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 L. Littnan
Affiliation: NOAA National Marine Fisheries Service

Permit Category: Research
Proposed Activity Dates: June 1, 2008 - May 31, 2009
Proposed Method of Entry (Vessel/Plane): NOAA RV Oscar Elton Sette, Contract Plane
Proposed Locations: Nihoa, Necker (Mokumanamana), French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Atoll, Midway Atoll, Kure Atoll

Estimated number of individuals (including Applicant) to be covered under this permit:
14 (though not all would be in the Monument simultaneously)
Estimated number of days in the Monument: 60-90 (though much of this is ship transit)

Description of proposed activities: (complete these sentences):

a.) The proposed activity would…
consist of efforts to help increase juvenile monk seal survival in the Northwestern Hawaiian Islands.

b.) To accomplish this activity we would ….
undertake enhancement actions including: 1) feeding and treating prematurely weaned and other undernourished seals in a captive facility, 2) relocating weaned/juvenile seals to areas of potentially greater survival, and 3) treating weaned/juveniles to decrease parasite loads.

c.) This activity would help the Monument by …
determining effective methods to aid in the recovery of endangered Hawaiian monk seal.

Other information or background:

Section A - Applicant Information

1. Applicant

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

Title: Head, Hawaiian Monk Seal Research Program

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

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

Fax:

Email:

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/NOAA Fisheries/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):

Dr. Jason Baker, Biologist
Pacific Islands Fisheries Science Center, NOAA Fisheries, DOC

Dr. Robert Braun
Contract Veterinarian/Pacific Islands Fisheries Science Center, NOAA Fisheries, DOC

Dr. Gregg Levine
Contract Veterinarian/Pacific Islands Fisheries Science Center, NOAA Fisheries, DOC

Chad Yoshinaga, Biologist
Pacific Islands Fisheries Science Center, NOAA Fisheries, DOC

Jessie Lopez, Biologist
JIMAR/Pacific Islands Fisheries Science Center, NOAA Fisheries, DOC

Dr. Frances Gulland
Veterinarian, Marine Mammal Center, Sausalito California

Dr. Bud Antonelis, Biologist
Pacific Islands Fisheries Science Center, NOAA Fisheries, DOC

Thea Johanos-Kam, Biologist
Pacific Islands Fisheries Science Center, NOAA Fisheries, DOC

Brenda Becker, Biologist
Pacific Islands Fisheries Science Center, NOAA Fisheries, DOC

John Henderson, Biologist
Pacific Islands Fisheries Science Center, NOAA Fisheries, DOC

Other Biologists TBD

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:

Location will be the sand beaches and near shore habits of all islands specified, including sand beaches of all islets within the atoll complexes of Kure Atoll, Midway Atoll, Pearl & Hermes Atoll, and French Frigate Shoals. Most of the effort, however, will take place in these habitats at French Frigate Shoals, Lisianski/Laysan Island, and Nihoa 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:***
The Hawaiian monk seal is on a path to extinction that is unlikely to be altered without human intervention. This application presents tools for improving the survival of young seals, an essential requirement for averting extinction.

The total abundance of Hawaiian monk seals in the Northwestern Hawaiian Islands (NWHI), has declined by 70 % since the late 1950s. Since then, the six main sub-populations have experienced everything from periods of promising growth to catastrophic setbacks. The causes of decline have varied over time and from place to place, but since the early 1990s the decline has been driven, in large part, by poor juvenile survival. Many of these young animals have failed to thrive, and only about 1 of every 5 live to reach maturity, a situation largely due to insufficient food availability. The age structure of the population is therefore now unfavorable for future growth and the total population will inevitably fall below 1,000 individuals in just a few years.

The decline will continue and the conservation challenge will intensify unless scientists and managers, working together, develop the means to improve juvenile survival. History teaches us that the monk seal will continue to face new and unforeseen challenges in the future, but after two decades of poor juvenile survival, it is clear that this problem must be addressed. Improving juvenile survival is one of four key activities highlighted in the new Recovery Plan for the Hawaiian monk seal, published by NOAA in the summer of 2007:

- Improving juvenile survival through direct intervention such as providing captive care and feeding;
- Mitigating mortality due to entanglement in marine debris;
- Reducing shark predation on seal pups; and
- Ensuring growth of the small Main Hawaiian Islands seal population.

All of these critical recovery activities are being pursued by NOAA and its partners. The work proposed here focuses on direct interventions with juvenile seals to improve their survival.

