

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

April 19, 2010

Board of Land and Natural Resources  
State of Hawaii  
Honolulu, Hawaii

Resubmittal of Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National Monument Research Permit to Ryan Nichols, NOAA Fisheries, Pacific Islands Fisheries Science Center, for Access to State Waters to Conduct Fish Growth Study Research Activities

The Division of Aquatic Resources (DAR) hereby submits a request for your authorization and approval for issuance of a Papahānaumokuākea Marine National Monument research permit to Ryan Nichols, fisheries biologist, Pacific Islands Fisheries Science Center, 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:

- Kure Atoll State Seabird Sanctuary

The Department has made an exemption determination for this permit in accordance chapter 343, HRS, and Chapter 11-200, HAR. See Attachment (“DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS AND CHAPTER 11-200 HAR, FOR PAPAHAANAUMOKUAKEA MARINE NATIONAL MONUMENT RESEARCH PERMIT TO RYAN NICHOLS, NOAA FISHERIES, PACIFIC ISLANDS FISHERIES SCIENCE CENTER, FOR ACCESS TO STATE WATERS TO CONDUCT FISH GROWTH STUDY RESEARCH ACTIVITIES UNDER PERMIT PMNM-2010-020”).

The activities covered under this permit would occur between May 1, 2010 and August 31, 2010.

The proposed activities are a renewal of work that has been previously permitted and conducted in the Monument.

INTENDED ACTIVITIES:

The applicant proposes to conduct a growth study on hapu'upu'u (Hawaiian grouper). Construction of an accurate growth curve requires empirical validation of the periodicity of marks on growth structures used to assign ages to fish individuals. Growth marks are readily

apparent on cross-sectioned otoliths (ear stones – typically used to age marine fish) of hapu'upu'u. The only technique available for validating the exact age estimate of an individual fish is injecting individuals with a fluorescent biomarker such as oxytetracycline (OTC) and then harvesting the fish after a period of time spanning formation of the growth mark. Harvested fish are then sacrificed and their otoliths extracted, sectioned, and examined for the presence of annuli peripheral to the fluorescent mark. The purpose of the applicant's research is to provide the validation of age estimates necessary for accurately describing the age and growth of hapu'upu'u.

The proposed activities would occur in collaboration with, and would be carried out by, Carl Meyer, HIMB. Carl Meyer has proposed, in a separate permit application, to capture and tag individual hapu'upu'u as part of his predator movement studies. The applicant proposes that an additional 15 specimens (10 at Kure and 5 at Midway) be captured and injected. These fish would be collected in either 2011 or 2012, as a continuation of the study, under a separate permit.

The methods used to capture and tag hapu'upu'u are described in Carl Meyer's application and state that SCUBA divers would capture hapu'upu'u by handlining (using a single baited hook) underwater. Captured hapu'upu'u would be restrained on the sea bed in a hand net during the procedure. Every fish captured and injected would also receive an external dart tag.

The use of OTC to validate growth mark formation in commercially harvested and other fishes has a long history of success. At the proposed concentrations, OTC is non-toxic to fishes. Although the application of OTC is presently regulated for domestic animal populations only, the spirit of the law is to proactively prohibit the unknowing consumption of antibiotics by humans. The Applicant points out that based on 2008 observations by Meyer, the grouper to be OTC-marked appear to be resident to the study sites. The commercial fishery in the Monument is now closed, sustenance fishing is no longer being permitted outside of Midway Atoll, and grouper are not fished for consumption within Midway Atoll. The chance that OTC-marked fish would be captured by fishers is essentially zero. Lastly, all OTC-marked fishes would be individually recognizable with external tags; notices advertising such would be distributed to licensed Ho'omalū Zone fishers well in advance of the marking study.

This activity was permitted in 2009, but attempts to collect fish were unsuccessful.

The proposed project would lead to better understanding of the biology of both NWHI and MHI populations of hapu'upu'u, and is necessary to help conserve populations being protected within the Monument, as well as populations subject to regulated extraction in the MHI.

