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

<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: Roger J. Cuffey
Affiliation: Pennsylvania State University

Permit Category: Research
Proposed Activity Dates: June 1, 2011 (earlier if possible) - Dec 31, 2011
Proposed Method of Entry (Vessel/Plane): Plane (already in Dec 2010)
Proposed Locations: Reef Hotel snorkel site, bone yard near boathouse, breakwater at harbor entrance

Estimated number of individuals (including Applicant) to be covered under this permit: 2
Estimated number of days in the Monument: 0 (had already visited Midway as member of WANT expedition/tour, permit no. PMNM-2010-015, Dec 13-20, 2010)

Description of proposed activities: (complete these sentences):

a.) The proposed activity would…

…, for the first time ever (to my knowledge), determine if bryozoans (Phylum Bryozoa) are present on Midway Atoll, and if so what species they represent, and what those species' distributions may indicate about their history, ecology, and biogeography. Bryozoans are minute polyps (1/2-mm long) which secrete porous calcareous/shell-material colonies/skeletons (up to several mm across) embedded in or attached to sheltered undersides of rubble, shells, ships, and rocks (hence can not be seen by divers using visual-survey-type methods).

b.) To accomplish this activity we would ….

… examine several small pieces of rubble, crusts, and rocks with stereoscopic binocular microscope, dissect or section some if necessary, and compare them with known species figured in the monographs and papers on bryozoans which I have accumulated over the course of my career in my lab at Penn State. While on Midway during the WANT expedition/tour (Dec 2010), I showed Jason Beatty, Monument Officer on Midway (who supervised water- and land-based activities of that tour), bryozoan specimens brought with me from Penn State, and explained what I would need him to collect, and from which locations on Midway. I also made detailed

sketches and notes of a few bryozoans which I saw there, but because I did not have powerful enough microscopes nor comparative literature there, I need to examine them here to confirm my tentative identifications made while in the field. After Jason Beatty collects (after hours) the bryozoan-bearing rubble, crusts, and rocks, he will air-mail them to me at Penn State so I can further examine and identify them. Once identified, I plan to write results up for publication/presentation at next fall's (Oct 2011; submission deadline June 30, 2011) annual national meeting of the Geological Society of America, where I have presented a number of similar papers in the past (see my Selected Bibliography attached).

c.) This activity would help the Monument by …
… documenting/demonstrating the occurrence of this major but inconspicuous phylum of invertebrates on this atoll, and thus adding to basic scientific knowledge of the Monument's inventory of its natural resources. So far as I am aware, no one has ever recorded bryozoan species from Midway. I would expect that such invertebrates should occur here, because they occur in sizeable diversity (~90 species) on other atolls and reefs I have examined in detail (Eniwetok/Enewetak, Okinawa, and the Great Barrier Reef in the Pacific; Bermuda, Bahamas, Bonaire, and Florida in the Atlantic).

Other information or background: Unlike many other marine organisms, bryozoans when seen and collected in the field are not alive any longer. By the time their colony crusts come to the attention of scientists (except in exceptional cases requiring much live-culturing techniques, access to running sea-water, and specialized equipment not available to me), the polyps have been dead for 10-100 years. Therefore, we refer to these as "modern" rather than "living". The up-side to this situation is that we can study these as if they were fossils, so that we can directly integrate knowledge from these modern forms with ancient ones, so that the long evolutionary history of their phylum can potentially be better known than is the case for many groups which have significant proportions of soft-bodied (hence not fossilized) members.

Among those older forms, we further distinguish between "subfossil" ones which are only a few thousand years old, and strictly "fossil" ones which are over 10 thousand years old (and, in the case of bryozoans elsewhere, may go back to about 500 million years old). The reason for mentioning this distinction is that, back in the mid-20th century, extensive dredging and harborwork was done on Midway, and some of the rock brought up was used to build the breakwater across the harbor entrance. From the appearance of the type and degree of fossilization or "diagenesis" of those dredged rocks, I think they fall into the subfossil category, which is of interest here because a few possible bryozoans occur in those rock fragments as well as on the modern rubble from the snorkel site.

The adjective "reefal" refers to bryozoans which are found on or dwelling in reefs whose frameworks are built by other organisms (i.e., not by bryozoans).

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Cuffey, Roger J.

