

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: Amy Baco-Taylor

Affiliation: Florida State University

Permit Category: Research

Proposed Activity Dates: October 2011

Proposed Method of Entry (Vessel/Plane): Research Ship Ka`Imikai-O-Kanaloa

Proposed Locations: Gardner Pinnacles region to Necker Ridge

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

4-5

Estimated number of days in the Monument: 22

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...

Opportunistically obtain samples of deep-sea corals and sponges through piggybacking on dives of geologist David Clague. Coral and sponge specimens would be used for comparison to collections made by Baco-Taylor previously in the Main and NWHI. Previous studies within the Archipelago by Baco-Taylor addressed distribution of deep-sea corals, genetic connectivity of precious corals, association of corals with specific substrate types, and association of invertebrates with deep-sea corals and sponges. The Baco-Taylor lab is also working on using DNA barcoding methods to aid in identification of deep-sea corals and has built up a large database of coral sequences from the Archipelago. Currently there are no samples from Gardner Pinnacles in the sample set, so any collections at this location would not only provide insights into the coral communities on this feature, but would also be a significant addition to our previous studies.

b.) To accomplish this activity we would

Opportunistically collect samples of corals and sponges during Dave Clague's submersible dives on Gardner Pinnacles, as dive time permits. One samples are returned to the surface, they will be processed for morphological identification and genetic studies.

c.) This activity would help the Monument by ...
Providing insights into the presence of deep-sea coral and sponge beds on Gardner Pinnacles and the degree to which the species found at this site overlap with other sampled locations in the Archipelago.

Other information or background: The PI is funded for a cruise to Necker Ridge, the diveable portion of which falls outside the monument. However, to reach Necker Ridge, the PI will be sharing the same leg of the KOK cruise with David Clague, who will be conducting geological sampling at Gardner Pinnacles. We hope to share samples with the Clague team from Gardner and thus are requesting this permit. We may also do some mapping on the NE end of Necker Ridge, which does fall into the Monument, but is covered on other permits already processed.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Baco-Taylor, Amy R

Title: Assistant Professor

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

Amy Baco-Taylor

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

[REDACTED]

Phone:

[REDACTED]

Fax:

Email:

[REDACTED]

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

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

Florida State University

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):

Benjamin LaBelle, Graduate Research Assistant, FSU

Dustin Long, Graduate Research Assistant, FSU

Diego Figueroa, Postdoctoral Scientist, FSU

1 volunteer, TBD

Section B: Project Information

5a. Project location(s):

- | | | | |
|---|-------------------------------------|--|--|
| <input type="checkbox"/> Nihoa Island | <input type="checkbox"/> Land-based | <input type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <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 checked="" type="checkbox"/> Gardner Pinnacles | <input type="checkbox"/> Land-based | <input type="checkbox"/> Shallow water | <input checked="" 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 type="checkbox"/> Midway Atoll | <input type="checkbox"/> Land-based | <input type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input type="checkbox"/> Kure Atoll | <input type="checkbox"/> Land-based | <input type="checkbox"/> Shallow water | <input type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> Other | | | |

Ocean Based

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

Location Description:

Deep slopes of features being examined by geologists for submerged terraces, if hard bottom, are likely to have dense deep-sea coral and sponges communities. We hope to opportunistically sample these communities as dive time permits. We will also be working on the Necker Ridge, however the diveable (< 2000m) portion of the Ridge falls outside the monument and thus does not require a permit.

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 obtain specimens of deep water corals and sponges from Gardner Pinnacles to add into broader genetic studies and distributional studies of corals and sponges from the NWHI and MHI.

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?

Specimens will be collected opportunistically, as we will be piggybacking on the dives of Dave Clague, who has other research interests. Thus we do not expect to obtain a large number of specimens on any of the dives. Most of the information will come from video surveys. Specimens will be selectively collected for species identification, with only a small portion of any specimen needed for genetic studies. We avoid collecting whole specimens unless they are abundant and appear to be new to science or unusual for Hawaiian waters. Samples will be taken where the dives find large numbers of corals and sponges and therefore should have a minimum impact on the overall communities.

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 submersible ballast shot will be the only manmade material left on these sites. The pilot's standard protocol on any dive is to find a clear area of substrate where the shot can be released. This material will be in the form of a small pile of tiny metal discs that readily corrode in seawater. The pilot's standard landing protocol is also to hover above the bottom first in order to locate a clear area of substrate to land the vehicle. The researchers and pilots involved in this project will take every possible precaution to minimize any disturbance their activities might have on these communities.

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.

The only other way to obtain information on coral and sponge resources on Gardner Pinnacles would be by dredging or bottom trawling (biological samples) both of which would have greater impact than the proposed transecting and selective sampling by submersible. Conducting this activity outside the monument would be interesting for comparative reasons, but have no relevance to the management and preservation of these types of resource sites inside the Monument. Note also that by sharing dive time, we will have less impact on the monument than if Baco-Taylor had separate dives in this location.