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

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

- Removing, moving, taking, harvesting, possessing, injuring, disturbing, or damaging any living or nonliving monument resource
- Discharging or depositing any material or matter into the Monument
- Possessing fishing gear except when stowed and not available for immediate use during passage without interruption through the Monument
- Attracting any living Monument resource
- 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 March 15th, 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.

Concerns raised:

1. How will the grouper be recaptured to collect the data? What is the recapture rate for Meyer year-to-year? What percentage of the fish injected does the applicant believe they will catch the following year?
2. The Applicant states that the proposed research is necessary "for a detailed stock assessment of this commercially valuable (MHI and NWHI) Hawaiian endemic species." Since there is no longer any commercial fishing taking place in the NWHI, and consequently the NWHI no longer has a commercial value, what is the benefit of the activity to the Monument?
3. Explanation needed for why applicant can not use the findings of previous studies that have used OTC with epinepheline groupers to demonstrate that single annulus are formed each year in this genus.

#### **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.
- The proposed activities are in compliance with HRS Chapter 343 (exemption class HAR §11-200-8(a)(5)).

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-2009-024 to conduct similar work in 2009.

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

**RESPONSE:**

1. Hapu'upu'u would be recaptured during the 2011 tagging-recapture conducted by Carl Meyers (HIMB) or another NOAA Fisheries cruise in the event Meyers is unable to continue sampling program. The Meyer year-to-year recapture rate is difficult to ascertain due to the fact that tagging studies last longer than one year and physically disturbing tagged fish during an ongoing study is not incorporated into research protocol. However, during cruises in 2008 tagged grouper were repeatedly sighted in the same general area. During the 2009 field season, Meyers reported 50% of the grouper sighted were tagged but not recaptured to identify tag numbers. Given this preliminary recapture rate based on visual sightings, the Applicant makes a conservative estimate of 40-50% for a recapture rate the following year.
2. The Applicant agrees that the "commercial value" is eliminated upon the completion of commercial fishing in the Monument, but points out that it does not negate the benefit to the Monument. Applicant refers to the Draft Monument Scientific Plan (Science Plan), May 2009, Native Biodiversity (3.1.2) which states, "life history studies are needed to provide information on essential habitat requirements, in all life stages, environmental tolerances, larval dispersal mechanisms and other parameters (age structure, growth and mortality) for key native species." Hapu'upu'u is a key endemic species of Hawaii, regardless of its commercial value. The proposed research would be extremely difficult to conduct in the MHI due to the low population density of hapu'upu'u from over-exploitation. The higher density of hapu'upu'u in the NWHI coupled with their shallower occurrence within the range of SCUBA provides the only favorable conditions for tagging and releasing specimens at depth.

3. The Applicant explains the primary reason to conduct OTC on Hapu'upu'u is that the presence of annuli is an environmental phenomenon, not a taxonomic. Currently, there are no published validations for annuli among epinepheline of the NWHI, MHI or most of the Central Pacific. Due to the potential effects the environment has on annuli formation the extrapolation of the findings from other studies to Hapu'upu'u annuli would be invalid. Although it may be assumed that congeners might share traits of annuli formation the validation of the timing and periodicity must be preformed if any age and growth estimates are to be calculated for this species.

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 certain special instructions and conditions, which are in addition to the Papahānaumokuākea Marine National Monument Research Permit General Conditions. All suggested special conditions have been vetted through the legal counsel of the Co-Trustee agencies (see Recommendation section).

MONUMENT MANAGEMENT BOARD OPINION:

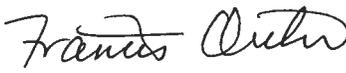
The MMB is of the opinion that the Applicant has met the findings of Presidential Proclamation 8031 and this activity may be conducted subject to completion of all compliance requirements. The MMB concurs with the special conditions recommended by DAR staff.

