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 (Kānemilohaʻi):	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 resources 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.

In addition, acoustic monitoring is one of the few cost effective ways to study vessel traffic in Monument waters. EAR data can provide a measure of where, when and how often vessels transited in the vicinity of the mooring package. This type of information is important for establishing baseline patterns of both permitted and illegal vessel traffic in the Monument in order to evaluate the effectiveness of management efforts.