Papahānaumokuākea Marine National Monument

RESEARCH Permit Application

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

ADDITIONAL IMPORTANT INFORMATION:

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

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

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

INCOMPLETE APPLICATIONS WILL NOT BE CONSIDERED

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

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

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: Timothy Grabowski
Affiliation: U.S. Geological Survey-Hawaiʻi Cooperative Fishery Research Unit, University of Hawaiʻi at Hilo
Permit Category: Research
Proposed Activity Dates: August 23, 2018-Sept. 16, 2018
Proposed Method of Entry (Vessel/Plane): NOAA ship Hiʻialakai
Proposed Locations: French Frigate Shoals, Maro Reef, Laysan, Lisianski, Pearl and Hermes Atoll, Midway Atoll, Kure Atoll, Brooks Bank, St. Rogatien Bank, Raita Bank, Northhampton Seamount, Pioneer Bank, Nero Seamount, Ladd Seamount

Estimated number of individuals (including Applicant) to be covered under this permit: 4

Estimated number of days in the Monument: 23

Description of proposed activities: (complete these sentences):

a.) The proposed activity would provide specimens for an age and growth study of Bluestriped Snapper (taʻape) *Lutjanus kasmira* throughout its introduced range in the Hawaiian Archipelago. The objectives of the study are to 1) evaluate whether there is a latitudinal gradient in the growth rate of Bluestriped Snapper across the Hawaiian Archipelago; 2) compare growth rates of Bluestriped Snapper from populations on the windward and leeward sides of the Main Hawaiian Islands; and 3) compare contemporary growth rates throughout the Hawaiian Archipelago to growth rates from 30 years ago in Oʻahu and contemporary growth rates from throughout the native range.

b.) To accomplish this activity we would need to collect 5-10 whole Bluestriped Snapper via spear from at least three of the proposed locations, freeze them whole and return them to laboratory facilities at the University of Hawaiʻi at Hilo. Once there, individuals will be thawed, photographed to serve as vouchers, measured to the nearest mm total length and standard length, and weighed to the nearest 1.0 g. Sex will be determined from a macroscopic examination of the gonads. The sagittal otoliths will be removed, mounted and sectioned, and used for age estimation following the methods described by Long and Grabowski

(2017). Additional tissues, e.g., stomach contents, fin clips, muscle tissue, will be archived at the University of Hawaiʻi at Hilo for potential future use.

c.) This activity would help the Monument by generating data to provide a better understanding of how individual growth rate of Bluestriped Snapper varies throughout the Hawaiian Archipelago and how it compares to the growth rate of native populations. Because individual growth rate is one of the primary factors driving the intrinsic growth rate of a population, it is an important component for assessing whether Bluestriped Snapper populations in the Hawaiian Archipelago are reaching an equilibrium. Further, an examination of the growth rates of populations from the Northwestern Hawaiian Islands may provide insights on the physiological and ecological capacity of the species to continue expanding its range.

Other information or background:
Bluestriped Snapper was introduced during 1955-1961 to Oʻahu and rapidly spread, establishing populations through the Hawaiian Archipelago (Randall 1987; Schumacher and Parrish 2005). Morales-Nin and Ralston (1990) found that Bluestriped Snapper collected from Oʻahu exhibited growth rates considerably higher than individuals from populations within the native range. This high growth rate was maintained in spite of Oʻahu being at a higher latitude than any of the native populations. This elevated growth rate is not uncommon in invasive populations of fishes (Rypel 2013) and has been well documented with invasive Red Lionfish *Pterois volitans* in the Caribbean, Gulf of Mexico, and western Atlantic Ocean (see Johnson and Swenarton 2016 for review). The high growth rate exhibited by members of introduced populations is typically associated with negative impacts on native species through predation and/or competition. However, unequivocal evidence of Bluestriped Snapper impacts on Hawaiian reefs has not been reported (Parrish et al. 2000; Grigg et al. 2008; Fukunaga et al. 2017).

Unfortunately, there has been no attempt to characterize Bluestriped Snapper growth rates at other locations in the Hawaiian Archipelago, nor any effort to evaluate whether growth rates have changed since last examined in 1990. Individual growth rate is one of the primary factors driving the intrinsic growth rate of a population. Therefore, a better understanding of how individual growth rate of Bluestriped Snapper varies throughout the Hawaiian Archipelago and how it compares to the growth rate of native populations is important for evaluating whether Bluestriped Snapper populations in the Hawaiian Archipelago may be reaching an equilibrium. Further, an examination of the growth rates of populations from the Northwestern Hawaiian Islands may provide insights on the physiological and ecological capacity of the species to continue expanding its range.