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 ultimate goal of the work described here is to assist in the recovery of the Hawaiian monk seal, a goal that is 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 animal capture, transport, and instrument deployment, during which all personnel will adhere to strict quarantine protocols as defined by USFWS. Movements will be confined to the immediate beach area to avoid potential disturbance to bird and plant life on the island interiors. After the final tag deployment or adequate monitoring period, NMFS monk seal researchers will arrange to return to the NOAA R/V Oscar Elton Sette or other vessel, thereby reducing any human disturbance to terrestrial habitats and species by returning early.

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. Hawaiian monk seals are one of the most threatened of these cultural and natural legacies. The work presented here is critical for the survival of this species into the future., and it is our intent to undertake this work with respect and in partnership with the Native Hawaiian community, Accordingly, all scientists participating on these cruises will receive a Native Hawaiian cultural briefing from any individual or group 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 management agencies. The applicants are also willing to incorporate personnel from OHA or another organization into field teams when possible/appropriate to help avoid adverse impacts on cultural sites.

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.

The techniques proposed here to improve juvenile survival can only be applied to seals in the NWHI. This population, unlike seals in the MHI, is demonstrating a population decline and nutrionally stressed seals.

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 potential gain from this project is the increased survival of juvenile monk seals in the rapidly dwindling NWHI population. This work if successful and applied on a broader scale in the future could slow or stop the population decline.

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

All activities here are devised in a manner to minimize time in the field. Researchers will remain in the field for only the time necessary to handle, treat and monitor seals to a degree that ensures the success of the studies and actions proposed here. The work proposed here is also intended to occur in conjunction with population assessment camps already in place or replace additional foraging trips by using seals for multiple purposes (i.e. worming trial and foraging research).

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

The NOAA Fisheries monk seal program has been conducting monk seal research, monitoring and conservation activities for over 25 years. We have a great history of success in all aspects of handling, sampling, relocating, treating and housing monk seals.

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. However, we are waiting for the issuance of our Marine Mammal Permit which is necessary for this work to take place.

8. Procedures/Methods:

A range of prospective approaches for increasing juvenile survival have been identified, including:

- Bringing young animals into captivity for feeding and veterinary care, followed by release back into the wild
- Translocation of weaned pups/juvenile seals from areas of lower to higher expected survival
- Treatment of free-ranging young animals to reduce parasite loads

Based on past experience, scientific review, and detailed consultations with external specialists, these three general approaches have been identified as the interventions most likely to be successful. Some latitude is required in the application of these interventions because at any given time, the optimal approach will depend on a number of factors such as the relative survival among the different sites, the logistics of moving animals, the availability of favorable release sites and so on.

Captive Feeding Program

The Hawaiian monk seal program will collect, as appropriate, juvenile seals (0-3 years old) to feed, treat, and protect in captivity. Seals selected for this work will be those that are prematurely weaned, undernourished twins, or otherwise in a condition that without captive care and supplemental feeding will perish. Seals will be transported to and cared for at the Kewalo Research Facility in Honolulu, Hawaii with the intent to release them back at their natal site or Nihoa Island (see translocation section) in the NWHI.

On-site operations. Field operations will be needed to assess, capture, and hold animals that would benefit from interventions to improve their survival. Assessment of individual seals is a routine element of ongoing annual studies. Capturing seals is more complicated because juvenile animals, in particular, may be absent from the islands for weeks at a time. Therefore, on-site holding is almost always required because capture cannot be reliably timed to coincide with the arrival and departure of a transport vessel or aircraft.

Transport of animals from NWHI to MHI and return. As much as possible, captive care operations will be supported by existing vessel and aircraft activity associated with establishing and retrieving annual field camps. In the past, the U.S. Coast Guard, U.S. Navy, and U.S. Air Force have provided additional assistance opportunistically, and similar arrangements will be sought to minimize transportation costs. In spite of such welcome help, additional chartering of both vessels and aircraft may be necessary.

Release and post-release monitoring.
Releasing animals may require temporary holding facilities if a “soft release” method (i.e, gradual introduction to the release site) is used. Staff will be needed to provide care at the release site, as well as to release and monitor the animals’ acclimation. Monitoring will involve

observational assessment to gauge animal condition and health, as well as tracking movement and foraging patterns using well-established tagging technology. In many, if not most, cases, releases will be timed to take advantage of personnel, equipment, and support from concurrent field studies.

Examples of protocols for captive care activities are included in Appendices 1-5.

Translocation

One method for improving survival is to move a seal from a site where survival is low to a second site where survival is high, either with or without an intervening period of captive care. Selection of such sites is a challenge as survival rates are highly variable year-to-year and are difficult to predict. At present, none of the primary NWHI colonies has consistently exhibited high natural survival, so that methods to improve juvenile survival must be sufficiently flexible to adapt to dynamic conditions. As an alternative to release within the NWHI, Necker (Mokumanamana) and Nihoa Islands may prove to be suitable for release of seals. Though available data for these sites is sparse, beach surveys suggest that seal numbers are increasing at at Nihoa Island and stable at Necker Island. Furthermore, length and girth at weaning are higher at these two sties relative the rest of the NWHI. These are both strong indicators that ample food resources exist in the area around the Islands.