RECOMMENDATION:

That the Board authorize and approve a Research Permit to Ryan Nichols, Pacific Islands Fisheries Science Center, with the following special conditions:

1. To prevent introduction of disease or the unintended transport of live organisms, the permittee must comply with the disease and transport protocol attached to this permit.
2. Tenders and small vessels must be equipped with engines that meet EPA emissions requirements.
3. 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

Respectfully submitted,

  
for Administrator

APPROVED FOR SUBMITTAL

A handwritten signature in black ink, appearing to read 'LH Thielen', written over the printed name.

LAURA H. THIELEN  
Chairperson

Attachment

LINDA LINGLE  
GOVERNOR OF HAWAII



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

LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

KEN C. KAWAHARA  
DEPUTY DIRECTOR - WATER

RUSSELL TSUJI  
DEPUTY DIRECTOR - LAND

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

April 6, 2010

TO: Division of Aquatic Resources File

THROUGH: Laura H. Thielen, Chairperson

FROM: Francis Oishi, Program Manager   
Division of Aquatic Resources

DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT  
UNDER THE AUTHORITY OF CHAPTER 343, HRS AND CHAPTER 11-200 HAR, FOR  
PAPAHĀNAUMOKUĀKEA MARINE NATIONAL MONUMENT RESEARCH PERMIT TO RYAN NICHOLS,  
NOAA FISHERIES, PACIFIC ISLANDS FISHERIES SCIENCE CENTER, FOR ACCESS TO STATE WATERS  
TO CONDUCT FISH GROWTH STUDY RESEARCH ACTIVITIES UNDER PERMIT PMNM-2010-020.

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 Ryan Nichols, NOAA  
Fisheries, Pacific Islands Fisheries Science Center, for Access to State Waters to Conduct Fish  
Growth Study Research Activities.

Permit Number: PMNM-2010-020.

Project Description:

The research permit application, as described below, would allow entry and activities to occur in  
Papahānaumokuākea Marine National Monument (Monument), including the NWHI State  
waters from May 1, 2010 through August 31, 2010.

This is a growth study on hapu'upu'u (*Epinephelus quernus*, Hawaiian grouper) including  
capturing and releasing 15 hapu'upu'u after injecting a fluorescent biomarker (oxytetracycline) to  
mark fish otoliths (ear stones). Marked fish would be found and harvested next year (under a  
separate permit) to construct an accurate growth curve. The purpose of the research is to provide  
validation of age estimates necessary for accurately describing the age and growth of hapu'upu'u.

The proposed activities are in direct support of the Monument Management Plan's priority  
management needs 3.1 – Understanding and Interpreting the NWHI (through action plan 3.1.1 –  
Marine Conservation Science). In addition, activities to support understanding and interpreting  
the NWHI are addressed in the Monument Management Plan Environmental Assessment. This  
EA states that “understanding the genetic diversity of species groups, and the way in which the

April 6, 2010

populations in areas change could be helpful to forecast, prepare for, and mediate potential threats to populations within the Monument” (PMNM MMP Vol 2, p.171). Life history and growth studies, such as those proposed, would enhance this understanding.

Consulted Parties:

The permit application was sent out for review and comment to the following scientific and cultural entities: Hawaii Division of Aquatic Resources, Hawaii Division of Forestry and Wildlife, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), United States Fish and Wildlife Service Hawaiian and Pacific Islands National Wildlife Refuge Complex Office, and the Office of Hawaiian Affairs (OHA). The Principal Investigator for this project, Carl Meyer, has also been consulted with respect to his experience in successfully tagging deep-water fish specimens. In addition, the permit application has been posted on the Monument Web site since March 15th, 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 the tagging and subsequent harvest of the subject hapu‘upu‘u, 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 recapture and harvest of tagged hapu‘upu‘u fish, 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 fisheries research related to the development and management of various aquatic organisms, including life history, migration, and growth studies, such as those being proposed.

