

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

July 11, 2014

Board of Land  
and Natural Resources  
Honolulu, Hawaii

Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National Monument Research Permit to Dr. Randall Kosaki, National Oceanic and Atmospheric Administration, Papahānaumokuākea Marine National Monument, for Access to State Waters to Conduct Surveys of Deep Coral Reefs

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. Randall Kosaki, Deputy Superintendent, of the National Oceanic and Atmospheric Administration (NOAA), Papahānaumokuākea Marine National Monument, 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 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 (Mokumanamana)
- French Frigate Shoals
- Gardner Pinnacles
- Maro Reef
- Laysan Island
- Lisianski Island, Neva Shoals
- Pearl and Hermes Atoll
- Kure Atoll State Seabird Sanctuary

The activities covered under this permit would occur between September 1, 2014 and August 31, 2015.

The proposed activities are a renewal of activities previously permitted and conducted in the Monument.

### INTENDED ACTIVITIES

The applicant proposes to explore and document the biodiversity of the Monument's deep coral reefs, which includes characterizing the fauna and documenting the presence or absence of alien/invasive species in deep reef ecosystems. This project would provide some of the first quantitative information regarding species presence, distribution and abundance on the mesophotic reef region in the Monument, as well as some of the first estimates of abiotic influences.

To carry out these activities, the applicant proposes using conventional and technical SCUBA diving technology. Dives would range between 10-35m in depth using conventional SCUBA, and between 35-90m using technical trimix. This would allow access to "Mesophotic Coral Ecosystems" (MCEs) which are recognized to have diverse and unique flora and fauna, but remain largely unexplored. Technical dives would be conducted under NOAA auspices and would conform to the regulations for the NOAA Dive Center.

Divers would conduct visual surveys, as well as take still and video records. As divers conduct surveys and collect species presence data, they would also be conducting searches for snowflake coral (*Carijoa riisei*), red algae (*Hypnea musciformis*), and invasive roi fish (*Cephalopholis argus*). The applicant proposes collecting voucher specimens of the targeted invasive species if found (3/dive site/species), as well as any unidentifiable fish, coral, or algae which may represent new geographic records or species (3/island or atoll/species). The applicant also proposes to collect one specimen of the five most abundant algal species for each dive site. One specimen, no larger than 5cm in greatest dimension, of each species would be collected and frozen for later identification.

In addition, information would be collected to monitor abiotic factors that may influence biodiversity on the deep reefs. As such, the applicant requests to deploy up to 10 temperature data loggers; and those deployed in 2010 (under permit PMNM-2010-031) would be retrieved and replaced with new data loggers.

While other monitoring programs exist in the NWHI, they are conducted primarily in the range of 10-20m. The target species for the activities described above are most abundant in depths of 30-100m, and are therefore unlikely to be encountered by existing surveys.

The activities proposed by the applicant directly support the Monument Management Plan's priority management needs in the Marine Conservation Science action plan (3.1.1), as well as the Alien Species action plan (3.3.2). Activities noted as part of these plans include monitoring and characterizing deep-water habitats, and conducting surveillance and eventual eradication of marine invasive species, respectively.

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

- 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
- Touching coral, living or dead
- 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 June 8th, 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 the acceptance of this application. The following concerns were raised:

1. *What will be done with any roi removed?*

The applicant states that roi will be provided to the lab of Dr. Brian Bowen at the Hawai'i Institute of Marine Biology. Population genetic analyses will be conducted by Bowen's lab.

2. *What kind of markers will be used so that the instruments can be relocated and removed on return trips?*

The applicant explains that he and his team are planning on attaching the temperature loggers to the stumps of dead black coral colonies. These dead "trees" persist for years, and provide conspicuous landmarks for the relocation of instrumentation. If dead trees are not present, the team will locate temperature loggers immediately adjacent to large live colonies of black coral. The team will do this in an attempt to facilitate relocation by association with conspicuous landmarks.

3. *Who is the owner of any voucher specimens collected and where will they be kept after the the cruise for taxonomic evaluation (eg. B. P. Bishop Museum)?*

The applicant states, that should the permit be approved, the permittee, would be the owner and responsible party of any specimens collected. Regarding where collections will be kept, in section 11 (page 20) of the application it specifies: "Specimens will be shared with HIMB for molecular analysis (particularly Carjoa, but also fishes),

University of Hawaii (non-invasive algal collections and water samples), USFWS (coral and the B.P. Bishop Museum (for their reference collection of Indo-Pacific coral reef fishes).” Furthermore individuals at each institution and their contact information are provided on page 20.

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

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

**Comments received from the public are summarized as follows:**

No comments were received from the public on this application.

**Additional reviews and permit history:**

Are there other relevant/necessary permits or environmental reviews that have or will be issued with regard to this project? (e.g. MMPA, ESA, EA) Yes  No

If so, please list or explain:

- The proposed activities are in compliance with the National Environmental Policy Act.
- A request to the National Marine Fisheries Service (NMFS) for a Section 7 informal consultation pursuant to the Endangered Species Act of 1973 is underway to analyze the effects of proposed activities within the Monument on protected species and Hawaiian monk seal critical habitat. The outcome of the consultation may require the applicant to adhere to other NMFS prescribed conditions. Such conditions would be reflected in the PMNM permit, prior to issuance.
- The Department has made an exemption determination for this permit in accordance with chapter 343 HRS, and Chapter 11-200, HAR. See Attachment (“DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS AND CHAPTER 11-200 HAR, FOR PAPAĀNAUMOKUĀKEA MARINE NATIONAL MONUMENT RESEARCH PERMIT TO DR. RANDALL KOSAKI, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, PAPAĀNAUMOKUĀKEA MARINE NATIONAL MONUMENT, FOR ACCESS TO STATE WATERS TO CONDUCT SURVEYS OF DEEP CORAL REEFS UNDER PERMIT PMNM-2014-015”).

Has Applicant been granted a permit from the State in the past? Yes  No

If so, please summarize past permits:

- The Applicant was granted permit PMNM-2009-038, PMNM-2010-031, PMNM-2011-042 and PMNM 2012-025 to conduct similar work in 2009, 2010, 2011, and 2012 respectively.

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 therein as specified in the application with the following 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:

1. That the Board declare that the actions which are anticipated to be undertaken under this permit will have little or no significant effect on the environment and is therefore exempt from the preparation of an environmental assessment.
2. Upon the finding and adoption of the department's analysis by the Board, that the Board delegate and authorize the Chairperson to sign the declaration of exemption for purposes of recordkeeping requirements of chapter 343, HRS, and chapter 11-200, HAR.
3. That the Board authorize and approve a research permit to Dr. Randall Kosaki, NOAA, Papahānaumokuākea Marine National Monument, 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 protocols attached to this permit.