Based on these observations, we propose to relocate a small number of weaned seals from FFS to Nihoa Island as a pilot study. Seals that are selected for this study will undergo full biomedical sampling and will be instrumented with a satellite tag for post-release monitoring. Protocols for capture and translocation are as follows:

Weaned/Juvenile seals will be identified for translocation at FFS.

Seals will be captured 1-2 days prior to the arrival of a transport vessel (likely the NOAA RV Oscar Elton Sette).

Seals will be captured with a hoop net or stretcher net and transported to Tern Island where they will be held in a small shore pen or in transport cages.

Either during initial capture or while at Tern, seals will be sedated, biomedically sampled, and instrumented with satellite tags for post-release monitoring. Sampling will include:
a. Blood samples for total protein, packed cell volume, serum chemistry, and/or parasites and other desired considerations. Samples are also used by the monk seal Health and Disease Program.
b. Skin or blood for DNA identification and stable isotope analysis.
c. Fecal, nostril, eye, and genital swabs for health and disease screening.
d. Blubber biopsy for fatty acid and contaminant analysis.

Tagging involves placing or removing a physical tag either into tissue of the flipper, under the skin surface, or affixed to the fur of the individual seal. Tags will be of several types:

1. Passive tags:
a. External flipper tag (plastic);
b. Passive Integrated Transponder (PIT) tag injected under the skin that can then be electronically scanned;
c. Bleach mark or epoxy resin on the fur (alphanumeric identification bleached white or black)
2. Active Tags: Transmitters and Archival tags are attached to the dorsal pelage using a low exothermic epoxy resin.
a. Radio transmitter that either transmits globally using satellites or short-range using VHF frequencies attached to the fur. The tags used for this study will include a small VHF transmitter and a GPS Satellite linked dive recorder which will provide GPS quality foraging locations and dive behavior;

Seals in transport cages will be kept cool by being placed in a shaded area or wet down as necessary.

Cages will be transported individually on a small boat to the transport vessel.

Transport vessel will travel to Nihoa Island.

Due to sensitivity of culture/natural resources, lack of quality landing sites, and potential rough sea conditions, seals will be released offshore near the main monk seal beach at Nihoa Island. Necker Island may also be a site for release of relocated seals. Release sites will be determined at the time of release and will be guided by sea state and weather conditions.

Movement of mother-pup pairs over short distances may also be undertaken at FFS to minimize mortality of pups due to shark predation. Data suggests that pups generally do not suffer shark-induced injury or mortality for approximately the first week of life (NMFS unpublished data). It is unknown if this is due to increased maternal vigilance, a lack of precociousness in the pup or some other factor. NMFS biologists may determine that transport of mother-pup pairs from Trig Island or Round Island to Tern Island or East Island is necessary. Mothers will be captured using a hoop net or herded into a cage for transport. Pups will be carried in a stretcher net. Animals will be kept within in sight of each other to minimize distress. Animals will be held in a pen or other structure on the beach for several hours prior to release to ensure that the mother and pup are bonded.

Worming
Monk seals are known to host a variety of gastrointestinal parasites (Dailey et al. 1988, 2004). Reif et al. (2006) reported that young seals infected with Diphyllobothrium spp. (tape worms) tended to be in poorer body condition than those uninfected, and proposed that “intervention strategies to reduce the gastrointestinal helminth burdens in immature animals should be considered as a conservation measure.” To date, no studies have been conducted to evaluate the efficacy of anti-helminth treatment as a method to improve juvenile survival.

Parasites are likely not a primary cause of mortality in monk seals, however they may further compromise animals already in ill health due to food limitation, thereby increasing their likelihood of dying (Gulland 1992). Gulland et al. (1993) showed that anti-helminth treatment increased the probability of survival in Soay sheep during a period of high overall mortality associated with poor food supply. Because monk seals are likely exposed to parasites frequently through their prey, anti-helminth treatment will only relieve parasite burden for a limited time. This work, then, is designed to temporarily relieve compromised young monk seals of their parasite burden to improve their chances of survival in a food limited environment. Specifically, we will determine the potential for enhanced survival of 1 and 2 year old seals following a single treatment to reduce gastro-intestinal parasite load.

