

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: Scott R. Santos

Affiliation: Department of Biological Sciences, Auburn University, AL 36849

Permit Category: Research

Proposed Activity Dates: June 2021

Proposed Method of Entry (Vessel/Plane): US Fish and Wildlife Service PI coring project in June 2021

Proposed Locations: Laysan Island

Estimated number of individuals (including Applicant) to be covered under this permit:
As in US Fish and Wildlife Service PI coring project in June 2021

Estimated number of days in the Monument: As in US Fish and Wildlife Service PI coring project in June 2021

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...

Collect 6 sediment core samples from the perimeter surrounding hypersaline lake in middle of Laysan Island. Cores would be to 12 inches (30.5 cm) depth and shipped intact to Auburn University where attempts would be made to hatch resting eggs of brine shrimp from layers of the cores. Given that deeper layers represent older points in time, this allows analyses of past population structure of the Laysan brine shrimp. Individual brine shrimp would be sacrificed following hatching for DNA analyses.

b.) To accomplish this activity we would

Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021.

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

Providing information on the species identity and past and current population structure of the Laysan brine shrimp, which to the best of our knowledge, has not been done

before. This work would also provide information on the potential uniqueness of the Laysan brine shrimp that could be utilized in conservation and management decisions for the population.

Other information or background:

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Santos, Scott R.

Title: Professor & Chair

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

As in US Fish and Wildlife Service PI coring project in June 2021

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

[REDACTED]

Phone: [REDACTED]

Fax: [REDACTED]

Email: [REDACTED]

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

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

Department of Biological Sciences, Auburn 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):

As in US Fish and Wildlife Service PI coring project in June 2021

Section B: Project Information

5a. Project location(s):

<input type="checkbox"/> Nihoa Island	<input type="checkbox"/> Land-based	<u>Ocean Based</u>	
<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 type="checkbox"/> Gardner Pinnacles	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Maro Reef			
<input checked="" type="checkbox"/> Laysan Island	<input checked="" 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			

NOTE: Shallow water is defined by water less than 100 meters in depth.

Remaining ashore on any island or atoll (with the exception of Sand Island, at Midway Atoll 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:

Perimeter surrounding hypersaline lake in middle of Laysan Island.

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:*

Collect 6 sediment core samples from the perimeter surrounding hypersaline lake in middle of Laysan Island. Cores would be to 12 inches (30.5 cm) depth and shipped intact to Auburn University where attempts would be made to hatch resting eggs of brine shrimp from layers of the cores. Given that deeper layers represent older points in time, this allows analyses of past population structure of the Laysan brine shrimp. Individual brine shrimp would be sacrificed following hatching for DNA analyses. Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021. Information on the species identity and past and current population structure of the Laysan brine shrimp, which has not been done before, would provide knowledge on the potential uniqueness of the Laysan brine shrimp that could be utilized in conservation and management decisions for the population.

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

If so, please list the species you specifically intend to target.

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?

Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021, who are trained in working in the Monument.

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?

Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021, who are trained in working in the Monument.

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 practicable alternative since the brine shrimp population is specific to Laysan Island.

d. How does the end value of the activity outweigh its adverse impacts on Monument cultural, natural and historic resources, qualities, and ecological integrity?
Adverse impacts to the Monument are considered minimal/none given the amount of material involved and that individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021 will conduct the collection. Information on the species identity and past and current population structure of the Laysan brine shrimp, which has not been done before, would provide knowledge on the potential uniqueness of the Laysan brine shrimp that could be utilized in conservation and management decisions for the population.

e. Explain how the duration of the activity is no longer than necessary to achieve its stated purpose.
Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021, who are trained in working in the Monument. No extra time beyond this is required.

f. Provide information demonstrating that you are qualified to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.
Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021, who are trained in working in the Monument. Processing of the cores, hatching of resting brine shrimp eggs and genetic analyses of individual shrimp would be conducted at Auburn University by Santos, who has experience in these areas (see included CV).

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.
Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021, who are trained in working in the Monument. Santos has funds through Auburn University to ship and process the cores as well as for genetic analyses.

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.
Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021, who are trained in working in the Monument.

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

N/A

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

8. Procedures/Methods:

NOTE: If land or marine archeological activities are involved, contact the Monument Permit Coordinator at the address on the general application form before proceeding.

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:

Sediment core samples from various points along the perimeter surrounding hypersaline lake in middle of Laysan Island in order to hatch resting eggs of brine shrimp (*Artemia franciscana*).

Scientific name:

Artemia franciscana

& size of specimens:

Collect 6 sediment core samples from the various points along the perimeter surrounding hypersaline lake in middle of Laysan Island. Cores would be to 12 inches (30.5 cm) depth and shipped intact to Auburn University where attempts would be made to hatch resting eggs of brine shrimp from layers of the cores. Given that deeper layers represent older points in time, this allows analyses of past population structure of the Laysan brine shrimp. Individual brine shrimp would be sacrificed following hatching for DNA analyses.

Collection location:

Various points along the perimeter surrounding hypersaline lake in middle of Laysan Island.

Whole Organism Partial Organism

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

All individual brine shrimp will be destroyed in the process of DNA isolation for genetic analyses following their hatching from resting eggs in the collected sediment samples

from Laysan Island. DNA not used in experiments will be vouchered and archived, along with remaining sediment core samples, at the Auburn University Museum of Natural History.

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

No, all brine shrimp will be destroyed in the process of DNA isolation for genetic analyses following their hatching from resting eggs in the collected sediment samples from Laysan Island.

• General site/location for collections:

From six points along the perimeter surrounding hypersaline lake in middle of Laysan Island.

• 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, brine shrimp will be maintained in isolation for other organisms.

• Will organisms be released?

No, all brine shrimp will be destroyed in the process of DNA isolation for genetic analyses.

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

Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021, who are trained in working in the Monument. Sediment core samples will be transported out of Monument by this team and then mailed to Auburn University.

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

Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021 and would be specific to this project since no other interested parties are known.

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

Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021, who are trained in working in the Monument and will already have the appropriate equipment with them.

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

Cores will be collected and shipped dry so no Hazardous Materials will be taken to or used within the Monument.

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

N/A

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

Required collection of the 6 sediment core samples would be done by individuals taking part in the US Fish and Wildlife Service PI coring project in June 2021. Core processing and hatching of brine shrimp resting eggs would be done once the cores arrive at Auburn University. DNA data generation and analyses would be conducted in 2022 with write-up and publications of information starting in 2023 and beyond.

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

Hoffman, S.K., K.W. Seitz, J.C. Havird, D.A. Weese, S.R. Santos. 2020. Invited SICB Symposium Contribution: Phenotypic comparability from genotypic variability among physically structured microbial consortia. *Integrative and Comparative Biology*. 60:288-303.

Havird, J.C., E. Meyer, Y. Fujita, R.C. Vaught, R.P. Henry, S.R. Santos. 2019. Disparate responses to salinity across species and organizational levels in anchialine shrimps. *Journal of Experimental Biology*. 222:jeb211920.

Thornhill, D.J., E.J. Howells, D.C. Wham, T.D. Steury, S.R. Santos. 2017. Invited Reviews and Syntheses: Population genetics of reef coral endosymbionts (Symbiodinium, Dinophyceae). *Molecular Ecology*. 26:2640-2659.

Santos, S.R. 2006. Patterns of genetic connectivity among anchialine habitats: a case study of the endemic Hawaiian shrimp *Halocaridina rubra* on the Island of Hawaii. *Molecular Ecology*. 15:2699-2718.

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

03/10/2021

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
- N/A Material Safety Data Sheets for Hazardous Materials