Papahānaumokuākea Marine National Monument

RESEARCH Permit Application

NOTE: ***This Permit Application (and associated Instructions) are to propose activities to be conducted in the Papahānaumokuākea Marine National Monument. The Co-Trustees are required to determine that issuing the requested permit is compatible with the findings of Presidential Proclamation 8031. Within this Application, provide all information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Papahānaumokuākea Marine National Monument (Monument).***

ADDITIONAL IMPORTANT INFORMATION:

- Any or all of the information within this application may be posted to the Monument website informing the public on projects proposed to occur in the Monument.

- In addition to the permit application, the Applicant must either download the Monument Compliance Information Sheet from the Monument website OR request a hard copy from the Monument Permit Coordinator (contact information below). The Monument Compliance Information Sheet must be submitted to the Monument Permit Coordinator after initial application consultation.

- Issuance of a Monument permit is dependent upon the completion and review of the application and Compliance Information Sheet.

INCOMPLETE APPLICATIONS WILL NOT BE CONSIDERED

Send Permit Applications to:
NOAA/Inouye Regional Center
NOS/ONMS/PMNM/Attn: Permit Coordinator
1845 Wasp Blvd, Building 176
Honolulu, HI 96818
nwhipermit@noaa.gov
PHONE: (808) 725-5800 FAX: (808) 455-3093

SUBMITTAL VIA ELECTRONIC MAIL IS PREFERRED BUT NOT REQUIRED. FOR ADDITIONAL SUBMITTAL INSTRUCTIONS, SEE THE LAST PAGE.

Papahānaumokuākea Marine National Monument
Permit Application Cover Sheet

This Permit Application Cover Sheet is intended to provide summary information and status to the public on permit applications for activities proposed to be conducted in the Papahānaumokuākea Marine National Monument. While a permit application has been received, it has not been fully reviewed nor approved by the Monument Management Board to date. The Monument permit process also ensures that all environmental reviews are conducted prior to the issuance of a Monument permit.

Summary Information

Applicant Name: Carl G. Meyer
Affiliation: Hawaii Institute of Marine Biology

Permit Category: Research
Proposed Activity Dates: May 1st-Oct 30 2015 (NOAA cruise & possible private charter)
Proposed Method of Entry (Vessel/Plane): Vessel (NOAA and possible private charter)
Proposed Locations: French Frigate Shoals, Pearl & Hermes Reef, Midway

Estimated number of individuals (including Applicant) to be covered under this permit: 8

Estimated number of days in the Monument: 70

Description of proposed activities: (complete these sentences):

a.) The proposed activity would…

Quantify the movements of top predators (sharks and large fishes) in the Monument to: (1) improve our broad understanding of Monument ecology, (2) further elucidate the role of deep reefs in the ecology of Monument predators, and (3) further clarify movements of large predators between Monument and Main Hawaiian Island (MHI) habitats.

b.) To accomplish this activity we would ….

Service existing acoustic receiver stations in the monument to (1) recover detection data from predators tagged in Monument and MHI waters up to spring 2016, and (2) prepare the receivers for another 12 months (i.e. into 2017) of listening.

c.) This activity would help the Monument by …

Our research will provide Monument managers with information on the movements patterns of culturally and ecologically important top predators, and further clarify the links between Monument and Main Hawaiian Island habitats. We already have a variety of Monument and Main Hawaiian Island top predators instrumented with acoustic tags and continued monitoring effort will continue to improve our understanding of the movement patterns of these animals. .

Other information or background:
Our research has minimal impact on monument resources. Our listening stations (acoustic receiver + moorings) are designed to have minimal substrate impact and leave nothing behind when they are removed.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Meyer, Carl, G.

Title: Assistant Researcher

1a. Intended field Principal Investigator (See instructions for more information):
Carl Meyer

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

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

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

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):
Yannis Papastamatiou, Co-collaborator, Research Diver, Field Biologist
Mark Royer, Co-collaborator, Research Diver, Field Biologist
Danny Coffey, Co-collaborator, Research Diver, Field Biologist
James Anderson, Co-collaborator, Research Diver, Field Biologist
TBD
TBD
TBD

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			

☐ 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:
Receiver Deployment and Recovery
A total of 22 receivers are currently deployed at 3 islands/atolls in the Monument (Appendix 1). Our goal is to service and redeploy these existing receivers to provide continued monitoring coverage within the Monument.