Before this technique is broadly applied we propose a small pilot study to test the efficacy of the worming technique. This study will focus on seals at Laysan or Lisianski Island, as these site have adequate numbers of animals and minimal mortality from confounding variables such as shark attacks. It will also reduce duplication of effort by working with the foraging research program. It will focus on juvenile seals up to two years of age (possibly up to age three), which is the age range exhibiting lowest survival. Further, only animals that have been weaned for at least 1 month will be considered to ensure that they have had ample exposure to parasites through feeding. As sex has been recognized to influence worm burden and its effects on the host in other mammals, to the greatest extent possible, the study will attempt to sex-match treated and control animals.

In order to test the hypothesis above, we will focus on animals that are most likely to be compromised by nutritional stress and parasites, but which are not moribund and unlikely to survive under any circumstances. Animals judged to be in medium to thin body condition will be selected. Very healthy, robust as well as emaciated moribund animals will be excluded.

Standard population surveys will be conducted to identify potential study subjects between 1 month post weaning to 2 years of age. Protocols for population surveys are included in the Hawaiian Monk Seal Field Manual, previously provided to the Monument for review. Assignment of individual seals to the control vs treatment groups will be by random selection or systematic assignment. All study subjects will be captured by hand and net, sedated, and feces collected for subsequent determination of parasite burden (voided feces or fecal sample via fecal loop stored in 10 % formalin), measured (axillary girth and dorsal standard length), tagged if necessary, and given an oral dose of praziquantal (Droncit, Bayer) at 5 mg/kg and 10 mg/kg fenbendazole (Panacur) or an equal volume of saline (controls), and released. They will also undergo the standard biomedical sampling.

The anti-helminth drugs selected for this study were chosen for their specificity to the target species (the chemicals act by dissolving the mouth parts of the parasites). Other chemicals are broad acting and can impact a large number of invertebrates in the marine environment.

A subset of these seals (up to 15) will be instrumented for post-monitoring to determine over-winter survival and to supplement foraging research efforts.

Post treatment condition will be determined by post-treatment observation (min 10 days), and assays of fecal egg counts in voided fecal samples collected 1-3 weeks post treatment. Subsequent survival will be determined through visual re-identification during regular monk seal population assessment field research, which typically occurs during June through August. If possible, survivors will be recaptured as above, measured and re-sampled for parasite burden. If recapture is not possible, then visual assessment of condition will be recorded (using standard MMRP subjective body condition scoring, med/thin/emaciated with +/- designations) and scat samples will be collected and preserved for detection of parasites. Differences in survival will be assessed based on both within-season survival and survival to the start of the subsequent field season.

The primary statistical analysis will consist of modeling survival (either with capture-recapture or logistic regression) of treatment and control animals to determine whether there is evidence that anti-helminth improves survival. Initial parasite load will be modeled as a covariate. Additional analysis will include comparison of body condition change of treated versus control animals as well as comparison of parasite loads at the first and second sampling for both groups. Parasite load in live animals will be estimated from fecal egg count (recognized as a measure of parasite fecundity combined with worm burden and host immunity). For dead animals, parasite load will be estimated by absolute worm count. Sample sizes will likely be limited by the number of available juveniles that meet the selection criteria for inclusion in the study. Unless the treatment effect is very large, the study may need to be carried out in multiple years or sites to draw definitive statistical conclusions. The study may be facilitated by conducting it in conjunction with other research involving capture and handling of juvenile monk seals (e.g., foraging and health screen studies).

Note: All projects above that require small boat operations will ensure that anchoring of boats will be done only in rubble or sand habitats and will avoid damaging coral reef structure.

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 monk seal

Scientific name:

Monachus schauinslandi

& size of specimens:

Captive Care

An unknown number of seals, but likely less than 4, may be brought to the MHI for captive care. During this time they will be biomedically sampled multiple times to monitor their health and condition. Protocols for sample collection are included in the Hawaiian Monk Seal Field Manual, previously provided to the Monument for review.

Worming Trial

Up to 30 juvenile seals (ages 1 month - 2 years) will be captured, sampled and treated for the parasite study. Of these 15 will be controls that will be sampled and treated with saline and 15 treatment seals will be sampled and treated with anti-helminth drugs.

30 feces collected for subsequent determination of parasite burden (voided feces or fecal sample via fecal loop stored in 10 % formalin),

30 measurements of morphometrics (axillary girth and dorsal standard length),

30 x 2 (per animal) blubber biopsies (approx. 0.6 cm diameter, 2-3 cm in length)

30 blood samples (up to 90 mL)

30 swabs x 5 orifices (anal, genital, mouth, nose, eye)

100 Scats opportunistically collected on beach

Up to 30 x 2 skin plugs from flipper tagging

There is also the possibility of conducting necropsies on any dead seals found during research activities. The type and number of samples collected during necropsies varies depending on the condition of the carcass. A necropsy protocol that highlights the potential tissues that may be collected from dead monk seals can be provided upon request, though tissues could include: samples from all major organs, skin, muscle, blood, blubber, hair, bone and other. These types of activities are covered under our monitoring permit.