Title: Professor Emeritus of Paleontology

(see my Vita and Bibliography attached to this application)

1a. Intended field Principal Investigator (See instructions for more information):
Jason A. Beatty
Monument Officer
Midway Atoll National Wildlife Refuge
Papahanaumokuakea Marine National Monument
[redacted]

2. Mailing address (street/P.O. box, city, state, country, zip):
Prof. Emer. Dr. Roger J. Cuffey
Department of Geosciences
[redacted]

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

3. Affiliation (institution/agency/organization directly related to the proposed project):
Pennsylvania State University (same as my mailing address above)

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):

none

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			
☐ 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			

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

Location Description:
Reef Hotel snorkel site, bone yard near boathouse, breakwater at harbor entrance

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 this proposed project is to determine whether members of the major but inconspicuous invertebrate Phylum Bryozoa (common name "bryozoans", or occasionally "sea-mats" or "sea-crusts") are present on Midway Atoll, which species they represent, and what those species' distributions may reveal about their biogeography, ecology, and history. So far as I know, this kind of information has never been documented for Midway Atoll before; and thus, it will add to basic scientific knowledge of the atoll's natural resources. The reason for undertaking this project is that I have found considerable bryozoan involvement on other reefs/islands around the world, and so I expect that I will find bryozoans on Midway as well. I visited Midway as a participant in the WANT expedition/tour in Dec 2010 (permit no. PMNM-2010-015), and can use observations from then to plan and accomplish the purpose of this project.

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?
A few small specimens will be obtained by hand after hours by Jason Beatty, of the on-Midway Monument staff; their size and number will be very limited. This procedure will effectively safeguard the Monument's resources and integrity.

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?
Again, the procedure mentioned above will be part of and hence compatible with the management of the Monument by its staff members. Moreover, the new knowledge which I expect to emerge from completion of this project will increase and thus enhance the Monument's resource base and natural integrity.

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. The specimens and observations must be on Midway in order to detect or uncover organisms there which have never been seen there before. Afterwards, in order to identify and document the bryozoan species which I may find among those materials, I need to examine them with the higher-powered microscope, processing implements, and comparative literature in my lab at Penn State, none of which are available in the Monument.

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

The end value of my activity will be to significantly expand the known invertebrate fauna on Midway. Obtaining and mailing the small pieces required to accomplish this will have so little impact on the Monument that the added knowledge will far outweigh any potential minor impacts.

e. Explain how the duration of the activity is no longer than necessary to achieve its stated purpose.
The duration of the proposed activity, once the specimens are air-mailed to me in Pennsylvania, is appropriate to accomplish the purpose/objectives of this study, as based on my years of experience carrying out similar studies in previous years (see my Vita and Bibliography attached).

f. Provide information demonstrating that you are qualified to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.
I have been researching and publishing on bryozoans in atolls and reefs, using the methods and procedures to be followed here, for the past 40 years (see my Vita and Bibliography attached).

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.
I already paid personally for my participation in the WANT expedition/tour in Dec 2010, and I have in hand at Penn State the microscope, equipment, and literature necessary to complete this study.

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 methods, techniques, and procedures proposed herein are standard practice for bryozoan studies like this, and so will achieve the research goals with no visible negative impact on the Monument (but instead will positively impact knowledge of the Monument's natural resources).

i. Has your vessel has been outfitted with a mobile transceiver unit approved by OLE and complies with the requirements of Presidential Proclamation 8031?
(When on Midway as part of the WANT expedition/tour (permit no. PMNM-2010-015) in Dec 2010, the on-Midway Monument staff took me out to the snorkel site in their small boat based permanently on Midway, so I presume that it had all the equipment required as mentioned above.)

j. Demonstrate that there are no other factors that would make the issuance of a permit for the activity inappropriate.
I know of no other factors that would make issuance of this permit inappropriate.

8. Procedures/Methods:
When on Midway in Dec 2010, I pointed out (to Jason Beatty, Monument Officer on Midway), several small specimens of modern rubble, crusts, and subfossil rock chips, all

of which I think would or might contain/bear bryozoans. He will collect, not interfering with his other duties, a few such specimens from the locations listed earlier herein. During that tour, I walked among the 2 million albatrosses on the island but did not enter any prohibited sea-bird colonies, did not enter any restricted beaches, and did not work at night.

After Jason Beatty air-mails these several small specimens to me, I will first photograph them closer-up than was possible in the field, and then examine them with stereoscopic binocular miscroscope, in order to compare their morphology/anatomy with previously described bryozoan species illustrated in the literature available to me here. I will probably have to dissect or section the specimens in order to fully reveal their internal skeletal structural components. These are standard procedures/methods for identifying modern and fossil bryozoans, and I have much experience doing this kind of lab work (see my Vita and Bibliography both attached here).

