

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: Daniel Rubinoff

Affiliation: The University of Hawaii

Permit Category: Research

Proposed Activity Dates: May 10 2016-May 10 2021

Proposed Method of Entry (Vessel/Plane): either, in coordination with Monument staff

Proposed Locations: La Perouse and Gardner Pinnacles

Estimated number of individuals (including Applicant) to be covered under this permit: approximately 10 including USFWS and Monument staff who act as assistants to us.

Estimated number of days in the Monument: 20

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...

To sample endemic Hawaiian Hyposmocoma moths from La Perouse and Gardner Pinnacles. Preliminary research has revealed endemic species on every emergent NWHI, including Gardner Pinnacle

b.) To accomplish this activity we would

Continue, as we have for the past five years, to coordinate with Monument staff to join expeditions and collect samples, or give them simple collecting gear (as in the past) so that they might help us as convenient. 100% of the samples we have received have been in direct collaboration with Agency staff and on Agency trips.

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

developing a list of endemic species only found in the Monument. Preliminary results suggest that these species have been isolated for millions of years and represent an important aspect of terrestrial biodiversity in the Monument, with profound implications for the evolution of endemic species throughout the Archipelago. Our research will

continue to allow us to describe new species, understand evolutionary relationships, and ecology for these endemic species allowing for their appreciation and conservation. Our past research has been featured on the Monument website twice, including one time in 2016.

Other information or background:

Please see attached research proposal.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Rubinoff, Daniel

Title: Professor

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

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

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

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

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

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):

Christopher Bird, Bradley Reil, Sheila Conant, Patrick Schmitz, William Haines, Jesse Eiben, Cynthia King, Michael San Jose all as field assistants. USFWS/NOAA staff including Sheldon Plentovich, Hoku Johnson, Jonathan Sprague, Cindy Rehkemper and other Monument staff when they are available and willing to assist.

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 checked="" type="checkbox"/> French Frigate Shoals	<input checked="" type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input checked="" type="checkbox"/> Gardner Pinnacles	<input checked="" type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input 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 type="checkbox"/> Other			

Ocean Based

Remaining ashore on any island or atoll (with the exception of Midway & Kure Atolls and Field Camp staff on other islands/atolls) between sunset and sunrise.

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

Location Description:

Hyposmocoma species occur in all terrestrial environments across the NWHI, and multiple species are present, or hypothesized for most islands. Nihoa, for example, has six confirmed endemic species and evidence for at least one other. For this permit we request access to La Perouse and Gardner Pinnacles.

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:*

Collection of adult and larval moths is essential to conduct species descriptions and DNA analysis of their evolutionary relationships. Please see attached proposal for more information.

*Considering the purpose of the proposed activities, do you intend to film / photograph federally protected species? Yes No

For a list of terrestrial species protected under the Endangered Species Act visit:

<http://www.fws.gov/angered/>

For a list of marine species protected under the Endangered Species Act visit:

<http://www.nmfs.noaa.gov/pr/species/esa/>

For information about species protected under the Marine Mammal Protection Act visit:

<http://www.nmfs.noaa.gov/pr/laws/mmpa/>

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?

The activity is very low impact and requires just slow paced foot traffic to conduct surveys. Over the past eight years of research we have had no issues with impacts on the Monument. Our methods remain the same. We only collect insects which have very high rates of reproduction and short life spans. These resources are therefore harvested sustainably and at very low levels. Our research focuses on discovery; species are not subject to perpetual harvesting, just sampling at levels far below those that would be harmful for long-term survival. Other resources and artifacts in the monument are not harvested or harmed during this research. It is understood that natural resources and cultural resources are one-in-the-same within native Hawaiian culture, and that such resources are to be respected and protected from adverse impacts during the course of our proposed activities. Again, because of the slow pace of the research and the fine-scale level of the study-collecting caterpillars the size of a grain of rice, there is a minimal risk of unintended activity and damage.

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?

