

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: Courtney Couch

Affiliation: UH Manoa, Hawai'i Institute of Marine Biology (HIMB)

Permit Category: Research

Proposed Activity Dates: May 1st - December 31st, 2015 (specific dates TBD)

Proposed Method of Entry (Vessel/Plane): R/V Hi'ialakai

Proposed Locations: (Shallow water reef (<100 ft depth), TBD, dependent on NOAA field cruise destinations)

Estimated number of individuals (including Applicant) to be covered under this permit: 6 (Dr. Courtney Couch, Jamie Sziklay Caldwell (co-field PI), Megan Ross, John Burns, Nyssa Silbiger, TBD). Only 2-3 individuals will need to enter the Monument to perform field surveys.

Estimated number of days in the Monument: 60

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...

Assess the health and community structure of corals on shallow-water reefs throughout the Papahānaumokuākea Marine National Monument. Our survey techniques will utilize a stratified-random to objectively survey the spatial variation in coral health at multiple sites within the Monument. We will also re-survey existing permanent and compare coral health data to previous studies to determine whether and to what degree coral health is changing in the Monument. These data will also be invaluable in determining the long-term implications of the 2014 bleaching event on coral disease risk and bleaching recovery. The resulting data will enable a comprehensive examination of coral health at large spatial scales throughout the Monument and the necessary framework for understanding the long-term consequences of coral disease in PMNM. In addition, surveys will be used to validate predictive models of coral disease outbreak risk.

b.) To accomplish this activity we would

Conduct surveys using SCUBA on shallow-water reefs to collect data on the health of corals as well as coral community structure along belt transects. Detailed descriptions of the surveyed colonies and visible disease lesions and signs of compromised health (e.g. bleaching, algal overgrowth, breakage) will be recorded to calculate prevalence and severity of each condition. By assessing coral health and disease along a subset of permanently marked transects, we will also be able to track disease prevalence, severity, incidence and rate of disease progression over time and compare those metrics of coral health with previous coral health surveys conducted in the Monument between 2004-2014. We will also conduct overlapping photo and video surveys in order to create digital reconstructions of the benthic habitat, which builds on previous research conducted in 2012 and 2013. Ultimately we will obtain detailed data on the community structure and health characteristics of surveyed corals. This research will allow us to decipher important characteristics of reduced health states affecting corals in the Papahānaumokuākea Marine National Monument.

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

Enabling a detailed analysis of coral health and community structure on shallow-water reefs of the Papahānaumokuākea Marine National Monument. Surveying at randomly chosen coordinates within each site will create a robust dataset for an objective analysis of the prevalence and severity of coral health afflictions. These data will also be incorporated into a larger Indo-Pacific meta-analysis that addresses the role of global and local stressors in coral disease. By establishing new permanent transects and/or resurveying existing ones, we will also be able to determine how coral health is changing over time and what effects potential disease outbreaks and the recent thermal stress may have on long-term coral demographics. The photo and video surveys will provide useful data for assessing the dynamics of coral community structure throughout the Monument. This research will be critical for tracking changes to coral health and ecosystem function in the face of increasing global stressors such as climate change and ocean acidification. Surveys will also serve to validate forecasting models of coral disease outbreak risk currently in development at the University of Hawaii and NOAA Coral Reef Watch, which the Monument can use in the future to assess disease outbreak risk and overall probability of coral health state in relation to remotely observed environmental stressors.

Other information or background:

Given the rising threat of climate change, severity of the 2014 bleaching event and strong link to increased bleaching and disease risk, it is imperative to continue monitoring coral health using standardized survey methods that facilitate broad scale analyses both within the Papahānaumokuākea Marine National Monument and across the Pacific. In 2014, we collaborated with PMNM to expand and enhance their coral health monitoring program for the Papahānaumokuākea Marine National Monument by adapting standardized methods used by experts across the Indo-Pacific. With our 2014

PMNM permit and support from PMNM, we were able to document the 2014 bleaching event in August 2014, then return in September 2014 to survey permanent transects. These permanent transects will be crucial quantifying the level of bleaching recovery or associated mortality, potential disease outbreaks, and changes in coral community dynamics. Utilizing an objective and randomized survey approach on reefs throughout the Papahānaumokuākea Marine National Monument will enhance the capability for monitoring the health of coral populations over broad spatial scales within this valuable ecosystem. By using a combination of stratified-random and permanent sites, we will be able to assess both large scale variation in coral health across the Monument as well track disease progression and incidence rates over time in sites of concern. Surveys will be incorporated into a larger regional database of coral health observations primarily to validate predictive models, and provide a robust dataset for assessing disease characteristics at the population level. We are also requesting permission to opportunistically sample a small number coral fragments for histopathology on unknown coral lesions. While most coral lesions in PMNM have been previously characterized by Dr. Greta Aeby, we would like the opportunity to sample previously undescribed lesions since histopathological assessments have not been conducted in the Monument during the last ten years. Through this research, we will not only be able to provide managers with information on how coral health differs spatially across the Papahānaumokuākea Marine National Monument and target sites with declining coral health, but also provide a crucial basis against which to compare future change.