Additionally, the former Division of Fish and Game established its own published list of exempted activities types under the Exemption Class #5, Exempt Items #4 & #8, respectively, including “wildlife and game surveys, censuses, inventories, studies . . . collection and captive propagation,” as well as the “capture of aquatic animals, tagging of said animals and attempted recapture to determine migration patterns, growth and life cycles.” DEPARTMENT OF LAND & NATURAL RESOURCES, EXEMPTION LIST FOR THE DIVISION OF FISH AND GAME (January 19, 1976).

April 6, 2010

The proposed tagging and growth study activities here appear to fall squarely under the exemption class identified under HAR § 11-200-8.A.5., and are succinctly described under the former Fish and Game Division exemption list published in 1976, as involving the capture and recapture of aquatic animals to study growth and life cycles. As discussed below, no significant disturbance to any environmental resource is anticipated in either the tagging or recapture of the growth study specimens. 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.

No prior studies of this type have been undertaken to date aside from a permit application studying interactions between fish populations in the Monument as indicated below. There is only one other permit application for interaction with hapu'upu'u in The Northwestern Hawaiian Islands (Carl Meyer's tagging activities). With this in mind, significant cumulative impacts are not anticipated as a result of this activity, and numerous safeguards further ensure that the potentially sensitive environment of the project area will not be significantly affected. All activities will be conducted in a manner compatible with the management direction of the Monument Proclamation in that the activities do not diminish monument resources, qualities, and ecological integrity, or have any indirect, secondary, cultural, or cumulative effects. The joint permit review process did not reveal any anticipated indirect or cumulative impacts, nor did it raise any cultural concerns, that would occur as a result of these activities.

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. This project has been subject to the public review process for over a year, as the applicant was in fact permitted to conduct the same activities last year, but the field team was unable to complete the permitted tasks. The current request is an attempt to fulfill activities previously permitted. In addition, by capturing and tagging fish in situ at depth-of-capture, barotrauma that would otherwise result from bringing fish up to the surface to tag, is avoided. The field PI for this project (C. Meyer) is experienced in this activity and reports that adverse effects are minimal when hapu'upu'u are treated in this manner. In

April 6, 2010

addition, the use of oxytetracycline (OTC) to validate growth mark formation in commercially harvested and other fishes has a long history of success. At the proposed concentrations, OTC is non-toxic to fishes. The harvesting of 15 hapu'upu'u in one year is negligible compared to the acceptable harvest rates of commercial bottomfishing, which include hapu'upu'u.

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.

---

Laura H. Thielen  
Board of Land and Natural Resources

---

Date

**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:** Ryan S. Nichols

**Affiliation:** NOAA Fisheries, Pacific Islands Fisheries Science Center

**Permit Category:** Research

**Proposed Activity Dates:** March 10 - August 30, 2010

**Proposed Method of Entry (Vessel/Plane):** NOAA ships Hi'ialakai and Oscar Elton Sette

**Proposed Locations:** Kure and Midway atolls (OTC Tagging), TBD NWHI (sustenance fishing)

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

3

**Estimated number of days in the Monument:** 54

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

a.) The proposed activity would...

substantively increase the information necessary to effectively manage and conserve stocks of the endemic hapu'upu'u or Hawaiian grouper at minimal risk and impact to its populations (ecological resource of the P-MNM) or to P-MNM cultural/historical resources.

In addition, collect hard parts and gonads from discarded species caught aboard NOAA vessels for sustenance fishing.

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

Continue previous years collaborative study utilizing services and specimens provided by another P-MNM-permitted research study. Carl Meyer (HIMB) is proposing that, during summer 2010, a three-member dive team will capture and tag individual hapu'upu'u on the forereefs of Kure and Midway atolls using the same methods that their group successfully developed on cruises to Kure and Midway in 2008 and again in 2009. Our study's fish will be hand-lined/netted in situ, measured (total length, TL in cm), administered antibiotic oxytetracycline (OTC), and the fish marked with an external tag enabling recognition of prior-tagged individuals by divers underwater.