References

Fukunaga A, RK Kosaki, and BB Hauk. 2017. Distribution and abundance of the introduced snapper *Lutjanus kasmira* (Forsskål) on shallow and mesophotic reefs of the Northwestern Hawaiian Islands. Bioinvasions Rec 6:259-268.

Grigg RW, J Polovina, AM Friedlander, and SO Rohmann. 2008. Biology of coral reefs in the Northwestern Hawaiian Islands. Pages 573-594 in BM Riegl and RE Dodge, eds. Coral reefs of the USA. Springer.

Johnson EG, and MK Swenarton. 2016. Age, growth and population structure of invasive lionfish (*Pterois volitans/miles*) in northeast Florida using a length-based, age-structured population model. PeerJ 4:e2730. doi:10.7717/peerj.2730

Long JM, and TB Grabowski. 2017. Otoliths. Pages 189-220 in MC Quist and DA Isermann, eds. Age and growth of fishes: principles and techniques. American Fisheries Society, Bethesda, Maryland

Morales-Nin B and S Ralston. 1990. Age and growth of *Lutjanus kasmira* (Forsskål) in Hawaiian waters. J Fish Biol 36:191-203.

Parrish JD, GS Aeby, EJ Conklin, GL Ivey, and BD Schumacher. 2000. Interactions of nonindigenous Blueline Snapper (Ta‘ape) with native fishery species. Report to Hawai‘i Department of Land and Natural Resources, Division of Aquatic Resources.

Randall JE. 1987. Introductions of marine fishes to the Hawaiian Islands. Bull Mar Sci 41:490-502.

Rypel AL. 2013. Do invasive freshwater fishes grow better when they are invasive? Oikos 123:279-289.

Schumacher BD and JD Parrish. 2005. Spatial relationships between an introduced snapper and native goatfishes on Hawaiian reefs. Biol Invasions 7:925-933.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Grabowski, Timothy B.
Title: Unit Leader, Hawai'i Cooperative Fishery Research Unit
Adjunct Associate Professor, University of Hawai'i at Hilo

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

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

Phone: [redacted]

Email: [redacted]

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

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

Hawai'i Cooperative Fishery Research Unit (USGS)
University of Hawai'i at Hilo

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):

Randall Kosaki, Ph.D., Research Diver and field PI, NOAA PMNM

Keolohilani H. Lopes, M.S., Research Diver, NOAA PMNM

Jason Leonard, Research Diver, PMNM

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

Joshua Copus, M.S., Research Diver, HIMB

Section B: Project Information

5a. Project location(s):

		Ocean Based	
☒ Nihoa Island	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Necker Island (Mokumanamana)	☐ Land-based	☒ Shallow water	☐ Deep water
☒ **French Frigate Shoals**	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Gardner Pinnacles	☐ Land-based	☒ Shallow water	☐ Deep water
☒ **Maro Reef**	☐ Land-based	☒ Shallow water	☐ Deep water
☒ **Laysan Island**	☐ Land-based	☒ Shallow water	☐ Deep water
☒ **Lisianski Island, Neva Shoal**	☐ Land-based	☒ Shallow water	☐ Deep water
☒ **Pearl and Hermes Atoll**	☐ Land-based	☒ Shallow water	☐ Deep water
☒ **Midway Atoll**	☐ Land-based	☒ Shallow water	☐ Deep water
☒ **Kure Atoll**	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Other (seamounts listed on p. 2)			

NOTE: For purposes of this application, shallow water is defined by water less than 100 meters in depth.

NOTE: Primary targets are in bold. Other locations are checked as weather contingencies.

☐ Remaining ashore on any island or atoll (with the exception of Sand Island, at Midway Atoll and field camp staff on other islands/atolls) between sunset and sunrise.

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

Location Description:

Outer forereefs of all locations checked above. “Other” box is checked above and refers to seamounts listed on p.2. (Brooks Bank, St. Rogatien Bank, Raita Bank, Northhampton Seamount, Pioneer Bank, Nero Seamount, Ladd Seamount. 50-100 m depths.