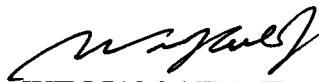
- d. Tenders and small vessels must be equipped with engines that meet EPA emissions requirements.
- e. Refueling of tenders and all small vessels must be done at the support ships and outside the confines of lagoons or near-shore waters in the State Marine Refuge
- f. No fishing is allowed in State Waters except as authorized under State law for subsistence, traditional and customary practices by Native Hawaiians.

Respectfully submitted,



FRAZER MCGILVRAY  
Administrator

APPROVED FOR SUBMITTAL



WILLIAM 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](mailto: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:** Randall Kosaki, Ph.D.

**Affiliation:** NOAA/NOS/ONMS/Papahānaumokuākea Marine National Monument

**Permit Category:** Research

**Proposed Activity Dates:** 25 day window between Sept. 1 and Sept. 30, 2012

**Proposed Method of Entry (Vessel/Plane):** NOAA Ship HI'IALAKAI

**Proposed Locations:** Nihoa, Necker, French Frigate Shoals, Gardner, Laysan, Maro, Lisianski, Pearl and Hermes, Midway, Kure, others TBD

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

13

**Estimated number of days in the Monument:** 25

**Description of proposed activities:** (complete these sentences):

a.) The proposed activity would...

The proposed activities would use conventional and technical SCUBA diving technology to explore and document the biodiversity of the NWHI's deep coral reefs, as well as to document the presence or absence of alien/invasive species in these deep reef ecosystems. Of primary interest are the invasive octocoral *Carijoa riisei*, and the invasive red alga *Hypnea musciformis*. These invasive species are spreading in the Main Hawaiian Islands, and are considered a serious threat to the southeastern end of the NWHI (Godwin et al. 2006, See 2007).

Pacific coral reefs host greater macroscopic biodiversity than any other marine habitat (Pyle 1995, Reaka-Kudla 1997, Myers 1999). Photosynthetic corals have recently been documented to a depth of at least 165 m in the Pacific; yet only the upper 30 m is well studied (e.g., Pyle 1996, 1998). Like tropical rainforest canopies before 1970, deeper reefs are largely unexplored, and the biodiversity at depths of 30-200 m (more than 80% of the depth range of coral-reef habitat) remains almost completely unknown.

These "Mesophotic Coral Ecosystems" (MCEs) have recently been prioritized for study, due to a growing realization that the flora and fauna are both diverse and unique, and also face growing threats. Perhaps most ominously, these reefs occur at the lower limit of the aragonite saturation



zone in much of the Pacific (Guinotte et al. 2006), and may be especially vulnerable to ocean acidification. The World Conservation Union (IUCN) has identified this ecosystem as a top conservation priority for reef fishes (Sadovy 2007). The biodiversity of these MCEs is threatened before its documentation has begun in earnest. We therefore propose to address both issues, and are in the process of characterizing the MCE fauna of the NWHI while simultaneously conducting surveys for the invasive species most likely to impact these deep reef ecosystems.

b.) To accomplish this activity we would ....

To accomplish the primary activity, we would conduct technical trimix dives on closed-circuit rebreathers from small boats supported by NOAA ship Hi'ialakai. The barrier to exploring MCEs has largely been technological. The vast majority of research on shallow coral reefs in the NWHI and elsewhere has been conducted with conventional SCUBA, but safe and meaningful scientific research with this gear has been confined mostly to the shallowest 30 m of reef habitat. Likewise, remote sampling methods (traps and trawls) have proven ineffective for sampling this complex rocky coral-reef environment (Dennis & Aldhous 2004). Deep-sea submersibles have been used to examine marine life at depths of 30-200 m in the tropical Pacific (e.g., Hills-Colinvaux 1986, Thresher & Colin 1986, Kahng & Maragos 2006), but they typically cost \$20,000-\$60,000 per day, and are rarely deployed in remote tropical Pacific regions. Furthermore, submersibles are ill-suited to identify and collect cryptic species typical of the reef environment. Low densities of *Hypnea* and *Carijoa* would most likely go undetected by submersible observers.

The depths of our proposed dives would range between 5-35 m (conventional SCUBA), and 35-100 m (trimix). Shallow-water dives will be conducted to perform safety dives as well as to survey adjacent shallow water reefs to enable comparisons to the MCE reefs. To assess the biological diversity of the MCEs, visual surveys will be conducted to identify the flora and fauna associated with differing MCE habitats. Additional divers will make presence/absence notes on fishes encountered during the survey dives. The ultimate goal of these checklists will be published, island-by-island checklist of fishes, corals, and algae known from the deep reefs of the NWHI. Due to the unexplored nature of this region, it is probable that divers will encounter new species. If an organism is encountered that is not readily identifiable, or may represent a new geographic record or new species, up to three voucher specimens per site will be collected and sent to appropriate taxonomic experts for description and/or identification. In addition, divers will search for invasive species such as *Hypnea* and *Carijoa* as described by Wagner et al. (2011). If the invasive species in question are found, not more than three voucher specimens per dive site will be collected for taxonomic identification and genetic characterization by scientists at the University of Hawaii. As an incidental activity, we also propose to remove any invasive Roi (*Cephalopholis argus*) encountered at any depth.

Additional information will be collected to begin monitoring efforts of abiotic factors that may influence biodiversity at these depths. For this purpose, temperature loggers will be deployed to track temperature fluctuations.

c.) This activity would help the Monument by ...

As nearly all of the mesophotic reef region in the Monument is undocumented, the proposed activities will provide some of the first quantitative information regarding species presence, distribution and abundance in the NWHI, as well as some of the first estimates of abiotic influences. During a preliminary survey of MCEs in the NWHI in August 2009, divers discovered extensive algal beds supporting rich populations of predominantly juvenile fishes, occurring at depths of 50-80 m. The nature and composition of these algal beds and associated habitats, and the striking abundance and diversity of juvenile fishes they harbor, appear to represent an entirely new paradigm for reef-associated ecology in general, and MCE communities in particular. Understanding the breadth of these habitats and associated communities is likely to have profound implications for future management considerations. 2009-2011 mesophotic dive surveys increased the number of fishes known from each of the NWHI by an average of 26.9%, a very significant increase in the known biodiversity of this region.

The 2012 cruise further characterized the deep reef algal beds. This was the first year that quantitative benthic surveys were conducted, and specimen collections focused on potential new geographic records and new species of algae. Algal specimens are currently undergoing traditional morphometric taxonomic analyses as well as genetic analyses by Drs. Heather Spalding and Alison Sherwood of the Univ. of Hawaii at Manoa's Dept. of Botany. They estimate that the 2012 collections produced approximately 76 new species of algae.

Our 2013 cruise represented the first dedicated rebreather cruise within NOAA, and the first of its kind to PMNM. Because open and closed circuit scuba may elicit different responses from reef fish (some are attracted to open circuit bubbles, others may be repelled by bubbles), we are not pooling older data collected on open circuit scuba with data collected on closed circuit rebreathers.