Translocation of Weaners

Up to 10 juvenile seals will be captured, sampled, and translocated from FFS to Nihoa Island. Seals will undergo biomedical sampling and instrumentation.

10 measurements of morphometrics (axillary girth and dorsal standard length),

10 x 2 (per animal) blubber biopsies (approx. 0.6 cm diameter, 2-3 cm in length)

10 blood samples (up to 90 mL)

10 swabs x 5 orifices (anal, genital, mouth, nose, eye)

10 x 2 skin plugs from flipper tagging

Collection location:
Captive Care
Potentially any of the 6 main sub-populations in the NWHI as this an opportunistic effort.

Worming Trial
Laysan or Lisianski Island

Translocation
French Frigate Shoals

☒ Whole Organism ☒ Partial Organism

9b. What will be done with the specimens after the project has ended?
Samples will be analyzed in a timely basis upon return to Honolulu. All samples collected and not analyzed during this project (i.e. duplicate blubber for fatty acids, skin for genetics) will be stored at the PIFSC or Bishop Museum for future analysis.

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

• General site/location for collections:
Captive Care - Kewalo Research Facility, Honolulu, 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?

They may be kept with other monk seals.

• Will organisms be released?

Yes. All monk seals captured in this study will be released either at Nihoa/Necker Islands or their site of collection.

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

All samples collected within the monument will be transported out on the NOAA/RV OES. Blubber and some other tissue samples will be stored in a liquid nitrogen dewar and/or in ethanol. Skin plugs from monk seals and may be stored in DMSO prior to freezing. Fecal samples are stored in buckets and later frozen on the vessel.

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

Currently NOAA Fisheries is the only group researching Hawaiian monk seals, thus eliminating duplicative research. However, we have several partners aiding us in the analysis of our samples and data. These include: Bishop Museum, University of Hawaii Manoa and Hilo, UH Hawaii Institute of Marine Biology, the Marine Mammal Center, Southwest Fisheries Science Center, Scripps Institute of Oceanography and Dalhousie University, Canada. The work in this application is designed to reduce presence in the field and the number of animals used by coupling programs. For instance, seals taking part in the worming trial will provide data for foraging research eliminating the need for dual projects.

Data collected during this study will also be provided to the Monument to aid with their management objectives.

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

Communications

	Radios/GPS
3	VHF radios
2	VHF battery charger
1	GPS w/ spare set of batteries
1	Fixed mount radio for office tent
1	Radio antenna for office tent
1	clear case for GPS
1	Garmin GPS for zodiac
	Sat Phone
1	Satellite Phone
2	sat phone charger (AC and DC, 1 ea/phone)
1	phone to computer chord (1/phone)
1	extra batteries

1	mast antenna
1	PVC pole to mount mast antenna
1	phone card adapter

Power Systems

1	Solar Panel Unit (includes two panels w/ hardware)
1	Solar Panel Mounting PVC Pole
1	Solar Panel Mounting Bracket and bolts
3	12 Volt battery
8	Battery cables (4 red, 4 black)
1	~6 f wire for direct solar to battery connection
3	Cig. lighter (female) to Battery connections
1	Power Box / Regulator
1	Cig. lighter (female) to Power Box connections
2	DC to AC Inverters

Spare Parts:

assort.	Electrical Connections (Butt ends, ring terminals..)
misc.	Shrink wrap 3/8 ", 1/4"
2	Cig. lighter Sockets
12	Fuses 'car fuse' (10, 15 AMPS - 6 ea)
4	Perko plugs (2 female, 2 male)
5	Fuses for tent radio (250V/6A)
1	voltmeter

Data and Tagging

3	Metal clipboards
1	Thermometer
3	camelbacks
4	Dry bags - 3 small, 1 large yellow
2	Bottles for Alcohol & Betadine
1	File, Round -for sharpening punch tips
2	Leather Punch
7	Leather Punch, Replacement Tips
2	Nail Brush
10	Pit Tags and 4 punches
40	Q-Tips
1	Soap, Waterless Antibacterial (large size)
3	Personal size, waterless antibacterial soap
1	Spray Bottles for bleach
1	Tag Reader
8	Tag Reader, AA Batteries
1	Tape Measure
1	Tupperware for Pit Tag
1	Tweezers for tissue plugs