As a result of last years unsuccessful attempt to collect fish for the OTC tagging study, we herein propose that a maximum of ten (10) and five (5) subadult-adult grouper of a range of sizes (> 50 cm TL), at Kure and Midway atolls, respectively, be injected intraperitoneally using sterilized syringes loaded with 50 mg of the antibiotic oxytetracycline (OTC, Liquimycin® 200) per kg body weight. For fish ranging in size from about 50-100 cm TL, the respective body weights and OTC dosages would be 2.5-20 kg (Nichols and DeMartini 2009) and about 125-1,000 mg/75-500 mg (0.6-5.0 ml/0.3-2.5 ml). The proposed OTC fish will be a separate entity to the fish participating in the acoustic transmitter study.

Sustenance fish will be processed post cleaning for the galley, gonads will be removed and hard parts (ear stones, vertebrae and dorsal ray/spines) will be extracted.

c.) This activity would help the Monument by ...  
providing the validation of age estimates necessary for accurately describing the age and growth of hapu'upu'u. The management of the extracted (MHI) and the conservation of protected (NWHI) stocks of this species are dependent on our knowledge of sustainable levels of take in the MHI, and the latter require sound age-growth and related life history data.

**Other information or background:** This collaborative study between academia (HIMB) and federal fisheries biologists would contribute substantively to the growing need and mandate for sharing natural resource specimens and the costs involved in their research.

**Section A - Applicant Information**

**1. Applicant**

Name (last, first, middle initial): Nichols, Ryan S.

Title: Fisheries Biologist (Research)

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

Carl Meyer, Hawaii Insitute of Marine Biology, U Hawaii

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

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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

**3. Affiliation (institution/agency/organization directly related to the proposed project):**

The proposed work is a collaborative study by NOAA Fisheries, Pacific Islands Fisheries Science Center, and the Hawaii Insitute of Marine Biology, Univ. Hawaii.

**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):**

HIMB personnel: two (2) diver-technicians (tbd)

**Section B: Project Information**

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

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

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

Location Description:

Shallow (< 30-m deep) forereef at Kure and Midway atolls

**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:***

In a separate Permit Application for March 2010 research, Carl Meyer (HIMB) is providing the rationale and justification for conducting in situ capture, external tagging, acoustic transmitter implantation, and release of hapu'upu'u grouper at Kure and Midway atolls on the same March-August 2010 cruises. Our justification for our Permit Application is as follows.

In addition to information on movement patterns, complementary data on age, growth, and other specific life-history attributes such as size-at-maturity and spawning seasonality of hapu'upu'u grouper are presently lacking. Combined parameter estimates provide the comprehensive input necessary for a detailed stock assessment of this commercially valuable (MHI and NWHI), Hawaiian endemic species. Understanding the biology of both NWHI and MHI populations will be necessary to help conserve populations being protected within the P-MNM and populations subject to regulated extraction in the MHI.

Construction of an accurate growth curve requires empirical validation of the periodicity of marks on growth structures used to assign ages to fish individuals. Growth marks are readily apparent on cross-sectioned otoliths (ear stones – a type of hard part typically used to age marine fish) of hapu'upu'u. Marks on hapu'upu'u otoliths appear to be formed annually, but the accuracy of the age estimates still requires validation (Nichols and DeMartini 2009). The primary reason to conduct OTC on Hapu'upu'u is that the presence of annuli is an environmental phenomenon, not a taxonomic. Currently, there are no published validations for annuli among epinepheline of the NWHI, MHI or most of the Central Pacific (Annuli on hapu'upu'u otoliths appear to complete translucent zone formation in late spring.) Harvested fish are then sacrificed and their otoliths extracted, sectioned, and examined microscopically under ultraviolet light in a darkened room to evaluate whether how many annuli are present peripheral to the fluorescent mark. For example, the presence of a single annulus peripheral to the fluorescent mark on the otolith of a fish at liberty for a year validates a once-yearly formation of the presumed annual growth mark.

