State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Aquatic Resources
Honolulu, Hawaii 96813

June 8, 2012

Board of Land
and Natural Resources
Honolulu, Hawaii

Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National Monument Research Permit to Dr. Marc Lammers, Assistant Researcher, University of Hawaii, Hawaii Institute of Marine Biology, for Access to State Waters to Deploy Hydrophone Arrays and Ecological Acoustic Recorders (EARs)

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 Dr. Marc Lammers, Assistant Researcher, University of Hawaii, Hawaii Institute of Marine Biology, pursuant to § 187A-6, Hawaii Revised Statutes (HRS), Chapter 13-60.5, Hawaii Administrative Rules (HAR), and all other applicable laws and regulations.

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

- Nihoa Island
- Necker Island
- French Frigate Shoals
- Gardner Pinnacles
- Maro Reef
- Laysan Island
- Lisianski Island
- Pearl and Hermes Atoll
- Kure Atoll

The activities covered under this permit would occur between July 15, 2012 and July 14, 2013. These activities are a renewal of previously permitted activities (deployment of deep-water EARs). New activities include the deployment of small hydrophone array packages as well as transect studies near these deployment sites.

INTENDED ACTIVITIES:

The purpose of these activities is to deploy four deep water Ecological Acoustic Recorders (EARs) to detect marine mammals, monitor vessel traffic, and monitor the acoustic activity of benthic and mesophotic ecological communities. The Applicant also requests approval to deploy and retrieve small, acoustic hydrophone recorder array packages adjacent to coral reef outcrops

in shallow water. The Applicant proposes to conduct benthic and reef fish surveys at each of the hydrophone array deployment sites in order to correlate reef noise with ecological conditions at each site.

The items used with each deep-water EAR are a syntatic foam collar on the EAR, an acoustic release, a garage post concrete block, and two sandbags. The hydrophone array packages consist of a single acoustic recorder combined with an 11-element hydrophone array and four time-lapse cameras. The recorder would be temporarily attached to the substrate and placed next to the array. The array would be deployed horizontally or vertically in the water column. The arrays would also be secured by screw anchors in the sandy substrate. The EARs and hydrophone arrays record acoustic signals on a duty cycle. The acoustic signals are then used to determine the type of organisms that produce the sounds. In this way, the distribution of different organisms, their acoustic behavior on a 24-hour basis, and their relative abundance can be determined. The EARs have been successful in detecting different species of dolphins, humpback whales, and different species of fish. The EARs also collect long-term data on the level of snapping shrimp sounds throughout the Monument. The EARs are capable of recording boat sounds from vessels that enter the Monument.

For the benthic and reef fish surveys around the hydrophone array packages, the Applicant would use four 25 meter transect lines with 10 photo-quadrats taken randomly along each transect to conduct ecological assessments at the beginning and end of each recording period. Subsequently, reef rugosity would be measured using a tape measure and meter stick. Last, the Applicant would use previously established NOAA RAMP visual techniques to estimate fish abundance and diversity estimates.

The deployments would be carried out in the following manner:

- Deep water deployments – The ship's J or A-frame would lift the deep EAR package over the side of the ship and then release the entire package and let it free drop to the bottom. The EARs would be moored on the bottom (approximately 400 m depth). The EARs would be retrieved the following year, in 2013.
- Hydrophone array packages would be deployed by SCUBA on flat, sandy substrates by divers using SCUBA, and secured to the substrate by sand screws. Divers would work from small tender vessels. The cameras would be secured using plastic stakes. These deployments would all be in shallow water (10-20 m.) and would be removed after 1-3 days by the same divers.

This research would assist in determining the presence or absence of different species in the Monument. The acoustics would help identify vessel traffic patterns, increase understanding of the relationship between the sounds occurring on coral reefs and their long-term condition, and help to determine if long-term presence or absence of sounds on a reef may be used as a possible indicator of relative stability of reef ecosystems over time.

The activities proposed by the applicant directly support the Monument Management Plan's priority management needs 3.1 – Understanding and Interpreting the NWHI (through action plan 3.1.1 – Marine Conservation Science).

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

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

REVIEW PROCESS:

The permit application was sent out for review and comment to the following scientific and cultural entities: Hawaii Division of Aquatic Resources, Hawaii 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 has been posted on the Monument Web site since April 16th, giving the public an opportunity to comment. The application was posted within 40 days of its receipt, in accordance with the Monument's Public Notification Policy.

Comments received from the scientific community are summarized as follows:

Scientific reviews support this application. The following concerns were raised during the review process. The applicant's responses are noted below.

1. *Considering the applicant states that the project would benefit Monument management by evaluating presence of vessel traffic (page 3: Part C of the Summary Information Section and page 10: Question 7c); what is the timeline for data analysis of any vessel acoustic signatures??*

   The applicant responds that they are continuing analysis of existing deep EAR data previously collected and expect to have results available by approximately November 2012. Data obtained from the proposed new deployments would not be available until approximately December 2013.

2. *Does the applicant have funding to ensure (1) that the EARs will be recovered in 2013, and (2) to ensure that those data will be analyzed?*

   The applicant states that their present funding would allow for the recovery the EARs, but that they do not yet have guaranteed funding for the analysis of the data for 2013. Funds for analysis come from the NWHI-HIMB Partnership Program, which is funded on a yearly basis and is subject to political volatility in Washington D.C.

3. *The applicant mentions that a proposal has been submitted to fund analyses related to vessel traffic patterns (page 4). When will the applicant receive confirmation of this funding source; and is the applicant seeking alternative funding sources in the interim that will allow the data to be analyzed for vessel traffic?*

The applicant responds that NOAA's Acoustics Program decided not to fund their proposal.

4. *Specifically what are the sounds that are indicative of reef "health" (as described on page 3) or lack of health, and what is the applicant's definition of reef health related to the proposed activities?*

   The applicant explains that the application of passive acoustics to measure reef "health" is still in currently in developmental stages. Reefs are full of biological sounds and no specific ones have yet been identified as being indicative of health per se. However, this work is meant to better understand the relationship between the sounds occurring on reefs and their long-term condition. The goal is to use the long-term presence or absence of sounds as an indicator of relative stability of reef ecosystems over time.

5. *Have the proposed hydrophone arrays been successfully deployed elsewhere, and has analysis of the data been able to (1) pinpoint the locations of sound producers, and (2) discriminate between, and identify sound producers? Are not EARs already capable of discriminating among multiple types of acoustic signatures?*

   The applicant responds that:
   (1) The hydrophone array was originally designed and built to record underwater sounds produced by overflying aircraft. This was an experiment sponsored by the Office of Naval Research (ONR) conducted in Hawaii during 2006. In 2010-2011 the array was overhauled and subsequently deployed in San Diego waters. Acoustic directionality (beamforming) algorithms used in Simon Freeman's previous work under the ONR Deep Ocean Detection Program are being applied to the data collected in San Diego. This previous work involved identifying and discriminating the direction of sound sources such as earthquakes, ships, and equipment used in oil exploration in the Philippine Sea using a similar array.