After the Midway bryozoan species are determined, I can then check their previously recorded distributions in both time and space, and so be able to see possible relationships among their history, ecology, and biogeography. Such relationships may reflect items like ocean currents carrying larvae between island groups, for example; but it is not yet possible to predict exactly what may emerge until after I have identified their species.

Once identified and plotted, I plan to immediately write a half-page summary/abstract of the results, and submit that by their deadline of June 30, 2011, for presentation at Geological Society of America's national annual meeting. Then, through August and September, I will prepare 25-30 pages of text and illustrations to tack up on a 4x8-ft posterboard at that meeting (to be in Minneapolis, MN, in early Oct 2011) so that all the 5,000 participants can walk by and see what we have found. After that, I will copy these, staple them, and provide copies for the Midway Atoll Visitors' Center and your Honolulu office files if you so wish.

[None of this is "archeological" activity at all, which would have involved human cultural artifacts. Instead, this small project is geological (rocks), paleontological (subfossils), biological (modern), and oceanographic (location in mid-ocean) in character.]

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:
None (Bryozoans species are so obscure or inconspicuous that people generally have not noticed them, unlike the larger and more obvious mollusk shells, crustaceans, echinoderms, and corals, so there are no widely used common names for any of them.)

Scientific name:
Not possible to tell yet; the purpose of this small project is to identify for the first time the bryozoan species encountered on Midway, and then publish those names.

& size of specimens:
approximately 10-15 total; 20-50 mm (1-2") across.

Collection location:
Reef Hotel snorkel site, bone yard near boathouse, breakwater at harbor entrance.

☒ Whole Organism ☒ Partial Organism

9b. What will be done with the specimens after the project has ended?
I do not expect the specimens to remain intact after the dissecting or sectioning procedures necessary to reveal their internal skeletal structures needed to identify them to species level. However, if any fragments remain, I will place them in the teaching collections at Penn State, where my and my colleagues' students can learn from them what is required to work in detail on this kind of invertebrate.

9c. Will the organisms be kept alive after collection? ☐ Yes ☒ No
They will already be dead when collected (see under Summary: Other … background).

• General site/location for collections:
N/A

• Is it an open or closed system? ☐ Open ☐ Closed
N/A

• Is there an outfall? ☐ Yes ☐ No
N/A

• Will these organisms be housed with other organisms? If so, what are the other organisms?
No

• Will organisms be released?
No

10. If applicable, how will the collected samples or specimens be transported out of the Monument?
The small pieces/specimens will be air-dried, carefully wrapped, and placed in a small box to be air-mailed by Jason Beatty, Monument Officer, to me at my lab at Penn State University.

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

I am not collaborating with any other bryozoan specialists nor Pacific ocean specialists. I know of no other investigators contemplating fieldwork on Midway bryozoans in the immediate future. (It is at least somewhat possible that my planned abstract/note and poster/presentation at the Geological Society of America meeting in late 2011 might stimulate interest in further work on Midway, but there is no way to predict that with certainty now.) I have no permits from/for Hawaii nor Fish/Wildlife Service.

12a. List all specialized gear and materials to be used in this activity:
my personal snorkeling face-mask with built-in nearsightedness prescription lenses , one small underwater film camera, one on-land film camera (Pentax)

12b. List all Hazardous Materials you propose to take to and use within the Monument:
none

13. Describe any fixed installations and instrumentation proposed to be set in the Monument:
none

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

June 2011 (earlier if possible): microscope and comparative identification of the bryozoan species in the small samples received from the on-Midway staff (Jason Beatty); plotting biogeographic and ecologic connections of those species; write short note/abstract for submission to Geological Society of America national meeting program.

July -- September 2011: preparing text and illustrations for GSA poster pages/presentation.

October 2011: publication of abstract and presentation of poster at Geological Society of America annual national meeting, to be in Minneapolis, Minnesota, this year.

November -- December 2011: will provide hard/paper copies of the entire presentation to the Monument and/or Fish & Wildlife Service, to place in the Midway Visitors' Center and in the Honolulu office files, as you desire.

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

REEFAL BRYOZOANS IN GENERAL:

Cuffey, R.J. 2011. Bryozoa. In Hopley, D., ed., Encyclopedia of Modern Coral Reefs; Springer, Dordrecht/Heidelberg; (in press).

Cuffey, R.J. & McKinney, F.K. 2007. Cheilostomata. AccessScience@McGraw-Hill, http://www.acessscience.com, DOI 10.1036/1097-8542.801690 (and McGraw-Hill Encyclopedia of Science & Technology, 10th ed., New York).