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:***

(a) Purpose of proposed activities

The purpose of this research is to provide managers with empirical data on top predator movement patterns in Monument waters, and movements between Monument and MHI habitats. This information will provide managers with a clearer understanding of the spatial dynamics of top predators in Monument waters, and the importance of MHI habitats to predators, such as tiger sharks, that have core home ranges located within the Monument but may migrate to MHI habitats for reproductive purposes. We have the following specific goals and objectives;

1. Download 22 underwater receivers currently stationed in the Monument to retrieve stored movement data from 153 top predators tagged with acoustic transmitters from 2013 to 2015.

2. Determine how widely these animals have ranged since Fall 2015 and identify their patterns of movement.

(b) Need for proposed activities

Top predators play an important role in many ecosystems and in Monument waters this role is filled by sharks (primarily tiger, galapagos, gray reef and whitetip reef sharks) and large teleost fishes (primarily ulua) (DeCrosta, Wetherbee et al. 1997, Friedlander & DeMartini 2002, Holzwarth et al. 2006, Papastamatiou et al., 2006). Science-based management of the marine top predators of the Hawaiian archipelago requires that we know whether key species are site-attached to specific areas or, if not, how frequent and extensive are their movements. Since 2005 we have been using a combination of acoustic and satellite tags to quantify top predator movements in the Monument, and address three broad questions relevant to management zoning; (1) Do top predators move across open ocean between atolls?, (2) How extensive are their intra-atoll movements?, and (3) Do top predators exhibit predictable patterns of movement and habitat use? (4) Do predators influence the presence of herbivores on mesophotic reefs?

Using these technologies we have already made substantial progress in quantifying predator movement patterns in Monument waters and beyond (see Meyer et al. 2007a,b, Meyer et al. 2009, 2010, Papastamatiou et al. 2013, Papastamatiou et al. 2015). For example, we have shown that tiger sharks routinely swim between atolls, range along the entire Hawaiian archipelago and venture hundreds of miles beyond Monument boundaries into open-ocean. Mature female tiger sharks may travel from monument waters to the Main Hawaiian Islands for pupping during the fall (Papastamatiou et al. 2013). We also obtained the first empirical evidence that gray reef sharks swim across open-ocean between atolls. We have found other top predators (e.g. ulua, Galapagos sharks) are site-attached to individual atolls, but wide-ranging within their 'home' atoll (e.g., Meyer et al., 2007a,b, 2010). We discovered that ulua & uku have predictable patterns of movement, including diel habitat shifts and tidal & lunar rhythmicity (Meyer et al., 2007a,b). We also found that during summer full moons, ulua from all over French Frigate Shoals atoll converge on one particular location where they form large spawning aggregations (Meyer et al., 2007a).

Although we have already made substantial progress in quantifying predator movement patterns in Monument waters, important questions remain unanswered. For example, we know that female tiger sharks travel from Monument waters to MHI habitats during the fall pupping season, but we are still unclear on whether there are equivalent reverse (MHI to Monument) migrations by tiger sharks occupying core home ranges located within the MHI. We know have over 40 MHI-captured tiger sharks equipped with long-lived (10 year) transmitters, and simply by maintaining a receiver presence in the Monument, we will be able to detect movements of these sharks from the MHI to Monument waters.

(c) Scope of proposed activities
We propose to recover, download and redeploy 22 receivers already stationed in Monument waters (see Appendix 1). This will enable us to recover another 12 months of predator movement data (Fall 2015-Summer 2016) and to continue monitoring our transmitter-equipped predators in order to determine how their movement patterns vary over multi year time-scales.