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:***

The purpose of the proposed activity is to provide specimens for an age and growth study of Bluestriped Snapper (ta‘ape) *Lutjanus kasmira* throughout its introduced range in the Hawaiian Archipelago. There has been no attempt to characterize Bluestriped Snapper growth rates at locations other than O‘ahu in the Hawaiian Archipelago, nor any effort to evaluate whether growth rates have changed since last examined in 1990. Individual growth rate is one of the primary factors driving the intrinsic growth rate of a population. Therefore, a better understanding of how individual growth rate of Bluestriped Snapper varies throughout the Hawaiian Archipelago and how it compares to the growth rate of native populations is important for evaluating whether Bluestriped Snapper populations in the Hawaiian Archipelago are reaching an equilibrium. Further, an examination of the growth rates of populations from the Northwestern Hawaiian Islands may provide insights on the physiological and ecological capacity of the species to continue expanding its range. The objectives of the study are to 1) evaluate whether there is a latitudinal gradient in the growth rate of Bluestriped Snapper across the Hawaiian Archipelago; 2) compare growth rates of Bluestriped Snapper from populations on the windward and leeward sides of the Main Hawaiian Islands; and 3) compare contemporary growth rates throughout the Hawaiian Archipelago to grow rates from 30 years ago in Hawaii and contemporary growth rates from throughout the native range. To accomplish this activity we would need to collect 5-10 whole Bluestriped Snapper via spear from at least three of the proposed locations, freeze them whole and return them to laboratory facilities at the University of Hawai‘i at Hilo. Once there, individuals will be thawed, photographed to serve as vouchers, measured to the nearest mm total length and standard length, and weighed to the nearest 1.0 g. Sex will be determined from a macroscopic examination of the gonads. The sagittal otoliths will be removed, mounted and sectioned, and used for age estimation following the methods described by Long and Grabowski (2017).

*Considering the purpose of the proposed activities, do you intend to film / photograph federally protected species? Yes ☐ No ☒

If so, please list the species you specifically intend to target.

For a list of terrestrial species protected under the Endangered Species Act visit:
http://www.fws.gov/endangered/
For a list of marine species protected under the Endangered Species Act visit:
http://www.nmfs.noaa.gov/pr/species/esa/
For information about species protected under the Marine Mammal Protection Act visit:
http://www.nmfs.noaa.gov/pr/laws/mmpa/

7. Answer the Findings below by providing information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Monument:

The Findings are as follows:

a. How can the activity be conducted with adequate safeguards for the cultural, natural and historic resources and ecological integrity of the Monument?

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 collection activities will cease immediately, and will be continued in another area.

Since samples will be collected using spear, there is no chance of bycatch. Further the sample size is extremely small relative to the local population sizes of Bluestriped Snapper at the proposed sample locations and given that the target species is invasive and potentially detrimental to native fauna, removal will have no negative effects.

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 "Continue and enhance research, characterization, and monitoring of marine ecosystems" (MCS-1), and to “Survey distributions and populations of known alien species at regular intervals” (AS-2.1)

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.

No, there is no practicable alternative to conducting the activity within the Monument. The monument represents the northernmost Bluestriped Snapper populations, native or inroduced, in the world. Therefore, there are no surrogate populations at similar latitudes that could be sampled to gain similar insights as to whether there is a latitudinal gradient in the growth rate of Bluestriped Snapper across the Hawaiian Archipelago.

d. How does the end value of the activity outweigh its adverse impacts on Monument cultural, natural and historic resources, qualities, and ecological integrity?

Collection of Bluestriped Snapper will have virtually no impacts on native species, natural resources, or ecological integrity. In addition, sampling invasive species is beneficial to the ecosystem as they 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 understanding the factors that may limit the expansion of this invasive species' range.

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

Sampling is opportunistic, and will be conducted by scientists who are permitted to work in the Monument for other research projects. Thus, the duration of this activity is driven by the total length of the research cruise rather than the total amount of time required to collect our minimum number of specimens.

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

The field personnel mentioned above have conducted hundreds of research dives within PMNM and have extensive spearfishing experience. All are extremely proficient with field identification of the fishes present within PMNM. The principal investigator, Dr. Timothy Grabowski, is a Research Fish Biologist with the U.S. Geological Survey and the Unit Leader of the Hawaiʻi Cooperative Fishery Research Unit. He has 18 years of experience using otoliths, scales, and other structures to estimate fish age. Dr. Grabowski has authored two book chapters and six peer-reviewed journal articles on the subject and trained numerous graduate and undergraduate students.

