

Papahānaumokuākea Marine National Monument
CONSERVATION & MANAGEMENT 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.

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 Fisheries

Permit Category: Conservation & Management

Proposed Activity Dates: 5/1/2017 - 4/30/2018

Proposed Method of Entry: NOAA RVs Oscar Elton Sette and Hi'ialakai, possibly Searcher and Kahana

Proposed Locations:

Hawaiian monk seal research and recovery efforts will occur across all islands, islets and atolls in the Northwestern Hawaiian Islands. Work will be done predominantly on the shoreline of each island/islet.

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

25

Estimated number of days in the Monument:

150

Project Title: Hawaiian Monk Seal Conservation and Research Activities

Description of Proposed Activities: (complete these sentences):

a.) The proposed activity would...

supporting priorities identified in the Papahānaumokuākea Marine National Monument Management Plan (December 2008, hereinafter referred to as MMP); specifically Priority Management Needs: 3.2 Conserving Wildlife (Hawaiian monk seals), and 3.3 Reducing Threats to Monument Resources (Hawaiian monk seals), as well as the Co-Trustee's Conservation & Management Activity: Natural Resource Protection, as listed in section 6.3 of that Monument permit application.

NOAA aims to accomplish natural resource protection related to monk seals by conducting "...management actions to promote the conservation of Monument resources which includes activities necessary to carry out protection of species, such as carrying out existing recovery plans" to fulfill our obligations under the Endangered Species Act and the Hawaiian Monk Seal Recovery Plan (NMFS 2007).

b.) To accomplish this activity we would...

be the continuation of three decades of effort to understand the biology, ecology and population trends of monk seals and identify threats to the species and implement actions to mitigate those dangers.

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

conduct population assessment and monitoring efforts across the NWHI archipelago in particular during the summer field camp season. Simultaneously we will collect information on the health, ecology and biology of monk seals and threats to the species and use these data to develop, implement and assess a multitude of recovery activities.

Recovery activities would include, but are not limited to, translocating seals away from danger and to areas of great survival, rehabilitation of undernourished seals, disentanglement from marine debris, mitigation of shark predation risks to pups at French Frigate Shoals, removal of marine debris, vaccination against morbillivirus, reuniting mothers and pups, and more.

Other information or background:

This is a brief summary of information relevant to monk seal research and recovery initiatives proposed here. More information can be found in the attached Recovery Plan for the Hawaiian Monk Seal.

- The Hawaiian monk seal is an endangered species numbering approx 1,300 individuals, 1,100 seals reside in the NWHI.
- The Hawaiian monk seal has been the focus of research and recovery activities for over 30 years. This has resulted in one of the most robust population datasets for a large mammal species allowing the Program to develop and assess cutting edge recovery actions.
- These recovery activities have resulted in the fact that a minimum of 28% of Hawaiian monk seals alive today are here because they directly benefited from an action or are the offspring of a female seal that benefited.
- In the PMNM, the key threats to the survival of the species include low birth rates combined with poor survival of juvenile Hawaiian monk seals to reproductive age. The majority of research activities are directed to understanding threats to the seals and mitigating those, particularly related to young female seals.
- All activities proposed here are permitted by the NOAA MMPA/ESA Permit 16632-01 (and associated NEPA docs etc.) and/or the Revised Recovery Plan for Hawaiian Monk Seals.
- This permit also supports effort conducted by our State and Federal partners that are directed towards monk seal research and recovery.

- This permit is comprehensive and includes ALL monk seal recovery activities that occur in the Monument including the predation by Galapagos sharks on monk seal pups at French Frigate Shoals (FFS); the primary source of seal mortality at FFS.
- Predation peaked in 1997-1999; it continues at a rate of 5-11 pups per year from 2000-2014 (usually 15-25% of the pup cohort each year).
- Between 1997 and 2014, shark predation affected approximately 250 pups out of roughly 1000 born at FFS. Sharks have killed many pups and others were permanently maimed by severe shark bites and subsequently died.
- Since 1997, NMFS has engaged in a variety of actions to address this threat, including pre-weaning and translocating pups, predator deterrents, and targeted fishing activities to remove problem G. sharks.
- Despite the suite of activities (e.g. deterrents of many kinds) implemented by NMFS, the monk seal population in the NWHI, and particularly at FFS, has continued to decline.
- Removing the sharks exhibiting this behavior from the environment is the most effective means of preventing continued predation.
- NMFS has consulted numerous stakeholders including Native Hawaiians, animal welfare groups,

conservation professionals, and the general public. Opinions and concerns are varied between individuals but no external group has requested NMFS cease this activity.

- This activity has been approved and undertaken safely and respectfully almost every year since 2010.

- Successful removal of these individuals could have a profound effect on the monk seal population at French Frigate Shoals while having negligible impact on the G. shark population.