   (2) Currently, acoustic data from individual array channels demonstrate the array's ability to identify sound producers such as marine mammals, snapping shrimp, and boat traffic. This capability is identical to the EARs. However, because the EAR records on a single channel the EAR is not able to determine the range or bearing to the source, and therefore, can not establish the location. Once the beamforming algorithms are implemented, the array will be unique to the EARs as information regarding the *direction* from which the sounds arrived from will be recorded.

6. *Specifically which echosounder will be used to locate drop sites for the deep EARs? Would this be the ship's multibeam sonar or an instrument on the small boats (i.e., tender vessels)?*

   The applicant states that they would use the ship's 12 kHz echosounder to identify drop sites for the deep EARs. This is the echosounder used by the ship's bridge for navigation.

7. *Specifically what fish survey method will be utilized: belt transects or stationary point counts?*

   The applicant states that three survey techniques would be employed (when possible, based on time constraints) to survey fish. Techniques 1 and 2 are intended so as data would be comparable with previous ecological surveys in the region. Technique 3 would be employed to gain a time-lapse spatial sense of fish abundance and species composition for acoustic beamforming. Technique 3 is intended primarily to obtain a time-series that includes both day and nighttime data:

   1. Belt transects would be employed principally to quantify abundant and small-bodied fishes.
   2. Stationary point counts would be employed to quantify estimates of larger and more mobile/transient fishes.
   3. Time-lapse handheld cameras would be positioned on the sea floor adjacent to the hydrophone array to obtain a time-series of relative fish abundance and species composition over time. Cameras would be equipped with built-in strobes to enable nighttime recording.

8. *What, if any, measures can be taken to minimize the risk of marine life becoming entangled in hydrophone array cables?*

   The applicant explains that the hydrophone array cable, when deployed horizontally, is negatively buoyant and would remain on the sandy sea floor. It is a thick, relatively stiff, rubber-enclosed cable that does not tangle easily. Furthermore, the cable would be secured firmly to the sea floor at both ends using sand-screw anchors. The cable would be kept in tension so that hydrophones remain precisely positioned, a critical aspect of the experiment. As a consequence the likelihood of entanglement is extremely low.

   During vertical deployments the hydrophone cable would remain in tension as a function of the surface marker buoy and the sand-screw anchor fixed to the deep end. Consequently the cable is unlikely to entangle any marine life.

9. *Is it necessary to use concrete anchors to deploy the deep EARs, or can a bio-degradable substance be used instead?*

   The applicant responds that they use a combination of a concrete block and sand bags as a redundancy measure. Their main concern is that one or more sandbags might rupture upon landing, which could compromise the deployment if insufficient weight is left to hold the mooring in place. The use of the concrete block is a hedge against this possibility.

10. *Are both sand and concrete anchors sterilized so as to avoid introducing foreign bodies into the ecosystem?*

    The applicant states that they do not have any specific sterilization procedure in place. Their sense is that the use of bleach or some other antiseptic would introduce unwanted

chemicals into the environment. However, they could soak the concrete blocks and sand bags in fresh water overnight to kill off any marine organisms, if that is desired.

11. *This reviewer understands that retrieval of any deep EARs deployed in 2012 would be part of a subsequent permit application; however recommend that when retrieval activities are proposed, the applicant should have protocols in place for handling unintentional organisms that may be attached to EAR instruments.*

    The applicant states that in their experience, fouling on deep EARs is minimal.

12. *Natural resources are cultural resources, and the applicant's intentions to learn more about PMNM resources in order to better protect them, using thorough measures to prevent damaging them in the process, is commendable and actually results in the proposed activities have a potential positive effect on the sacred natural and cultural resources of Papahānaumokuākea.*

    The applicant agrees and says that they would conduct their work with the utmost sensitivity and respect for all natural and cultural resources within the Monument.

13. *Recommend that the researchers ensure all anchors and associated hardware for all instruments are placed in sand only.*

    The applicant states that this is their goal.

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 Section 7 ESA consultation has been initiated and is in process.
- The Department has determined that the permit activities are exempt from the requirement to prepare an Environmental Assessment under HRS Chapter 343, and HAR, Chapter 11-200. See Attachment ("DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS, AND CHAPTER 11-200, HAR, FOR PAPAHĀNAUMOKUĀKEA MARINE NATIONAL

MONUMENT RESEARCH PERMIT TO DR. CHRISTOPHER WINN AND DR. SAMUEL KAHNG, ASSISTANT RESEARCHERS, HAWAII PACIFIC UNIVERSITY, OCEANIC INSTITUTE, FOR ACCESS TO STATE WATERS TO CONDUCT OCEAN CARBON RESEARCH ACTIVITIES UNDER PERMIT PMNM-2012-041").

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

- Deployment of deep water EARS was previously permitted to Dr. Whitlow Au of HIMB under PMNM-2010-34.

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

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

STAFF OPINION:

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

MONUMENT MANAGEMENT BOARD OPINION:

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

RECOMMENDATION:

Based on the attached proposed declaration of exemption prepared by the Department after consultation with and advice of those having jurisdiction and expertise for the proposed permit actions, The Department requests that:

1. The Board declare that the actions to be undertaken under this permit will have little or no significant effect on the environment and are therefore exempt from the preparation of an environmental assessment.

2. Upon the finding and adoption of the department's analysis by the Board, 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. The Board authorize and approve a Research Permit to Dr. Marc Lammers, Assistant Researcher, University of Hawaii, Hawaii Institute of Marine Biology, with the following special conditions:

a. This permit is not to be used for nor does it authorize the sale of collected organisms. Under this permit, the authorized activities must be for noncommercial purposes not involving the use or sale of any organism, by-products, or materials collected within the Monument for obtaining patent or intellectual property rights.

b. The permittee may not convey, transfer, or distribute, in any fashion (including, but not limited to, selling, trading, giving, or loaning) any coral, live rock, or organism collected under this permit without the express written permission of the Co-Trustees.

c. To prevent introduction of disease or the unintended transport of live organisms, the permittee must comply with the disease and transport protocol attached to this permit.

d. Tenders and small vessels must be equipped with engines that meet EPA emissions requirements.

e. 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.

f. No fishing is allowed in State Waters except as authorized under State law for subsistence, traditional and customary practices by Native Hawaiians.