In order to adequately protect any ecosystem, a necessary first step is to determine what organisms and habitats are present. Surveys resulting from this project will allow managers to establish baseline habitat and population estimates to help inform future decisions. Given the magnitude of impending threats such as climate change, it is imperative for managers to have a baseline of information to be able to identify future changes to the system.

The identification of invasive alga would help the Monument by establishing a presence-or-absence baseline at the island groups intermediate in location between the Main Hawaiian Islands (presumed source of these invasive species) and the rest of the NWHI. Nihoa and Mokumanama are the two islands/banks that are the most likely gateway or stepping stones for invasive species from the MHI to the NWHI. *Carijoa* is abundant in the waters of Maui County and Oahu, and also occurs on Kauai (Godwin et al. 2006, See 2007). It is known to overgrow black coral colonies and associated substrata in the Auau Channel (and elsewhere in the MHI). It has not yet been detected in the NWHI, but small colonies have been seen at Kaula Rock, Five Fathom Pinnacle, and Niihau, all of which are geographically intermediate between the MHI and

NWHI (Montgomery, personal communication). Although existing monitoring programs in the NWHI, e.g. RAMP (Reef Assessment and Monitoring Program) survey for all taxa and will record alien or invasive species when encountered, most of these surveys are conducted between 10 and 20 m depth. Carijoa is most abundant in 30-100 m depth, and in the NWHI, Hypnea is only known from depths exceeding 35 m at Mokumanamana. Thus, existing surveys are unlikely to encounter either species. If detected at an early stage of colonization and spread, eradication may be a possibility (e.g. pilot Carijoa eradication project in Nawiliwili Harbor on Kauai).

**Other information or background:** see appended Word document for preliminary findings from previous cruises.

**Section A - Applicant Information**

**1. Applicant**

Name (last, first, middle initial):

Kosaki, Randall K.

Title: Deputy Superintendent, NOAA/ONMS Papahanaumokuakea Marine National Monument

**1a. Intended field Principal Investigator (See instructions for more information):**  
same (Randall Kosaki)

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

[REDACTED] [REDACTED]

[REDACTED] [REDACTED]

[REDACTED] [REDACTED]

[REDACTED] and email address: N/A

**3. Affiliation (institution/agency/organization directly related to the proposed project):**  
NOAA/NOS/ONMS Papahanaumokuakea Marine National Monument

**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):**

Kelly Gleason, Ph.D., Research Diver, NOAA PMNM

Randall Kosaki, Ph.D., Research Diver, NOAA PMNM

Richard Pyle, Ph.D., Research Diver, B.P. Bishop Museum

Greg McFall, M.S., Research Diver, NOAA Grays' Reef National Marine Sanctuary

Yannis Papastamatiou, Ph.D., Research Diver, Florida Museum of Natural History

Daniel Wagner, Ph.D., Research Diver, NOAA PMNM

Brian Hauk, M.S., Research Diver, NOAA PMNM

Keo Lopes, Research Diver, Univ. of Hawaii

Jasmine Cousins, small boat coxswain, PMNM

Research Diver, TBD

**Section B: Project Information**

**5a. Project location(s):**

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

**Ocean Based**

- |   |                                     |
|---|-------------------------------------|
| <input checked="" type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
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NOTE: There is a fee schedule for people visiting Midway Atoll National Wildlife Refuge via vessel and aircraft.

Location Description:

**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:***

This project aims to shed light on the distribution and abundance of MCE organisms and habitats. This project represents an ongoing attempt to generate baselines for the distribution and abundance of important reef fishes, corals and algae. These investigations provide the necessary first step for managers to be able to adequately manage PMNM on an ecosystem-wide scale. Work completed to date includes preliminary quantitative surveys of mesophotic fish assemblages at all ten of the major islands/reefs of the NWHI. Quantitative benthic surveys have been completed at Nihoa, Mokumanamana, French Frigate Shoals, Gardner Pinnacles, Maro, Lisianski, and Midway.

**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?

No activities will be performed in the vicinity of known historical resources. If any such resources are discovered in the course of these proposed activities, their location(s) will be noted and reported to appropriate experts and authorities. Our survey activities will cease immediately, and will be continued in another area.

Biological sampling will be limited to small numbers of voucher specimens for taxonomic ID and genetic analysis. Removal of alien /invasive species is generally considered to be beneficial to the ecosystem, habitat, and native organisms. Care will be taken to individually bag samples to preclude facilitation of reproduction or dispersal via fragmentation.

If potential new records or new species of flora or fauna are encountered, they will be individually selected and sampled. Fish specimens will be collected via pole spear or hand nets. Algal, sponge and coral specimens will be hand picked and sealed in watertight bags. All of these methods have virtually no potential for collateral damage. These methods are highly selective, and thus no damage to the habitat or accidental take of non-target species will occur. The sample sizes requested are restricted to the bare minimum that would be required for scientific analysis and publication. These small sample sizes directly reflect our desire to minimize impacts to populations of marine life that simultaneously represent natural and cultural resources.

Temperature loggers will be deployed at up to ten sites to track variations in temperature. These sensors are small (about the size of a half dollar) and unobtrusive to the surrounding environment. Care will be taken to ensure placement clear of any sensitive organisms or habitats.

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 support PMNM Management Plan's Marine Conservation Science Action plan to "develop baseline inventory of the biological resources and biodiversity of deep reefs... using all available technologies, including ... remotely operated vehicles (ROVs), and technical diving."

Diver-based searches for invasive alga support PMNM Management Plan's Alien Species Action Plan (ASAP) by conducting active surveillance to detect and monitor alien species (AS 2.1); development of alien species detection and monitoring protocols (AS 2.3), mapping the invasive red alga *Hypnea musciformis* (AS 7.1), and surveillance of the snowflake coral *Carijoa riisei* (AS 7.2).

Although *Hypnea* has been recorded at Mokumanamana (entangled in lobster traps) at depths accessible by the proposed activities of this permit application, we have yet to record *Hypnea* during any of the dives on the 2009-2011 cruises. Similarly, *Carijoa* has not yet been detected by these surveys. Unlike most situations globally where invasive species have run rampant before any monitoring of their abundance is initiated, we appear to be "ahead of the curve" in that surveys for these AS have been initiated before the AS themselves are present in any abundance. This will allow for early detection and monitoring of the spread of these species.

We recognize that all natural resources are also cultural resources. Documenting the spatial distribution of these resources, as well as identifying previously unknown taxa, is a necessary precursor to properly managing and protecting these natural/cultural



resources. Our findings to date include discovery of the highest levels of endemism recorded in any marine ecosystem, which implies that these systems are in fact far more fragile and vulnerable than was previously assumed. These results have direct management implications related to the protection and conservation of these ecosystems.