Section A - Applicant Information

1. Applicant

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

Title: Supervisory Research Ecologist

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

,

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

[Redacted mailing address]

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

Phone:

Fax:

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

NOAA Fisheries

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):

Stacie Robinson, Scientist
 Jessie Bohlander, Scientist
 Michelle Barbieri, Veterinarian
 Michael Burns, Scientist
 Angie Kaufman, Scientist
 Brenda Becker, Scientist
 Mark Sullivan, Scientist
 Thea Johanos, Scientist
 Tracy Mercer, Scientist

Section B - Project Information

5a. Project location(s):

Ocean Based

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

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

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

Location Description:

Hawaiian monk seal research and recovery efforts will occur across all islands, islets and atolls in the Northwestern Hawaiian Islands. Work will be done predominantly on the shoreline of each island/islet.

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:*

All activities described in this application are directed towards understanding the biology, ecology, and population dynamics of the Hawaiian monk seal and identifying factors that impact the survival and recovery of the species. All of this information is then compiled to develop, implement, and assess the recovery actions described in this application.

*Considering the purpose of the proposed activities, do you intend to film / photograph federally protected species?

Yes No

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

<http://www.fws.gov/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?

All monk seal conservation and management activities conducted by the permit applicants will be carried out with strict safeguards for the natural, cultural and historic resources of the Monument as required by Presidential Proclamation 8031, and other applicable law and agency policies and standard operating procedures. All agencies have field protocols and best management practices. These practices and procedures will minimize or eliminate disturbance to wildlife, flora, habitats, and cultural and historic resources.

We have a rigorous training that all field staff undergo before being deployed to seasonal field camps. This includes monk seal based activities but also how to safe guard and minimize impacts to other natural and cultural resources. This will be further supported by undergoing resource manager training by key field staff.

Additionally, pre-access permit and cultural briefings will be conducted for all new personnel entering the Monument and annually for all.

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?

Our Program has been conducted monk seal research and conservation activities in the NWHI for decades. We have a large presence in the NWHI with the potential to negatively impact a number of cultural and natural resources. We have worked hard over the decades to develop and refine our protocols to minimize the amount of time and impact on these resources as well as follow other established protocols.

For new and particularly sensitive activities we direct considerable energy to share information with our Monument partners on the need and justification for each activity. For example for the shark predation mitigation work that has been permitted multiple times and is included in this project we consulted extensively with our MMB and native Hawaiian partners.

There has been extensive consultation with the Native Hawaiian community on this and many other Hawaiian monk seal research and conservation efforts since initiating this series of predation mitigation strategies in 2010. In 2010 -2011, we consulted with and received quality input from OHA and the Monument's Native Hawaiian Cultural Working Group (NHCWG). The feedback from the NHCWG and others was not homogenous with a diverse array of perspectives and opinions both supporting and opposing the activity. The NHCWG determined it was unable to offer an endorsement or censure of the proposed management activity and has not reviewed the activity since. We are looking forward to providing any information to the NHCWG at their request in the future.

Discussions with other members of the Hawaiian community have resulted in constructive feedback and improved understanding of the views of some representatives of the Native Hawaiian community on our proposed work. From these meetings, we also supported the participation of a number of Native Hawaiians in our shark predation mitigation work in 2010 and 2011.

In 2013 with the addition of seal flesh as bait, we were encouraged by the State of Hawaii Board of Land and Natural Resources to communicate with, and be responsive to, stakeholders regarding this activity. We alerted approximately 35 organizations and

individuals about our field activities during the 2013 field season (including shark fishing) and updated them on our plans for the 2014 season. To date, none of these entities has expressed questions or concerns.

We also undertook consultations regarding the use of tissue from previously deceased monk seals as bait with several Native Hawaiians with whom we have been working with on other monk seal issues. In this regard, we have held one-on-one discussions

with several individuals (cultural practitioners, partners, and/or advisors). Input we received during these one-on-one discussions ranged from full support and understanding to acceptance without expressed support. No one we have spoken with regarding the use of seal tissue has voiced opposition or indicated that the use of seal tissue as we have proposed would adversely affect their productive relationships with our program or otherwise diminish their support for monk seal conservation. The overarching sentiment we have heard has been that as long as the seals would be dead of a cause beyond our control (which would be the case), using their bodies to try to

save a still living seal, while admittedly difficult to consider or undertake, would be a reasonable effort in light of the endangered status of the monk seal population.

To safeguard the ecological integrity of the Monument, we propose to limit the scope of our removal actions as described above and also to avoid by-catch of any other wildlife to the greatest degree possible. Possible adverse effects on the coral reef ecosystem

at FFS from shark removals were investigated using the EcoSim model (Parrish, unpublished data). Results from that work indicated that the removal of 20 sharks had a nearly imperceptible effect on the dynamics of the FFS ecosystem.