Respectfully submitted,

GUY KAULUKUKUI
Acting Administrator

APPROVED FOR SUBMITTAL

WILLIAM J. AILA, JR.
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: Marc Lammers
Affiliation: Hawaii Institute of Marine Biology

Permit Category: Research
Proposed Activity Dates: July-September 2012
Proposed Method of Entry (Vessel/Plane): NOAA ship Hi'ialakai
Proposed Locations: For Short term acoustic surveys and/or deep EAR deployment

Nihoa (Moku Manu):	23.06°N	161.92°W
Necker (Mokumanamana):	23.57°N	164.70°W
French FS (Kānemiloha'i):	23.87°N	166.29°W
Gardner Pinnacles (Pūhāhonu):	25.02°N	167.98°W
Maro Reef (Nalukākala):	25.42°N	170.59°W
Laysan (Kauō):	25.77°N	171.73°W
Lisianski (Papaāpoho):	26.06°N	173.97°W
Pearl/Hermes (Holoikauaua):	27.93°N	175.74°W
Midway (Pihemanu):	28.20°N	177.35°W
Kure (Mokupāpapa):	28.42°N	178.33°W

Estimated number of individuals (including Applicant) to be covered under this permit: 2
Estimated number of days in the Monument: 25

Description of proposed activities: (complete these sentences):

a.) The proposed activity would…

Involve deploying and retreiving a portable diver-deployed line-array of hydrophones, secured temporarily to the sandy bottom at approximately 10-20 m depth. Hydrophone deployment will be conducted simultaneously with benthic and reef-fish surveys in order to correlate recorded reef noise with ecological conditions around each field site. Deployments will last a maximum of three days at each site. We will also deploy four deep water Ecological Acoustic Recorders (EARs) to depths ranging from 100 m to 500 m that will be used to record marine mammal activity, vessel traffic and sounds produced by the benthic and mesophotic communities. The

items used with each EAR will be a syntatic foam collar on the EAR, an acoustic release, a garage post concrete block and two sandbags.

b.) To accomplish this activity we would ....
Survey each field site and find an appropriate flat sandy region of sea floor adjacent to a large coral reef outcrop. Divers would then take the cable from the line array buoy from the dive tender and anchor it to the bottom using temporary sand-screw anchors. The floating buoy section of the array will float at the surface allowing for re-location and radio communication with the data logger. After deployment a survey of reef fish and benthic habitat will be conducted around the hydrophone site to a range of 100 m from the array, at depths of no more than 20 m. Retrieval of the array will be a reversal of the deployment process. A small boat dive tender will be required and at least two dives will need to be completed in the same location. For deep EAR deployments, we will first survey candidate locations with the ship's echosounder for relatively flat, sandy sites. We will then use the ship's J-frame or A-frame to lift the mooring anchor (cement block and sandbag), the acoustic release and deep EAR package along with flotation foam over the side of the ship and then release the entire package and let it drop to the bottom.

c.) This activity would help the Monument by ...
Helping to evaluate the relative health of coral reef ecosystems in the Monument and validating the effectiveness of Monument protection via passively 'listening' to sounds made by reef organisms. We aim to collect data for the development of a process through which rapid assessments of reef health can be made by listening to reef sounds over a period of days. This way, ecological differences within and outside the Monument can be acoustically characterized, in addition to any changes within the Monument. It is intended that this tool will be used in aiding management decisions regarding protection of valuable marine resources such as the Monument. This process will also assist in evaluating vessel traffic patterns and marine mammal activity near the acoustic deployment areas.

Other information or background:
Evaluating the ecological state of the Monument is important to the successful management of the ecosystem within the Monument. Using passive acoustic recording, the relative state of Monument ecosystems over time and space can be quantified, allowing for rapid appraisal of any changes that may take place due to climate effects or human-related activities within the Monument.
Hydrophone arrays determine where sound producers are located in addition to recording their sounds. Using an array will allow us to pinpoint sections of the reef that are acoustically active and record what types of biological sounds are produced on different portions of the reef and the surrounding water. Combined with visual surveys, this information will allow us to determine to what extent different types of organisms contribute to the overall recorded sound field.

This type of information is important for managing the reso urces of the Monument, as it allows us to determine differences in the ecology of each area acoustically, and provide baseline data so that we may detect changes in the ecology of each area over time.

Comparisons between acoustic data recorded within and outside the Monument (in the main Hawaiian Islands) will allow us to quantify the effect of the Monument's protected status on the sound field, yielding insight toward the effect of the Monument on the overall ecology of the marine environment.

EARs have been used to acoustically monior Monument waters since 2006. Over the past several years, acoustic analyses have focused on documenting natural ambient sounds in order to establish baselines of activity for long-term comparisons. Considerable attention has been focused on the sounds produced by snapping shrimp, which are the most ubiquitous source of sound on coral reefs. Data collected in the Monument have so far yielded a wealth of information regarding temporal patterns of activity over periods of days, weeks and seasons. For example, EAR data have revealed that snapping shrimp are more active at night and also during periods of the new moon. They have also shown that snapping shrimp respond acoustically to storm events and changes in water temperature. In addition, it was recently shown that snapping shrimp activity is tied to variations in the concentration of Chlorophill a in surrounding waters. All these findings point to the fact that snapping shrimp are good bio-indicators of physical factors affecting the reef and that they will be very useful, over time, to help determine the relative stability of the ecosystems being monitored.

Other important findings obtained by deploying EARs in the Monument have involved documenting the occurrence of marine mammals in Monument waters. Last year a paper was published describing the occurrence of humpback whales in the NWHI. It demonstrated that the NWHI are an important wintering area for the north Pacific population, probably on par with the main Hawaiian Islands. Recent analyses suggest that the abundance of humpback whales in the NWHI have been rising over the past several years. In addition, fin whales and minke whales are being documented in Monument waters and subsequent analyses will focus on documenting trends associated with their occurrence.

Finally, deep water EAR deployments made in the past 2 years have been successful at recording vessel traffic at several sites. Both shipping and non-shipping traffic has been found in many recordings. Analyses related to vessel traffic patterns are ongoing but have been temporarily suspended due to a lack of funding. They will be resumed as soon as new sources of funding have been secured. A proposal was recently submitted to the NOAA Acoustics Program to specifically support the analysis of these data and any new data collected.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Lammers, Marc O.

Title: Assistant Researcher, HIMB

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

2. Mailing address (street/P.O. box, city, state, country, zip): [redacted]

Phone: [redacted]

Fax: [redacted]

Email: [redacted]

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

3. Affiliation (institution/agency/organization directly related to the proposed project):
Hawaii Institute of Marine Biology and Scripps Institute of Oceanography

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):
Simon Freeman, Field Principal Investigator
Lauren Freeman, Research diver.