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.

Sampling is opportunistic, and will be conducted by scientists who will be working in the Monument for other research projects. The Cooperative Fishery Research Unit has sufficient base funding to support the cost of processing the fish and otolith samples upon arrival in Hilo.

Impacts to natural resources from this proposed project are minimal, verging on undetectable. Therefore, we cannot foresee any impacts generated by the proposed activities that would require mitigation.

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.

Our methods and procedures are appropriate to achieve the goals of the proposed project in relation to their impacts to PMNM cultural, natural, and historic resources, qualities, and ecological integrity. Analysis of otoliths is generally regarded as the most reliable method for estimating the age and growth of fishes. This method will use a small sample of Bluestriped Snapper, an invasive species, collected using spearfishing which will result in no bycatch or impacts to the reef structure.

i. Has your vessel 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.

8. Procedures/Methods:

We propose collecting 5-10 whole Bluestriped Snapper via spear from at least three of the locations listed above. Upon removal from the water, they will be frozen and returned to laboratory facilities at the University of Hawaiʻi at Hilo. Once there, individuals will be thawed, photographed to serve as vouchers, measured to the nearest mm total length and standard length, and weighed to the nearest 1.0 g. Sex will be determined from a macroscopic examination of the gonads. The sagittal otoliths will be removed, mounted and sectioned using a low-speed isometric saw. The thin sections will be polished and examined under the microscope to count annuli and measure the radius of the otolith at each annulus following the methods described by Long and Grabowski (2017). Additional tissues, e.g., stomach contents, fin clips, muscle tissue, will be archived at the University of Hawaiʻi at Hilo for potential future use.

NOTE: If land or marine archeological activities are involved, contact the Monument Permit Coordinator at the address on the general application form before proceeding.

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 names:

Bluestriped Snapper, but the species is also known as Common Bluestripe Snapper, Blue-banded Hussar, Blue-banded Sea Perch, Blue-banded Snapper, Bluebanded Snapper, Blue-lined Sea Perch, Bluelined Snapper, Blue-lined Snapper Fish, Blue-striped Seaperch, Blue-striped Snapper, Bluestripe Seaperch, Bluestripe Snapper,

Common Blue-strips Snapper, Four-lined Snapper, Moonlighter, Yellow and Blue Seaperch, Madras, Perche à Raies Bleues, Vivaneau à Raies, Bleues, Pargo de Rayas Azules, and Ta‘ape.

Scientific names:

Lutjanus kasmira

& size of specimens:

Ten individual fish of various sizes from will be collected by pole spear at three islands or reefs for a total sample size of 30 Bluestriped Snapper. Exact locations will be determined by field staff, and will depend on weather, diving conditions, and the availability of the desired species.

Collection location:

Nihoa, Mokumanama, French Frigate Shoals, Gardner Pinnacles, Maro, Laysan, Lisianski, Pearl and Hermes, Midway, Kure, Brooks Bank, St. Rogatien Bank, Raita Bank, Northhampton Seamount, Pioneer Bank, Nero Seamount, Ladd Seamount

☒ Whole Organism ☐ Partial Organism

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

Specimens will be analyzed as described above at the University of Hawai‘i at Hilo. A digital photograph will be taken of each individual to serve as a voucher. In addition to otoliths, tissue samples, such as gut contents, fin clips, muscle samples, will be taken from the specimens and archived. The remainder of the fish will be disposed of following University of Hawai‘i at Hilo regulations.

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

• General site/location for collections:

TBD

• Is it an open or closed system? N/A

• Is there an outfall? N/A

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

• Will organisms be released?

No.

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

Frozen whole.

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

Results from the proposed project will be published as soon as practicable. The Principal Investigator is unaware of other researchers conducting studies that would utilize the other tissue samples being harvested from the sampled fish.

12a. List all specialized gear and materials to be used in this activity:
Pole spear, hand nets, plastic bag.

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: N/A

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

Writing and publication will commence when an adequate sample size of specimens or data have been collected. Submission, peer review, and final publication can take on average two months to one year.

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

The Principal Investigator has no publications directly related to the proposed project.

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.

_____ 07 June 2018_____
Signature Date

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

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

DID YOU INCLUDE THESE?

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