The use of OTC to validate growth mark formation in commercially harvested and other fishes has a long history of success. However, due to the potential effects the environment has on annuli formation the extrapolation of the findings from other studies to Hapu'upu'u annuli would be invalid. Although it may be assumed that congeners might share traits of annuli formation the validation of the timing and periodicity must be preformed if any age and growth estimates are to be calculated for this species.

At the proposed concentrations (which are accepted standard for marking fish otoliths), OTC is non-toxic to fishes. Although the application of OTC is presently regulated for domestic animal populations only under the Code of Federal Regulations (C.F.R.) 21, 556.500, the spirit of the law is to proactively prohibit the unknowing consumption of antibiotics by humans. Based on 2008 observations (C. Meyer, unpubl. data), however, the grouper to be OTC-marked appear to be resident to the study sites and occur well inshore of the boundary that forms the spatial fishery closure protecting resources on the shallow forereef of Kure atoll. Furthermore, no Ho'omalua Zone-permitted bottomfishers fish as far upchain as Kure atoll and therefore the chance that OTC-marked fish will be captured by fishers is essentially nil. All recreational or commercial

extraction of reef fishes at Midway Atoll is currently prohibited. Lastly, all OTC-marked fishes will be individually recognizable with external tags; notices advertising such would be distributed to licensed Ho'omalū Zone fishers well in advance of the marking study.

#### References

Nichols RS, DeMartini EE (2009) Preliminary estimates of age and growth for the endemic Hawai'ian grouper (hapu'upu'u, *Epinephelus quernus*, F. Serranidae). Pacific Islands Fisheries Science Center, PIFSC Administrative Report H-08-06, 19p.

### **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?

First, by avoiding coral damage by anchoring small craft only on sand adjacent to shallow forereef. Second, by capturing and tagging fish in situ at depth-of-capture to avoid barotrauma that would otherwise result from bringing fish up to the surface to tag. The collaborator (C. Meyer) who is petitioning for a separate permit to continue his group's underwater capture, external tagging, and acoustic transmitter implantation activities in 2010, has demonstrated in his report on 2008 activities that adverse effects are minimal when hapu'upu'u are treated in the described manner. Lastly, we will either review the NOAA vessel Hi'ialakai's cultural briefing material or attend a cultural briefing to ensure proper cultural safeguards are incorporated into research design.

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 possibility that some of the tagged hapu'upu'u might be seriously injured or die as a result of capture and tagging has been effectively minimized by successful protocols developed on May and June 2008 research cruises to Kure and Midway.

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 the activity elsewhere, say, in the MHI. Hapu'upu'u grouper are endemic to the Hawaiian Archipelago and Johnston atoll, and they do not occur at diving depths in the MHI or Johnston. And, in order to conduct the study, the tagging and marking of individual fish must be done underwater by divers at 10-30 m depths.

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 potential benefit, specifically to the Monument, which has an interest in biodiversity and habitat as they relate to native species, is the direct need to better document life history, habitat requirements, and the role that the native species like hapu'upu'u play in maintaining a stable ecosystem. In addition to the Monuments understanding of biodiversity and habitat is the compliment of validating the estimated ages of this species, thereby providing accurate input to the assessment of its stock in the MHI. These end values for both the Monument and MHI far outweighs the negatives of any serious injury or mortality of relatively few individuals in the short term (duration of this permit). The benefits of this information for assessing the MHI stock \_and\_ understanding the biology of this important benthic predator in the P-MNM further overshadow the anticipated future recapture and sacrifice of at most 10 individual fish in 2010-2011.

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

The cruise duration is no longer than needed to accomplish the proposed activities.