Cuffey, R.J. 2000. Sunken battle wreckage as substrates for unintended artificial reefs. Geological Society of America Abstracts with Programs, v. 32, no. 2, p. 13+14.

Cuffey, R.J. & Utgaard, J.E. 1999. Bryozoans. In Singer, R., ed., Encyclopedia of Paleontology, rev. ed.; Fitzroy Dearborn, Chicago; v. 1, p. 204-216.

Kosich, D.F., & Cuffey, R.J. 1978. Recognition of multilaminar cheilostome bryozoan species in modern Bermuda reef-rock. Geological Society of America Abstracts with Programs, v. 10, p. 259.

Cuffey, R.J. 1977a. Bryozoa (general characteristics); Cheilostomata; Trepostomata. McGraw-Hill Encyclopedia of Science & Technology, 4th ed.; McGraw-Hill, New York; v. 2, p. 387-389; v. 3, p. 19-20; v. 14, p. 89-90; respectively.

Cuffey, R.J. 1977b. Bryozoan contributions to reefs and bioherms through geologic time. American Association of Petroleum Geologists Studies in Geology, no. 4, p. 181-194.

Cuffey, R.J. 1977c. Bryozoans in Floridian and Bahamian reefs – Notes for field observers. In Multer, H.G., ed., Field Guide to Some Carbonate Rock Environments, Florida Keys and Western Bahamas; new ed.; Kendall-Hunt, Dubuque; p. 352-354.

Cuffey, R.J. & Fonda, S.S. 1976. "Giant" Schizoporella – Sedimentologically important cheilostome bryozoans in Pleistocene and Recent carbonate environments of Bermuda, the Bahamas, and Florida. Geological Society of America Abstracts with Programs, v. 8, p. 474-475.

Cuffey, R.J. 1972. The roles of bryozoans in modern coral reefs. Geologische Rundschau, v. 61, p. 542-550.

SPECIFICALLY PACIFIC REEFAL BRYOZOANS:

Null, S., Cuffey, R.J., & Hewitt, M.C. 1997. Modern reef-flat bryozoans at Komaka Island, Okinawa – Comparisons for the paleoecology of reefs and bryozoans. Geological Society of America Abstracts with Programs, v. 29, no. 1, p. 70.

Cuffey, R.J., & Pachut, J.F. 1990. Clinal morphological variation along a depth gradient in the living scleractinian reef coral Favia pallida: Effects on perceived evolutionary tempos in the fossil record. Palaios, v. 5, p. 580-588.

Cuffey, R.J. & Cox, R.S. 1987. Reef-dwelling-bryozoans of Enewetak Atoll. In Devaney, D.M., Reese, E.S., Burch, B.L., & Helfrich, P., eds., The Natural History of Enewetak Atoll; U.S. Department of Energy, Oak Ridge; v. 2, p. 85-92.

Cuffey, R.J. & Montaggioni, L.F. 1986. Discovery and significance of fossil reefal bryozoans in the uplifted Miocene "atoll" of Makatea (French Polynesia). Geological Society of America Abstracts with Programs, v. 18, p. 577.

Cuffey, R.J. 1985. Reef-dwelling cyclostome bryozoans on Enewetak Atoll – Comparisons and contrasts for fossil reefs. Geological Society of America Abstracts with Programs, v. 17, p. 283-284.

Basile, L.L., Cuffey, R.J., & Kosich, D.F. 1984. Sclerosponges, pharetronids, and sphinctozoans (relict cryptic hard-bodied Porifera) in the modern reefs of Enewetak Atoll. Journal of Paleontology, v. 58, p. 636-650.

Cuffey, R.J. & McKinney, F.K. 1982. Reteporid cheilostome bryozoans from the modern reefs of Enewetak Atoll, and their implications for Paleozoic fenestrate bryozoan paleoecology. Pacific Geology, v. 16, p. 7-13.

Haggerty, J.A., Weber, J.N., Cuffey, R.J., & Deines, P. 1980. Environment-related morphologic and geochemical variability in the modern reef corals Favia pallida and Favia stelligera on Enewetak Atoll. Pacific Geology, v. 14, p. 95-113.

Cuffey, R.J. 1978. A note on bryozoans in the modern reefs of Enewetak Atoll and the Australian Great Barrier Reef. Pacific Geology, v. 13, p. 65-76.

Cuffey, R.J. 1973. Bryozoan distribution in the modern reefs of Eniwetok Atoll and the Bermuda Platform. Pacific Geology, v. 6, p. 25-50.

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