Section B: Project Information

5a. Project location(s):

		Ocean Based	
☒ Nihoa Island	☐ Land-based	☒ Shallow water	☒ Deep water
☒ Necker Island (Mokumanamana)	☐ Land-based	☒ Shallow water	☐ Deep water
☒ French Frigate Shoals	☐ Land-based	☒ Shallow water	☒ Deep water
☒ Gardner Pinnacles	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Maro Reef			
☒ Laysan Island	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Lisianski Island, Neva Shoal	☐ Land-based	☒ Shallow water	☒ Deep water
☒ Pearl and Hermes Atoll	☐ Land-based	☒ Shallow water	☒ Deep water
☒ Midway Atoll	☐ Land-based	☒ Shallow water	☒ Deep water
☒ Kure Atoll	☐ Land-based	☒ Shallow water	☒ Deep water
☐ Other			

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

Location Description:

Although exact locations of acoustic instrument deployment are cruise and weather dependent, general locations we intend to target are:

Nihoa (Moku Manu):	23.06°N	161.92°W	(array & deep EAR site)
Necker (Mokumanamana):	23.57°N	164.70°W	(array site)
French FS (Kānemiloha'i):	23.87°N	166.29°W	(array & deep EAR site)
Gardner Pinnacles (Pūhāhonu):	25.02°N	167.98°W	(array site)
Maro Reef (Nalukākala):	25.42°N	170.59°W	(array site)
Laysan (Kauō):	25.77°N	171.73°W	(array site)
Lisianski (Papaāpoho):	26.06°N	173.97°W	(array & deep EAR site)
Pearl/Hermes (Holoikauaua):	27.93°N	175.74°W	(array & deep EAR site)
Midway (Pihemanu):	28.20°N	177.35°W	(array site)
Kure (Mokupāpapa):	28.42°N	178.33°W	(array site)

Attached is a map showing the tentative locations where the array work might be conducted (white squares). The final locations will be determined by the cruise's itinerary, which will be set by other priorities. Also shown are the tentative locations of deep EAR mooring deployments. These also will be subject to the limitations imposed by cruise priorities, logistics and weather.

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:***
To characterize the ambient biological noise produced by different reefs within the Monument and determine the azimuth of vessel traffic noise sources in Monument waters by deploying and retrieving small acoustic recorders for 1-3 days at a number of field sites within the Monument. To deploy up to 4 deep EARs at depts ranging from 100 m to 500 m in order to monitor vessel traffic, marine mammal activity and the acoustic activity of the benthic and mesophotic communities for one year.

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?
We will be deploying and retrieving an array of acoustic sensors in shallow water and will not be collecting any samples. The array will only be deployed for 1-3 days and will be completely removed afterwards. The deep EARs that will be deployed are entirely passive and do no emit any sounds themselves. EAR moorings have been used to monitor marine mammals and other marine biota around the world for the past several years and are completely safe to the environment. They do not interfere in any way with the behavior of nearby animals as they are entirely passive and no different fundamentally from any other moored instrument, such as a temperature sensor. In addtion, their presence in the environment is temporary, as they will be removed the following year. Therefore, no cultural, natural and historic resources will be jeopodized by our activities and ecological integrity of the Monumnet will be left undisturbed.

The four deep EARs that were deployed in the Monument in 2010 were recovered in 2011 from the following locations:

Kure Atoll	28 20.052'	178 15.195'	depth = 123 m
Nihoa	23 04.474'	162 04.967'	depth = 405 m
French Frigate Shoals	23 44.373'	166 23.473'	depth = 372 m
Lisianski Island	25 54.207'	174 01.373'	depth = 374 m

Recovery of the instruments required that the anchoring weights be left on the ocean floor. Each mooring anchor was composed of a 75 lbs concrete garage post anchor and three burlap bags filled with sand weighing approximately 25 lbs each. No plastic bags were used. Althought the exact susbrated on which deployments were made could not be visually verified, deployment locations were selected based on the relative rugosity observed on the ship's echosounder. To maximise the likelyhood of landing the moorings on sand, the locations selected were the flattest

that could be found in the area. The same deployment procedure and materials will be used for this year's proposed deployments.

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 believe the deployment and recovery of the hydrophones is completely compatible with the management direction and will not jeapordize any of the Monument's cultural, natural, and historic resources, qualities and ecological integrity. We are very aware of the cultural and spiritual importance of the NWHI to the Native Hawaiian community. We understand that for many Native Hawaiians the NWHI represent a genealogical origin and that they are considered a return path for their spirits after death. We also understand and agree that is it important that all resources in the Monument be treated with both a high degree of respect and reverence. Therfore, we assure that deployment and recovery of the hydrophones will take Native Hawaiian cultural aspects into full consideration. All activities related to the hydrophones will be conducted in a way so as to have the smallest and shortest impact possible and no activities will be knowingly engaged in that are somehow disrespectful of Native Hawaiian cultural and spiritual practices.

EARs have been used to acoustically monior Monument waters since 2006. Over the past several years, acoustic analyses have focused on documenting natural ambient sounds in order to establish baselines of activity for long-term comparisons. Considerable attention has been focused on the sounds produced by snapping shrimp, which are the most ubiquitous source of sound on coral reefs. Data collected in the Monument have so far yielded a wealth of information regarding temporal patterns of activity over periods of days, weeks and seasons. For example, EAR data have revealed that snapping shrimp are more active at night and also during periods of the new moon. They have also shown that snapping shrimp respond acoustically to storm events and changes in water temperature. In addition, it was recently shown that snapping shrimp activity is tied to variations in the concentration of Chlorophill a in surrounding waters. All these findings point to the fact that snapping shrimp are good bio-indicators of physical factors affecting the reef and that they will be very useful, over time, to help determine the relative stability of the ecosystems being monitored.

Other important findings obtained by deploying EARs in the Monument have involved documenting the occurrence of marine mammals in Monument waters. Last year a paper was published describing the occurrence of humpback whales in the NWHI. It demonstrated that the NWHI are an important wintering area for the north Pacific population, probably on par with the main Hawaiian Islands. Recent analyses suggest that the abundance of humpback whales in the NWHI have been rising over the past several years. In addition, fin whales and minke whales are being documented in Monument waters and subsequent analyses will focus on documenting trends associated with their occurrence.

Finally, deep water EAR deployments made in the past 2 years have been successful at recording vessel traffic at several sites. Both shipping and non-shipping traffic has been found in many recordings. Analyses related to vessel traffic patterns are ongoing but have been temporarily suspended due to a lack of funding. They will be resumed as soon as new sources of funding have been secured. A proposal was recently submitted to the NOAA Acoustics Program to specifically support the analysis of these data and any new data collected.

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.
The Monument represents an ecological system within unique oceanographic conditions which experiences unique protection and isolation from human impacts. To evaluate the effects of these conditions and impacts acoustically, hydrophones must be placed within the Monument. Acoustic data collection from within the monument is a critical component of our study as we aim to draw comparisons between the sound fields within the Monument and those from unprotected areas subject to urbanization and resource extraction within the MHI.

Furthemore, if we want to determine the presence of vessel traffic using acoustic instruments within the monument then the recording devices need to be within the Monument.

