorer Program is to collect data and information in areas identified as priority by the broad ocean science community, and to make those data and information publicly accessible as soon as possible following a cruise in order to generate follow-on exploration, research and management activities. If samples are collected in the Papahānaumokuākea Monument, the goal of the office would be to curate them in a National repository. If feasible, a piece of a sample may be provided to the Bishop Museum for handling and curation. However, if only one specimen is available that cannot be sub-sampled, that specimen will be provided to the Smithsonian Institution in order to provide public access to as many researchers as possible. Let us know if an MOU/MOA is critical. Please keep in mind getting agreements through official NOAA clearance often takes months.

3. *Please confirm findings on consultation (mentioned in app) on negative impacts on protected species by the XBT deployments.*

Initiation of an ESA Section 7 informal consultation is underway to analyze the effects of proposed activities (including XBT deployments) within the Monument on protected species and designated monk seal critical habitat, and request concurrence from NMFS that proposed activities may affect but are not likely to adversely affect protected species and monk seal critical habitat. 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.

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

Cultural reviews support the acceptance of this application. No concerns were raised.

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.
- 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 conducting multi-beam mapping activities and

operating a gravimeter and magnetometer 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 PAPAHAŌNAUMOKUĀKEA MARINE NATIONAL MONUMENT RESEARCH PERMIT TO KELLEY ELLIOTT, NOAA OFFICE OF OCEAN EXPLORATION AND RESEARCH, FOR ACCESS TO STATE WATERS TO CONDUCT BATHYMETRIC MAPPING ACTIVITIES UNDER PERMIT PMNM-2015-018.”)

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

- Monument permits have been issued for sonar mapping activities since 2008. Past permits for similar activities include: Dr. Christopher Kelley, PMNM-2009-052 in 2009, Joyce Miller, PMNM-2008-001 in 2008, and Dr. James Gardner, PMNM-2011-013 in 2011.

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

PMNM staff is of the opinion that Applicant has properly demonstrated valid justifications for his application and should be allowed to enter the NWHI State waters and to 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 PMNM staff.

RECOMMENDATION


That the Board authorize and approve a Research Permit to Kelley Elliott, NOAA Office of Ocean Exploration and Research, with the following special conditions:

1. That the Board declare that the actions which are anticipated to be undertaken under this permit will have little or no significant effect on the environment and is therefore exempt from the preparation of an environmental assessment.
2. Upon the finding and adoption of the department's analysis by the Board, that the Board delegate and authorize the Chairperson to sign the declaration of exemption for purposes of recordkeeping requirements of chapter 343, HRS, and chapter 11-200, HAR.
3. Tenders and small vessels must be equipped with engines that meet EPA emissions requirements.
4. 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 Marine Refuge.
5. No fishing is allowed in State Waters except as authorized under State law for subsistence, traditional and customary practices by Native Hawaiians.
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.

Respectfully submitted,


Maria Carnevale
State Co-Manager
Papahānaumokuākea Marine National Monument

APPROVED FOR SUBMITTAL


Suzanne 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:

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.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Elliott, Kelley

Title: Field Operations Lead for NOAA Office of Ocean Exploration and Research (OER)

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

2. Mailing address (street/P.O. box, city, state, country, zip): Hawaii Undersea Research Laboratory, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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

3. Affiliation (institution/agency/organization directly related to the proposed project):
National Oceanic and Atmospheric Administration/Office of Oceanic and Atmospheric Research/ Office of Ocean Exploration and Research

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):

Kelley Elliott, Expedition Coordinator, Office of Ocean Exploration and Research (OER), [REDACTED]

Brian Kennedy, Expedition Coordinator, Office of Ocean Exploration and Research (OER), [REDACTED]

John McDonough, Expedition Coordinator, Office of Ocean Exploration and Research (OER), [REDACTED]

Jeremy Potter, Expedition Coordinator, Office of Ocean Exploration and Research (OER), [REDACTED]

Elizabeth "Meme" Lobecker, Multibeam mapping team, Office of Ocean Exploration and Research (OER), [REDACTED]

Derek Sowers, Multibeam mapping team, Office of Ocean Exploration and Research (OER), [REDACTED]

Lindsay McKenna, Multibeam mapping team, Office of Ocean Exploration and Research (OER), [REDACTED]

Multiple TBDs, Multibeam processing team

David Lovalvo, ROV Team Lead, Office of Ocean Exploration and Research (OER), [REDACTED]

Brian Bingham, ROV Engineer, University of Hawaii (UH), [REDACTED]

Multiple TBDs, ROV Engineers

Brendan Reser, Data Manager, Office of Ocean Exploration and Research (OER), [REDACTED]

Jared Drewniak, Telepresence Engineer, Office of Ocean Exploration and Research (OER), [REDACTED]

Daniel Wagner, Science Team, Papahānaumokuākea Marine National Monument (PMNM), [REDACTED]

Michael Parke, Science Team and Point of Contact for NMFS Science Priorities, Pacific Island Fisheries Science Center (PIFSC), [REDACTED]

Frank Parrish, Science Team, Pacific Island Fisheries Science Center (PIFSC), [REDACTED]

Eric Breuer, Science Team, Pacific Island Fisheries Science Center (PIFSC), [REDACTED]

Frank Cantelas, Science Team, Office of Ocean Exploration and Research (OER), [REDACTED]

Multiple TBDs, Science Team

Section B: Project Information

5a. Project location(s):

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

All mapping and ROV operations are expected to be in depths of 250m and deeper, and will not include work within state waters. Permission to conduct CTD rosette operations in state waters is being requested. At the preparation of this application, the first mapping cruise will target Necker to the southern boundary of PMNM, with the majority of the time spent around Necker to fill gaps in its existing multibeam coverage. ROV targets have not been finalized but sites presently under consideration include the major deep rift zone ridges off southeast Pearl & Hermes, Pioneer Bank, East Northampton seamount, southeast Maro and the northern side of St Rogatien Banks. Other targets include the "large 3,000 m deep crater east of Maro, the larger flank failure block north of Maro, Bank 9, the deep 200 m high drowned reef terrace edge north of Gardner pinnacles, the deep unnamed guyot and adjacent deep seamount east of Pearl & Hermes, and the channel between Pioneer and Lisianski. We request flexibility in selecting the other sites in the southern half of PMNM. These are secondary sites intended to provide a daily 8 hrs of ROV real time video during the transits to and from higher priority sites in the northern half of the monument. As often as is operationally feasible, ROV dives are conducted between 8 am and 5 pm in order to make the real time video feed as convenient as possible for viewers on shore.

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 overarching goal of the project is to extend and improve the understanding of the distribution and diversity of deepwater habitats within the Monument. Data and information from the cruises will build on the recent Falkor work and provide a foundation of critical environmental intelligence - timely actionable data and information products - to improve management and spur further exploration and research. NOAA priorities for the work include a combination of science, education, outreach, and open data objectives that will support management decisions at multiple levels. The effort also serves as an opportunity to highlight the uniqueness and importance of this national symbol of ocean conservation.

The acquisition of high-resolution seafloor mapping data is an essential precursor to making significant biological, geological, archaeological and oceanographic discoveries in the monument. The Okeanos Explorer cruises will collect seafloor mapping data to supplement previous work. These maps form the basis for selecting ROV dive targets. ROV cruises would take the next major step in baseline habitat characterization by using the ROV system to visually investigate unknown and little known deep water habitats within the monument identified as priority by scientists and managers, including providing the first ever look at deep water communities living below 2,000 m. CTD casts may be conducted to collect additional information about the physical and chemical properties of the water column, including at sites of interest identified from mapping and ROV investigation.

The information and data generated by this project will directly contribute to a better understanding of the deep water habitats, ecosystems and geologic history of the NWHI by providing PMNM basic information about the about the rich and unique biological resources and habitats of this region. It is this understanding that provides continuous support for the monument and its protection of these resources.

MAPPING

NOAA Ship Okeanos Explorer has three scientific sonars that are configured to operate simultaneously without interference: a 30 kHz multibeam system, 18 kHz split-beam fisheries sonar, and 3.5 kHz chirp sub-bottom profiler sonar. 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. All of these systems are routinely used by this exploration vessel and have provided invaluable scientific data for marine researchers and managers, including numerous National Marine Sanctuaries.

Multibeam:

Multibeam sonar mapping will be conducted in areas of PMNM where gaps are present in the existing coverage, or the existing data is poor quality. Multibeam mapping will also take place during the transits to and from sites where other operations will be

conducted, and planned to continue to build upon previous mapping surveys as much as feasible. Multibeam sonar data will produce high-resolution bathymetry and acoustic backscatter maps. These maps will provide critical baseline information to scientists and resource managers interested in identifying and expanding our understanding of the important biological habitats and ecological connections in the Monument, and the geology of the NWHI. Additionally, the data collected will help scientists better understand the size and character of seafloor habitats in the area, allowing for improved targeting of future exploration and research, including the selection of sites for further investigation with a ROV.

Expendable bathythermographs (XBT):

During multibeam operations, XBTs are deployed every 4-6 hours 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.