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.  
In order to provide managers insight into the distribution and abundance of flora and fauna of the MCE region in the Monument, surveys must be conducted in the Monument, as it has been shown that organisms vary substantially between neighboring islands and atolls.

d. How does the end value of the activity outweigh its adverse impacts on Monument cultural, natural and historic resources, qualities, and ecological integrity?  
Visual surveys and related sampling will have virtually no impacts on native species, natural resources, or ecological integrity. Temperature sensors are extremely small and unobtrusive to the surrounding environment. If new records or new species of fishes, corals, sponges or algae are encountered, the minimal number of voucher species collected per site (3 maximum) is negligible compared to the importance of increasing our understanding of the composition, biodiversity, biogeographic affinities, and levels of endemism of these deep reef communities. Having this very basic level of information on biodiversity is one of the cornerstones of responsible management. It is information (from shallow-water field characterizations) on the unique natural and cultural resources of the NWHI that led to the high level of protection that these ecosystems now enjoy. We are now expanding this characterization to include the deeper half of the coral reef habitat, and the results (e.g. levels of endemism) are even more impressive than in shallow water. This kind of information is needed to maintain the high levels of protection afforded to these reefs. Perhaps even more importantly, these discoveries strengthen the argument that large-scale MPAs are valuable conservation tools because not only do they protect the biodiversity that you know of (e.g. shallow reefs), but they also protect the biodiversity that you have yet to discover (mesophotic reefs and deeper). In addition, sampling invasive species is beneficial to the ecosystem as portions of the invasive will be removed from the community.

Impacts to natural resources from this proposed project are minimal, verging on undetectable. We will not be working in the vicinity of any known historic resources, thus impacts to those resources are not expected. Similarly, impacts to cultural resources (beyond the collection of specimens as requested) are not expected. The information gained from these activities are critical to increasing manager's understanding of the ecosystems within PMNM, and important to increasing awareness of the benefits of large MPAs.

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

Given the large areas of deep reef habitat that remain unexplored and uncharacterized, there is no way that this effort could be regarded as "longer than necessary." It will be minimally adequate to enable a quantitative comparison of the abundance and distribution of benthic-associated species and additionally of alien/invasive species with the heavily infested MHI, and the more pristine NWHI. These sites will provide baselines that can be revisited at points in the future to determine what the status and trends of the environment are with regard to both local and global effects.

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

I have conducted visual qualitative and quantitative surveys of coral reef benthic and fish fauna for over 25 years. I was one of the original founding instructors of the University of Hawaii's national award-winning marine transect course, Quantitative Underwater Ecological Sampling Techniques (QUEST). I first conducted marine life surveys in the NWHI in 1982, and have been integrally involved in planning and executing the NWHI Reef Assessment and Monitoring Program (RAMP) cruises since their inception in 2000. I have logged nearly 1000 decompression dives on air, nitrox, and trimix to depths of up to 300 feet. The dive operations will be supervised topside by Brian Hauk (PMNM Technical Divemaster), Jason Leonard (PMNM Technical Divemaster, Unit Diving Supervisor), Kelly Gleason (PMNM Technical Divemaster), and Greg McFall (Line Office Dive Officer, National Ocean Service). Richard Pyle (BP Bishop Museum), is one of the most highly respected experts in the world on the application of mixed gas breathing technologies to deep coral reef research. Pyle is also the foremost expert on the taxonomy of deep coral reef fishes. All PMNM divers (Kosaki, Hauk, Leonard, Gleason, Wagner) have the most advanced dive certifications in NOAA, including the deepest depth authorization and closed-circuit rebreather, mixed gas diluent authorizations.

g. Provide information demonstrating that you have adequate financial resources available to conduct and complete the activity and mitigate any potential impacts resulting from its conduct. NOAA/NOS/PMNM will support the project with its allocation of ship time aboard NOAA R/V HI'IALAKAI, as well as with other in-kind support (salary for staff, small boat support, administrative support). Fish taxonomic analysis is funded via a PMNM contract with the B.P. Bishop Museum for taxonomic and curatorial assistance. Algal taxonomic analysis is funded via a PMNM contract with the Dept. of Botany, University of Hawaii. NOAA ships, and activities conducted off of them, are considered to be self-insured by the Federal government. Taxonomic support for sponges and other invertebrate taxa will be supported as appropriate by PMNM. A grant proposal to NOAA's Office of Ocean Exploration and Research (OER) is currently in review.

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 proposed survey methods are among the most scientifically robust and time efficient methods for quantifying distribution and abundance of organisms. Due to limitations of technical diving, divers only have approximately 20 minutes on any given dive in which to collect information. As a result, perturbations to the environment are minimal. Additionally, proposed collection methods limit the number of specimens taken to the minimum number that will ensure accurate taxonomic identification. The numbers required will be many orders of magnitude below that which would produce a measurable or biologically significant impact to the ecological integrity of the Monument. As noted earlier, the removal of invasive species is generally considered to be beneficial to the environment. Wherever possible, specimens will be used for additional studies (genetics) or will be added to museum collections as reference/voucher specimens where they will be available to all researchers. We recognize that natural resources are in fact cultural resources. Thus, for both biological and cultural reasons, sampling or collecting will be restricted to the bare minimum that is necessary to meet the standards of peer-reviewed science. There will be no interaction with cultural or historical resources outside of the organisms that are the direct focus of this study.

In addition, the shipboard multibeam sonar systems on HI'IALAKAI will be used to locate suitable topographic features. These data products will be used to target suitable habitats for dive expeditions. Hi'ialakai is equipped with Kongsberg Simrad EM3002 and EM300 multibeam sonar systems. They operate at 300kHz and 30kHz respectively, with maximum power outputs of 1kw and 9kw respectively. This is well below the threshold for any harmful interactions with marine mammals. Multibeam sonar is a standard scientific mapping tool in wide use globally. No impacts to marine mammals have been documented. Multibeam operations typically take place at night (after all divers and dive boats are back on board), for two to three hours on select evenings. We do not anticipate running the multibeam on more than ten evenings for a total of less than 30 hours.

Essentially all of our multibeam work will be in shallow water (by multibeam standards), and will use the EM3002D. The EM3002D is a low-power sonar, with a maximum output of 1kw (compared with 9kw for the EM300 deep-water sonar). Sounds from the EM3002D are very short pulses, with each pulse lasting 0.15 milliseconds. Pulse rate varies from 6 to 30 pulses per second. The beam is narrow (1 to 2°) in fore-aft extent and wide (170°) in the cross-track extent. Each ping consists of multiple fan-shaped transmissions (segments) at different cross-track angles. Any given mammal at depth near the trackline would be in the main beam for only one or two of the nine segments. Also, marine mammals that encounter the multibeam swath are unlikely to be subjected to repeated pulses because of the narrow fore-aft width of the beam and will receive only limited amounts of pulse energy because of the short pulses. Animals close to the ship (where the beam is narrowest) are especially unlikely to be ensonified for more than one 0.15ms pulse (or two pulses if in the overlap area). Kremser et al. (2005) noted that the probability of a cetacean swimming through the area of exposure when a multibeam echosounder emits a pulse is small. The animal would have to pass the transducer at close range and be swimming at speeds similar to the vessel in order to receive the multiple pulses that might result in sufficient exposure to cause temporary hearing impairment (temporary threshold shift, or TTS). Navy sonars that have been linked to avoidance reactions and stranding of cetaceans: (1) have longer pulse duration than the Kongsberg EM3002D; (2) are often directed close to horizontally versus more downward for the multibeam echosounder; and (3) are of much higher power. The area of possible influence of the multibeam echosounder is much smaller—a narrow band below the source vessel. Also, the duration of exposure for a given marine mammal can be much longer for naval sonar. Gerrodette and Pettis (2005) noted no behavioral changes by baleen whales in response to use of a 38 khz. echosounder.