Please see attached proposal for a complete explanation. Briefly, this research will allow for the appreciation and management of endemic moths which are important scavengers and herbivores in the NWHI. The data we collect has been and will continue to be an important addition to the natural history and evolution of the NWHI terrestrial fauna. Our collections are very infrequent and have no lasting damage to insect populations. For this proposal we are requesting access to La Perouse and Gardner Pinnacles

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.

These species of moth are not only endemic to the Monument, but EACH island has its own endemic species. So discovery of new species and their ecological and evolutionary placement requires working on each Island. There are species on La Perouse and Gardner Pinnacles which have never been studied, we request permission to collect and study these particular species.

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

There will be no negative impact on the Monument. The number of larvae we collect is never more than a small fraction-less than 10%- of the larvae present due to the limited, low impact collection methods and the abundance of the larvae, and great infrequency with which we or our surrogates are able to visit the islands. The benefits of understanding the biodiversity of the islands is an essential aspect of preserving this biodiversity and fully understanding the ecology of the NWHI. In eight years of research we have never had an issue of damage or adverse effects.

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

Because space to reach each island is extremely limited, we rarely have the opportunity to go to more than one island per year, and even then are not able to spend enough time to completely survey that island. Being able to sample La Perouse and Gardner Pinnacles is the goal of the current permit. Because transportation is rarely available, we are opportunistic and coordinate with federal agencies when space is available. The visit to either island will be very short-likely a matter of hours to search for, and find, endemic caterpillars.

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

We have conducted the exact same kinds of surveys on the Main Hawaiian islands over the past 14 years with very positive results. We have coordinated with pre-Monument staff and Monument staff to conduct this research in the NWHI and continued a no-damage and positive results tradition over the past eight years. Please see attached manuscript for an example of species descriptions and other publications from earlier NWHI work. Please note that this work was published, but we have a significant amount

more left to do. The NWHI have been crucial in understanding the broader evolution of Hyposmocoma moths, which are Hawaii's most ecologically diverse adaptive radiation.

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. We have grant support, as in the past, to support this research. Most frequently, we rely on collaborators or Federal staff to collect for a few hours for us while they are participating in other activities. Even 20 minutes of collecting by Monument staff has yielded new species and important information! We do intend to coordinate with NOAA and USFWS to join in expeditions whenever possible, but volunteers have been very helpful over the past seven years.

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 have had no adverse impact since we simply walk carefully and very slowly across the islands looking for tiny caterpillars, the size of grains of rice. We are often on our hands and knees. Our procedures are very slow and have never resulted in the unintended damage or death of any Monument resource.

i. Has your vessel been outfitted with a mobile transceiver unit approved by OLE and complies with the requirements of Presidential Proclamation 8031?
we will use Monument vessels, as permitted, we will not hire our own.

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

For the past seven years, our proposed project has had no adverse impacts. This proposal is just request to continue the ongoing work which has had no negative impact and many positive results for the understanding of the evolution, and natural history of the Monument. Please see attached proposal

8. Procedures/Methods:

Please see attached proposal for a complete detail of all methods. On La Perouse and Gardner Pinnacles we would simply walk slowly and gather tiny moth caterpillars.

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:

Hawaiian Fancy case caterpillars

Scientific name:
Hyposmocoma

& size of specimens:

Specimens are generally under 5 mm in length, and we attempt to collect approximately 30 live samples from abundant populations (which usually number in the hundreds of thousands if not more)

Collection location:
all terrestrial areas of the NWHI

Whole Organism Partial Organism

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

All specimens will be professionally prepared and deposited at the University of Hawaii Insect Museum and the Bishop Museum in perpetuity always available for future research for any researcher or interested party. Rubinoff is Director of the University of Hawaii Insect Museum and will make sure all specimens are handled appropriately.

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

• General site/location for collections:

The Insect Biodiversity lab at the University of Hawaii.

• 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?
no

• Will organisms be released?
never

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

in tiny plastic vials

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

No one else is working on Hyposmocoma-anywhere. All samples will be preserved and available for future study.