Single Beam and Split Beam Sonar:

The single beam is used to collect information about the water column, such as at gas plume or seep sites, and to obtain information about biomass. The EK60 split-beam sonar is used as a quantitative scientific echosounder to identify water column acoustic reflectors - typically biological scattering layers, fish, or gas bubbles - providing additional information about water column characteristics and anomalies. Fishery scientists have developed methods to analyze EK60 data to support fish stock assessment (e.g. Atlantic herring, pollock, capelin) and to predict hot spots of large fish in coral reefs. Split beam sonars are also being used to help develop "acoustic signatures" of different marine species, which will greatly enhance existing efforts to assess abundance, distribution, and behavior using remote sensing methods.

Sub Bottom Profiler:

The primary purpose of this sonar is to provide echogram images of surficial geological sediment layers underneath the seafloor to a maximum depth of about 80 meters below the surface. The Sub Bottom Profiler is normally operated to provide information about the sedimentary features and the bottom topography that is simultaneously being mapped by the multibeam sonar. The data generated by this sonar is fundamental in helping geologists interpret the shallow geology of the seafloor. Collecting this data within the Monument will provide greatly improved insights into the geology of the region, and supplement existing magnetometer and gravity measurements obtained by other vessels. If only limited sub-bottom operations are allowed, the profiler would be used at selected sites to provide additional insight into the geologic history of PMNMs banks and seamounts.

ROV OPERATIONS:

The purpose of conducting ROV operations is to conduct interdisciplinary site characterization at priority targets in the Monument. Interdisciplinary site characterization would be achieved by visually surveying priority targets while

simultaneously acquiring environmental data with in situ sensors mounted on the ROVs (CTD and DO). 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. The combined dives will enable scientists and managers to have a better understanding of the diversity and distribution of deep water habitats in the Monument, and should contribute to enhanced protection of these resources. The ROVs 6000m depth capability puts areas of the Monument within reach that have never been seen before.

ROV Sampling:

Although there are currently no plans to collect rock or biological specimens on either ROV cruise, we would like to have the option available through this permit. If collecting is carried out, only very selective specimen collections with the ROV that have the potential to contribute significant scientific discoveries are requested under this permit. These would be limited to two rock samples per dive, each of which will have either no or a minimal amount of attached organisms, and no more than five biological specimens per dive, suspected of being new species or new records for Hawaiian waters. Any sample collection activity would meet PMNM's policy for voucher specimen collections.

Ultra Short Base Line Acoustic Navigation (USBL):

The Tracklink TL10000MA system is used to track and record the position of the ROVs during the course of a dive. Integration of this relative position information with the surface ship position as determined by GPS allows the calculation of the position of the ROV on the seafloor. In this way, observations made by the ROV can be geo-referenced to standard latitude, longitude and depth coordinates.

CTD CASTS:

Site characterization involves detailed exploration of a specific site or region, including taking measurements of chemical and physical seawater properties. CTD casts would be conducted at selected sites to collect data of the chemical and physical properties of the water column (i.e., temperature, salinity, dissolved oxygen, pCO₂, and sound velocity). This may include locations where ROV dives are conducted to allow for an improved understanding of the environmental conditions by measuring the physical or chemical properties of the water column overlying or hosting a particular habitat.

*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/endangered/>

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?

This is a very low impact project that only involves collecting mapping, video, and sensor data. Although there are currently no plans to collect rock or biological specimens on either ROV cruise, we would like to have the option available through this permit. If collecting is carried out, the ROV manipulator will be used for very selective sampling that minimally effects the the nearby seafloor and fauna. We request permission to collect a maximum of 2 rock samples per dive, each of which will have either no or a minimal amount of attached organisms. We request a maximum of 5 voucher specimens of corals and sponges per dive. Only biological specimens suspected of being new species or new records for Hawaiian waters will be targeted. Mapping information will be collected with a single-beam sonar (the same system as on NOAA Ship Oscar Elton Sette), sub-bottom profiler and EM 302 multibeam sonar (the same system as on R/V Falkor).

ROVs and CTDs - Video and sensor data will be collected with deepwater ROVs. Sensor data will also be collected if CTD casts are performed. ROV operations will typically take place within several meters of the seafloor, and are conducted in a way to minimize seafloor disturbances. On occasion, the ROV is set down on the seafloor in order to acquire very close imagery of habitats or features of interest. Common procedure includes visually scanning the seafloor to ensure the area the ROV is set on does not include corals or other animals, however some animals may reside beneath the sediment or may be too small to see. The ROV also has a temperature probe that may be shallowly inserted into the seafloor sediment to measure the depth or temperature of features of interest. Finally, though we try to prevent any unnecessary seafloor disturbance, it is likely that at some point the ROV will inadvertently touch some benthic fauna (e.g., sea whip) or that water moving through the ROV thrusters will stir up small amounts of seafloor sediment. Any disturbance would likely be similar to that seen during normal near bottom SCUBA dives.

Given the minor and short-term durations of potential impact, we expect ROV operations will have no significant effect on the cultural, natural, and historic resources and ecological integrity of the monument.

XBTs - XBTs are deployed to obtain sound velocity profiles. The profiles are required to calibrate the multi-beam system and ensure accurate bathymetric mapping. The XBT type is the Deep Blue probe produced by Lockheed Martin Sippican. A single Deep Blue XBT is 8.5 in. length x 2 in. width and weighs 2.53 lbs. It consists of a plastic spool, hair thin copper wire (< 1mm width), zinc weight, thermistor (comprised of two short wires (< 8.5 in. length)) and is contained in a clear plastic housing. The Deep Blue XBT contains no chemical solutions. During the Okeanos Leg 1 dedicated mapping cruise, XBTs will likely need to be deployed once every 4-6 hours to ensure accurate bathymetric data collection (resulting in 4-6 total XBT deployments in a 24-hour period, and an estimated 28 to 120 XBTs during the duration of the mapping cruise). The low estimate is based on the possibility that much of the mapping leg may actually be spent outside of the monument. During the two planned ROV expeditions, mapping operations would be conducted mainly at night in transit to the next dive location, resulting in a total of 2 XBT deployments in a 24-hour period, or an estimated 78 to 98 XBTs during the duration of the two ROV cruises. While CTD casts every 4-6 hours are an alternative method to obtain sound velocity profiles, the ship must interrupt survey operations for approximately 3.5 hours to conduct a single cast in 3000-6000 meters of water. The impact would be highly detrimental and cost prohibitive in terms of efficient use of ship time for mapping. Assuming we would need 106-218 sound velocity profiles, and given that the ship can map 10,000 sq. km in 4.7 days at depths between 3000-6000 m, conducting CTD casts instead of XBTs would reduce the seafloor area mapped during the three legs by 30,000-68,000 square km (an area roughly the size of the land mass of HI, or twice the size of HI, respectively). This is the reason XBT deployments are requested.

The very fine wire connecting the XBT probe to the ship is extremely easy to break by hand once the probe reaches maximum depth. The minimal tensile strength of the wire should represent a minimal entanglement risk for species of concern. The potential for XBT deployments to impact ESA-listed species was the topic of an informal consultation request from the Monument to NMFS during the permit review for the Falkor expeditions. The Monument's determination was that the Falkor's use of XBTs may affect, but is not likely to adversely affect, Hawaiian monk seals, green sea turtles, hawksbill sea turtles, leatherback sea turtles, olive ridley sea turtles, North Pacific loggerhead sea turtles, MHI Insular false killer whales, humpback whales, sperm whales, fin whales, blue whales, sei whales, and north pacific right whales. We expect the same determination would be made with respect to the deployment of XBTs by the Okeanos Explorer.

Mapping - We expect that mapping operations will have no effect on the cultural, natural, and historic resources and ecological integrity of the monument. Multibeam mapping has already taken place in the Monument with no detected effects on the Monument resources. We expect all mapping will take place in deep water and at considerable distance from emergent land. NOAA Ship Okeanos Explorer has three scientific sonars that are configured to operate simultaneously without interference: a 30 kHz multibeam system, 18 kHz split-beam fisheries sonar, and 3.5 kHz chirp sub-

bottom profiler sonar. 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. All of these systems are routinely used by this exploration vessel and have provided invaluable scientific data for marine researchers and managers, including numerous National Marine Sanctuaries. Each of these sonar systems is described separately in the sections below. An assessment of potential impacts on marine mammals using best available information is then provided along with proposed safeguards to reduce any potential impacts.