Reference:

Gerrodette, T., and J. Pettis. 2005. Responses of tropical cetaceans to an echosounder during research vessel surveys. Abstract, 16th Bien. Conf. Mar. Mamm. 12-16 Dec. 2005. San Diego, CA.

Kremser, U., P. Klemm, and W.D. Kotz. 2005. Estimating the risk of temporary acoustic threshold shift, caused by hydroacoustic devices, in whales in the Southern Ocean. *Antarctic Science* 17 (2005):3-10.

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.

There are no other factors that would make issuance of a permit inappropriate under the Proclamation and its Findings section. The sample sizes are very small, the information potentially gained is invaluable to managers, and the people recruited to staff this project are among the very best in the world when it comes to characterization of deep reefs.

#### **8. Procedures/Methods:**

Technical diving will be conducted under NOAA auspices, and will conform to the regulations of the NOAA Dive Center. Dive sites will be determined in advance through habitat suitability modeling based on bathymetry. Divers will enter the water from, and be recovered by, the primary dive platform, an 11 m Ambar boat (HI-1) launched from the starboard davit aboard Hi`ialakai. HI-1 will also have on board a backup diver with full SCUBA gear who will be available to assist the primary divers with bottle swaps, etc., during decompression and in the case of any emergency. The dive team and primary dive boat will be shadowed by a 19' SAFEboat chase boat, which will have on board a backup technical diver with a full technical trimix rig. The chase boat will be available to follow a separate lift bag or float should the members of the primary dive pair become separated. Both boats will be operated by dedicated coxswains who will not be diving. Boats will be within clear radio range of Hi`ialakai at all times. The primary dive team will be dropped on pre-determined sites. All dives will be

conducted while live-boating, i.e. no anchoring. Bottom times of 20 minutes or less are expected in waters over 200'. No dives in excess of 300' will be conducted. Decompression times of less than 45 minutes are expected, and decompression will be conducted while drifting in blue water. A lift bag or float will enable the support boats to remain in close proximity to the divers at all times.

During the dive, one diver will deploy a temporary 25 m transect to conduct a belt survey of all fishes and invertebrates within a 2 meter wide swath along the transect. This technique is best for observing and identifying fish, especially smaller or cryptic species. Following the fish survey, an additional diver will take still and video records of habitat type along the same transect. Benthic composition will be assessed based on percent cover estimates using a modified quantitative rapid ecological assessment (REA) method at each site. In addition, voucher specimens of the five most abundant algal species, as well as of any new sponge records or species, will be collected at each site (one specimen per species, no larger than 5 cm in greatest dimension). Algal specimens will be frozen for later identification by Heather Spalding (University of Hawaii, Dept. of Botany), a recognized expert in Hawaiian mesophotic algae. Sponge specimens will be preserved in 95% ethanol for later identification by Dr. Barbara Calcinaï (Polytechnic University of Marche, Italy), a recognized expert in sponge taxonomy. These algae and sponge voucher specimens will be used to identify the most abundant taxa in the benthic video at the species level wherever possible.

These methods have been used to survey shallow water reefs throughout the NWHI, and will produce similar quantitative data that can be compared between shallow and deep assemblages. In addition to transect surveys, divers will make presence/absence notes on fishes encountered during dives outside of transect boundaries. These observations will enable researchers to create island-by-island checklists of fishes, corals, sponges and algae known from the mesophotic reefs of the NWHI. If any unknown fishes, coral, sponges or algae are observed during the dive, voucher specimens will be collected. These collections will be placed in sealed "dry bags," and may be sent to the surface via a lift bag for the chase boat to recover to ensure safety of the divers. The primary dive boat will have the responsibility of being near the divers at all times. Thus, recovery of lift bags by the chase boat will not compromise dive safety. No more than three samples of any given specimen type will be collected per site. All collections will follow Monument collection and transport protocols for proper collection and storage of samples while in the Monument. Only divers with appropriate taxonomic expertise in Hawaiian/Pacific mesophotic fishes (Kosaki, Pyle, Papastamatiou, Leonard) will collect fish, if such collections are deemed necessary. No more than one diver per dive will collect fish to completely prevent any possibility of accidental over-collecting due to poor/no communication between divers.

Although this permit requests permission to take samples of new records or undescribed species of fishes at each site, such events are expected to be rare based on the past two years of mesophotic exploration in the NWHI by this same team of divers. We expect that fewer than 20 fish specimens (total) will be collected under this permit. A large majority of new records noted in 2009, 2010, and 2011 were based on conclusive in situ visual identification, photo/video vouchers, or both.

As divers conduct surveys and species presence/absence data, they will also be conducting searches for the invasive alga *Hypnea* and the invasive octocoral *Carijoa*. If encountered, depth/time will be recorded, which will allow an approximate spatial fix to be established based on the support boat's GPS track. Approximate greatest dimensions of invasive colonies will be recorded, and specimens (<5cm greatest dimension) will be collected either by hand or with metal clippers. Specimens will be placed in sealed bags and will be carried to the surface with the divers. If encountered, the invasive grouper Roi (*Cephalopholis argus*) will be opportunistically removed using three-pronged pole spears.

As reef systems are driven largely by abiotic factors, we propose to continue monitoring of temperature to help explain potential causes of deep reef productivity and diversity. Divers will also deploy temperature sensors at up to ten sites (TBD) to track changes in temperature over time. These sensors are extremely small (about the size of a quarter) and will be placed on the substrate via attachment to a lead diving weight. Care will be taken to ensure placement is on bare substrate or sand so as not to impact any living organisms. These temperature loggers will be retrieved (or replaced, if future permits allow) whenever these sites are next re-visited. Logistics, funding, and permit approvals allowing, we intend to recover/replace these on a Summer 2015 cruise. If possible, four temperature loggers deployed in 2010 will be recovered and replaced this year.

A Deep Ocean Engineering ROV (remotely operated vehicle) may be opportunistically used from Hi`ialakai to ground-truth bathymetry and confirm bottom conditions at potential dive sites.