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

The PIFSC PI (Nichols) has been a working member of a team of respected fisheries research biologists at the PIFSC who work on fish age and growth. Representative, relevant publications include:

DeMartini EE, Landgraf KC, Ralston S (1994) A recharacterization of the age-length and growth relationships of Hawaiian snapper, *Pristipomoides filamentosus*. NOAA Tech Memorandum NMFS-SWFSC-199

Humphreys RL Jr (2000) Otolith-based assessment of recruitment variation in a North Pacific seamount population of armorhead *Pseudopentaceros wheeleri*. *Mar Ecol Prog Ser* 204: 213-223  
Humphreys RL Jr, Campana SE, DeMartini EE (2005) Otolith elemental fingerprints of juvenile Pacific swordfish *Xiphias gladius*. *J Fish Biol* 66:1660-1670.

None of the potential impacts on hapu'upu'u populations would require mitigation.

g. Provide information demonstrating that you have adequate financial resources available to conduct and complete the activity and mitigate any potential impacts resulting from its conduct. The relatively minimal costs (< \$ 0.5 K) required for the fluorescent biomarker and syringes are easily subsumed by the 2009 Life History Program base budget (\$ 30K) within the Fisheries Stock Assessment and Fish Biology Division of the PIFSC.

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 number of test fish individuals is trivial relative to the resident natural populations at the two atolls. The eventual sacrifice (in 2010-2011) of at most 10 individual fish would have no impact on their populations (estimated from 2002-2008 survey data of the PIFSC, CRED, as about 5 fish per ha at these depths in atoll forereef habitat).

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

NOAA vessel Hi'ialakai has all the required electronics.

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

No

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

All activities related to the underwater capture, tagging, and release of specimens is described in a separate permit application being submitted by Carl Meyer of HIMB, which describes methods for the monitoring of fish movements.

**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:

hapu'upu'u grouper

Scientific name:

Epinephelus quernus

# & size of specimens:

15 total (50-110 cm fork length)

Collection location:

Kure (10 specimens); Midway (5 specimens)

Whole Organism  Partial Organism

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

All fish collected during the period of the permit will have been released underwater at their exact underwater capture sites

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

No organisms kept.

• General site/location for collections:

Forereef at 10-30 m depths of Kure and Midway atolls.

• Is it an open or closed system?  Open  Closed

• Is there an outfall?  Yes  No

• Will these organisms be housed with other organisms? If so, what are the other organisms?  
No

• Will organisms be released?  
Yes

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

None of the fish individuals that are to be collected will be transported anywhere.

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

This collaborative (HIMB, PIFSC) study is unique

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

A fluorescent bio-marker (oxytetracycline, aka OTC); sterile syringes to administer solution in situ at depth.

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

fluorescent bio-markers (oxytetracycline hydrochloride [OTC]). MSDS are appended.

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

None

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

A subset (an estimated 10 individuals) of the fish that have been externally tagged and internally marked with the fluorescent biomarker in 2009 will need to be collected and sacrificed for extraction of bio-marked otoliths (earstones) in either 2010 (1-yr validation) or 2011 (2-yr validation). Laboratory otolith analysis, statistical data analyses, and incorporation of test results into a manuscript on hapu'upu'u age and growth will extend through 2012. At that time a final draft ms should be available. It is reasonable to expect that results of the study would be published in a peer-reviewed journal like Fishery Bulletin in 2013.

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

None \_directly\_ related to the subject species but one co-author (DeMartini) has published on both the age-growth and reproductive life histories of allied Hawaiian bottomfishes:

DeMartini EE, Lau BB (1998) Morphometric criteria for estimating sexual maturity in two snappers, *Etelis carbunculus* and *Pristipomoides sieboldii*. *Fishery Bulletin* 97:449-458.

Lau BB, DeMartini EE (1994) An evaluation of oocyte size in multiple regressions predicting gonad weight from body weight: a test using Hawaiian ehu, *Etelis carbunculus*. NOAA Technical memorandum NMFS-SWFSC-212.