Kongsberg EM302 Multibeam Sonar:

The following are specifications for the multibeam system that will be used during this project:

The specifications of the Kongsberg EM302 system are:

Operating frequency	30 kHz
Depth range	10-7000 m
Swath width	5.5xDepth, to approx 8 km
Pulse forms.....	CW and FM chirp
Swath profiles per ping	1 or 2
Maximum Source Level (Deep CW Mode)	243 dB re 1 µPa @1m (RMS)
Pulse Duration (Deep CW Mode).....	5 ms
Pulse Duration (Extra Deep 1, FM Mode).....	100 ms
Motion compensation:	
- Yaw	± 10 degrees
- Pitch	± 10 degrees
- Roll	± 15 degrees
Sounding pattern	Equi-distant /equiangular
High resolution mode	High Density processing
Sidelobe suppression	> 25 dB
Suppression of sounding artefacts.....	8 frequency coded transmit sectors
Beam focusing	On transmit (per sector) and on reception (dynamic)
Beamforming method	Time delay
Gain control	Automatic
Swath width control	Manual or automatic, soundings intact when reduced swath width
Seabed imagery/sidescan sonar image	Standard
Water column display.....	Standard
Mammal protection	Standard
Transmit array (deg)150 (across track) x 0.5 (along track)
Receive array (deg)1 (across track) x 30 (along track)
Number of beams per swath 288
Maximum number of sounding per swath 432
Maximum number of swaths per ping2
Maximum number of soundings per ping 864

Kongsberg EK60 Split-Beam Sonar:

The EK60 is a split-beam sonar that is used extensively and routinely by NOAA, fishing vessels, and international fisheries scientists as a quantitative scientific echosounder to identify water column acoustic reflectors - typically biological scattering layers, fish, or gas bubbles. It is a valuable tool for fisheries research because the backscatter reflectance can be calibrated in order to obtain corrected target strength values for features of interest within the ensonified area. Fishery scientists have developed methods to analyze EK60 data to support fish stock assessment (e.g. Atlantic herring, pollock, capelin) and to predict hot spots of large fish in coral reefs. Split beam sonars are also being used to help develop "acoustic signatures" of different marine species, which will greatly enhance existing efforts to assess abundance, distribution, and behavior using remote sensing methods. This sonar is routinely utilized by NOAA's Fishery Survey Vessels (Henry B. Bigelow, Oscar Dyson, Bell M. Shimada, Rueben Lasker, Oscar Elton Sette). NOAA vessel Oscar Elton Sette routinely uses their EK60 within the Papahānaumokuākea Marine National Monument in support of science missions (LT R. Wittam, personal communication, January 8, 2015). The following are specifications for this system as used on the Okeanos Explorer:

- Operating frequency: 18 kHz
- Operational modes: Active
- Transmission power: Adjustable in steps
- Pulse Lengths: Adjustable
- Ping rate: adjustable
- Maximum ping rate: 20 pings / sec
- Receiver instantaneous dynamic range: 150 dB

Knudsen Chirp 3260 Sub-bottom Profiler (SBP) Sonar:

The primary purpose of this sonar is to provide echogram images of surficial geological sediment layers underneath the seafloor to a maximum depth of about 80 meters below the surface. The SBP is normally operated to provide information about the sedimentary features and the bottom topography that is simultaneously being mapped by the multibeam sonar. The data generated by this sonar is fundamental in helping geologists interpret the shallow geology of the seafloor. Collecting this data within the Monument will provide greatly improved insights into the geology of the region, and supplement existing magnetometer and gravity measurements obtained by other vessels. The SBP on the Okeanos is a 3.5 kHz 10kW installation. The pings from the SBP are directed downward by a transducer mounted in the hull of the ship, forming a 27° cone. The source power output varies with water depth from 50 watts in shallow water to 800 watts in deep water, with power settings carefully monitored and adjusted appropriately during operations. The nominal power output is 10 kilowatts (kW), but the actual maximum radiated power is 3 kW or 222 dB re1 $\mu\text{Pa} \cdot \text{m}$. Note this maximum source power is less than that of the EM302 multibeam (243 dB re1 $\mu\text{Pa} \cdot \text{m}$). The maximum ping duration is up to 64 ms. The SBP is capable of reaching depths of 10,000 m at its highest power and longest pulse length settings.

This section will provide analysis of the potential effects of Okeanos Explorer's sonar systems on sensitive marine life within the Monument.

We believe that Okeanos Explorer's multibeam system poses minimal risk to cetaceans in the monument and provide the following analysis to support our contention. Given that Okeanos Explorer uses one of the two multibeam systems on R/V Falkor, we have excerpted - with minor revisions specific to the installation on the Okeanos - much of the information from the Monument's ESA section 7 Initial letter to NMFS for the Falkor work. There were no reports of impact to marine mammals during the Falkor cruises. Please note that Okeanos Explorer only has an EM302 while Falkor has both an EM 302 and an EM 710. The EM302 on the Okeanos Explorer has a 0.5° transmit array along-ship aperture compared to 1° on the Falkor. This makes the along track transmit beam narrower, but increases the maximum source level by 6 dB. Given this slightly different configuration, sound propagation model results from Dr. Xavier Lurton have been updated and tailored for the EM302 sonar installation specifically used on the Okeanos Explorer.

The multibeam emits very short high intensity sound pulses into the marine environment. The effects on marine life from exposure to high intensity noise vary with the frequency, intensity, and duration of the sound source, and the physiology and hearing characteristics of the exposed animal. Exposure to very high levels of sound can cause soft tissue injuries that could directly result in fatality. Exposure to lower levels at frequencies within the animal's range of hearing may cause injury in the form of permanent hearing damage, also referred to as permanent threshold shift (PTS). Exposure to even lower levels may cause behavioral effects that include temporary threshold shifts (TTS), temporarily masked communications and/or acoustic environmental cues, alteration of ongoing behaviors, and areal avoidance.

The current NMFS threshold for the onset of PTS in cetaceans from exposure to in-water sounds is ≥ 180 dB re 1 microPa. The same threshold for pinnipeds is ≥ 190 dB re 1 microPa. Exposure to impulsive in-water sounds at ≥ 160 dB re 1 microPa is the threshold the onset of TTS and behavioral disturbance for all marine mammals, whereas the same threshold for exposure to non-impulsive sound (continuous noise) is ≥ 120 dB re 1 microPa. Because the sonar systems to be used in this action are considered impulsive sources, the 160 dB re 1 microPa threshold for the onset of TTS and behavioral disturbance would apply, and significant exposure above that level at a frequency within the animal's hearing range would be considered an adverse impact.

Accurately predicting the 160 dB re 1 microPa isopleth from any sound source is difficult, but particularly so for multibeam sonar. Using the simplest example, that of an unfocused, omni-directional single point source in unbounded homogenous water, sound will disperse from the source in a spherical pattern. In this example, the equation $RL = SL - (20\log R + \alpha R)$ estimates spherical spreading loss where RL = received level; SL = source level; R = range in meters, and α is the absorption coefficient in water as a function of frequency (Lurton & DeRuiter 2011). In addition to source level and

frequency, the distance for which different decibel levels are experienced away from the source is also dependent on a number of other factors that include density, salinity, and the amount of suspended solids in the water. Detailed information on these naturally occurring factors in the marine environment is rarely available and consequently they are generally not considered in the equations. Assuming for the moment that the EM 302 system is a simple omni-directional point source, then the 180 dB and 160 dB re 1 microPa isopleths would fall at approximately 1,000 m and 2,800 m, respectively, based on a α value of 6 dB/km (@30 kHz) as computed from representative CTD casts of local oceanographic conditions in the vicinity of PNMN.

Multibeam systems are not simple omni-directional point sources but rather are focused sonar arrays that use “selective angular directivity” and furthermore transmit “very short pulses at limited ping rates” (Lurton & DeRuiter 2011). These two characteristics of this type of sonar decrease the potential sound exposure level as well as decrease the probability of the animals being subjected to TTS threshold intensity levels. Figure 1 provides diagrams excerpted from Lurton & DeRuiter (2011) showing the generalized ensonification volume of a multibeam sonar system from both horizontal (Fig 1a) and overhead (Fig. 1b) perspectives. Fig 1b also provides the variables used to estimate the exposure time of a stationary animal as the ship passes on its survey track. The exposure time can be estimated by $\emptyset R/V$ where \emptyset is the longitudinal transmitting lobe aperture in radians, R is the range from the source to the animal, and V is the speed of the ship. The aperture of the EM 302 on the Okeano is 0.5° but since it would operate in dual swath mode in shallower water it will be conservatively treated as 1° (same as the Falkor), yielding a \emptyset value of 0.02 radians. The ship will be mapping at 8 knots (4.116 m/s). At 200m distance, the exposure times for a stationary animal caught in the ensonification plane of the EM 302 are therefore calculated to be 1 second. This exposure time increases linearly with R so that at 1000 m distance, the exposure time increases to 5 seconds.

Dr. Xavier Lurton (IFREMER) has recently created a simplified model of the specific behavior of the Okeanos Explorer’s EM302 system in terms of direct radiated level inside the water. Model output graphics showing radiated sound transmission patterns in the horizontal and vertical planes of the water column are provided in an attachment to this permit (Case Study: Okeanos Explorer - EM 302 - Hawaii). This analysis represents our best estimates of radiated sound levels given the current configuration of the sonar. The assumptions behind the model are:

- 1) The Deep Mode of the EM302 was used (i.e., longest pulse length and highest power -- or worst case scenario).
- 2) The model uses the current best understanding of the directivity pattern of the sonar that includes both the individual transducer directivity and the transmit sector beam forming.
- 3) The model does not include any masking effects by the hull or gondola. The draft of the transducer “gondola” on the Okeanos Explorer is 5.65 m below the water line. This configuration causes a baffle effect from the gondola structure and the hull above, and

further reduces the likelihood of direct ensonification of an animal on or near the surface, especially a short distance away from the ship.

4) a value of 6 dB/km @ 30 kHz was used as a first-order approximation of the absorption coefficient representative of oceanographic conditions in the vicinity of PMNM.

