

Papahānaumokuākea Marine National Monument
RESEARCH Permit Application

NOTE: *This Permit Application (and associated Instructions) are to propose activities to be conducted in the Papahānaumokuākea Marine National Monument. The Co-Trustees are required to determine that issuing the requested permit is compatible with the findings of Presidential Proclamation 8031. Within this Application, provide all information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Papahānaumokuākea Marine National Monument (Monument).*

ADDITIONAL IMPORTANT INFORMATION:

- Any or all of the information within this application may be posted to the Monument website informing the public on projects proposed to occur in the Monument.
- In addition to the permit application, the Applicant must either download the Monument Compliance Information Sheet from the Monument website OR request a hard copy from the Monument Permit Coordinator (contact information below). The Monument Compliance Information Sheet must be submitted to the Monument Permit Coordinator after initial application consultation.
- Issuance of a Monument permit is dependent upon the completion and review of the application and Compliance Information Sheet.

INCOMPLETE APPLICATIONS WILL NOT BE CONSIDERED

Send Permit Applications to:

Papahānaumokuākea Marine National Monument Permit Coordinator

6600 Kalaniana'ole Hwy. # 300

Honolulu, HI 96825

nwhipermit@noaa.gov

PHONE: (808) 397-2660 FAX: (808) 397-2662

SUBMITTAL VIA ELECTRONIC MAIL IS PREFERRED BUT NOT REQUIRED. FOR ADDITIONAL SUBMITTAL INSTRUCTIONS, SEE THE LAST PAGE.

Papahānaumokuākea Marine National Monument Permit Application Cover Sheet

This Permit Application Cover Sheet is intended to provide summary information and status to the public on permit applications for activities proposed to be conducted in the Papahānaumokuākea Marine National Monument. While a permit application has been received, it has not been fully reviewed nor approved by the Monument Management Board to date. The Monument permit process also ensures that all environmental reviews are conducted prior to the issuance of a Monument permit.

Summary Information

Applicant Name: Charles Littnan

Affiliation: National Marine Fisheries Service

Permit Category: Research

Proposed Activity Dates: 13 May to 31 Aug 2010

Proposed Method of Entry (Vessel/Plane): Vessel

Proposed Locations: French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, Midway Atoll, Kure Atoll

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

5

Estimated number of days in the Monument: 50

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...
provide the first high resolution topographic maps for land areas in the Monument.

b.) To accomplish this activity we would
collect high-resolution geodetic differential GPS (dGPS) data at the proposed locations in order to generate detailed Digital Elevation Models (DEMs). Specifically, the surveys will include all accessible subaerial areas within each atoll including coralline and secondary sandy islands in accordance with provisions to protect local flora and fauna.

c.) This activity would help the Monument by ...
providing high-resolution Digital Elevation Models and GIS raster layers for the NWHI that will serve as baseline datasets for documenting current topographic conditions and characteristics. The methods established will establish protocols for future monitoring of sea level rise and other impacts on terrestrial habitats.

Other information or background:

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Littnan, Charles L.

Title: Lead Scientist, Hawaiian Monk Seal Research Program

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

Lucas Moxey, Ecosystem Observation Division, PIFSC

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

[REDACTED]

Phone:

[REDACTED]

Fax:

Email:

[REDACTED]

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

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

Pacific Islands Fisheries Science Center, National Marine Fisheries Service, NOAA,
Department of Commerce

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):

Chad Yoshinaga, Chief Scientist

Jessica Lopez, Biological Technician

Others TBD

Section B: Project Information

5a. Project location(s):

<input type="checkbox"/> Nihoa Island	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Necker Island (Mokumanamana)	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input checked="" type="checkbox"/> French Frigate Shoals	<input checked="" 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 checked="" type="checkbox"/> Lisianski Island, Neva Shoal	<input checked="" type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input checked="" type="checkbox"/> Pearl and Hermes Atoll	<input checked="" type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input checked="" type="checkbox"/> Midway Atoll	<input checked="" type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input checked="" type="checkbox"/> Kure Atoll	<input checked="" type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Other			

Ocean Based

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

Location Description:

At each site, pre-existing benchmarks will be accessed to set up and remove a GPS receiver. In addition, all accessible land areas will be walked by a person carrying a backpack with a second receiver. Survey tracks will be placed 5-10 m apart, and areas deemed too sensitive will not be traversed (e.g., interior of Lisianski Island). In all areas, extreme caution to avoid undue disturbance to wildlife will be exercised.