DeMartini, Landgraf, Ralston (1994) See full reference in section 7f above.

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):**

Tagging: Dr. Carl Meyer, Principal Field investigator, Hawaii Institute of Marine Biology, U Hawaii,

HIMB personnel: two (2) diver-technicians (tbd)

Otolith/gonad sampling: LT. Collin Little, Principle Field investigator, NOAA Ship Oscar Elton Sette, ops.sette@noaa.gov

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

Tagging: Kure and Midway atolls

Otolith/gonad collections: When applicable; Gardner, Laysan, Lisianski, Maro, Necker, Raita, St. Rogetien.

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

**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.**

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

All funding comes from an annual budget of the United States Federal Government for the National Oceanic and Atmospheric Administration.

**5. Time frame:**

Activity start: May 1, 2010

Activity completion: August 30, 2010

Dates actively inside the Monument:

From: May 1, 2010

To: August 30, 2010

Describe any limiting factors in declaring specific dates of the proposed activity at the time of application: The ship's schedule is subject to change to a variety of factors such as weather delays and changes in project schedules. The actual project dates within the permit time frame are tentative.

Personnel schedule in the Monument: NOAA ship Hi'ialakai, NOAA ship Oscar Elton Sette, Crew and Scientist list will be provided prior to sailing

**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:** The 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 IMO # 8835619  
NOAA Ship Oscar Elton Sette IMO # 8835097

**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):** These inspections are conducted periodically in accordance with Monument regulations. The inspections will be conducted again between May 1<sup>th</sup> – August 8<sup>th</sup> while the ship prepares for the first PMNM cruise of the year.

- Rodent free, Date: TBD but will be prior to entry into Monument  
 Tender vessel, Date: TBD but will be prior to entry into Monument  
 Ballast water, Date: TBD but will be prior to entry into Monument  
 Gear/equipment, Date: TBD but will be prior to entry into Monument  
 Hull inspection, Date: TBD but will be prior to entry into Monument

**9. Vessel information (NOTE: if you are traveling aboard a National Oceanic and Atmospheric Administration vessel, skip this question):**

Vessel name:

Vessel owner:

Captain's name:

IMO

Vessel ID#:

Flag:

Vessel type:

Call sign:

Embarkation port:

Last port vessel will have been at prior to this embarkation:

Length:

Gross tonnage:

Total ballast water capacity volume (m3):

Total number of ballast water tanks on ship:

Total fuel capacity:

Total number of fuel tanks on ship:

Marine Sanitation Device:

Type:

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

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

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

VMS Email

Inmarsat ID#:

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

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

**10. Tender information:**

On what workboats (tenders) will personnel, gear and materials be transported within the Monument? List the number of tenders/skiffs aboard and specific types of motors: The NOAA Ship HI`IALAKAI and Oscar Elton Sette has the following tenders which will be deployed.

1. 8m - Jetboat Launch - 270 hp Yanmar (Diesel)
2. 10m - Jetboat Launch - 315 hp Yanmar (Diesel)
3. Rescue Boat - Four Stroke 115 hp (Gas)
4. (2) Zodiac inflatable boat - single outboard engine (Four Stroke 50hp)

Additionally, HI`IALAKAI and Oscar Elton Sette may carry one or more of the following science party provided tenders:

1. 19' Safeboat - twin outboard engines (Four Stroke 60 hp each)
2. 19' Safeboat - twin outboard engines (Four Stroke 75 hp each)
3. 19' Safeboat - AHI multibeam sonar survey launch - Volvo inboard/outboard Diesel (236 hp)
4. (2) Avon inflatable boat - single outboard engine (Four Stroke 50hp)
5. 10m console boat - twin outboard engines (Four Stroke 90 hp each)

**Additional Information for Land Based Operations**

**11. Proposed movement of personnel, gear, materials, and, if applicable, samples:**  
Not Applicable

**12. Room and board requirements on island:** Not Applicable

**13. Work space needs:** none

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