Figure A shows horizontal plane (top-down) views of sound pressure levels at three different receive depths within the water column directly below the transducer: 10m, 50m, and 200m. These figures demonstrate the remarkably narrow zone of ensonification in the along-track direction. Figure B shows the across track radiation pattern for the full water column below the EM302 transducer, with a zoom in of the near surface region. The 160 and 180 dB/ μ Pa isopleths are plotted to show ranges from the sonar relevant to potential PTS and TTS impacts on cetaceans. In figure A, note the difference in the 160 dB/ μ Pa isopleth in the beam plane and elsewhere around the ship. For all but this plane, the isopleth occurs at 400 m or less from the ship. For animals directly within the beam plane, sound pressure levels drop below 160 dB/ μ Pa within 1500 m of the ship near the surface, and within 1800 m at a depth of 200 m. Submerged animals more than 400 m from the ship that are caught in the ensonification volume as the ship passes will be only briefly subjected to the elevated sound levels occurring inside the transmitter beam pattern. Furthermore, the narrow fan-shaped beam patterns of the Okeanos Explorer system provide ample possibilities for the animals to quickly escape the sound. The only possible scenario for more extended exposure would be if the animal were to suddenly start moving in the exact direction and speed as the ship, which is unlikely. This very selective spatial pattern of the sound radiation makes this configuration very different from seismic airgun sources (omnidirectional) or military mid-frequency active sonars that are often directed horizontally through the water column.

Transmit pulse forms and rates are yet two other differences that distinguish multibeam sonar from other types of sonar and acoustic sources and further reduce their potential threat to marine mammals. Sound is not transmitted continuously from these systems but rather in extremely short pulses (i.e., pings). Ping durations obtained from the EM302 manual (page 36) are very brief -- 0.7 to 5.0 milliseconds. The ping rate or in other words, how frequently pings are emitted, is depth dependent and is provided for different depths in tables 2 and 3 of the manual and show that at a depth of 400 m, the ping rate is 30 pings/min, decreasing to 3.6/min at 4000 m. Another way of putting it is that when the ship is mapping in 400 m of water, any submerged marine mammal caught in the ensonification volume will be subjected to only a 0.7 millisecond ping every 2 seconds. When the ship is mapping in 4,000 m of water, the mammal could potentially hear a 5-40 millisecond ping every 17 seconds. The fore-aft width of the ensonification volume at 200 m distance from the ship is approximately 4 meters. Based on an 8 nm/hr mapping speed and using this width as an example, this distance will be traversed by the ship in 1 second. Therefore, a submerged stationary marine mammal 200m from the ship while it is surveying depths of 400 m should be subjected to at most a single ping of 0.7 milliseconds of duration. If the encounter occurs where

the water depth is 4,000 m, the chances are low that it will even be subjected to a single ping.

Another consideration is the hearing range of the various species covered under the ESA. As mentioned earlier, the EM 302 system is 30 kHz. Figure 4 provides a general diagram of the hearing ranges of the various groups of marine mammals that was originally presented as Fig 4.2-3 of the Southwest Fisheries Science Center's Draft Programmatic Environmental Assessment released in April, 2013. The figure was modified to include only mammal groups under consideration for this review. The frequency range of the EM 302 system was superimposed on the bars. The first observation from this figure is that the system is not expected to produce sound audible to the LF cetacean group (baleen whales or Mysticetes) whose hearing range is believed to be below 30 kHz.

The second observation is that the system is also transmitting at the upper portion of the pinniped hearing range. Together, these observations suggest that toothed whales are likely to be the ESA group potentially most affected by the mapping activities. Within monument waters, the sperm whale (*Physeter macrocephalus*) is the only species of toothed whales that's ESA listed. One other species, the false killer whale (*Pseudorca crassidens*) may be encountered during the transits to and from Honolulu and the monument boundary. Observers will therefore pay particular attention to spotting and avoiding these two species.

On December 23, 2013, NOAA released for public comment it's new "Draft Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammals: Acoustic Threshold Levels for Onset of Permanent and Temporary Threshold Shifts". The document is anticipated to be finalized winter 2015. Included are updated acoustic threshold levels for the onset of both PTS and TTS that "will replace those currently in use by NOAA." The updates include PTS and TTS levels for both impulsive and non-impulsive sound sources for 5 marine mammal functional hearing groups that include low, mid, and high-frequency cetaceans, phociid pinnipeds, and otariid pinnipeds. In addition, the updates include the addition of a second new metric for assessing acoustic activities: PTS and TTS cumulative sound exposure level (SELcum) thresholds. These thresholds are calculated with and without marine mammal auditory weighting functions. Since SELcum is not as yet being used for ESA recommendations, we only examined what the new sound intensity thresholds will be, now calculated as dBpeak values instead of dBrms values. Tables 6a and 7 in that guidance document provide these threshold values. TTS peak decibel levels range from 195 dB re 1 microPa for HF cetaceans, 224 dB re 1 microPa for LF cetaceans, and 229 dB re 1 microPa for both families of pinnipeds. While dBpeak (maximum value) is calculated differently than dBrms, the rule of thumb is that the latter are generally 3 dB less than the former (Tom Weber, pers comm and see Fig 5 below). These new TTS thresholds are based on the most current science available and suggest that the Okeanos Explorer multibeam system will not exceed these levels for any of the functional groups if they are further

than 100 m from the ship at the surface and 300 m from the ship if diving directly below the transducer.

The National Science Foundation's 2011 document "Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement for Marine Seismic Research Funded by the National Science Foundation or Conducted by the U.S. Geological Survey" provides a detailed analysis of potential impacts of seismic, multibeam, and sub-bottom sonars on sea turtles and marine mammals. Seismic surveys have the most potential impact and are not proposed in this permit application. The document evaluates deep water multibeam systems ranging from 12-95 kHz. The EM302 operates at 30 kHz so falls within the frequency, source levels, pulse lengths and beam widths evaluated by this report. The SBP on the Okeanos is of the same type evaluated in the report. With respect to multibeam echosounders (MBES) and sub-bottom profilers (SBP), the following direct excerpts are conclusions of this document regarding the potential impact on sea turtles, mysticetes, odontocetes, and pinnepeds:

Sea Turtles:

"Operation of the MBES, SBP, or pingers is not expected to affect sea turtles, because the associated frequency ranges are above the known hearing range of sea turtles. The SBP operates at 3.5 kHz with a maximum source output of 222 dB re 1 μ Pa-m. Thus, the frequency range of the SBP is outside the known detection range of sea turtles based on available data. As a result, sea turtles are not expected to be capable of hearing the higher frequency sounds produced by SBPs. Furthermore, the intermittent and narrow downward-directed nature of the MBES and SBP as emitted from the transiting seismic vessel would result in no more than one or two brief ping exposures."

Mysticetes

"During the proposed marine seismic surveys, the pings from the MBES, SBP, and pingers would be very short (<1-64 ms) (Table 2-5). Thus, a given mammal would not receive many of the downward-directed MBES or SBP pings as the vessel passes by. In the case of the MBESs that operate at 30 kHz or higher, their operating frequencies are too high to have any effects on mysticete behavior. Source levels of the SBPs, another type of echosounder, are lower (maximum source level 222 dB re 1 microPa [rms]) than those of the MBES discussed above (Table 2-5). Thus, there is even less likelihood of TTS occurring through exposure to SBP sounds, even in an animal that is briefly near the source. The SBP is usually operated simultaneously with other higher-power acoustic sources. Many marine mammals, particularly mysticetes, move away in response to the approaching higher-power sources or the vessel itself before the mammals are close enough for there to be any possibility of effects from the SBP's less-intense sounds. The possibility of PTS through exposure to MBES or SBP sounds is considered negligible and PTS is not expected to occur. Burkhardt et al. (2008) concluded that immediate direct injury was possible only if a cetacean dived under the vessel into the immediate vicinity of the transducer. Furthermore, PTS (or any injury or pathological effect) has never been demonstrated for any marine mammal exposed to echosounders such as the proposed MBESs and SBPs."

Odontocetes

“In summary, sounds from all the MBESs would be readily audible to most and possibly all odontocetes when animals are within the narrow angular extent of the intermittent sound beam. As with baleen whales, odontocete communications will not be masked appreciably by MBES, SBP, or pinger signals given their low duty cycles, the brief period (i.e., seconds) when an individual mammal would potentially be within the downward-directed MBES or SBP beam from a transiting vessel, and the relatively low source level of a pinger. Operation of MBESs, SBPs, and pingers is not likely to impact odontocetes. The project MBESs, SBPs, and pingers are not expected to induce TTS. The possibility of PTS through exposure to MBES or SBP sounds is considered negligible.”

Pinnipeds

“The SBPs associated with the proposed marine seismic activities operate in the MF range of approximately 3.5 kHz with a maximum source output of 222 dB re 1 μ Pa-m (rms). The frequency range of the SBPs is within the frequency band audible to pinnipeds. Masking effects due to MBES, SBP, or pinger signals are expected to be minimal or non-existent. Thus, brief exposure of pinnipeds to small numbers of signals from the MBES or SBP would not result in a —take by harassment as defined by NMFS and the ESA. The project MBESs, SBPs, and pingers are not expected to induce TTS. Although the MBESs, SBPs, and pingers can presumably be heard by pinnipeds, their operation is not likely to affect pinnipeds. The intermittent and narrow downward-directed nature of the MBESs and SPBs would result in no more than one or two brief ping exposures of any individual pinniped given the movement and speed of the vessel and animal; such brief exposure to this sound is not expected to cause injury or PTS based on results of limited studies of some pinniped species.”