*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?
The activity will be conducted with adequate safeguards for the resources and ecological integrity of the Monument. This project is a continuing effort to quantify top predator movements and throughout Hawaii for the purpose of informing management. Principal Investigator Carl Meyer has previously consulted with William Aila about the cultural implications of this research. Mr Aila is very familiar with our research, having both observed and assisted us during shark tagging activities conducted at French Frigate Shoals in June 2010. This provided a valuable opportunity for Carl Meyer to discuss at length with Mr Aila the challenges associated with balancing cultural concerns against the need for directed management of Monument resources, including the gathering of scientific knowledge.

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?
The proposed activities will have minimal impact on the resources of the region. This year we are only asking to service existing listening devices (underwater receivers) located within Monument waters. This research is being conducted in concert with the priorities listed in Monument research plan for the Monument. The scientific knowledge provided by these activities will help managers to better understand the movement patterns of sharks and other top predators in Monument waters and beyond.

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.
There is no practicable alternative to conducting activities in the Monument. We are addressing questions that are directly relevant to management of Monument resources (we are quantifying movement patterns of top predators throughout the Monument), hence the study must be carried out within the Monument.

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 management value of data produced by our research activities outweighs the minor, transient impacts on Monument resources. The methods and procedures that we are proposing will have minimal impacts on Monument resources, qualities, and ecological integrity. Our receivers are stationed on uncolonized habitats, and removal will leave no evidence of their presence in shallow habitats (see Appendix 2), and leave only a small end weight in mesophotic habitats. The scientific knowledge provided by these activities will help managers to better understand the role of sharks and other top predators in the Monument ecosystem.

e. Explain how the duration of the activity is no longer than necessary to achieve its stated purpose.
The actual fieldwork component of this research involves the minimum time required to service instrumentation currently deployed in the Monument.

f. Provide information demonstrating that you are qualified to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.
The principle investigator has more than 20 years of experience conducting this type of research (see attached CV for details) and is well qualified to conduct and complete the activity and mitigate any potential impacts resulting from its conduct. All personnel included in this permit application have extensive experience conducting research in wildlife refuges, and in the proposed research techniques. This is a continuance of a multi-year project.

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.

Our research will be supported by resources from University of Hawaii. These resources will be adequate to conduct and complete the proposed activities and mitigate any potential impacts resulting from its conduct.

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 methods and procedures that we are proposing are ideal for achieving our goals with minimal impacts to Monument resources, qualities, and ecological integrity. The use of passive monitoring techniques (self-contained acoustic receivers) means that we need relatively little human access to the Monument in order to achieve continuous, year-round monitoring of predator movements. Our shallow site receivers are stationed on uncolonized habitats, and removal will leave no evidence of their presence (see Appendix 2). Mesophotic receivers leave a small end-weight behind on recovery.

i. Has your vessel been outfitted with a mobile transceiver unit approved by OLE and complies with the requirements of Presidential Proclamation 8031?
We will use a combination of NOAA and private charter vessels equipped with appropriate mobile tranceiver units

j. Demonstrate that there are no other factors that would make the issuance of a permit for the activity inappropriate.
We have met all requirements of previously issued permits for research work in PMNM. There are no other factors that would make the issuance of a permit for our proposed activities inappropriate.

8. Procedures/Methods:
Activities will be carried out from small boats lauched from a mother ship. Servicing of receivers will be done by snorkelers and SCUBA divers, and from small boats via an acoustic release system. Our chosen long-term monitoring method (remote acoustic monitoring) is ideal for quantifying animal movements in remote, environmentally-sensitive locations because it has minimal environmental impact and requires only occasional, brief access by researchers to individual study sites, yet provides continuous monitoring of animal movements at those sites.

Shallow (<30 m) receiver deployments: We will continue to use a temporary receiver mooring system that has previously been empirically demonstrated to successfully withstand seasonal high surf. Moorings, installed by snorkelers or SCUBA divers will consist of sand screws in areas of soft sediment, and chain around uncolonized substrate in hard bottom areas (live substrates will be avoided). We will completely remove these moorings when acoustic monitoring is completed (receivers will be in place for at least 2 years). The receivers will be anchored to the moorings and suspended 1-4 m above the ocean floor. The receivers will identify and record the presence of any acoustic transmitters within range (up to 500 m). The transmitter number, time of arrival and departure and the date will be recorded and stored until the data are downloaded from the receivers to a computer. The receivers have a battery life of approximately 15 months and will be serviced at 12 month intervals.