The deep EAR deployments proposed for this year will help build on the data sets obtained two years ago. Long-term data series become more valuable with each year that they are collected and data from EARs are no different in this regard. An additional year of data collection will help answer questions about whether the incidence of fin and minke whales are increasing in the Monument, similarly to what has been found for humpback whales, and it will also provide more insight into vessel traffic patterns. In addition, the data will help continue to build a library of sounds from deep dwelling organisms, which we currently know nearly nothing about.

d. How does the end value of the activity outweigh its adverse impacts on Monument cultural, natural and historic resources, qualities, and ecological integrity?
There will not be any adverse impact on the Monument so our activities should be considered as harmless. The anchoring materials that will be used do not contain any plastic of synthetic components and will therefore naturally decompose with time. We believe that the benefits of better understanding the occurrence of protected resources and vessels in Monument waters outweigh any temporary negative impacts from the abandoment of anchoring materials. Documenting the presence of endangered species such as fin whales in Monument waters will bring positive media and public attention to the Monument, which will in turn help strengthen support for management goals. Documenting the relative presence of vessels in Monument waters will help guide management decisions regarding required enforcement levels and and will help guage the effectiveness of current management efforts.

e. Explain how the duration of the activity is no longer than necessary to achieve its stated purpose.
To obtain a three-dimensional acoustic view of the field site the array will need to be positioned along x, y, and z axes for 24 hours at a time due to the daily cycle of acoustic activity found on

most reefs. Therefore the duration of the experiment is 72 hours and there are no other reasons for us to remain at the location. The deep EARs that will be deployed will be deployed for a one-year period. This length of time is meant to maximize the monitoring period for vessel and marine mammal sounds as well as to conform to deployment and recovery logistics. Once deployed, we do no expect to be able to return to recover the instruments until the following year.

f. Provide information demonstrating that you are qualified to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.
Marc Lammers led the design of the EAR and has been deploying EARs in the NWHI and many other parts of the world since 2006. He has been involved in bioacoustic research for the past 17 years.

Simon Freeman is an experienced SCUBA diver having logged more than 500 dives. He is familiar with conducting complex procedures underwater through his experience in technical diving. He has conducted SCUBA field studies in the Main Hawaiian Islands, New Zealand, and San Diego previously and is familiar with the necessary procedures undertaken in scientific diving. He has logged more than 200 dives in tropical coral reef environments and understands the care required in minimizing damage to coral reef organisms. He also has previous experience in working with hydrophone arrays through the ONR funded Deep Ocean Detection Program (DODP) at Scripps Institution of Oceanography.

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.
The field-based component of this project is supported by an allocation of ship time (July-September period, dates TBD) on the NOAA research vessel Hiialakai, from a line item in the budget of the Monument. Subsequent data analysis is made possible by an NSF IGERT award that provides support for Simon Freeman until June 2013. The deep EARs that will be deployed were previously funded by by the HIMB-NWHI Coral Reef Research Partnership (NMSP MOA 2005-008/66882).

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.
The method we are applying, that is to record acoustic signals thorughout the Monument will allow us to investigate acoustically the relative state of the marine ecosystem througout the Monument and compare these findings to data collected in the Main Hawaiian Islands.
This type of information provides insight into the cultural, natural and historical resources of the Monument. These observational techniques will not affect the quality and ecological integrity of the Monument.

Each deep EAR mooring anchor will be composed of a 75 lbs concrete garage post anchor and three burlap bags filled with sand weighing approximately 25 lbs each. No plastic bags will be

used. Although the exact substrate on which the deployments will be made cannot be visually verified, deployment locations will be selected based on the relative rugosity observed on the ship's echosounder. To maximize the likelihood of landing the moorings on sand and away from any deep-water coral, the locations selected will be the flattest that can be found in the area.

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

j. Demonstrate that there are no other factors that would make the issuance of a permit for the activity inappropriate.
These acoustic recordings are a continuation of research efforts that have been conducted for five years and throughout the history of the Monument by Marc Lammers and Whitlow Au at HIMB. During these previous efforts, there have been no problems with permit violations by our research team, no safety issues, and no complaints of offensive behavior. Under these circumstances there are no other factors that would make the issuance of the permit inappropriate.

8. Procedures/Methods:
Observations, deployment and retrieval of all hydrophone array equipment will be conducted using SCUBA apparatus. Divers will work from a small tender deployed from the research vessel. Initial observations at each site will be conducted to determine an appropriate location for hydrophone deployment. Hydrophones will be deployed on subsequent dives in locations within sites that provide level, sandy ground adjacent to the reef edge with unobstructed acoustic direct pathways to reef habitat.
The hydrophone array will be deployed along the sea floor parallel to the reef edge and secured to the bottom using dive weights and screw anchors. The depth of deployment will be between 10-20 m depth. Additional stakes will mark the geometric placement of each array element. During subsequent dives 24 and 48 hours later if possible, the array will be repositioned first orthogonal to the reef edge, then vertically in the water column whilst taking care to record the relative geometric positions of each element. The array and all associated equipment will be removed after 72 hours at each site. The array will be deployed simultaneously with a single hydrophone recorder (Loggerhead). All acoustic recorders will work on a duty cycle (on and off periods) to record 7 minutes of acoustic information every 10. The data are subsequently analyzed with computer-based alogirthms that will allow us to evaluate diurnal patterns of acoustic activity at various locations within the Monument and to identify various sound producing organisms such as invertebrates, fish, and marine mammals. We are also able to record engine sounds and determine the diretion of vessels that enter the monument and are within 5-10 km of the hydrophones. During deployment dives, surveys of benthic cover and reef fish will be conducted in the immediate area of hydrophone deployment.

Benthic surveys will be conducted by Lauren Freeman and Simon Freeman, the same team that will be deploying and retrieving the hydrophone (both AAUS science divers at Scripps, with previous research diving experience in the main Hawaiian Islands). After hydrophone deployment, ecological surveys will be conducted at the beginning and end of the recording period. A series of four 25m transect lines with 10 photo-quadrats taken randomly along each transect will be conducted at each site, based on methods outlined in Preskitt et al. (2004). Photo-quadrats will subsequently be analyzed for percent coral cover, percent algae cover, and dominant coral growth form. Alongside each transect we will measure reef rugosity using a tape measure and meter-stick method. Lastly, we will estimate fish abundance and diversity estimates using visual techniques used on previous NOAA RAMP cruises at each location. Although estimation outcomes vary due to human biases, we intend to adhere as closely as possible to established NOAA techniques in order to maximize the accuracy of comparisons between this data set and previously collected information. Regarding all surveys, it is critical for interpreting the acoustic data to have simultaneous ecological data collection.

The four deep EARs will be deployed directly off the ship by droping them overboard at sites ranging from 100-500 m in depth. EARs also work on a duty cycle and collect data through out the year on a daily basis. The data will be analyzed with computer-based alogirthms that will allow us to establish long-term activity patterns in the Monument and identify various sound producing organisms such as invertebrates, fish, dolphins and whales, as well as vessels that enter that occur within listening range of the EAR.