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

Since we are conducting video surveys and selective sampling using a submersible, the impacts to the Monument resources will be minimized. Additionally these dives are already approved with a permit for geological studies, so we are only adding a small amount of biological sampling to already approved dives. Any discoveries of coral and sponge communities will provide insights into how well deep-sea communities on Gardner Pinnacles are connected to other sites inside and outside the monument by combining the resulting data into studies already in progress in the Baco-Taylor lab.

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

With the addition of our work, the length of the already approved dives will not change. We are simply adding biological sampling.

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

The applicant has been working as a PI on projects on the distribution and molecular ecology of Hawaiian deep-sea corals since 1998 and is experienced in the identification of coral species from the submersible. She has enough experience to be able to identify most of the types of corals we expect to encounter and thus to be able to determine if new species or species not previously observed in Hawaii occur on Gardner Pinnacles. She also has extensive experience collecting, processing and preserving deep-sea coral and sponge specimens. She is also collaborating with Dr. Stephen Cairns at the Smithsonian Institution, who is a morphological taxonomist that has described many new species of deep-sea corals from Hawaii from her previous collections. Another collaborator is Henry Reiswig, who is the world expert on Hawaiian deep-sea sponges. The cruise participants include members of the Baco-Taylor lab who are or will be trained by Baco-Taylor.

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.

Funding for the ship and submersible time is provided by the Hawaii Undersea Research Laboratory. Post-cruise processing would occur as part of Baco-Taylor's related projects. Potential impacts are minimal and are covered by the HURL and KOK permit applications.

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 goals of this project are to opportunistically obtain samples to add into genetic and distributional studies of Hawaii's deep-sea coral and sponge communities. Since the work is piggybacked, we anticipate collecting a small number of specimens (~20 per dive), and only a portion of the specimen in most cases, as outlined above. We will also derive data from video surveys, which have no additional impacts. Thus we anticipate we will not have a significant impact on the monuments resources. The methods we will use are the same we have used on

previous cruises in the NWHI and have resulted in descriptions of 10 species and 2 genera of octocorals and antipatharians new to science, with several more species descriptions in preparation.

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

It is the applicant's understanding that the KOK will be fitted with VMS prior to its departure from Honolulu.

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 the issuance of a permit for the activity inappropriate.

8. Procedures/Methods:

A total of six 8-hr submersible dives are planned for David Clague's project. During each submersible survey dive, video will be continuously recorded. When the submersible stops to collect a rock or other sample for the geological group, if time permits, they will collect any adjacent corals and sponges that are representative of the community in that area. The submersible has two video cameras, one with a depth and time overlay, and will record both video and audio during the dive. The submersible's two manipulators will be used to collect smaller colonies in their entirety or remove branches of approximately 20 cm in length from larger colonies. Specimens of other invertebrates living on the corals (i.e., ophiuroids, crinoids, crabs, etc) will likely be collected at the same time and will be processed, preserved, and provided to appropriate specialists.

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:

Undetermined but focus will be on corals and sponges and associated invertebrates collected incidentally

Scientific name:

Cnidaria and Porifera, echinoderms, crustaceans, and other invertebrates

& size of specimens:

Maximum of 1-2 specimens of undetermined size of each species of coral and sponge. Larger colonies will be subsampled while smaller colonies may be collected in their entirety.

Collection location:
Gardener Pinnacles

Whole Organism Partial Organism

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

Specimens will be collected by, or donated to, appropriate specialists for examination and proper curation. Corals and sponges will be subsampled for molecular genetics, and reproductive histology, with the remaining specimen deposited at the Smithsonian for morphological taxonomy.

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

• General site/location for collections:

• 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?

• Will organisms be released?

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

The specimens will be frozen to -80 C in an ultracold freezer, and/or preserved in either formalin or alcohol, and transported out on the research ship KOK.

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

Specimens will be collected by Baco-Taylor, and forwarded to appropriate specialists including Stephen Cairns (corals) and Henry Reiswig (sponges) for assistance with morphological identifications. The only other project we are aware of in the Monument is the Clague project which focuses on geology. Previous work has also been conducted in the monument by Chris Kelley, who is a part of HURL. No one has collected biological samples at this site that we are aware of. Thus we anticipate this research and sampling should not be duplicative.

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

Pisces IV or V submersible with video and data systems, attached manipulator arms, and boxes/baskets for specimen collection.

Preservatives for collected specimens (formalin, alcohol, and RNA later).

Zip lock bags, nalgene jars, and other containers for specimen storage.

Other typical ship laboratory equipment such as microscopes, ultracold freezer, camera and stand for photodocumentation.