Deep (mesophotic >50m) receiver deployments: We will recover and redeploy 6 underwater receivers at existing mesophotic sites at Pearl and Hermes Reef and French Frigate Shoals atoll. Receivers will be attached to weighted (with concrete block) moorings , and dropped to the sea floor so that they land on the flat habitat. The moorings will incorporate an acoustic release to allow for surface recovery. Use of an acoustic release means the end weights and lower 30cm of the mooring (chain, polypro and twine) are sacrificial and will be left in situ when the receivers are recovered. As with shallow units, the mesophotic zone receivers will be suspended 4 m above the ocean floor and will be serviced at 12 month intervals.

Data retrieval, reduction and analysis: We will download receivers currently deployed in Monument waters (Appendix 1). Data downloading consists of interfacing the receiver to a computer via a wireless 'bluetooth' connection, and can be accomplished in the field. Preliminary data reduction and analyses will commence after downloading.

Cited References

Friedlander AM and EE DeMartini (2002). Contrasts in density, size, and biomass of reef fishes between the northwestern and the main Hawaiian islands: the effects of fishing down apex predators. Marine Ecology Progress Series 230:253-264.

Holland KN, Wetherbee BM, Lowe CG and CG Meyer (1999) Movements of tiger sharks (Galeocerdo cuvier) in coastal Hawaiian waters. Marine Biology 134: 665-673.

Holzwarth SR, DeMartini EE, Zgliczynski BJ, Laughlin JL (2006) Sharks and jacks in the Northwestern Hawaiian Islands from towed-diver surveys 2000-2003. Atoll Research Bulletin 543: 257-280.

Meyer CG, Holland KN, Papastamatiou YP. 2007a. Seasonal and diel movements of giant trevally (Caranx ignobilis) at remote Hawaiian atolls: implications for the design of Marine Protected Areas. Marine Ecology Progress Series. 333: 13-25.

Meyer CG, Papastamatiou YP, Holland KN. 2007b. Seasonal, diel and tidal movements of green jobfish (Aprion virescens, Lutjanidae) at remote Hawaiian atolls: Implications for Marine Protected Area design. Marine Biology. 151: 2133-2143.

Meyer CG, Clark TB, Papastamatiou YP, Whitney NM, Holland KN. 2009. Long-term movements of tiger sharks (Galeocerdo cuvier) in Hawaii. Marine Ecology Progress Series. 381: 223–235.

Meyer CG, Papastamatiou YP, Holland KN. 2010. A multiple instrument approach to quantifying the movement patterns and habitat use of Tiger (Galeocerdo cuvier) and Galapagos sharks (Carcharhinus galapagensis) at French Frigate Shoals, Hawaii. Marine Biology. 157:1857–1868. DOI: 10.1007/s00227-010-1457-x

Meyer CG, Meyer CG, O'Malley JM, Papastamatiou YP, Dale JJ, Hutchinson MR, et al. 2014. Growth and Maximum Size of Tiger Sharks (Galeocerdo cuvier) in Hawaii. PLoS ONE 9(1): e84799. doi:10.1371/journal.pone.0084799.

Papastamatiou YP, Wetherbee BM, Lowe CG, Crow GC. 2006. Distribution and diet of four species of carcharhinid shark in the Hawaiian Islands: evidence for resource partitioning and competitive exclusion. Marine Ecology Progress Series 320: 239-251

Papastamatiou YP, Meyer CG, Carvalho F, Dale JJ, Hutchinson MR, et al. 2013. Telemetry and random walk models reveal complex patterns of partial migration in a large marine predator. Ecology 94: 2595-2606. doi: 10.1890/12-2014.1.

Wetherbee BM, Crow GL and CG Lowe (1997). Distribution, reproduction and diet of the gray reef shark Carcharhinus amblyrhynchos in Hawaii. Marine Ecology Progress Series 151: 181-189.