3 Bleach Dispensing Bottles w/ lines

2 Backpacks (1 Large / 3 Daypacks)
2 Hoop net and poles
hoop net: 3 poles, 1 connector
1 Streacher net
8 Coveralls
8 Gloves
2 Kneepads
1 scale
1 weighing pole
tagsEmergency Equipment
1 Emergency Pelican
2 Generators
1 Generator supply bucket
1 Grey Tool Kit
1 debris tool bucket
3 Binos
3 Cameras w/accessories
1 First off bucket
1 tent repair kit
1 PHR Zodiac and gear
1 FFS whaler (or new Avon) and gear
2 boat tool kits
1 office supplies

Kitchen Supplies
1 Coleman Kitchen Table
1 Drinking Jug, 5 gal
1 Stove, cast iron
1 Oven, collapsible
3 Propane regulator & hose (Stove)
2 Fire Extinguisher
30 Water Jugs, 6 gal
20/10 Trash bags, Large / Xlarge
50 Ziplock bags, S / M / L (50 ea.)
1 Foil
1 Plastic wrap
3 Hot pads
4 Dish towels
2 Paper towels
5 Scrubbies & Sponges (misc)
1 Kitchen Action Packer
8 sets dishes, cups, utensils
Living Amenities

8	Foam pads
8	Sleeping bags
8	Pillows
8	Sand chairs
4	Seat cushions
1	Toilet seat
3	Tarp, Large
3	Tarp, Medium
1	Lg. Broom w/ dustpan
1	Whisk broom w/ dust pan
1	Dry erase board
4	Tables, 2 med, 2 lg
1 set	1/2" Plywood for latrine (3 sides, 1 top)
8	Towels Sets: Bath Towel/Face Cloth (2 sets/ per)
30	Toilet paper (1 roll/3 days)
5 lbs	Lime for L.D.
2	propane lantern
1	lantern tree
5	fluorescent lanterns
20	lantern batteries
3	Sunscreen, SPF 30, 6 oz. (.5/per/wk)
5	Sunscreen, SPF 50, 6 oz. (.5/per/wk)
2	Joy liquid soap
5	Campsuds, 16 oz (.2/per/wk)
3	Flashlights
6 sets	Flashlight batteries
5	Lighters
2	Matches 250/box
2 pkg	Clothes pins
3	fly swatters
2	ant traps

Medication

1	O2 Kit
1	IV Kit
1	Crash Kit
1	Large Med pelican

Tents (per camp…i.e. at Laysan)

1	Large 9' x 13' tent
1	Large Fly 13' x 21'
1	Ridge pole (1 / tent + spare)
4	Ridge pole support (2 / tent + spare set)
24	Wall poles 5' (12 / tent + spare set)
6	Extendable aluminum poles

40 Set of stakes for tent/fly (40 / tent)
1 Small 8 x 8 tent
1 Small Fly
1 Ridge pole
2 Ridge pole support
8 Wall poles
20 Set of stakes for tent/fly (20 / tent)
4 small pup tents

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

MSDS for all chemicals will be provided if necessary

HAZMAT
MEDICAL/SAMPLE STORAGE
500 mL DMSO
1 L Ethanol
5 L Liquid Nitrogen
500 mg Paziquantal (Droncit, Bayer)
500 mg Fenbendazole (Panacur)
1 L 10% Formalin

FLAMMABLES
Boating
1 Corrosion Block
1 Epoxy Cement
2 EZ Store Fuel Stabilizer
1 Boat Oil
2? Gas, 55 gal drums
1 Grease, Silicon
2 Marine Sealant / Silicon Sealer
1 Marine Tex
1 gal Ospho Rust Remover
1 Permatex
1 Resin
1 Silicone Lubricant
2 WD-40/LPS
Generator
1 Carburator Cleaner
1 Lead Substitute
2 Motor Oil, Quart (SAE 10W-40)
Propane
1 Propane tank, 40 lb

1	Propane tank, 20 lb
2	Propane tank, 1 lb
	Insecticide
2	Tick Repellant
1	Insecticide
3	Bug bombs

Tagging
500 mL Epoxy for tags
500 mL acetone

	Animal Handling
20	Clorox
50	Developer, Clairoxide 20 Vol.
	Instant Whip
	Lightening Activators (envelopes)

1	SPILL KIT

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

No permanent fixed installations will be set in the monument for this work.

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

Data collected via satellite tags will not be analyzed until all the tags have stopped transmitting or have been recovered. This could be up to 6-8 months from the time of deployment. After all the data is collected foraging information will be analyzed and summarized.