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:*

Current warming trends affecting our planet have resulted in accelerated melting of polar ice masses, as well as the thermal expansion of global water bodies that serve as heat repositories, therefore contributing to global sea-level rise. These processes are predicted to impact numerous global coastal areas, including the NWHI. Baker et al. (2006) performed mapping surveys at three atolls (Lisianski, Pearl and Hermes, and French Frigate Shoals) to investigate possible sea-level rise effects. They concluded that sea level rise was a potentially very serious threat to terrestrial habitats in the NWHI even under rather conservative sea level rise scenarios. Some of these habitats are critically important to endangered and threatened species, as well as to non-ESA listed seabird species.

Coastal erosion resulting from sea level rise as induced by global climate change will likely result in a significant loss of NWHI terrestrial habitats. Furthermore, sand erosion resulting from severe storms and seasonal large swells further contribute to its denudation. The work by Baker et al. (2006) provided general insights regarding the topographic characteristics at three locations throughout the NWHI at varying degrees of spatial resolution. However, sufficient data to reliably anticipate, adapt to or mitigate impacts is lacking. Current needs include the collection of high-resolution survey-grade (geodetic) GPS elevation data throughout the low-lying NWHI. This will provide:

- 1) Baseline topography valuable for numerous research and management applications in the Monument;
- 2) Improved modeling of future sea-level rise impacts.
- 3) A basis for monitoring changes in terrestrial habitats;
- 4) Information needed to devise future sea level rise mitigation measures.

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 goal of the work described here is to provide a basis for understanding and responding to a serious threat to Monument natural resources, consistent with Monument mandates. The research proposed herein is compatible with the conservation and management goals of the Monument and minimizes disturbance to the NWHI ecosystem.

Our studies will be designed and executed so as to minimize impacts to the terrestrial and marine environment. For instance, on-island time will be limited to that required for survey work, during which all personnel will adhere to strict quarantine protocols as defined by USFWS. The survey activities will be piggybacked on monk seal population assessment surveys so that no extra visits to islands will be required. Any camping on islands will likewise be accommodated by the already permitted monk seal field camps.

Native Hawaiians share a close link to the ocean, marine life, and islands within the monument and seek to maintain the living cultural resources found there. Many of these resources are embodied in, or rely on, the terrestrial habitats that this study will focus on. Accordingly, all scientists participating on these cruises will receive a Native Hawaiian cultural briefing before departure to the NWHI. In addition, the primary permittee, chief scientist, and other appropriate personnel look forward to consulting with the Office of Hawaiian Affairs (OHA) and the Monument's Native Hawaiian program coordinator on proper conduct while in the NWHI, on cultural sensitivities associated with the proposed activities and locations, and on the applicability of the results of this research to the role of OHA as one of the NWHI stakeholder agencies.

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 7a.

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. The focus of the study is the terrestrial habitats of 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?

Understanding the potentially catastrophic impacts of sea level rise far outweighs any adverse impacts that might occur in carrying out this research. Regardless, all attempts are being made to minimize any negative impacts to natural and cultural resources.

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

Surveys will be conducted as efficiently as possible and in concert with monk seal field camp research, coordinated during field camp deployment and pickup cruises. The techniques proposed are extremely efficient as data collection is relatively rapid, whereas post-hoc processing of data will occur outside the Monument.

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

The Hawaiian Monk Seal Research Program has been conducting low impact research in the NWHI for over two decades. Experienced field technicians will guide the GPS survey technician around the islands. Guidance will be sought from experienced FWS staff where necessary when entering bird colonies. The applicant was a co-author on the only study of sea-level rise to date in the NWHI and led the field portion of that study. The field PI has great expertise in GIS, GPS, mapping and remote sensing technologies.

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.

All research/enhancement activities are supported by NOAA Fisheries funding and primarily with the use of NOAA research vessels.

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.

All participating staff are educated and trained to respect all cultural, natural and historic resources in the Monument. Our first and primary objective is "Do no harm". See section 7a above for details.