Okeanos Explorer sonars will be turned on before the ship enters into the Monument and will only be turned off during ROV dives or CTD casts. We will minimize turning the system on and off as a precautionary measure to avoid possible startling of the animals. When the multibeam system is turned off in the Monument, the flexible “soft start” mode will be used to restart the multibeam. The soft start mode is a delay function, starting the sonar transmissions at a low output level and then gradually increasing to the level required for optimal bathymetry data collection. The soft start modes can either be set at -10 or -20 decibels with a 0 to 15 minute ramp up time to the desired power. We can select -10 dB, -20 dB or maximum transmit power. Maximum transmit power is recommended by Kongsberg for maximizing the mapping swath coverage. In the deepest operating mode the EM302 is 243 dB re 1 microPa. When operating in shallow modes the decibels are 238 dB re 1 microPa.

Because the EK60 and SBP sonars are of lower intensity than the multibeam, and are run simultaneously with the multibeam, these protective measures will help avoid inadvert exposure of marine mammals and sea turtles to all three sonars.

We therefore do not believe the Okeanos Explorer mapping activities will have any significant adverse effects on marine mammals in the monument. Similar opinions regarding the safety of multibeam mapping activities have been expressed by the NMFS Southwest Fisheries Science Center in their draft programmatic environmental assessment. Even so and in order to mitigate impacts to marine mammals, observers on the Okeanos Explorer's bridge will carefully monitor for the presence of marine protected species, and permitted personnel would follow best management practices recommended by PMNM to minimize disturbance. If cetaceans are present within 200 meters of the ship, the vessel would stop until the animals depart the area. We will try to minimize turning the multibeam system on and off to reduce the possibility of startle responses by marine mammals that could be in the vicinity of the ship, particularly at night. Leaving them on also provides marine mammals advanced warning that the ship is in the vicinity, further reducing the possibility of a collision. When the systems have been shut down for any reason, such as during an ROV dive or CTD cast, the multibeam soft start mode – a delay function, starting sonar transmissions at a low output level and gradually increasing - would be used to minimize any impact on cetaceans. Only after the multibeam has been brought from soft start to full power would the SBP sonar then be turned back on.

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? We are aware of the significance and cultural importance of the NWHI to Native Hawaiians. As a sacred place, and especially in the realm of Po (beyond Mokumanamana), our hope is to tread lightly and leave no footprint from our activities. Recognizing that natural resources are, in fact, cultural resources for Native Hawaiians, it is our hope that the information and data generated by this project will assist PMNM by providing basic information about the about the rich and unique biological resources and habitats of this region. This knowledge will contribute directly to the documentation of these natural/cultural resources, and it is this understanding that allows for enhanced protection of these resources. Only very selective specimen collections with the ROV that have the potential to contribute significant scientific discoveries (detailed in section 7a) are requested under this permit, and would be collected in a way that minimally effects the nearby seafloor and fauna. Given the minor and short-term durations of potential impact, we expect ROV operations will have no significant effect on the cultural, natural, and historic resources and ecological integrity of the monument. We believe this proposed activity is consistent with the spirit of Proclamation 8031, and specifically with Finding 1.b. Additionally, this project will facilitate the Monument's effort to "bring the place to the people, rather than the people to the place" through telepresence and other outreach and education efforts that will share PMNM resources with a broad audience online in real-time.

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.

Multibeam sonar mapping is the current state of the art technique used to map in depths below 50m. The SBP data is an essential dataset in understanding the geology of the area. Given the cost of running a research vessel, failing to collect SBP data while exploring the monument with the multibeam would be a missed opportunity to gather key insights about seafloor geology and sediment characteristics. ROVs surveys are the state of the art method to collect high resolution video information. No better alternative methods exist to acquire high resolution bathymetry data or close up video data. A major objective of the project is to benefit the management of the monument by revealing the nature of the seafloor and associated habitats within its boundaries. The vast majority of existing high resolution video information is from depths shallower than 2000m. At present there are no other submersibles in the Hawaii region that can operate deeper than 2000m.

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

The information gathered will directly contribute to a better understanding of the deep water habitats, ecosystems and geologic history of the NWHI. The potential value of this information to visually ground-truth recently mapped habitats is tremendous. As noted in 7.b. (above), there are no significant anticipated impacts to PMNM cultural, natural, or historic resources. At the present time, no specimens will be collected, but if permitted to do so, will involve the careful selection and collection of a minimal number. No shore access is required. If project gear touch or rest on the seafloor, it will be minimal and for short duration. In our estimation, the end value of this activity far outweighs any potential impacts, thus meeting the criteria noted under Finding 1.d. in Proclamation 8031.

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

Even with a relatively large number of ship days, this project cannot complete the huge task of groundtruthing all of the interesting and unique deepwater seafloor features within the monument boundaries. However, this is long enough to at least briefly investigate many of the highest priority targets identified by recent work in the area.

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

I have helped to plan and execute numerous deep sea submersible cruises during my years with NOAA. The biggest reason for past successes are the very competent science and operations team that we assemble for all major expeditions. Among those involved in the Monument work is Dr. Christopher Kelley who has been working in the Hawaiian Archipelago for decades and was Chief Scientist on the recent Falkor mapping expeditions in the Monument. Also, David Lovalvo, our ROV Team Lead, has decades of experience safely building and operating both manned and unmanned

submersibles around the globe, many of which have been in areas of particular cultural and natural significance.

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. NOAA Ship Okeanos Explorer is a public vessel of the United States of America. Funding for Okeanos Explorer originates from the federal budget of the United States of America, specifically the Department of Commerce and the National Oceanic and Atmospheric Administration. NOAA has agreed to provide the ship, multibeam and ROV systems, and their own technicians required for this cruise. The U.S. government is self-insured.

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.

Multibeam mapping is the state of the art technique for mapping seafloor deeper than 50m. The Okeanos Explorer multibeam system is the most up to date system being produced and sold by Kongsberg. The Sub-bottom Profiler sonar is normally operated to provide information about the sedimentary features and the bottom topography that is simultaneously being mapped by the multibeam sonar. The data generated by this sonar is fundamental in helping geologists interpret the shallow geology of the seafloor. The EK60 split-beam sonar is used extensively and routinely by NOAA, fishing vessels, and international fisheries scientists as a quantitative scientific echosounder to identify water column acoustic reflectors - typically biological scattering layers, fish, or gas bubbles. This sonar is routinely utilized by NOAA's Fishery Survey Vessels, including the Oscar Elton Sette. ROVs are the state of the art method to collect high resolution video information. The Okeanos Explorer's ROV has perhaps the best video capabilities of any scientific ROV system in the world. The CTD rosette is a standard instrument used to collect information about the physical parameters of the water column.

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

No, but we have made arrangements with PMNM to borrow their 750 Faria Watchdog VMS unit and have it installed during Okeanos Explorer's inport period in Honolulu in June or early July prior to proposed work in PMNM.

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

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

8. Procedures/Methods:

A complete track plan of all dive targets and survey lines will be created and installed into the ship's navigation computers and multibeam systems. All mapping data from previous cruises will also be incorporated into their real time multibeam displays to

provide guides for minimizing seams between old and new data. The survey lines will be numbered in the order in which they should be done and the ship will run each line at approximately 8 nm/hr. ROV operations will be conducted during daylight hours during two of the three cruise legs. We plan to conduct one ROV dive each day for a maximum of 40 anticipated ROV dives within PMNM waters during the project period. No ballast is discharged during ROV operations. Multibeam, single beam and sub-bottom mapping are carried out around the clock during the leg without ROV operations. During the two legs with the ROV, mapping surveys will be conducted during hours when the ROV is on deck. Video from ROV operations will be stored onboard the ship and streamed live to shore. A video of the mapping acquisition computer will be streamed to shore in real time. All data will be sent to shore and available via ftp site for interested scientists and managers as the cruises proceed. All data will be publicly available in the NOAA Data Centers within 90 days of cruise completion.

During the Okeanos Leg 1 dedicated mapping cruise, XBTs will likely need to be deployed once every 4-6 hours to ensure accurate bathymetric data collection (resulting in 4-6 total XBT deployments in a 24-hour period). During the two planned ROV cruises, mapping operations would be conducted mainly at night in transit to the next dive location, resulting in a total of 2 XBT deployments in a 24-hour period. This would result in a maximum total number of 218 XBTs that would be deployed in PMNM during the project period. The XBT is deployed using a LM-3A Hand-held release system which establishes an electrical connection between the XBT and ship-board data processor/recorder. Upon deployment the copper wire de-reels from the plastic spool as it free falls from the sea surface vertically through the water column. Data are recorded and displayed real time on the ship-board data processing equipment as the Deep Blue XBT falls to its rated depth of 760 m (the quantity of copper wire contained within the plastic spool). After the XBT reaches its maximum depth the copper wire is detached at the surface manually by hand and the instrument and wire descend to the seafloor where they will remain.