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

Formalin will be stored and used in the ship wet lab.

Alcohol (70% ETOH) will be stored and used in the ship wet lab.

RNA later will be stored and used in the ship wet lab.

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

NA

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

Specimen examination and preparation of new species descriptions will depend on the specialist.

Genetic analysis will be completed in 1 year.

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

The following publications included work on deep-sea corals, primarily within Hawaii:

Baco, A.R. and S.D. Cairns. Submitted. A comparison of morphological and molecular variation in the deep-sea octocoral primnoid genus *Narella*.

Tittensor, D.P. A.R. Baco, J. H. Hall-Spencer, J.H. Orr and A.D. Rogers. 2010. Seamounts as refugia from ocean acidification for stony corals. *Marine Ecology* 31 (Suppl 1) 212-225.

Herrera, S., A.R. Baco, and J.A. Sanchez. 2010. Molecular systematics of the bubblegum corals (Paragorgiidae, Octocorallia): phylogenetic relationships with *Sibogagorgia* and description of a new deep-sea species. *Molecular Phylogenetics and Evolution*. 55(1): 123-135.

Clark, M., C. Kelly, A.R. Baco and A.A. Rowden. 2009. Fauna of Cobalt-Rich Seamounts. Report to the International Seabed Authority. International Seabed Authority. In Press. 49 pp.

Tittensor, D.P., A.R. Baco, P. Brewin, M.R. Clark, M. Consalvey, J. Hall-Spencer, A.A. Rowden, T. Schlacher, K. Stocks and A.D. Rogers. 2009. Predicting global habitat suitability for stony corals on seamounts. *Journal of Biogeography* 36: 1111-1128.

Smith, C.R., S. Gaines, A. Friedlander, C. Morgan, A. Thurnherr, S. Mincks, L. Watling, M. Clark, A. Baco, A. Bernardino, F. De Leo, P. Dutrieux, A. Resier, J. Kittinger, J. Padilla-Gamino, R. Prescott, and P. Srsen. 2008. Preservation Reference Areas for Nodule Mining in

the Clarion-Clipperton Zone: Rationale and Recommendations to the International Seabed Authority. International Seabed Authority. 12 pp.

Baco, A.R. 2007. Exploration for deep-sea corals on North Pacific seamounts and islands. Invited for special volume of *Oceanography* 20(4): 58-67.

Waller, R.G., and A.R. Baco. 2007. Reproductive morphology of three species of deep-water precious corals from the Hawaiian Archipelago: *Gerardia* sp., *Corallium secundum* and *Corallium lauense*. *Bulletin of Marine Science*. 81(3): 533-542.

Parrish, F.A., and A.R. Baco. 2007. Chapter 4: State of Deep Coral Ecosystems in the United States Western Pacific Region: Hawaii and the United States Pacific Islands. pp. 155-194. In: S.E. Lumsden, T.F. Hourigan, A.W. Bruckner G. and Dorr (eds.) *The State of Deep Coral Ecosystems of the United States*. NOAA Technical Memorandum CRCP-3. Silver Spring MD 365 pp.

Rogers, A.D., Baco, A., Griffiths, H., Hart, T. and Hall-Spencer, J.M. 2007. Corals on Seamounts. Chapter 8 in Pitcher, T.J., Morato, T., Hart, P.J.B., Clark, M.R., Haggan, N. and Santos, R.S. (eds) *Seamounts: Ecology, Conservation and Management*. Fish and Aquatic Resources Series, Blackwell, Oxford, UK. pp 141-169.

Cairns, S.D., and A.R. Baco. 2007. Review and five new Alaskan species of the deep-water octocoral *Narella* (Octocorallia: Primnoidae). *Systematics and Biodiversity* 5(4): 391-407.

Baco, A.R., A.M. Clark, and T.M. Shank. 2006. Six microsatellite loci from the deep-sea coral *Corallium lauense* (Octocorallia: Coralliidae) from the islands and seamounts of the Hawaiian archipelago. *Molecular Ecology Notes* 6: 147-149.

Etnoyer P.J., S.D. Cairns, J.A. Sanchez, J.K. Reed, J.V. Lopez, W.W. Schroder, S.D. Brooke, L. Watling, A. Baco-Taylor, G.C. Williams, A. Lindner, S.C. France, and A.W. Bruckner. 2006. *Deep-Sea Coral Collection Protocols*. NOAA Technical Memorandum NMFS-OPR-28, Silver Spring, MD. 53 pp.

Baco, A.R. and T.M. Shank. 2005. Population genetic structure of the Hawaiian precious coral *Corallium lauense* (Octocorallia: Coralliidae) using microsatellites. In *Cold-Water Corals and Ecosystems* (eds. A. Freiwald, JM Roberts), Springer-Verlag Berlin Heidelberg, Germany pp. 663-678.

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