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:
N/A

Scientific name:
N/A

& size of specimens:
N/A

Collection location:
N/A

☐ Whole Organism ☐ Partial Organism

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

9c. Will the organisms be kept alive after collection? ☐ Yes ☐ No
N/A

• General site/location for collections:
N/A

• Is it an open or closed system? ☐ Open ☐ Closed
N/A

• Is there an outfall? ☐ Yes ☐ No
N/A

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

• Will organisms be released?
N/A

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

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

12a. List all specialized gear and materials to be used in this activity:
In additon to the deep EARs that will be deployed, acoustic recordings will be made with two additional devices: the single-element standalone 'Loggerhead' acoustic recorder (approx 6 x 30 in. cylinder, 30lbs) built by Loggerhead Instruments and an 11-element unevenly-spaced line array built by the Buckingham lab at Scripps Institution of Oceanography (approx. 15 x 40 in. cylinder with 100ft-long cable, 80lbs).

The Loggerhead acoustic recorder consists of a single HTI hydrophone and a signal conditioning board that includes a preamp and adjustable band-pass filters. The sampling frequency of this recorder is 80 kHz. The array consists of eleven elements arranged in four five-element nested linear arrays. The design frequencies of these arrays are 250, 500, 1000, and 2000 Hz. The sampling frequency of each channel is 80 kHz. The word "element" is used to refer to any one of the eleven hydrophones in the hydrophone array. Each hydrophone is a small pressure sensor encased in rubber, connected together with a rubber-encased cable. The eleven hydrophones are

arranged in a geometric manner so that there are four groups of five hydrophones arranged with the same distance between each. The total lengths of these groups are 1.5 m, 3 m, 6 m, and 12 m. As the hydrophones in each group are arranged equidistantly, the spacings between the hydrophones within each group are 0.325 m, 0.75 m, 1.5 m, and 3 m respectively. The attached figure shows how the hydrophones are arranged along the cable. The hydrophones are arranged this way so that the array can focus on different acoustic frequencies – the spacing between hydrophones limits the frequencies that they can record. Having different spacings allows the hydrophones to record where a wider range of sounds come from.

The array can either be deployed horizontally along the bottom or vertically in the water column. During horizontal deployment the hydrophone cable will be held in tension between the two screw anchors at each end and the height of the screw anchor eyelets will be adjusted so that the hydrophones and cable will rest on the sand. As the hydrophones and cables are negatively buoyant they will be in contact with the sand and will not float in the water. The data collection module and battery pack are housed in floating, pressure-resistant containers that are designed to float at or near the surface. An extension cable may be coupled between the array and the data collection module to facilitate deployment along the bottom and/or in deeper water. A tilt sensor embedded in the array cable enables tilt-compensation when the array is deployed vertically. Eleven small stakes (similar to tent pegs) will be used to mark the position of each hydrophone. All stakes and any anchoring equipment will be removed after each survey.

The array will preferably be secured to the bottom using only the screw anchors as the transportation of dive weights by divers to and from the hydrophone site would be more challenging than the transportation of relatively lightweight screw anchors. The array will be deployed in locations with little current and swell. However, if water movement results in the excessive motion of the array while deployed horizontally, two diver weight belts with up to 20 lbs. of weight will be secured tightly to the array cable to prevent array movement. No weights will be used during vertical deployment. The screw anchors to be used for securing the hydrophones to the sea floor are approximately 40 inches long – it is anticipated that 95% of this length (38 inches) will be below the sand surface when deployed. The hydrophone cable will be connected to two-inch diameter eyelets on the upper end of the screw anchors. The anchors will be inserted into the sand by rotating the screw using a wooden stick inserted in the eye at the top of the anchor. Removal involves rotating the anchor in the opposite direction. Attached image shows an example screw and a wooden dowel used during field trials in San Diego.

Time-lapse cameras will be synchronized to run simultaneously with the hydrophone during its recording periods, so that concurrent visual data can be collected with acoustic data. The hydrophones will record a sample of ambient reef noise for 2 minutes at the beginning of every 30 minute period. The time-lapse cameras will be programmed to simultaneously turn on and record still images during these periods. Time-lapse cameras will be mounted on removable plastic stakes, similar in size to tent-pegs, that will be inserted in to the sandy sea floor. Plastic stakes will be removed with the cameras upon recovery.

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

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

The complete list of instruments we plan to deploy includes the following:
1. The hydrophone array
2. A compact single hydrophone recorder (Loggerhead systems) similar to the EARs
3. Four underwater digital cameras (Canon D10)
4. Four deep EARs

These are all temporary items and will be recovered either during the current cruise or in the case of the deep EARs, the following year.
Schematic diagrams showing how the first three types of instruments will be deployed as well as photos of the three types of acoustic recorders to be used, are attached.

14. Provide a time line for sample analysis, data analysis, write-up and publication of information:
We expect analysis of the array data to be mostly completed by the end of 2012. Write-ups usually take no more than an additional year, although the turn-around time for some journals can exceed 300 days, so time to publication can still be considerable post-submission of the study. The EAR data will only become available when EARs are recovered, sometime in the summer of 2013. We expect the data from the EARs to be analyzed by the end of 2013.

Results from these studies will be made available to the Monument, FWS, and state managers as quickly as possible. Brown-bag luncheons at HIMB allow researchers to highlight important or interesting new results and discuss them with the management personnel. In addition, HIMB holds an annual symposium during which researchers present the most current findings from their ongoing research in the Monument. These efforts ensure that research results are provided to the Monument co-trustees as quickly as they become available.

15. List all Applicants' publications directly related to the proposed project:
•Freeman, S. E., D'Spain, G. L., Lynch, S., Stephen, R., Heaney, K., Murray, J., Baggeroer, A., Worcester, P., Dzieciuch, M., Mercer, J. "Simultaneous horizontal and vertical direction-of-arrival characterization of water-borne seismic phases using adaptive processing methods". J. Acoust. Soc. Am. Subm.

•Lammers, M.O., Brainard, R.E. and Au, W.W.L (2006). "Diel trends in the mesopelagic biomass community of the Northwestern Hawaiian Islands observed acoustically". Atoll Research Bulletin, 543:391-407.

•Lammers, M.O., Brainard, R.E. and Au, W.W.L., Mooney, T.A. and Wong K. (2008). "An Ecological Acoustic Recorder (EAR) for long-term monitoring of biological and anthropogenic sounds on coral reefs and other marine habitats." J. Acoust. Soc. Am. 123:1720-1728

•Lammers, M.O., Fisher-Pool, P., Au, W.W.L., Wong, K., Meyer, C. and Brainard, R., (2011). "Humpback whale (Megaptera novaeangliae) wintering behavior in the Northwestern Hawaiian Islands observed acoustically." Mar. Ecol. Prog. Ser. 423:261-268.

•Lammers, M.O., Stieb, S., Au, W.W.L., Mooney, T.A., Brainard, R.E. and Wong, K. (In prep). "Temporal, geographic and density variations in the acoustic activity of snapping shrimp." To be submitted to Mar. Ecol. Prog. Ser.