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:

Rocks and deepwater corals and sponges

Scientific name:

NA

& size of specimens:

2 rocks and 5 coral/sponges per site

Collection location:

Undetermined as of the preparation of this report

Whole Organism Partial Organism

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

Rocks will be first provided to researchers at the University of Hawaii who will analyze and collaborate with researchers elsewhere to determine the age and nature of the lavas. Carbonate samples, if any, will likely be fossil corals or bivalves and be provided to researchers specializing in deep water marine fossils. Coral and sponge specimens will likely be split between the Smithsonian and Bishop museum to ensure access to as many researchers as possible. Rocks will be dried on board the ship, while coral and sponge specimens will be aliquoted and frozen, placed in buffer, and placed in EtOH for genetic and taxonomic analysis.

One of our team (Kelley) will be responsible for all specimens collected in the monument. He will provide the rocks samples to Dr. Michael Garcia of the University of Hawaii (basalt), and Dr. David Clague of MBARI (carbonate) for examination and dating. Very old fossil bivalves in the class Rudista, if found and collected, will be sent to either the Smithsonian or the British Museum of Natural History due to their importance in confirming a late Cretaceous age of their collection sites. Manganese crust samples will be provide to Dr. James Hein of the USGS and/or others with interest and experience in analyzing their mineral and metal content. Biological specimens will either be corals or sponges, along with their commensals that are incidentally collected. Each coral specimen will be split, with one piece going to Bishop Museum and the other to the Smithsonian, the latter where they will be taxonomically identified by Dr. Steven Cairns and others. Sponge specimens will be provided to the Bishop Museum after microscopic examination by one of us (Kelley). Holly Bolick, the Bishop Museum invertebrate collection curator, will then provide a piece of each sponge to Dr. Henry Reiswig at the University of Victoria for taxonomic identification. Commensal echinoderms (seastars, ophiuroids, and crinoids will be sent to the Smithsonian for taxonomic identification by Dr. Christopher Mah. Crustaceans and any other organisms found on the corals and sponges will be provided to the Bishop Museum.

The following is a list of those researchers who will likely receive both rock samples and biological specimens (A), rock samples (B) or biological specimens (C), collected during these cruises This list should be considered partial and includes only researchers identified as potential recipients at the preparation of this application.

A) Both Rock Samples and Biological Specimens

1) Christopher Kelley, Hawaii Undersea Research laboratory, University of Hawaii, [REDACTED]
[REDACTED]

B) Rock Samples

1) Michael Garcia, Dept of Geology and Geophysics, University of Hawaii, [REDACTED]
[REDACTED]

2) David Clague, Monterey Bay Aquarium Research Institute
[REDACTED]

3) James Hein, US Geological Survey, [REDACTED]
[REDACTED]

C) Biological Specimens

1) Dr. Steven Cairns, National Museum of Natural History, Smithsonian Institution
[REDACTED]

2) Holly Bolick, Bernice Pauhi Bishop Museum, 1525 [REDACTED]
[REDACTED]

3) Henry Reiswig, University of Victoria, [REDACTED]
[REDACTED]

4) Christopher Mah, National Museum of Natural History, Smithsonian Institution
[REDACTED]

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

• General site/location for collections:
Undetermined but from deep water

• Is it an open or closed system? Open Closed

• Is there an outfall? Yes No

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

• Will organisms be released?

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

On the ship

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

Many of the ROV surveys will be in areas mapped during the recent Falkor cruises. Additional mapping done by Okeanos Explorer will complement mapping accomplished during previous expeditions. Okeanos Explorer has an open data policy so all data collected during the expeditions will be freely available through the NOAA Data Centers.

Other scientists with interests and expertise in the region will be engaged in cruise planning and execution. Notably, Dr. Amy Baco-Taylor (FSU) who plans to conduct related work in PMNM has expressed interest in the expedition and is expected to join as a member of the science team from shore via telepresence for part of the expedition. Her team has already shared their 2014-16 cruise plans and research sites. She will be provided with, and invited to provide input into the development of, our cruise plans, and notified of any changes to our plans via daily science team e-mails during expedition execution. We will collaborate with her to ensure our plans are complementary and not duplicative.

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

Kongsberg Simrad EM302 Multibeam sonar system and sound velocity profilers for calibrating the systems at different locations within the monument.

Kongsberg Simrad EK60 singlebeam sonar.

Knudsen Chirp 3260 Sub-bottom profiler.

Deep Discoverer and Seirios remotely operated vehicles (ROVs), and Tracklink 10,000 Ultra Short Baseline system for tracking the location of the ROVs underwater.

Seabird Electronics Model 9/11+ CTD in 24-position rosette frame with seabird SBE-32 carousel SBE 32 Carousel, and ports for auxiliary sensors (Light Scattering Sensor, Oxidation – Reduction Potential, Dissolved Oxygen).

12b. List all Hazardous Materials you propose to take to and use within the Monument:

If samples are collected with the ROV, EtOH will be brought into the monument for specimen preservation.

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

none

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

Every effort will be made to complete the preliminary mapping data processing by the end of the cruises. Preliminary mapping and ROV data and information products should be available on shore by the end of September 2015. Quality assured mapping and ROV data products are further processed and reviewed following the cruises before being made publicly available via the NOAA Data Centers. All data and information should be publicly available via the NOAA Data Centers within 90 days of cruise completion.

All data acquired on Okeanos Explorer will be provided to the public archives without proprietary rights. All data management activities shall be executed in accordance with NAO 212-15, Management of Environmental and Geospatial Data and Information [http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_212/212-15.html]. All data acquired by Okeanos Explorer are archived and publically available within 90 days of the end of each cruise via the NOAA Data Centers.

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

Kelley, C., J. R. Smith, J. Tree, J. Miller, B. Boston, M. Garcia, G. Ito, J. Taylor, F. Lichowski, D. Wagner, J. Leonard, B. Dechnik, D. Luers. In press. New seafloor mapping surveys are rewriting the geologic history of the Hawaiian Archipelago. EOS.

Kelley, C.; R. Moffitt; & J.R. Smith. 2006. Description of bottomfish essential fish habitat on four banks in the Northwestern Hawaiian Islands. Atoll Research Bulletin. No. 543, 319-332. (Note: utilized multibeam sonar mapping data from the monument)

Kelley, C. & W. Ikehara. 2006. The impacts of bottomfishing on Raita and West St. Rogatien Banks in the Northwestern Hawaiian Islands. Atoll Research Bulletin. No. 543, 305-318. (Note: utilized multibeam sonar mapping data from the monument)

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.

Signature

Date

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

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

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):

Kelley Elliott, Expedition Coordinator, Office of Ocean Exploration and Research (OER), kelley.elliott@noaa.gov, 301-734-1024

Brian Kennedy, Expedition Coordinator, Office of Ocean Exploration and Research (OER), brian.kennedy@noaa.gov, 401-874-6150

John McDonough, Expedition Coordinator, Office of Ocean Exploration and Research (OER), john.mcdonough@noaa.gov, 301-734-1023

Jeremy Potter, Expedition Coordinator, Office of Ocean Exploration and Research (OER), Jeremy.Potter@noaa.gov, 301-723-1145

Elizabeth "Meme" Lobecker, Multibeam mapping team, Office of Ocean Exploration and Research (OER), elizabeth.lobecker@noaa.gov, 603-862-1475

Derek Sowers, Multibeam mapping team, Office of Ocean Exploration and Research (OER), derek.sowers@noaa.gov, 603-862-0369

Lindsay McKenna, Multibeam mapping team, Office of Ocean Exploration and Research (OER), lindsay.mckenna@noaa.gov, 603-862-5246

Multiple TBDs Multibeam processing team

David Lovalvo, ROV Team Lead, Office of Ocean Exploration and Research (OER), david.lovalvo@noaa.gov, 203-938-9845

Brian Bingham, ROV Engineer, University of Hawaii (UH), bsb@hawaii.edu, 808-956-2373

Multiple TBDs ROV Engineers

Brendan Reser, Data Manager, Office of Ocean Exploration and Research (OER), brendan.reser@noaa.gov, 228-688-3516

Jared Drewniak, Telepresence Engineer, Office of Ocean Exploration and Research (OER), jared.drewniak@noaa.gov, 617-319-8574

Daniel Wagner, Science team, Papahānaumokuākea Marine National Monument (PMNM), Daniel.Wagner@noaa.gov, 808-694-3961

Michael Parke, Science Team and Point of Contact for NMFS Science Priorities, Pacific Island Fisheries Science Center (PIFSC), michael.parke@noaa.gov, 808-725-5754.

Frank Parrish, Science Team, Pacific Island Fisheries Science Center (PIFSC), frank.parrish@noaa.gov, 808-725-5701

Multiple TBDs, Science Team

A separate permit application will be submitted for NOAA Ship Okeanos Explorer crew.

2. Specific Site Location(s): (Attach copies of specific collection 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 & 3 (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.

3. Other permits (list and attach documentation of all other related Federal or State permits): N/A

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. N/A

4. Funding sources (Attach copies of your budget, specific to proposed activities under this permit and include funding sources. See instructions for more information):

Cruise operations are being funded by a combination of NOAA OMAO base-funded Day At Sea (DAS) allocations for three NOAA Line Offices, OER base-funded DAS, and OER funding to cover the mission costs for DAS operations on Okeanos Explorer.

Of the 69 DAS scheduled for this project, 29 DAS are funded by a Line Office Allocation to OAR, 20 DAS are funded by a Line Office Allocation to NMFS, 3 DAS are funded by a Line Office Allocation to NOS, and 17 DAS are program base funded by OAR's Office of Ocean Exploration and Research. See attached notification from NOAA's Fleet Council that 69 DAS have been allocated to NOAA Ship Okeanos Explorer for the CAPSTONE Expedition. Additional mission costs are covered by NOAA's Office of Ocean Exploration and Research (OER).