**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:

Snowflake coral

Red algae

Peacock grouper, roi

Deep reef fishes TBD

Deep water corals TBD

Deep water algae TBD

Deep water sponges TBD

Scientific name:

*Carijoa riisei*

Hypnea musciformis

Cephalopholis argus

Other fishes, algae, corals, invertebrates, sponges TBD

# & size of specimens:

If potential new records or new species of fishes, coral, invertebrates, sponges or algae are encountered, a maximum of three specimens per site will be collected. Maximum sizes for fish are dependent on size of the fish (whole specimen collected), algal samples will not exceed 10 cm in greatest dimension, whereas coral and sponge samples will not exceed 20 cm in greatest dimension (for morphological analysis).

If either Hypnea or Carijoa are encountered, three specimens per species per dive site will be collected. Maximum specimen size will be 5 cm in greatest dimension.

Collection location:

Nihoa, Mokumanama, French Frigate Shoals, Gardner Pinnacles, Maro, Laysan, Lisianski, Pearl and Hermes, Midway, Kure

Specific latitude/longitude of dive sites will be determined by NCCOS habitat suitability models, multibeam sonar bathymetry, and weather.

Whole Organism  Partial Organism

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

Specimens will be given to the University of Hawaii, Hawaii Institute of Marine Biology, State of Hawaii, B.P. Bishop Museum and/or the Polytechnic University of Marche (sponge samples) for positive identification. Additional genetic studies will be performed by the Hawaii Institute of Marine Biology. Fish specimens will be added to the Indo-Pacific fishes reference collection at the B.P. Bishop Museum.

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

• General site/location for collections:



TBD. Divers will aim to survey algal meadows and reef ledges in 35-100 m of water. Generally, the highest probability for encountering *Hypnea* and *Carijoa* is in these deeper waters. Some surveys will be conducted in less than 30 m, as in shallow-water habitats characterized by boulders and overhangs for community comparisons between deep and shallow reefs. Habitat suitability models (utilizing existing multibeam bathymetry) that take into account depth ranges, bottom type (hard/soft), rugosity, and slope are being generated by NOAA NCCOS. In addition, the shipboard multibeam sonar systems on HI'IALAKAI will be used to locate suitable topographic features. These data products will be used to target suitable habitats for dive expeditions.

Similarly, some dives using conventional scuba may be conducted in shallow (0-35m) areas to search for new records.

- 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?**

Specimens of *Hypnea*, *Carijoa*, and any additional (non-invasive) algae, sponges, reef fish, and water samples will be triple-bagged, labeled, and frozen per the conditions of the Monument Specimen Transport Protocol. Coral samples will be handled per the conditions of the Monument Specimen Transport Protocol.

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

Specimens will be shared with HIMB for molecular analyses (particularly Carijoa, but also fishes), University of Hawaii (non-invasive algal collections and water samples), USFWS (coral) and the B.P. Bishop Museum (for their reference collection of Indo-Pacific coral reef fishes).

**Points of Contact:**

HIMB: Dr. Rob Toonen [REDACTED]

USFWS: Mr. Anthony Montgomery [REDACTED]

BPBM: Dr. Richard Pyle [REDACTED]

UH Manoa, Botany Dept.: Dr. Heather Spalding ([REDACTED])

Polytechnic Univ. of Marche: Dr. Barbara Calcinaï [REDACTED]

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

Closed-circuit rebreathers, including helium-oxygen-nitrogen compressed gas breathing mixes, and nitrox or 100% oxygen decompression mixes. All collecting will be done either by hand (algae, coral, sponges, water samples) or hand nets or pole spears (fishes).

**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:**

Small Tidbit temperature loggers. Approximately five will be deployed at French Frigate Shoals, and five at Pearl and Hermes Atoll. Actual number deployed depends on locating suitable benthic structure that will allow for secure attachment and ease of relocation.

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

Sample analysis will begin upon return to Honolulu. Continued collections are anticipated in 2015 at islands and atolls that were undersampled between 2009-2013. Although preliminary written results will be made available within one year of return, a final analysis and publication will not be initiated until most or all of islands have been surveyed.

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

CV attached

Literature Cited:

Dennis, C. & Aldhous, P. 2004. A tragedy with many players. *Nature* 430: 396-398.

Godwin, S., K.S. Rodgers and P.L. Jokiel. 2006. Reducing potential impact of invasive marine species in the northwestern hawaiian islands marine national monument. Report to: Northwest Hawaiian Islands Marine National Monument Administration.

Guinotte, J.M., Buddemeier, R.W., Kleypas, J.A. 2003. Future coral reef habitat marginality: temporal and spatial effects of climate change in the Pacific basin. *Coral Reefs* 22:551-558.

Hills-Colinvaux, L. 1986. Deep water populations of *Halimeda* in the economy of an atoll. *Bull. Mar. Sci.* 38(1):155-169.

Kahng, S. E. & J.E. Maragos. 2006. The deepest, zooxanthellate scleractinian corals in the world? *Coral Reefs* 25(2): 254.

Myers, R.F. 1999. Micronesian reef fishes: a comprehensive guide to the coral reef fishes of Micronesia. Third edition, revised and expanded. Coral Graphics, Barrigada, Guam. vi + 330 p., 192 pls.

Pyle, R.L. 1995. Chapter 12. Pacific reef and shore fishes, p. 205-238. In: Maragos, J.E., Peterson, M.N.A., Eldredge, L.G., Bardach, J.E. & Takeuchi, H.F. (eds.), *Marine and coastal biodiversity in the tropical island Pacific region. Volume 1. Species systematics and information management priorities.*

Program on Environment, East-West Center, Honolulu. 424 p.

Pyle, R.L. 1996. How much coral reef biodiversity are we missing? *Global Biodiversity* 6(1): 3-7.

Pyle, R.L. 1998. Chapter 7. Use of advanced mixed-gas diving technology to explore the coral reef "Twilight Zone", p. 71-88. In: Tanacredi, J.T. & Loret, J. (eds.), *Ocean Pulse: A Critical Diagnosis*. Plenum Press, New York. xii + 201 p.

Sadovy, Y. 2007. Final Report: Workshop for Global Red List Assessments of Groupers Family Serranidae; subfamily Epinephelinae (<http://www.hku.hk/ecology/GroupersWrasses/iucnsg/>). University of Hong Kong.

See, Kevin. 2007. Report on the marine invasive species in Papahānaumokuākea Marine National Monument. Report to NOAA/NOS Papahānaumokuākea Marine National Monument. 27 pp. Sept. 2007.

Thresher, R.E. & Colin, P.L. 1986. Trophic structure, diversity, and abundance of fishes of the deep reef (30-300 m) at Enewetak, Marshall Islands. *Bull. Mar. Sci.* 38(1): 253-272.

Wagner, D., Y.P. Papastamatiou, R.K. Kosaki, K.A. Gleason, G.B. McFall, R.C. Boland, R.L. Pyle & R.J. Toonen (2011). New records of commercially valuable black corals (Cnidaria: Antipatharia) from the Northwestern Hawaiian Islands at mesophotic depths. *Pac. Sci.* 65(2): 249-255.