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 3/23/12
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): Marc Lammers, P.I. [redacted]; Simon Freeman, Science diver and data analyst. [redacted] Lauren Freeman, Science diver. [redacted]
Lisa Munger, Alternate Science diver, [redacted]
Pollyanna Fisher-Pool, Alternate Science diver, [redacted]

2. Specific Site Location(s): (Attach copies of specific collection locations): Approximate site location GPS coordinates are as follows. Ideal sites are shallow, sheltered areas of sea floor between 30'-60' in depth with a sandy bottom. (Exact site locations subject to weather and cruise plan):

Nihoa (Moku Manu):	23.06°N	161.92°W
Necker (Mokumanamana):	23.57°N	164.70°W
French FS (Kānemiloha'i):	23.87°N	166.29°W
Gardner Pinnacles (Pūhāhonu):	25.02°N	167.98°W
Maro Reef (Nalukākala):	25.42°N	170.59°W
Laysan (Kauō):	25.77°N	171.73°W
Lisianski (Papaāpoho):	26.06°N	173.97°W
Pearl/Hermes (Holoikauaua):	27.93°N	175.74°W
Midway (Pihemanu):	28.20°N	177.35°W
Kure (Mokupāpapa):	28.42°N	178.33°W

Maps showing candidate areas for temporary equipment deployments are attached.

3. Other permits (list and attach documentation of all other related Federal or State permits): Papahānaumokuākea Marine National Monument research permit application attached. (OMB Control # 0648-0548).

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. None.

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

5. Time frame:
Activity start: August 1st, 2012
Activity completion: August 30th, 2012

Dates actively inside the Monument:
From: 25 Days from August 1st to August 30th, 2012. Exact dates to be determined based on ship schedule.

Describe any limiting factors in declaring specific dates of the proposed activity at the time of application: Weather, unanticipated changes in cruise schedule

Personnel schedule in the Monument: Simon Freeman and Lauren Freeman, entire duration of research cruise.

6. Indicate (with attached documentation) what insurance policies, bonding coverage, and/or financial resources are in place to pay for or reimburse the Monument trustees for the necessary search and rescue, evacuation, and/or removal of any or all persons covered by the permit from the Monument:

Simon Freeman and Lauren Freeman: Divers Alert Network (DAN) master level dive accident insurance (see attached).

Simon Freeman and Lauren Freeman: University of California Student off-campus travel insurance (see attached).

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

X Vessel
☐ Aircraft

Provide Vessel and Aircraft information: NOAA vessel.

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:
Lenth:
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: Not applicable (NOAA vessel).

Additional Information for Land Based Operations

11. Proposed movement of personnel, gear, materials, and, if applicable, samples:
No land-based operations are planned.

12. Room and board requirements on island: None

13. Work space needs: None

DID YOU INCLUDE THESE?
X Map(s) or GPS point(s) of Project Location(s), if applicable
☐ Funding Proposal(s)
☐ Funding and Award Documentation, if already received
X Documentation of Insurance, if already received
☐ Documentation of Inspections
X Documentation of all required Federal and State Permits or applications for permits

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

June 8, 2012

TO: Division of Aquatic Resources File

THROUGH: William J. Aila, Jr., Chairperson

FROM: Guy Kaulukukui, First Deputy and Acting Administrator
Division of Aquatic Resources

SUBJECT:

DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS, AND CHAPTER 11-200, HAR, FOR PAPAHĀNAUMOKUĀKEA MARINE NATIONAL MONUMENT RESEARCH PERMIT TO DR. MARC LAMMERS, ASSISTANT RESEARCHER, UNIVERSITY OF HAWAII, HAWAII INSTITUTE OF MARINE BIOLOGY, FOR ACCESS TO STATE WATERS TO DEPLOY HYDROPHONE ARRAYS AND ECOLOGICAL ACOUSTIC RECORDERS (EARS)
UNDER PERMIT PMNM-2012-029.

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

Project Title:
Papahānaumokuākea Marine National Monument Research Permit to Dr. Marc Lammers, Assistant Researcher, University of Hawaii, Hawaii Institute of Marine Biology, for Access to State Waters to Deploy Hydrophone Arrays and Ecological Acoustic Recorders (EARs).

Permit Number: PMNM-2012-0029.

Project Description:
The research permit application, as described below, would allow entry and activities to occur in Papahānaumokuākea Marine National Monument (Monument), including the NWHI State waters from July 15, 2012 through July 14, 2013.

This project entails the deployment of four deep water Ecological Acoustic Recorders (EARs) to detect marine mammals, monitor vessel traffic, and monitor the acoustic activity of benthic and mesophotic ecological communities. In addition, the applicant requests permission to deploy and retrieve small, acoustic hydrophone recorder array packages adjacent to coral reef outcrops in

shallow water. The applicant further proposes to conduct benthic and reef fish surveys at each of the hydrophone array deployment sites in order to correlate reef noise with ecological conditions at each site. The deep water EARs would be dropped from a ship to the seafloor after a suitable bottom type (flat and sandy) is located. The hydrophone array packages would be deployed by SCUBA divers who would anchor them to sandy substrate using sand screws. This research would help determine the distribution of baleen whales in deep waters of the Monument, as well as continue to collect data on the acoustic environment of coral reefs in shallow water. All of the materials are passive and do not emit any sounds themselves.

The activities proposed by the applicant directly support the Monument Management Plan's priority management needs 3.1 – Understanding and Interpreting the NWHI (through action plan 3.1.1 – Marine Conservation Science). This action plan calls for further understanding of "functional linkages of marine organisms and their habitats" and also notes that monitoring data can help scientists understand causes of change. Additionally, the proposed activities also support need 3.2 of the Monument Management Plan – Conserving Wildlife and Habitat (through action plan 3.2.1 – Threatened and Endangered Species). This action plan applies to "census cetacean populations." Activities to support conserving wildlife and habitat, as well as understanding and interpreting the NWHI, which could include acoustic monitoring and marine mammal detection, are addressed in the Monument Management Plan Environmental Assessment. This EA explains how understanding population change could be helpful in forecasting, preparing for and mediating potential threats to populations within the Monument (PMNM MMP Vol. 2, p.171). Efforts to monitor ecological communities and cetacean populations, such as those proposed here, would advance this understanding.

Consulted Parties:
The permit application was sent out for review and comment to the following scientific and cultural entities: Hawaii Division of Aquatic Resources, Hawaii 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 has been posted on the Monument Web site since April 16, 2012. The public has had full 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 § 11-200-(8), HAR, including the criteria used to determine significance under § 11-200-12, HAR, The Department of Land and Natural Resources (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.

1. All activities associated with this permit 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. § 11-200-7, HAR. Since this permit involves an activity that is precedent to a later planned activity, i.e. the

subsequent recovery of deployed deep-water EARs, the categorical exemption determination here treats all planned activities as a single action.

2. The Activities Proposed Here Come Within the Scientific Research Exemption Because There are No Serious or Major Environmental Disturbances. Chapter 343, HRS, and section 11-200-8, HAR, provide for a list of classes of actions exempt from environmental assessment requirements. §11-200-8(A)(5), HAR, specifically 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." This exemption class has been interpreted to include acoustic monitoring and tracking of animals such as those being proposed.