Day Rate for 1 DAS on NOAA Ship Okeanos Explorer:

Mapping Cruise: \$14,656 (PFD DAS)+\$6,000 (Mission costs) = \$21,256 per DAS

ROV/Mapping Cruise: \$14,656 (PFD DAS)+\$17,000 (Mission costs) = \$31,656 per DAS

	Total # DAS	OMAO			OAR	Total Cost
		NMFS	NOS	OAR	OER	
Leg 1 (Mapping)	22	0	0	22	0	\$454,432
Leg 2 (ROV/Mapping)	23	0	0	7	16	\$728,088
Leg 3 (ROV/Mapping)	24	20	3	0	1	\$759,744
		20	3	29	17	\$1,942,264

NMFS DAS	\$	293,120
NOS DAS	\$	43,968
OAR DAS	\$	425,024
OER BASE DAS and Mission Costs	\$	1,180,152

5. Time frame:

Activity start: July 1, 2015

Activity completion: September 27, 2015

A subset of dates between July 1 and September 27, 2015. Current cruise dates are July 13 - August 3; August 10 - September 1; September 7 - September 27, 2015. Dates may shift slightly within the July 1- September timeframe.

Dates actively inside the Monument:

From: July 1, 2015

To: September 27, 2015

We expect to conduct 3 cruises in the vicinity of the Hawaiian Archipelago totaling about 69 days between July and September 2015. We propose to allocate a large subset of those days for work within the Monument, spending the majority of cruise days actively inside the Monument.

Current cruise dates are:

- July 13 - August 3
- August 10 - September 1
- September 7 - September 27

These dates may shift slightly within the July 1- September timeframe.

Describe any limiting factors in declaring specific dates of the proposed activity at the time of application: Cruise dates may shift slightly (i.e. a few days to a few weeks) for ship scheduling reasons.

Personnel schedule in the Monument:

CRUISE EX-15-04 LEG 1 (MAPPING): JULY 13 - AUGUST 3, 2015

- CDR Mark Wetzler, Commanding Officer, NOAA Ship Okeanos Explorer, co.explorer@noaa.gov, 401-378-8284
- LT Emily Rose, Operations Officer, NOAA Ship Okeanos Explorer, ops.explorer@noaa.gov, 301-713-7772
- Elizabeth "Meme" Lobecker, Multibeam mapping team, Office of Ocean Exploration and Research (OER), elizabeth.lobecker@noaa.gov, 603-862-1475
- Multiple TBDs Multibeam processing team
- Brendan Reser, Data Manager, Office of Ocean Exploration and Research (OER), brendan.reser@noaa.gov, 228-688-3516
- Jared Drewniak, Telepresence Engineer, Office of Ocean Exploration and Research (OER), jared.drewniak@noaa.gov, 617-319-8574
- NOAA Ship Okeanos Explorer Crew (see attached crew roster)

CRUISE EX-15-04 Leg 2 (ROV/MAPPING): AUGUST 10 - SEPTEMBER 1, 2015

- CDR Mark Wetzler, Commanding Officer, NOAA Ship Okeanos Explorer, co.explorer@noaa.gov, 401-378-8284
- LT Emily Rose, Operations Officer, NOAA Ship Okeanos Explorer, ops.explorer@noaa.gov, 301-713-7772
- Kelley Elliott, Expedition Coordinator, Office of Ocean Exploration and Research (OER), [kelley.elliott@noaa.gov](mailto:kelly.elliott@noaa.gov), 301-734-1024
- Lindsay McKenna, Multibeam mapping team, Office of Ocean Exploration and Research (OER), lindsay.mckenna@noaa.gov, 603-862-5246
- Multiple TBDs Multibeam processing team
- David Loyalvo, ROV Team Lead, Office of Ocean Exploration and Research (OER), david.lovalvo@noaa.gov, 203-938-9845
- Brian Bingham, ROV Engineer, University of Hawaii (UH), bsb@hawaii.edu, 808-956-2373

- Multiple TBDs ROV Engineers
- Brendan Reser, Data Manager, Office of Ocean Exploration and Research (OER), brendan.reser@noaa.gov, 228-688-3516
- Jared Drewniak, Telepresence Engineer, Office of Ocean Exploration and Research (OER), jared.drewniak@noaa.gov, 617-319-8574
- Daniel Wagner, Science team, Papahānaumokuākea Marine National Monument (PMNM), Daniel.Wagner@noaa.gov, 808-694-3961
- Frank Parrish, Science Team, Pacific Island Fisheries Science Center (PIFSC), frank.parrish@noaa.gov, 808-725-5701
- Multiple TBDs, Science Team
- NOAA Ship Okeanos Explorer Crew (see attached crew roster)

CRUISE EX-15-04 Leg 3 (ROV/MAPPING): SEPTEMBER 7 - 27, 2015

- CDR Mark Wetzler, Commanding Officer, NOAA Ship Okeanos Explorer, co.explorer@noaa.gov, 401-378-8284
- LT Emily Rose, Operations Officer, NOAA Ship Okeanos Explorer, ops.explorer@noaa.gov, 301-713-7772
- Brian Kennedy, Expedition Coordinator, Office of Ocean Exploration and Research (OER), brian.kennedy@noaa.gov, 401-874-6150
- Derek Sowers, Multibeam mapping team, Office of Ocean Exploration and Research (OER), derek.sowers@noaa.gov, 603-862-0369
- Multiple TBDs Multibeam processing team
- David Lovalvo, ROV Team Lead, Office of Ocean Exploration and Research (OER), david.lovalvo@noaa.gov, 203-938-9845
- Brian Bingham, ROV Engineer, University of Hawaii (UH), bsb@hawaii.edu, 808-956-2373
- Multiple TBDs ROV Engineers
- Brendan Reser, Data Manager, Office of Ocean Exploration and Research (OER), brendan.reser@noaa.gov, 228-688-3516
- Jared Drewniak, Telepresence Engineer, Office of Ocean Exploration and Research (OER), jared.drewniak@noaa.gov, 617-319-8574
- Daniel Wagner, Science team, Papahānaumokuākea Marine National Monument (PMNM), Daniel.Wagner@noaa.gov, 808-694-3961
- Frank Parrish, Science Team, Pacific Island Fisheries Science Center (PIFSC), frank.parrish@noaa.gov, 808-725-5701
- Multiple TBDs, Science Team
- NOAA Ship Okeanos Explorer Crew (see attached crew roster)

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:

NOAA Ship Okeanos Explorer is a public vessel of the United States of America. The U.S. government is self-insured.

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

- Vessel
 Aircraft

Provide Vessel and Aircraft information:

NOAA SHIP OKEANOS EXPLORER

The NOAA Ship Okeanos Explorer, R 337 (WTDH), is NOAA's only ship dedicated exclusively for ocean exploration. Okeanos Explorer is one of the six former U.S. Navy T-AGOS class ships acquired and converted by NOAA for use as scientific research ships. Originally built for anti-submarine warfare, former USNS Capable was commissioned as NOAA Ship Okeanos Explorer on August 13, 2008. Prior to commissioning, the vessel underwent extensive refurbishment from 2005 – 2008 by Todd Pacific Shipyards Corporation, including adding mission space for the ROV hanger, bow and stern thrusters, fairings for mapping sensors, and bridge upgrades. The ship has been outfitted with a hull-mounted deep-water multibeam echo sounder (MBES), a single-beam echo sounder (SBES), and a sub-bottom profiler (SBP), along with host of ancillary equipment. In 2013 the ship was integrated with two body ROV system (Deep Discoverer and Seirios) with depth rating of 6000 m.

Detailed layouts of the all of the new, modified and relocated equipment can be accessed at <http://www.moc.noaa.gov/oe/index.html>.

Vessel Specifications

Vessel specifications available online at <http://www.moc.noaa.gov/Ships%20Characteristics/NOAA%20Ship%20Okeanos%20Explorer%20-%20Final%2014Jan2014.pdf>

Hull Number:	337
Call letters	WTDH
Builder	VT Halter Marine, Inc., Moss Point, MS
Launched	Oct 28, 1988
Delivered to NOAA	Sept 10, 2004
Commissioned	Aug 14, 2008
Length (LOA)	68.3 m (224 feet)
Breadth	13.1 m (43 feet)
Draft, Maximum	5.13 m (16.83feet) Bow Thruster Retracted 6.12m (20.08 feet) Bow Thruster Lowered

Range 9600 nm
Endurance 40 days
Cruising speed 10 knots
Mapping speed 7-10 knots
Berthing 46

Commissioned officers 6
Licensed engineers 3
Crew 26
Scientists 20
Ambar RHIB 2
Full Load displacement 2312 long tons
Gross Tons (US) 1517 long tons
Gross Tons (int'l) 2062 long tons

Light ship displacement 1616 long tons

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:

2 Willard 670 SOLAS Fast Rescue Boats (FRB), Jet drive propulsion

Additional Information for Land Based Operations

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

Not applicable

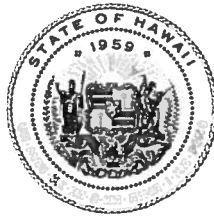
12. Room and board requirements on island: Not applicable

13. Work space needs: Not applicable

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
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

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

KEKOA KALUHIWA
FIRST DEPUTY

W. ROY HARDY
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
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

May 22, 2015

TO: Division of Aquatic Resources File

THROUGH: Suzanne Case, Chairperson

FROM: Maria Carnevale
Papahānaumokuākea Marine National Monument

DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS AND CHAPTER 11-200 HAR, FOR PAPAHAANAUMOKUĀKEA MARINE NATIONAL MONUMENT RESEARCH PERMIT TO KELLEY ELLIOTT, NOAA OFFICE OF OCEAN EXPLORATION AND RESEARCH, FOR ACCESS TO STATE WATERS TO CONDUCT BATHYMETRIC MAPPING ACTIVITIES UNDER PERMIT PMNM-2015-018

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 Kelley Elliott, University of Hawai'i, Hawai'i Undersea Research Laboratory, for Access to State Waters to Conduct Bathymetric Mapping Activities

Permit Number: PMNM-2015-018

Project Description:

The research permit application, as described below, would allow entry and activities to occur in Papahānaumokuākea Marine National Monument including the NWHI State waters between July 1, 2015 and June 30, 2016.