With knowledge of the penalties for false or incomplete statements, as provided by 18 U.S.C. 1001, and for perjury, as provided by 18 U.S.C. 1621, I hereby certify to the best of my abilities under penalty of perjury of that the information I have provided on this application form is true and correct. I agree that the Co-Trustees may post this application in its entirety on the Internet. I understand that the Co-Trustees will consider deleting all information that I have identified as "confidential" prior to posting the application.

---

Signature

Date

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

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

**DID YOU INCLUDE THESE?**

- Applicant CV/Resume/Biography
- Intended field Principal Investigator CV/Resume/Biography
- Electronic and Hard Copy of Application with Signature
- Statement of information you wish to be kept confidential
- Material Safety Data Sheets for Hazardous Materials

## Papahānaumokuākea Marine National Monument Compliance Information Sheet

**1. Updated list of personnel to be covered by permit. List all personnel names and their roles here (e.g. John Doe, Diver; Jane Doe, Field Technician, Jerry Doe, Medical Assistant):**

Kosaki, Randall	Chief Scientist, rebreather diver
Leonard, Jason	Rebreather diver
Wagner, Daniel	Rebreather diver
McFall, Greg	Rebreather diver
Hauk, Brian	Rebreather diver
Pyle, Richard	Rebreather diver
TBD	Rebreather diver
TBD	Rebreather diver
Annandale, Senifa	Support diver
Owen, Hadley	PMNM coxswain

**2. Specific Site Location(s): (Attach copies of specific collection locations):**

Mokumanamana, French Frigate Shoals, Pearl and Hermes Atoll, Midway Atoll. No detailed locations available yet; my team is reviewing all available multibeam sonar maps for appropriate reef fish habitat at mesophotic depths, and negotiations are ongoing with the NOAA Diving Program on what depth we will be authorized to dive.

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

None.

**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.**

NA

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

Funded by NOAA NOS PMNM.

**5. Time frame:**

Activity start: 6 September 2014 – depart Pearl Harbor

Activity completion: 20 September 2014 – return to Pearl Harbor

Dates actively inside the Monument:

From: 8 September 2013

To: 28 September 2014

Describe any limiting factors in declaring specific dates of the proposed activity at the time of application: Mechanical or medical issues may delay departure and/or cause an early return. This is unlikely.

Personnel schedule in the Monument: All personnel enter PMNM on NOAA ship Hi'ialakai on 8 September, and depart PMNM on Hi'ialakai on 28 September.

**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: Federal government is self-insured**

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

- Vessel  
 Aircraft

Provide Vessel and Aircraft information: NOAA ship Hi'ialakai.

**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: NOAA ship Hi'ialakai

Vessel owner:  
Captain's name:  
IMO#:  
Vessel ID#:  
Flag:  
Vessel type:  
Call sign:  
Embarkation port:  
Last port vessel will have been at prior to this embarkation:  
Length:  
Gross tonnage:  
Total ballast water capacity volume (m3):  
Total number of ballast water tanks on ship:  
Total fuel capacity:  
Total number of fuel tanks on ship:  
Marine Sanitation Device:  
Type:

Explain in detail how you will comply with the regulations regarding discharge in the Monument. Describe in detail. If applicable, attach schematics of the vessel's discharge and treatment systems:

Other fuel/hazardous materials to be carried on board and amounts:

Provide proof of a National Oceanic and Atmospheric Administration (NOAA) Office of Law Enforcement-approved Vessel Monitoring System (VMS). Provide the name and contact information of the contractor responsible for installing the VMS system. Also describe VMS unit name and type:

VMS Email:  
Inmarsat ID#:

\* Individuals MUST ENSURE that a type-approved VMS unit is installed and that its automatic position reports are being properly received by the NOAA OLE system prior to the issuance of a permit. To make sure your VMS is properly configured for the NOAA OLE system, please contact NOAA OLE at (808) 203-2503 or (808) 203-2500.

\* PERMITS WILL NOT BE ISSUED TO INDIVIDUALS ENTERING THE MONUMENT VIA VESSEL UNTIL NOAA OLE HAS CONTACTED THE MONUMENT PERMIT COORDINATOR WITH A 'POSITIVE CHECK' READING.

## **10. Tender information:**



On what workboats (tenders) will personnel, gear and materials be transported within the Monument? List the number of tenders/skiffs aboard and specific types of motors: Two PMNM 19' Safeboats, each powered by twin Honda 4-stroke 90 hp outboards.

### **Additional Information for Land Based Operations**

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

NA

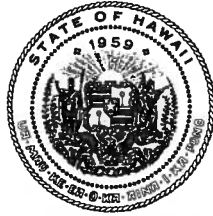
**12. Room and board requirements on island: NA**

**13. Work space needs: NA**

#### **DID YOU INCLUDE THESE?**

- Map(s) or GPS point(s) of Project Location(s), if applicable
- Funding Proposal(s)
- Funding and Award Documentation, if already received
- Documentation of Insurance, if already received
- Documentation of Inspections
- Documentation of all required Federal and State Permits or applications for permits

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



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

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

JESSE SOUKI  
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

July 11, 2014

TO: Division of Aquatic Resources File

THROUGH: William J. Aila, Jr., Chairperson *WJA*

FROM: Frazer McGilvray  
Division of Aquatic Resources *F. McGilvray*

**SUBJECT:**

DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS AND CHAPTER 11-200 HAR, FOR PAPAHAUNAUMOKUĀKEA MARINE NATIONAL MONUMENT RESEARCH PERMIT TO DR. RANDALL KOSAKI, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, PAPAHAUNAUMOKUĀKEA MARINE NATIONAL MONUMENT, FOR ACCESS TO STATE WATERS TO CONDUCT SURVEYS OF DEEP CORAL REEFS UNDER PERMIT PMNM-2014-015.

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. Randall Kosaki, National Oceanic and Atmospheric Administration, Papahānaumokuākea Marine National Monument, for Access to State Waters to Conduct Surveys of Deep Coral Reefs

Permit Number: PMNM-2014-015

Project Description:

The research activities, as described below, would allow entry and activities to occur in Papahānaumokuākea Marine National Monument (Monument), including the NWHI State waters between September 1, 2014 and August 31, 2015.

This is an effort to explore and document the biodiversity of the Monument's deep coral reefs, which includes characterizing the fauna and documenting the presence or absence of alien/invasive species in deep reef ecosystems. Limited collections would be made of targeted invasive species if found, as well as any unidentifiable fish, coral, or algae which may represent new geographic records or species. There would also be limited algal collection which would

ITEM F-1c

help characterize the biodiversity at each site. In addition, the deployment of temperature loggers would be undertaken to monitor conditions on the deep reefs.

The proposed activities are in direct support of the Monument Management Plan's priority management needs in the Marine Conservation Science action plan (3.1.1), as well as the Alien Species action plan (3.3.2). These action plans includes efforts to monitor and characterize deep-water habitats, and to conduct surveillance and eventual eradication of marine invasive species, respectively.