Tissue samples will be analyzed at different times. Feces, blubber and other tissues used for diet analysis will be processed and logged within one month of return to Honolulu. They will then be distributed to the appropriate lab for analysis. Other samples should be analyzed within 6 months of collection depending on the workload of partner and contract laboratories. An important point to emphasize is that we do have partners in place to analyze samples and interpret resulting data.

Publication of results will not occur until after at least two field seasons and will likely extend through 2010.

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

The following is a list of publications that are relevant to the work being proposed and many are authored by those listed under this permit application:

Hawaiian Monk Seal Recovery Plan

Antonelis GA, Baker JD, Johanos TC, Braun RC, Harting AL 2006. Hawaiian monk seal (Monachus schauinslandi): status and conservation issues. Atoll Res. Bull. 543: 75-101

Abernathy, K. J. 1999. Foraging ecology of Hawaiian monk seals at French Frigate Shoals, Hawaii. M.S. Thesis, Univ. of Minnesota, Minneapolis, MN, 65 p.

Antonelis, G.A., J.D. Baker, and J.J. Polovina. 2003. Improved body condition of weaned Hawaiian monk seal pups associated with El Niño events: potential benefits to an endangered species. Marine Mammal Science 19(3): 590-598.

Baker JD, Harting AL, Johanos TC 2006. Use of discovery curves to assess abundance of Hawaiian monk seals. Mar. Mamm. Sci. 22(4): 847-861

Baker, J. D. and T. C. Johanos. 2004. Abundance of the Hawaiian monk seal in the main Hawaiian Islands. Biological Conservation. 116: 103-110.

Baker, J. D., and T. C. Johanos. 2002. Effects of research handling on the endangered Hawaiian monk seal. Mar. Mammal Sci. 18:500-512.

Baker JD, Littnan CL, Johnston DW 2006. Potential effects of sea level rise on the terrestrial habitats of endangered and endemic megafauna in the Northwestern Hawaiian Islands. Endang. Species Res. 4:1-10

Baker JD, Thompson PM 2007. Temporal and spatial variation in age-specific survival rates of a long-lived mammal, the Hawaiian monk seal. Proc. R. Soc. Lond. B. 274(1608): 407-465

Bowen, D. 2001. Review of the Population Assessment of the Hawaiian Monk Seal. External peer review prepared for the University of Miami Independent System for Peer Reviews. 12 February 2001. 13 p.

Caretta JV, Forney KA, Muto MM, Barlow J, Baker J, Lowry M, Hanson, B and Muto, MM 2007. Draft U.S. Pacific Marine Mammal Stock Assessments: 2005. U.S. Dep. Commer., NOAA Tech. Memo. NOAA-TM-NMFS-SWFSC-xxx (in draft)

Fyler CA, Reeder TW, Berta A, Antonelis G, Aguilar A, Androukaki E 2005. Historical biogeography and phylogeny of monachine seals (Pinnipedia: Phocidae) based on mitochondrial and nuclear DNA data. J. Biogeogr. 32(7): 1267-1279

Goodman-Lowe, G. D. 1998. Diet of the Hawaiian monk seal (Monachus schauinslandi) from the Northwestern Hawaiian Islands during 1991-1994. Marine Biology 132:535-546.

Goldstein T, Gulland FMD, Braun RC, Antoneli GA, Kashinsky L, Rowles TK, Mazet JAK, Dalton LM, Aldridge BM, Stott JL 2006. Molecular identification of a novel gamma herpesvirus in the endangered Hawaiian monk seal (Monachus schauinslandi). Mar. Mamm. Sci. 22(2): 465-471

Harting, A. L. 2002. Stochastic simulation model for the Hawaiian monk seal. Ph.D. Dissertation. Montana State University, Bozeman, MT, 328 p.

Johanos TC, Baker JD 2002. The Hawaiian monk seal in the Northwestern Hawaiian Islands, 2000. U.S. Dep. Commer., NOAA Tech. Memo. NOAA-TM-NMFS-SWFSC-340, 125 p.

Johanos TC, Baker JD 2001. The Hawaiian monk seal in the Northwestern Hawaiian Islands, 1999. U.S. Dep. Commer., NOAA Tech. Memo. NOAA-TM-NMFS-SWFSC-310, 130 p.

Johanos TC, Baker JD 2000. The Hawaiian monk seal in the Northwestern Hawaiian Islands, 1998. U.S. Dept. of Commer., NOAA Tech. Memo. NOAA-TM-NMFS-SWFSC-292, 125p.

Johanos TC, Baker JD 2004. The Hawaiian monk seal in the Northwestern Hawaiian Islands, 2001. U.S. Dep. Commer., NOAA Tech. Memo. NOAA-TM-NMFS-PIFSC-1, 134 p.