The primary purpose of the proposed project is to map the seafloor (i.e. produce bathymetric maps) of the Monument using multibeam and single beam sonar as well as utilize the Deep Discoverer ROV (Remote Operated Vehicle) in areas deeper than 250m. The ROV will target locations where high density deep water coral and sponge communities are likely to occur. The Applicant will attempt to map presently unmapped portions of the seafloor including a focus on the eastern end of the monument at Middle Bank and the west end of Mokumanamana. This area was identified during previous mapping expeditions (e.g. R/V FALKOR, R/V KILO MOANA).

At present, there are no other submersibles in the Hawai'i region that can operate deeper than 2000m.

Up to sixty (60) individuals would enter the Monument during three cruises between July 1 and September 30, 2015. The proposed activities would take place in waters deeper than 250 m and would not occur in state waters.

ROV operations will be conducted during daylight hours during two of the three cruise legs. One ROV dive will be conducted each day for a maximum of forty (40) anticipated ROV dives within PMNM waters during the project period. No ballast will be discharged during ROV operations. Multibeam, single beam and sub-bottom mapping will be carried out around the clock during the leg without ROV operations. During the two legs with the ROV, mapping surveys will be conducted during hours when the ROV is on deck. Video from ROV operations will be stored onboard the ship and streamed live to shore. A video of the mapping acquisition computer will be streamed to shore in real time. All data will be sent to shore and available via ftp site for interested scientists and managers as the cruises proceed. All data will be publicly available in the NOAA Data Centers within 90 days of cruise completion.

The Applicant is also making adjustments to reduce potential impacts on marine animals from the multibeam and single beam sonars during ROV dives or CTD (Conductivity, Temperature, Depth instrument) casts. The Applicant will minimize turning the system on and off as a precautionary measure to avoid the possibility of startling animals. When the multibeam system is turned off in the monument, the flexible "soft start" mode will be used to restart the multibeam. The soft start mode is a delay function that gradually increases the level required for optimal bathymetry data collection. This protective measure will help avoid inadvertent exposure of marine mammals to all three sonars. If cetaceans are in the vicinity (within 200 yards), the Applicant would stop the vessel until the animals depart from the area.

No negative effects of instrumentation involved in the proposed activities have been observed.

In terms of specimen collection, the Applicant intends to collect two (2) rocks and five (5) coral/sponges per dive site. Rocks will be analyzed to determine age and lava type to determine the late Cretaceous age of their collection sites. Coral and sponge specimens will be split between Bishop Museum and the Smithsonian to ensure access to multiple researchers. Only biological specimens suspected of being new species or new records for Hawaiian waters will be targeted.

The activities proposed by the Applicant directly support the Monument Management Plan's priority management need under the Marine Conservation Science Action Plan (MCS) Activity MCS-1.3: Map and characterize deep-water habitat (defined as waters more than 30 m depth). Activities to support coordinated field operations in the NWHI are addressed in the Monument Management Plan Environmental Assessment (December 2008) which resulted in a FONSI, or a Finding of No Significant Impact. This EA recognizes that sidescan sonar and other methods would be used to collect data needed to continue mapping and characterizing deepwater habitats in the Monument. (PMNM MMP Vol 2, p.8, 28, and 185).

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, and the Office of Hawaiian Affairs (OHA). In addition, the permit application was posted on the Monument Web site on March 11, 2015 and revised application was posted on March 16, 2015, 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 bathymetric mapping activities involving the use of multibeam sonar systems, gravimeter, and magnetometer; 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. Since this permit involves an activity that represents a commitment to a larger project, i.e. conducting bathymetric mapping activities of the seafloor within the Monument, the categorical exemption determination here will treat all planned activities as a single action, to the extent possible.

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 activities appear to fall squarely under the exemption class #5, exempt item #2 as described under the division of Forestry and Wildlife exemption list published on June 12, 2008. This exemption class has been interpreted to include "new transect lines, recording..." such as those to be supported by the proposed activities. It has also been interpreted to include vessel transiting transect lines and multibeam sonar systems, gravimeter, and magnetometer in the collection of bathymetric mapping data. As discussed below, no significant disturbance to any environmental resource is anticipated in the sampling of Monument resources. Thus, so long as the below considerations are met, an exemption class should include the action now contemplated.

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.

Similar activities of this type, to conduct bathymetric multibeam sonar mapping activities, have been permitted and undertaken in the past. In 2008, Joyce Miller was issued permit PMNM-2008-011 for bathymetric multibeam mapping activities in deep and shallow water around French Frigate Shoals, Nīhoa Island, and Pearl and Hermes Atoll. Dr. Christopher Kelley was issued permit PMNM-2009-052 in 2009 for multibeam mapping activities in deep and shallow water around Nīhoa Island, and again in 2014 for waters surrounding Nīhoa, Mokumanamana, French Frigate Shoals, Gardner Pinnacles, Maro Reef, Laysan Island, Lisianski Island, Pearl and Hermes Atoll, and Kure Atoll under permit PMNM-2014-002. In 2011, Dr. James Garner was issued permit PMNM-2011-013 for bathymetric mapping in deep water around Mokumanamana. Since bathymetric mapping within the Monument is not complete, it is reasonable to expect future permit requests for similar work. No deleterious impacts to the environment resulted from similar previous activities. 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.

The proposed project would be supported by the OKEANOS EXPLORER (proposed permit PMNM-2015-025) (See Table 1). The cruise dates for this project are July 3- July 24, July 31-August 22, August 28- September 3, and September 7-30, 2015 totaling fifty (50) days within the Monument. Refer to Tables 1 – 5 for concurrent activities in the Monument during the duration of this project. Though there are multiple permittees, there is not an anticipated cumulative impact due to the differences in research objectives and resources being studied.

Table 1. Concurrent projects aboard the OKEANOS.

PMNM-2015-025 Wetzler (proposed)	This permit would support various PMNM permitted projects aboard the OKEANOS	All locations
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Table 2. Concurrent projects aboard the SEARCHER.

PMNM-2015-017 Springer (proposed)	This proposed action would be to conduct intertidal biodiversity studies using traditional ecological knowledge	Nīhoa, Mokumanamana, French Frigate Shoals, Gardner Pinnacles
PMNM-2015-026 Bird-Toonen (proposed)	This proposed action entails conducting intertidal biodiversity activities	All locations

Table 3. Concurrent project aboard the HIKIANALIA

PMNM-2015-021 Thompson (proposed)	This proposed permit would provide opportunities for apprentice navigators to practice traditional wayfinding	Nīhoa, Mokumanamana, French Frigate Shoals, Gardner Pinnacles
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Table 4. Concurrent project about the MAKANI‘OLU

PMNM-2015-014 Kikiloī (proposed)	This proposed action would conduct archaeological and cultural research activities	Nīhoa, Mokumanamana
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Table 5. Concurrent projects aboard the HI‘IALAKAI

PMNM-2015-006 Simon HI‘IALAKAI (approved)	This permit allows the NOAA Ship HI‘IALAKAI entry into the Monument. Personnel aboard the vessel would be permitted under separate permits	All locations
PMNM-2015-012 Godwin (proposed)	This proposed action would be to conduct Reef Assessment and Monitoring Program (RAMP) activities	All locations
PMNM-2015-015 Gleason (proposed)	This proposed action would be to conduct maritime heritage activities in the NWHI	All locations
PMNM-2015-016 Wall (proposed)	This proposed action would be to conduct coral bleaching assessment activities in the NWHI	All locations
PMNM-2015-019 Littnan (proposed)	This proposed action would be to conduct monitors and surveys of various areas using an Unmanned Aerial System (UAS)	Laysan, Lisianski, Pearl and Hermes, Midway Atoll
PMNM-2015-020 Meyer (proposed)	This proposed action would be to conduct top predator research consisting of fishing for various shark and fish species	All locations

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. This particular Applicant is serving as a platform for concurrent activities to take place. The permittees that the ship will support will conduct research that will help inform our understanding of Monument resources. This will give managers the newest information from which to make management decisions.

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.

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 Case
Chairperson, Board of Land and Natural Resources

Date