Activities to support understanding and interpreting the NWHI are addressed in the Monument Management Plan Environmental Assessment (December 2008) which resulted in a FONSI. This EA states that monitoring of deepwater ecosystems would provide essential information and data for ecosystem-based management of the Monument (PMNM MMP Vol. 2, p.30). In regard to alien species surveillance and removal, the EA summarizes that while there may be short-term negative effects from disturbance, the long-term beneficial effect of reducing the extent of infestation could allow native marine corals and marine species that depend on that coral to return to their historic levels (PMNM MMP Vol. 2, p.182).

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 June 8th, giving the public an opportunity to comment. The application was posted within 40 days of its receipt, in accordance with the Monument's Public Notification Policy.

Exemption Determination:

After reviewing HAR § 11-200-8, including the criteria used to determine significance under HAR § 11-200-12, DLNR has concluded that the activities under this permit would have minimal or no significant effect on the environment and that issuance of the permit is categorically exempt from the requirement to prepare an environmental assessment based on the following analysis:

1. All activities associated with this permit, including surveys and collections, have been evaluated as a single action. As a preliminary matter, multiple or phased actions, such as when a group of actions are part of a larger undertaking, or when an individual project is precedent to or represents a commitment to a larger project, must be grouped together and evaluated as a single action. HAR § 11-200-7. Since this permit involves an activity that is precedent to a later planned activity, i.e. the recovery of temperature data loggers, the categorical exemption determination here will treat all planned activities as a single action.

2. The Exemption Class for Scientific Research with no Serious or Major Environmental Disturbance Appears to Apply. Chapter 343, HRS, and § 11-200-8, HAR, provide for a list of classes of actions exempt from environmental assessment requirements. HAR §11-200-8.A.5. exempts the class of actions which involve "basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major

disturbance to an environmental resource.” This exemption class has been interpreted to include “surveys, censuses, inventories, studies, photographing, recording, sampling, collection, culture and captive propagation of aquatic biota”, such as those being proposed.

The proposed collection activities here appear to fall squarely under the exemption class #5, exempt item #5 as described under the former Fish and Game Division exemption list published in January 19, 1976. As discussed below, no significant disturbance to any environmental resource is anticipated in the sampling of Monument resources. Thus, so long as the below considerations are met, an exemption class should include the action now contemplated.

3. Cumulative Impacts of Actions in the Same Place and Impacts with Respect to the Potentially Particularly Sensitive Environment Will Not be Significant. Even where a categorical exemption appears to include a proposed action, the action cannot be declared exempt if “the cumulative impact of planned successive actions in the same place, over time, is significant, or when an action that is normally insignificant in its impact on the environment may be significant in a particularly sensitive environment.” HAR § 11-200-8.B. To gauge whether a significant impact or effect is probable, an exempting agency must consider every phase of a proposed action, any expected primary and secondary consequences, the long-term and short-term effects of the action, the overall and cumulative effect of the action, and the sum effects of an action on the quality of the environment. HAR § 11-200-12. Examples of actions which commonly have a significant effect on the environment are listed under HAR § 11-200-12.

The activities would be a continuation of work previously conducted by the applicant, which involves accessing the Monument’s deep coral reefs using technical SUBA diving technology to document biodiversity. The applicant received a permit to conduct similar work annually from 2009 thru 2013, and is likely to request future permits to continue this work. No other studies of this type have been undertaken to date. Access to deep coral reefs is limited and bottom times are minimal. With this in mind, significant cumulative impacts are not anticipated as a result of this activity, and numerous safeguards further ensure that the potentially sensitive environment of the project area will not be significantly affected. All activities would 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.

The activities would be conducted from the NOAA Ship HI'IALAKAI during its September cruise. The following table shows all permitted activities that may occur concurrently.

**Table 1. Concurrent Projects Aboard NOAA SHIP HI'IALAKAI**

Permit	Purpose and scope	Location
PMNM-2014-005 Ellis-Simon HI'IALAKAI (approved)	This permit allows the NOAA Ship HI'IALAKAI entry into the Monument. Personnel aboard the vessel would be permitted under separate permits	All locations
PMNM-2014-001 Co-Trustee (approved)	This permit allows monk seal field camp operations with activities from June - September 2014.	Kure Atoll, Midway Atoll, French Frigate Shoals
PMNM-2014-023 Parrish-Van Atta (proposed)	The proposed action would involve the selective removal of up to 20 Galapagos sharks from French Frigate Shoals to mitigate predation on Hawaiian monk seals with activities from June to September 2014.	French Frigate Shoals
PMNM-2014-012 Couch (proposed)	This proposed action would be to assess health and community structure of corals on shallow-water reefs with activities from August 7 - 31, 2014	All locations
PMNM-2014-024 Donahue (proposed)	This proposed action would be to evaluate coral reef bioerosion in the NWHI from August 7 - 31, 2014.	All locations
PMNM-2014-025 Donahue (proposed)	This proposed action would be to characterize <i>Pocillopora meandrina</i> (POME) colony fish and invertebrate communities from August 7 - 31, 2014.	All locations
PMNM-2014-018 Godwin (proposed)	This proposed action would be to conduct Pacific Reef Assessment and Monitoring Program activities from August 7 - 31, 2014	All locations
PMNM-2014-015 Kosaki (proposed)	This proposed action would be to document the biodiversity of deep reefs using conventional and technical SCUBA diving technology from September 6 - 30, 2014.	All locations

**Table 2. Concurrent projects Aboard NOAA SHIP SETTE**

Permit	Purpose and scope	Location
PMNM-2014-005 Koes SETTE (approved)	This permit allows the NOAA SETTE entry into the Monument. Personnel aboard the vessel would be permitted under separate permits	All locations
PMNM-2014-001 Co-Trustee (approved)	This permit allows monk seal field camp operations with activities from June - September 2014.	French Frigate Shoals, Lisianski Island, Pearl and Hermes Atoll, Midway Atoll, Kure Atoll

The above other permits would potentially be active in the Monument concurrently with the proposed activities. Most of those would be dealing with different organisms or habitat types and would not overlap. Of these proposed permits, none are intended to duplicate the collections and scope of Kosaki's research.

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. The USCG Ship Kukui may also be transiting in the area for the purposes of re supplying Midway Atoll and supporting Co Trustee Conservation and Management activities.

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

4. Overall Impacts will Probably be Minimal and Insignificant. Any foreseeable impacts from the proposed activity will probably be minimal, and further mitigated by general and specific conditions attached to the permit. Specifically, all 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, other applicable law and agency policies and standard operating procedures.

Conclusion. Upon consideration of the permit to be approved by the Board of Land and Natural Resources, the potential effects of the above listed project as provided by Chapter 343, HRS and Chapter 11-200 HAR, have been determined to be of probable minimal or no significant effect on the environment and exempt from the preparation of an environmental assessment.

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William J. Aila, Jr.  
Chairperson, Board of Land and Natural Resources

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Date