

**Papahānaumokuākea Marine National Monument**  
RESEARCH Permit Application

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

**ADDITIONAL IMPORTANT INFORMATION:**

- Any or all of the information within this application may be posted to the Monument website informing the public on projects proposed to occur in the Monument.
- In addition to the permit application, the Applicant must either download the Monument Compliance Information Sheet from the Monument website OR request a hard copy from the Monument Permit Coordinator (contact information below). The Monument Compliance Information Sheet must be submitted to the Monument Permit Coordinator after initial application consultation.
- Issuance of a Monument permit is dependent upon the completion and review of the application and Compliance Information Sheet.

**INCOMPLETE APPLICATIONS WILL NOT BE CONSIDERED**

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

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

## **Papahānaumokuākea Marine National Monument Permit Application Cover Sheet**

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

### **Summary Information**

**Applicant Name:** Timothy Grabowski

**Affiliation:** U.S. Geological Survey-Hawai'i Cooperative Fishery Research Unit,  
University of Hawai'i at Hilo

**Permit Category:** Research

**Proposed Activity Dates:** August 23, 2018-Sept. 16, 2018

**Proposed Method of Entry (Vessel/Plane):** NOAA ship Hi'ialakai

**Proposed Locations:** French Frigate Shoals, Maro Reef, Laysan, Lisianski, Pearl and Hermes Atoll, Midway Atoll, Kure Atoll, Brooks Bank, St. Rogatien Bank, Raita Bank, Northampton 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 (ta'ape) *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 O'ahu 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 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). Additional tissues, e.g., stomach contents, fin clips, muscle tissue, will be archived at the University of Hawai'i 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 O'ahu 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 O'ahu exhibited growth rates considerably higher than individuals from populations within the native range. This high growth rate was maintained in spite of O'ahu 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.