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

Yes

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

There are no factors, such as other permit violations, that should prevent the issuance of this permit. All activities are inline with Hawaiian Monk Seal Recovery Plan and relevant sections of the Monument Management Plan.

8. Procedures/Methods:

We propose the use of Kinematic dGPS as the principal data collection methodology based on the overall mapping requirements, geodetic accuracy (+/- 1-2 cm horizontal; +/- 2-3 cm vertical) and reliability needs, current availability of National Geodetic Survey (NGS) Horizontal B-order benchmark information, field characteristics and remote location, logistical requirements, small baseline distances, and data post-processing advantages.

Kinematic dGPS consists in the field deployment of two survey-grade dual-frequency GPS receivers, one serving as a stationary base station positioned at a well-established location (XYZ coordinates), and a secondary mobile backpack-mounted receiver serving as a rover used for collecting track and profile data on foot. Both GPS units are then operated simultaneously to track a minimum of four navigation satellites, and the data is subsequently post-processed for deriving accurate geolocation information. The two GPS receivers are used for recording the phases of carrier waves from each navigational satellite, while considering that numerous internal and external factors (e.g.: receiver & satellite clock offsets, ionospheric & tropospheric delays, multipath)

affect the “uncorrected” carrier signals and therefore result in initial low-accuracy geolocation estimates. While operated simultaneously within a short baseline distance (< 100 km), signals recorded at each receiver are affected equally. Following data collection, post-processing efforts include the use of high-accuracy NGS control points for deriving baseline correction solution algorithms that are then applied to the raw GPS data. This allows for the reconstruction of the rover’s precise track and altitude determinations with centimeter-scale accuracy. As such, the post-processing nature of the Kinematic technique therefore offers greater data processing flexibility and higher location accuracy.

Currently, the NGS provides accurate latitude and longitude (XY) geolocation information for various benchmarks distributed throughout the NWHI with an accuracy of approximately 1 cm (Horizontal B-order stations). From this data, only Midway Atoll has a well-established elevation referenced to the WGS84 ellipsoid plane based on observations from the Midway Atoll tide station. In contrast, all other atolls in the NWHI lack tide-gage stations, therefore allowing only for theoretical ellipsoidal height estimates based on mathematical modeling of the shape of the earth and referenced to the NAD83 datum. Considering this, we propose the use of a digital theodolite (e.g. DT500A Sokkia) for accurately determining the elevations between the predicted mean low water (MLW) in reference to each of the local NGS benchmarks for establishing a reference plane. Such technique would thus allow for post-field corrections necessary for establishing a common tidal benchmark datum reference plane, as well as for the corresponding atoll-specific dGPS data points.

Following the set-up of a geodetic GPS receiver at a known NGS benchmark, a backpack rover unit will be used for elevation data collection within all accessible areas. These will consist of track and point surveys carried out along shorelines and cross-shore beach transects in square wave patterns. When accessing each coralline and secondary sandy island, special care will be taken to follow all local wildlife conservation and management guidelines. In areas occupied by wildlife and/or vegetation that prevents along-track data collection, point-source data will be used along with global

and local interpolation methods, including tessellation and Triangular Irregular Networks (TINS) methods for estimating height information. As part of the pre-deployment preparations, preliminary field surveys will be conducted at selected locations throughout O`ahu for assessing and finalizing equipment configurations, calibrations, hardware testing, and surveying techniques.

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:

n/a

Scientific name:

n/a

& size of specimens:

n/a

Collection location:

n/a

Whole Organism Partial Organism

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

n/a

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?

n/a

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

n/a

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

Survey-grade dual-frequency GPS receivers and a digital theodolite.

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

n/a

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

GPS receiver will record at set benchmarks only during survey period (removed once each site has been surveyed).

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

GPS data post-processing and DEM development will require approximately one year at which preliminary results can be presented. Write up and publication will follow within two years of data processing. More importantly, DEM's will be made available to the Monument and other stakeholders as soon as they are available (i.e., likely before research is published).

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

Baker, J.D., Littnan, C.L., and Johnston, D.W., 2006. Potential effects of sea level rise on the terrestrial habitats of endangered and endemic megafauna in the Northwestern Hawaiian Islands. *Endangered Species Research* 4:1-10.

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