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: J. Michael Reed, L. Michael Romero
Affiliation: Tufts University

Permit Category: Research
Proposed Activity Dates: 2020
Proposed Method of Entry (Vessel/Plane): Previously chartered USFWS Vessel or Plane
Proposed Locations: Midway, Laysan, Kure

Estimated number of individuals (including Applicant) to be covered under this permit: 22

Estimated number of days in the Monument: 14

Description of proposed activities: (complete these sentences):

a.) The proposed activity would…

The specific activity would be to salvage feathers from Laysan ducks for use in quantifying stress hormone levels (corticosterone) in the feathers. Stress hormones are put down in feathers when they grow, so they are an integrated measure of hormone levels over the course of time when the feathers grew in. They have the added benefit that they can be extracted from feathers that have been molted, and from the feathers of dead birds, even decades after the bird's death.

We are interested in looking at stress hormone levels in the feathers of Laysan Ducks, comparing individuals from Laysan to those breeding on Midway. Our interest is comparing the birds between a setting of hypersaline wetland as compared to individuals with greater access to freshwater.

b.) To accomplish this activity we would ….

We would salvage feathers from each of at least 24 birds – 12 from each island; 15 birds from each island would be even better. We don't need many feathers – 2 primary or secondary or tail feathers, or 8 body feathers, from each bird would suffice. And as

stated, our goal would be to get them from dead birds so no one would disturb living birds. If the opportunity arises to pluck feathers (or clip the distal end from a feather, without actually plucking it) from a living bird – e.g., a rehab animal – and it is deemed that it will pose no risk to the bird, then those feathers would be fine also.

Feather(s) of each individual would be placed in its own envelope/bag/container, and labelled – at least by island, and sex (if known); ID if you have them banded.

It does not matter when the feather are collected on one island relative to the other. Even if the ghost crabs have taken the flesh, if there is a pile of feathers, that's also fine as a sample – it would be important, however, for the feathers from different piles (presumable individuals) to be stored in different bags, rather than all mixed together. Even an isolated feather placed in its own bag would be useful.

Feathers would be transported to Tufts University for analysis. Analyses are destructive, so no complete feathers would remain afterward.

c.) This activity would help the Monument by …

Glucocorticoids have been used tentatively as bioindicators of habitat quality via its effects on individual condition. Glucocorticoids are central to the stress response, and they play significant rolls in individual physiology; chronic stress can cause decreased survival and neuronal death, and its effects can be cross-generational (affecting the adult performance of the offspring of chronically stressed parents). Glucocorticoids in feathers reflect an integrated measure of stress hormone levels across the weeks they are regrown, and thus might reflect body condition that could have population-level consequences. The two islands differ strongly in wetland characteristics, as well as in duck behavior and vital rates. We are interested in knowing if the habitat and vital rate differences are reflected in glucocorticoid levels expressed in the feathers. If they are, it would suggest the need to investigate to determine if the elevated hormone levels are a management concern or not.

[It is important to know that that stress hormones are natural products in an animal's body, and that having elevated stress hormones does not necessarily mean that there is concern for the individual – being able to produce stress hormones when needed is a sign of a healthy individual. But it also could indicate the presence of a stressor, that if chronically present, could lead to health consequences for the bird. Stress hormones are a good initial index of potential problems, but definitive diagnosis would need to rely on other metrics.]

Other information or background:

Collection methods should create no disturbance to living birds beyond that normally caused by a person walking around.

The methods we are using are standard for the field, and have been performed repeatedly by our lab at Tufts University.
Michael Reed has worked on endangered Hawaiian waterbirds since 1992. Michael Romero is a leading authority on stress in wild animals (including writing the one academic book on the topic).

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Reed, J. Michael; Romero, L. Michael

Title: Professors of Biology

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

Field work would be done by one or more of the following (depending on opportunity):
Beth Flint, USFWS
Stephen Barclay, USFWS
Joseph Latsha, USFWS
Suzzane Pluskat, Pacific Rim Conservation Veterinarian
Kelly Goodale, USFWS
Leila Nagatani, USFWS
Amanda Boyd, USFWS
Timothy Clark, USFWS
Jonathan Plissner, Island Conservation
Tristan Luxner, USFWS
TBD, 4 NOAA NMFS Staff
TBD, 4 USFWS Staff
TBD, 4 State of Hawaii DLNR/DOFAW Staff

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:

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

- Tufts Universiy
- USFWS

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):

Listed above

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: 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:

For both islands, anywhere Laysan Ducks can be found

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 activities is to measure glucocorticoid (stress) hormones in feathers of Laysan Ducks. The goals are to compare conditions of birds in two different wetland conditions, and to establish a baseline for future evaluation of stress hormone levels.

*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/endangered/
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 will be conducted with standard safeguards for the natural, cultural, and historical resources and ecological integrity of the Monument. All personnel that will be involved in the field activities have worked in terrestrial habitats in the monument before and/or have extensive experience on several islands that contain a variety of wildlife and cultural resources. They will be able to avoid stepping on nests and otherwise disturbing nesting birds and other natural resources.

The proposed activities would not affect any historical or cultural resources and personnel will stay away from any such resources. No ground disturbance or movement of rocks will be necessary and sites will be selected which are easily accessible.

The use of feathers for the evaluation of stress hormones is a widely used method. It is not invasive, and our collection methods do not require handling birds. This is a method that is not invasive and that does not cause harm to the birds. Feather collection is common tool for measuring indicators in bird species; mortality or injury would not occur from salvage; even limited feather collection from a living bird would be highly unlikely to cause harm.

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 proposed activity will have a negligible impact on the natural resources of the Monument. This is a method that is non-invasive and will not adversely affect cultural, natural, or historic resources. Samples will be collected on previously planned expeditions intended for other purposes. The duration of the activity will be very short; occurring incidentally as part of a routine Monument work.