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

• 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:
Please refer to Appendix 2

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:
Please refer to Appendix 2

14. Provide a time line for sample analysis, data analysis, write-up and publication of information:
Analyses, interpretation and publication of data are ongoing. We already have eleven papers derived from our PMNM studies published in international peer-reviewed journals.

15. List all Applicants' publications directly related to the proposed project:
Meyer CG, Papastamatiou YP, Holland KN. 2007. Seasonal, diel and tidal movements of green jobfish (Aprion virescens, Lutjanidae) at remote Hawaiian atolls: Implications for Marine Protected Area design. Marine Biology. 151: 2133-2143.

Meyer CG, Holland KN, Papastamatiou YP. 2007. Seasonal and diel movements of giant trevally (Caranx ignobilis) at remote Hawaiian atolls: implications for the design of Marine Protected Areas. Marine Ecology Progress Series. 333: 13-25.

Meyer C.G., T.B. Clark, Y.P. Papastamatiou, N.M. Whitney, & K.N. Holland. (2009). Long-term movements of tiger sharks (Galeocerdo cuvier) in Hawaii. Marine Ecology Progress Series. 381: 223-235.

Meyer CG, Papastamatiou YP, Holland KN (2010). A multiple instrument approach to quantifying the movement patterns and habitat use of tiger and Galapagos sharks at French Frigate Shoals, Hawaii. Marine Biology 157: 1857-1868

Papastamatiou YP, Friedlander AM, Caselle JE, Lowe CG. 2010. Long term movement patterns and trophic ecology of blacktip reef sharks (Carcharhinus melanopterus) at Palmyra Atoll. Journal of Experimental Marine Biology and Ecology 386: 94-102

Papastamatiou YP, Cartamil DP, Lowe CG, Meyer CG, Wetherbee, BM, Holland KN. 2011. Scales of orientation, directed walks, and movement path structure in sharks. Journal of Animal Ecology. In Press.

Dale JJ, Stankus AM, Burns MS, Meyer CG. 2011. The Shark Assemblage at French Frigate Shoals Atoll, Hawai'i: Species Composition, Abundance and Habitat Use. PLoS ONE. In Press.

Nakamura I, Watanabe YY, Papastamatiou YP, Sato K, Meyer CG. 2011. Yo-yo vertical movements suggest a foraging strategy for tiger sharks Galeocerdo cuvier. Marine Ecology Progress Series. In Press.

Dale JJ, Meyer CG, Clark CE. 2011. The ecology of coral reef top predators in the Papahanaumokuakea Marine National Monument. Journal of Marine Biology. In Press.

Iosilevskii G, Papastamatiou YP, Meyer CG, Holland KN. 2012. Energetics of the yo-yo dives of predatory sharks. Journal of Theoretical Biology. 294:172–181.

Meyer CG, Holland KN. 2012. Autonomous measurement of ingestion and digestion processes in free swimming sharks. Journal of Experimental Biology. 215, 3681-3684. doi:10.1242/jeb.075432.

Meyer C, O'Malley J, Papastamatiou Y, Dale J, Hutchinson M, Anderson J, Royer M, Holland K. 2014. Growth and maximum size of tiger sharks (Galeocerdo cuvier) in Hawaii. PLoS One 9:e84799

Papastamatiou YP, Meyer C., Carlvaho F., Dale J., Hutchinson M., Holland K. 2013. Telemetry and random walk models reveal complex patterns of partial migration in a marine predator. Ecology. 94: 2595-2606

Papastamatiou YP, Meyer CG, Kosaki RK, Natalie J. Wallsgrove NJ, Popp BN. 2015. Movements and foraging of predators associated with mesophotic reefs and their potential for linking ecological habitats. Marine Ecology Progress Series. 521:155-170. doi:10.3354/meps11110

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:

NOAA/Inouye Regional Center
NOS/ONMS/PMNM/Attn: Permit Coordinator
1845 Wasp Blvd, Building 176
Honolulu, HI 96818
FAX: (808) 455-3093

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