Accordingly, the former Division of Fish and Game established its own published list of exempted activities types under this exemption class, including "placing recording devices in the field to determine animal movement", as well as "wildlife and game surveys, censuses, inventories, studies . . . marine surveys and research activities." DEPARTMENT OF LAND & NATURAL RESOURCES, EXEMPTION LIST FOR THE DIVISION OF FISH AND GAME 3 (January 19, 1976).

The proposed acoustic monitoring activities here appear to fall squarely under the exemption class identified under § 11-200-8(A)(5), HAR. As discussed below, no significant disturbance to any environmental resource is anticipated in either the deployment or recovery of EARs or hydrophone arrays. 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." § 11-200-8(B), HAR. 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. § 11-200-12, HAR. Examples of actions which commonly have a significant effect on the environment are listed under § 11-200-12, HAR.

Shallow water EARs have been successfully deployed in the Monument for several years. Deep-water EARs (such as those that would be used here), were successfully deployed in 2010 at depths down to 500 m. These deeper deployments offer a unique perspective on the frequency of animals such as blue whales, fin whales, sei whales, minke whales, and humpback whales. This is the first attempt to use hydrophone arrays adjacent to coral reef assemblages. It offers a unique understanding of the relationship between sounds occurring on reefs and their long term condition. This data may also be used as an indicator of relative stability or fragility of reef ecosystems over time. No significant cumulative impacts are anticipated. Numerous safeguards will ensure that the potentially sensitive environment will not be significantly affected. All activities will be conducted in a manner compatible with the management direction of the

Monument Proclamation in that the activities do not diminish monument resources, qualities, and ecological integrity, or have any indirect, secondary, cultural, or cumulative effects. The joint permit review process did not reveal any anticipated indirect or cumulative impacts. Nor did it raise any cultural concerns that would occur as a result of these activities.

If approved, the proposed activities would be conducted from the NOAA Ship HI'IALAKAI (PMNM-2012-009), during its August or September, 2012 cruises. The following tables list additional activities that are anticipated to take place on these cruises pending approval of permit applications, and that may occur concurrently.

Table 1. Concurrent Projects Aboard NOAA SHIP HI'IALAKAI During the August Cruise

Permit	Purpose and Scope	Location
PMNM-2012-009 Ellis	The permit allows NOAA Ship HI'IALAKAI entry into PMNM. Personnel aboard the vessel will be permitted under separate permits.	All locations
PMNM-2012-025 Kosaki (proposed)	The proposed action is to use conventional and technical SCUBA to survey biodiversity of NWHI deep reefs and the presence/absence of alien species in these ecosystems.	All locations
PMNM-2012-020 Anthony (proposed)	The proposed action is to videotape animals and cultural sites for a cultural briefing video.	All locations
PMNM-2012-033 Bowen (proposed)	The proposed action is to collect shallow reef fish, plus mesophotic reef fish, invertebrates and one plant species for genetic surveys.	All locations
PMNM-2012-028 Lemus (proposed)	The proposed action is to allow interviews with research scientists during the course of their field work, and filming of both the natural resources under study and the scientists conducting the studies to develop multimedia resources for distance learning.	All locations
PMNM-2012-041 Winn-Kahng (proposed)	The proposed action is to allow water sampling collection activities.	All locations

There are six other permits could potentially be active in the Monument concurrently with the proposed activities in August, 2012. One of the proposed activities involves transects of coral reefs, and needs to be considered. However, this activity (PMNM-2012-025) would take place on deep reefs while the applicant would be doing transects near shallow reefs. The activities of Dr. Bowen (PMNM-2012-033) would also entail collecting reef fish in shallow reefs. The two activities are distinguished from each other in that transect activities by the Applicant would not involve collections and would take place in the immediate area surrounding the hydrophone arrays. There would be no overlap between the two. The other activities taking place during this

cruise deal with different organisms or habitat types that do not overlap. None of the other proposed activities during this time involve deployment of acoustic recorders. The culmination of these permits, and their disparate activities, occurring throughout the Monument over a 4-week period, will not have significant cumulative impacts.

Table 1. Concurrent Projects Aboard NOAA SHIP HI'IALAKAI During the September Cruise

Permit	Purpose and Scope	Location
PMNM-2012-009 Ellis	The permit allows NOAA Ship HI'IALAKAI entry into PMNM. Personnel aboard the vessel will be permitted under separate permits.	All locations
PMNM-2012-041 Winn-Kahng (proposed)	The proposed action is to allow water sampling collection activities.	All locations
PMNM-2012-033 Donahue (proposed)	The proposed action is to allow collection of (dead) corals, and to retrieve and deploy coral settlement blocks.	All locations
PMNM-2012-034 Godwin (proposed)	The proposed action is to allow coral reef assessment and monitoring activities.	All locations

During the September, 2012 cruise, only one of the proposed activities involves transects of coral reefs (PMNM-2012-034). This activity entails transects on the reef itself and not in the immediate area surrounding the hydrophone arrays (which will be sandy substrate). Thus there would be no overlap between the two activities. The settlement blocks put out by Donahue (PMNM-2012-033) will be placed at existing CRED structures. These will not overlap with the Applicant's activities. None of the other proposed activities during this time involve deployment of acoustic recorders. The culmination of these permits, and their disparate activities, occurring throughout the Monument over a 4-week period, is not anticipated to have significant cumulative impacts.

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

4. Overall Impacts will Probably be Minimal and Insignificant. Finally, any exemption declaration must involve an agency determination that the action involved will probably have minimal or no significant effects on the environment. § 11-200-2, HAR; Sierra Club v. Dept. of Transportation, 115 Hawai'i 299, 309 (2007). The potential "significance" of any anticipated environmental effect is evaluated under § 11-200-12, HAR.

Again, any foreseeable impacts from the proposed activity will probably be minimal. The impacts (if any) are mitigated by general and specific conditions attached to the permit. Specifically, all research 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, and other applicable law and agency policies and standard operating procedures. Projects very similar to this project have been subject to the public review process for several years. The applicant has been in a collaborative relationship with other permit holders who have been allowed to deploy and recover shallow and deep-water EARs in the Monument. These collaborators include HIMB's Dr. Carl Meyer and Dr. Whitlow Au, and Dr. Russell Brainard of NOAA's Pacific Island Fisheries Science Center. These individuals have been permitted to conduct many of the same activities over the past four years.

Conclusion.

After review and consideration of the proposed permit as submitted to the Board of Land and Natural Resources, the potential effects of the above described, and the law as provided by Chapter 343, HRS, and Chapter 11-200, HAR, the Department has determined that the activities will probably have minimal or no significant effect on the environment.

Therefore, the Department determines that the Permit and activities set forth above are exempt from the preparation of an Environmental Assessment.

APPROVED

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WILLIAM J. AILA, JR. Date
Chairperson, Board of Land and Natural Resources