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, for several reasons. The Monument contains the only populations of these species. Alternative methods for evaluating stress hormone levels are more intrusive (requiring handling living birds), and would still have to be done on the 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?

The proposed project will have no adverse impacts on Monument cultural, natural or historic resources. The project will not result in any harm to the birds. No cultural or historic resources will be disturbed by the proposed project. The project will collect valuable data for the Monument on stress hormone levels of Laysan Ducks that could

help researchers and managers better understand the effects habitat management may be having on trust resources.

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

This work will be done in conjunction with previously planned monitoring trips to Midway and Laysan. No extra time on the islands will be allotted for this project; USFWS biologists feel they can complete this project in the time they already had planned to be on the islands.

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

Neither Reed nor Romero will be part of the teams going to any of the islands; all team members visiting the islands have already been vetted for work there, and are experienced at the site and with the birds.
Reed is experienced with working with endangered Hawaiian birds; he has done field work on the main islands since 1992, and published 21 papers in the scientific literature on Hawaiian birds.
Romero's entire career has been studying the stress response in animals; of the >150 papers he has published on this topic, 9 are specifically on stress hormones in feathers.

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.

Romero has funding already in place from the National Science Foundation that can pay for the assays needed for the stress hormone work. We do not anticipate any impacts for the project that would require mitigation.

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.

We anticipate no effects on the Monuments cultural, natural, or historic resources, qualities, or ecological integrity. All methods being used are standard protocols for bird research that have been used successfully to measure stress hormone levels in other species.

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.

There are no other factors that we can think of that would make the issuance of a permit for this activity inappropriate.

8. Procedures/Methods:

All work as part of this project will occur on land on Laysan, Midway, and/or Kure. Project staff will travel to each island using the standard travel protocols followed by USFWS. Travel will be the minimum needed to gather samples, and will be done incidentally to already-planned activities. Feathers will be gathered from the ground, or from bodies of salvaged birds.

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:
Laysan Duck

Scientific name:
Anas laysanensis

& size of specimens:

We will gather 2-8 feathers (2 if primary, secondary, tail; 8 if body) of each bird. 12-15 individuals on Laysan, 12-15 on Midway, and 12-15 on Kure.

Collection location:

Laysan and Midway

☐ Whole Organism ☒ Partial Organism

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

Analysis procedure is destructive, so we do not anticipate there being any feathers left. If they are, they will be stored at the University in anticipation of future needs by other researchers.

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

N/A

• 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?
N/A

• Will organisms be released?
N/A

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

The feathers will be placed in clearly labeled zip-loc bags and transported in a bucket or bag to Honolulu, Hawaii. The feathers will then be shipped, following appropriate legal procedures, to Medford, Massachusetts.

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

We are not aware of any related research being conducted on this species. The amount of feather samples will be limited, so that there will be little or no leftovers analyses. If there are leftover feathers, we will make them available for any work approved by the Monument.

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

Poly plastic bags

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:

Samples to be analyzed within 6 months of sampling. Write-up and submission for publication would occur within 4 months of completing the analyses.

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

Note: these are just the papers specifically on feathers and stress hormones:

Romero, L.M. Fairhurst, G.D. 2016. Measuring corticosterone in feathers: strengths, limitations, and suggestions for the future. Comp. Biochem. Physiol. Part A: Mol. Integ. Physiol. 202:112-122.

Studholme, K.R., Hipfner, J.M., Romero, L.M., Gormally, B.M. Iverson, S.J., Crossin, G.T. 2018. Egg size is independent of variation in pre-breeding feather corticosterone in Cassin's auklets during favorable oceanographic conditions. Gen. Comp. Endocrinol. 268:64-70.

Parker Fischer, C., Rao, R., Romero, L.M. 2017. Exogenous and endogenous corticosterone in feathers. J. Avian Biol. 48:1301-1309.

Grunst, M.L., Grunst, A.S., Parker, C.E., Romero, L.M., Rotenberry, J.T. 2015. Pigment-specific relationships between feather corticosterone concentrations and sexual coloration. Behav. Ecol. 26:706-715.

Kennedy, E.A., Lattin, C.R., Romero, L.M., Dearborn, D.C. 2013. Feather coloration in museum specimens is related to feather corticosterone. Behav. Ecol. Sociobiol. 67:341-348.

Lattin, C.R., Reed, J.M., DesRochers, D.W., Romero, L.M. 2011. Elevated corticosterone in feathers correlates with corticosterone-induced decreased feather quality: a validation study. J. Avian Biol. 42:247-252.

DesRochers, D.W., Reed, J.M., Awerman, J., Kluge, J., Wilkinson, J., van Griethuijsen, L.I., Aman, J., Romero, L.M. 2009. Exogenous and endogenous corticosterone alter feather quality. Comp. Biochem. Physiol. Part A: Mol. Integ. Physiol. 152:46-52.

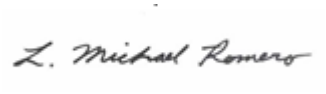
Strochlic, D. Romero, L.M. 2008. The effects of chronic psychological and physical stress on feather replacement in European starlings (*Sturnus vulgaris*). Comp. Biochem. Physiol. Part A: Mol. Integ. Physiol. 149:68-79.

Romero, L.M., Strochlic, D., Wingfield, J.C. 2005. Corticosterone inhibits feather growth: potential mechanism explaining seasonal down regulation of corticosterone during molt. Comp. Biochem. Physiol. Part A: Mol. Integ. Physiol. 142:65-73.

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.

30 Jan, 2020

Signature Date



30 Jan, 2020

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