

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

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: Megan Donahue

Affiliation: Hawai'i Institute of Marine Biology

Permit Category: Research

Proposed Activity Dates: 06/01/14-11/15/14

Proposed Method of Entry (Vessel/Plane): R/V Hiialakai

Proposed Locations: Shallow water reef (<100 ft depth) focused on bioeroder communities in forereef and lagoon habitats. Specific locations for the study will depend on cruise logistics but will include forereef sites at FFS, LIS, PHR, and KUR and lagoon sites at MID.

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

6

Estimated number of days in the Monument: 50

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...

measure bioerosion rates and bioeroder community composition on reefs in the NWHI to evaluate whether internal bioeroders can serve as indicators of community response to ocean acidification on coral reefs. Taking advantage of variation in pH at large and small spatial scales, we will test whether the total bioerosion rate and/or the community composition of internal bioeroders responds to natural spatial variation in pH or other environmental drivers along the Archipelago. Bioerosion rates will be measured using microCT scans of coral blocks to get a 3D image of the eroded material; this method gives a better estimate of bioerosion rate than the traditional buoyant weight technique and allows characterization of distinct bioeroder groups. Community composition will be measured using mass sequencing, paired with taxonomic and genetic identification of particular taxa.

b.) To accomplish this activity we would

(i) measure bioerosion rates by installing small calcium carbonate blocks (5x5x2cm) on reef

substrate at each site. These blocks act as a settling substrate for bioeroding organisms. Prior to deployment, each block is scanned by microCT (to create a 3D image of the block) and autoclaved. Five calcium carbonate blocks were deployed at each of 20 forereef sites (5 sites each at FFS, LIS, PHR, and KUR) and 20 blocks were deployed at one lagoon site (MID) during the July-August 2011 and 2012 cruises to the PMNM (a site is a 20m x 20m area of reef). All blocks have been retrieved except for 10 at Midway that were left for a multi-year comparison of bioerosion rates within a site. On the upcoming cruise, we plan to retrieve these last 10 calcium carbonate blocks at Midway.

(ii) measure variation in bioeroder community composition by collecting thirty small pieces (5x5x5cm) of dead coral skeleton at each of 21 sites (FFS, LIS, PHR, KUR, MID). These pieces of reef substrate will be sampled for bioeroding fauna using both traditional taxonomic identification and molecular techniques.

c.) This activity would help the Monument by ...
evaluating whether internal bioeroders can serve as indicators of community response to ocean acidification on coral reefs. The community structure and function of bioeroding organisms may have a major effect on coral reef resilience: the sponges, polychaete worms, and tiny mollusks that comprise bioeroder communities control the strength and complexity of the coral reef framework, which is the habitat for more charismatic coral reef organisms. Shifts in the composition and functioning of these out-of-sight, but fundamental members of coral reef ecosystems may change the accretion-erosion balance of coral reefs. The methods developed here will help managers anticipate the likely effects of ocean acidification on bioeroder communities and bioerosion rates.

Other information or background: All forereef sites are co-located with NOAA-CRED permanent sites. This minimizes the impact to the reefs and facilitates sharing of information