Johanos TC, Baker JD 2005. The Hawaiian monk seal in the Northwestern Hawaiian Islands, 2002. U.S. Dep. Commer., NOAA Tech. Memo. NOAA-TM-NMFS-PIFSC-5, 154 p.

Littnan, C.L., J.D. Baker, F.A. Parrish, and G. J. Marshall. 2004. Evaluation of possible effects of video camera attachment on the foraging behavior of immature Hawaiian monk seals. Mar. Mamm. Sci. 20:345-352.

Longenecker K, Dollar RA, Cahoon MK 2006. Increasing taxonomic resolution in dietary analysis of the Hawaiian monk seal. Atoll Res. Bull. 543: 103-113

MacDonald, C. D. 1982. Predation by Hawaiian monk seals on spiny lobsters. J. Mammal. 63:700.

Marine Mammal Commission. 2002. Hawaiian monk seal program review, Honolulu, Hawaii, 15-17 April, 2002. U.S. Mar. Mammal Comm., Bethesda, MD., 33 p.

Parrish, F.A., Boland, R.C. 2004. Habitat and Reef-Fish Assemblages of Bank Summits in the Northwestern Hawaiian Islands. Mar Bio. 144:1065-1073.

Parrish, F. A., K. Abernathy, G. J. Marshall, B. M. Buhleier, 2002. Hawaiian monk seals (Monachus schauinslandi) foraging in deepwater coral beds. Mar. Mamm. Sci. 18:244-258.

Parrish, F. A., M. P. Craig, T. J. Ragen, G. J. Marshall, and B. M. Buhleier. 2000. Identifying diurnal foraging habitat of endangered Hawaiian monk seals using a seal-mounted video camera. Mar. Mamm. Sci. 16:392-412.

Parrish, F. A., G. J. Marshall, C.L. Littnan, M. Heithaus, S. Canja, B. L. Becker, R. C. Braun, and G. A. Antonelis. 2005. Foraging of juvenile monk seals at French Frigate Shoals, Hawaii. Marine Mammal Science 21(1):93-107.

Ragen TJ 1993. Status of the Hawaiian monk seal in 1992. Southwest Fish. Sci. Cent. Admin. Rep. H-93-05, 79p.

Reif JS, Kliks MM, Aguire AA, Borjesson DL, Kashinsky L, Braun RC, Antonelis GA2006. Gastrointestinal helminths in the Hawaiian monk seal (Monachus schauinslandi): associations with body size, hematology, and serum chemistry. Aquat. Mamm. 32(2): 157-167

Siniff, S. 2001. Population Assessment of the Hawaiian Monk Seal. External peer review prepared for the University of Miami Independent System for Peer Reviews. 15 February 2001. 15 p.

Stewart, B. S. 2004a. Geographic patterns of foraging dispersion of Hawaiian monk seals (Monachus schauinslandi) at the Northwestern Hawaiian Islands. Pacific Islands Fisheries Science Center Admin. Rep. H-04-05C.

Stewart, B. S. 2004b. Foraging ecology of Hawaiian monk seals (Monachus schauinslandi) at Pearl and Hermes Reef, Northwestern Hawaiian Islands: 1997-1998. Pacific Islands Fisheries Science Center Admin. Rep. H-04-03C.

Stewart, B. A., G. A. Antonelis, J. D. Baker, and P. Y. Yochem. In press. Foraging biogeography of the Hawaiian monk seal in the Northwestern Hawaiian Islands. Third NWHI Scientific Symposium, Honolulu, Hawaii. Atoll Research Bulletin.

Stewart, B. S. and P. K. Yochem. 2003. Dispersion and foraging ranges of Hawaiian monk seals (Monachus schauinslandi) near Lisianski and Midway Islands: 2000 & 2001. HSWRI Technical Report 2003-322: 1-106.

Stewart, B. S., and P. K. Yochem. 2004a. Dispersion and foraging of Hawaiian monk seals (Monachus schauinslandi) near Lisianski and Midway Islands: 2000-2001. Pacific Islands Fisheries Science Center Admin. Rep. H-04-04C.

Stewart, B. S., and P. K. Yochem. 2004b. Use of marine habitats by Hawaiian monk seals (Monachus schauinslandi) from Laysan Island: Satellite-linked monitoring in 2001-2002. Pacific Islands Fisheries Science Center Admin. Rep. H-04-02C.

Stewart, B. S., and P. K. Yochem. 2004c. Use of marine habitats by Hawaiian monk seals (Monachus schauinslandi) from Kure Atoll: Satellite-linked monitoring in 2001-2002. Pacific Islands Fisheries Science Center Admin. Rep. H-04-02C.

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