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

light bulbs and plastic buckets

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

None. Caterpillars will be collected alive for rearing.

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:

We will continue to write up results of this research constantly. Manuscripts based on this project continue to be produced every year, a sample publication is attached to this application. As more species are discovered, they will be described. We will also incorporate these species into Archipelago-wide DNA studies to understand the deep-time evolution of NWHI lineages.

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

Schmitz, P. and D. Rubinoff. 2009. New Species of Hyposmocoma (Lepidoptera, Cosmopterigidae) from the remote Northwestern Hawaiian Islands of Laysan, Necker and Nihoa. *Zootaxa* 2272: 37-53.

Schmitz, P. and D. Rubinoff. 2008. Three new species of Hyposmocoma (Lepidoptera, Cosmopterigidae) from the Hawaiian Islands, USA based on morphological and molecular evidence. *Zootaxa*.1821: 49-58.

Rubinoff, D. 2008. Phylogeography and ecology of an endemic radiation of Hawaiian aquatic case-bearing moths (Hyposmocoma: Cosmopterigidae). *Philosophical Transactions of the Royal Society of London B* 363: 3459-3465.

Rubinoff, D and W. P. Haines. 2006. Hyposmocoma molluscivora Description. *Science* 311:1377

Rubinoff, D. and W. P. Haines. 2005. Web-spinning caterpillar stalks snails. *Science* 309:575

Rubinoff, D. and P. Schmitz. 2010. Multiple aquatic invasions by an endemic, terrestrial Hawaiian moth radiation. *Proceedings of the National Academy of Sciences, USA* 107:5903-5906.

Schmitz, P. and D. Rubinoff. 2011. The Hawaiian amphibious caterpillar guild: New species of *Hyposmocoma* (Lepidoptera: Cosmopterigidae) confirm distinct aquatic invasions and complex speciation patterns. *Zoological Journal of the Linnean Society* 162: 15-42.

Schmitz, P. and D. Rubinoff. 2011. Ecologically and Morphologically Remarkable New Cosmet Moth Species of the Genus *Hyposmocoma* (Lepidoptera: Cosmopterigidae) Endemic to the Hawaiian Islands with Reference to the Spectacular Diversity of Larval Cases. *Annals of the Entomological Society of America* 104: 1-15

Kawahara, A.Y., N. Tangalin, D. Rubinoff. 2011. Life-history notes on the fern-mining endemic *Hyposmocoma* (*Euperissus*) *trivitella* Swezey 1913 (Lepidoptera: Cosmopterigidae) from Kauai and a report of associated parasitoids (Hymenoptera: Bethyloidea). *Proceedings of the Hawaiian Entomological Society* 43: 9-12.

Kawahara, A. Y. and D. Rubinoff. 2012. Three new species of Fancy Case caterpillars from threatened forests of Hawaii (Lepidoptera, Cosmopterigidae, *Hyposmocoma*). *Zookeys* 170: 1–20. doi: 10.3897/zookeys.170.1428.

Kawahara, A.Y., Rubinoff, D. 2013. Convergent evolution of morphology and habitat use in the explosive Hawaiian fancy case caterpillar radiation. *Journal of Evolutionary Biology* 26:1763-1773.

Haines, W. P., P. Schmitz, and D. Rubinoff. 2014. Ancient diversification of *Hyposmocoma* moths in Hawaii. *Nature Communications*. 5: doi:10.1038/ncomms4502

Dupont, S. and D. Rubinoff. 2015. Larval and larval case morphology of *Hyposmocoma* species (Cosmopterigidae: Lepidoptera), with a discussion on adaptations to larval case-bearing locomotion. *Annals of the Entomological Society of America*. 108: 1037-1052

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:**

NOAA/Inouye Regional Center
NOS/ONMS/PMNM/Attn: Permit Coordinator
1845 Wasp Blvd, Building 176
Honolulu, HI 96818
FAX: (808) 455-3093

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