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.

There is not a practicable alternative location to the proposed activity outside of the Monument because this threat to the recovery of the endangered Hawaiian monk seal has only been identified in the Monument. While a small portion of the monk seal population lives outside of the Monument, in the MHI, the species will not likely avoid extinction without a healthy population in the NWHI. Recovery requires at least 2900 seals in the NWHI with at least 5 of the 6 main sub-population above 100 individuals and increasing.

Specifically related to the shark predation mitigation component of these recovery activities: FFS shark predation must be mitigated to recover the FFS population. Losing a high number of pre-weaned and newly weaned pups to shark predation is a unique phenomenon at French Frigate Shoals only; therefore, we propose to manage this threat at this location only. We have tested other practicable alternatives (deterrents etc.) and they have not worked. We have taken this focused and targeted approach to maximize the limited federal resources and minimize adverse impacts to other Monument resources by conducting the shark removal activities at 4 of the 9 islets at FFS.

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 intent of all activities are to foster the recovery of the iconic and endangered Hawaiian monk seals. Many safeguards are in place to minimize the potential for negative impacts to the natural and cultural resources of the Monument (i.e. biosecurity measures). To date our recovery activities have had a significant benefit to the monk seal population and expect this will continue into the future.

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

This is a conservation permit for Hawaiian monk seals and covers activities that might need to be undertaken year-round as necessary. The majority of the work, however, is targeted from May to September to overlap with the primary breeding season for the species.

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 Hawaiian Monk Seal Research Program has been undertaking monk seal conservation and research activities in the Northwestern Hawaiian Islands since the early 80's. We have a long history of successful operations in the area and demonstrated measurable positive impact for the population.

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.

Funding from US Federal Government.

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.

Everything we are proposing in this permit has been assessed and approved in previous permits. We work hard to adhere to all Monument BMPs and regulations that overlap with our activities. We operate in areas related to our work to minimize impacting any other resource unnecessarily and many of our activities provide benefits to other resources (i.e. debris removal, entrapment walks, etc.)

i. Has your vessel been outfitted with a mobile transceiver unit approved by OLE that 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.

All other necessary permits and approvals have been acquired for this work and applicants have been in compliance with previous PMNM permits.

8. Procedures/Methods:

The following list of activities is intended to promote the recovery of the Endangered Hawaiian monk seal at any or all breeding sites in the NWHI. For more information about these activities please review attached document MMPA/ESA Permit 16632-01. Activities may include:

A) Conservation Research Activities

i. Population Monitoring.

a. Conducting seal assessments by visually identifying animals, marking animals, flipper tagging, pit tagging and other techniques approved under MMPA/ESA permit 16632-01 will occur across the NWHI.

b. Deploying field staff in camps for months at a time at French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, and Kure Atoll. Short duration stays at Midway will be coordinated with USFWS.

c. Instrumentation of seals for post release monitoring or understanding ecology and behavior of monk seals will include seal mounted cameras, telemetry tags or other technology approved under MMPA/ESA permit 16632-01.

d. Other monk seal directed research as needed and authorized by MMPA/ESA permit 16632-01. All projects will be captured as a memo to file to ensure PMNM MMB is informed of all monk seal conservation research activities.

B) Recovery Interventions

i. Disentanglement of monk seals from marine debris;

ii. Health response, including but not limited to cutting umbilical cords, lancing abscesses, administering antibiotics, vaccinating animals and responding to disease outbreaks, and necropsy;

iii. Anthelmintic treatment ('deworming') by field staff, which may include monitoring to detect improvement in body condition of treated seals versus control seals. Anthelmintic medications may include various cestodocides and nematocides (e.g. praziquantel, fenbendazole, ivermectin, emodepside) applied via various routes (e.g. oral, injectable, topical);

iv. Translocation, consisting of the following types:

a. Intra-atoll: These translocations will include moving seals from areas of high risk where threats are imminent to safer areas, and moving pups to promote maternal fostering when necessary. Field staff will perform these movements; greater resources (e.g. veterinarian care) will not typically be necessary.

b. Inter-atoll: These translocations will include transport of weaned female pups from atolls/islands of low survival to those of higher survival.

c. MHI – NWHI: These translocations will include transport of main Hawaiian Island (MHI) seals that are considered a threat to themselves or humans because they have demonstrated a pattern of interacting with humans.

d. NWHI-captive care: Seals may be taken into temporary captivity for treatment at appropriate, federally permitted rehabilitation facilities in the MHI for release back in the NWHI (i.e. permitted for captive care of injured, ill or prematurely weaned seals) (see below).

e. Aggressive male seal translocations to areas with no pups or juveniles (see below);

v. Reunion of nursing mothers and pups, when separated (includes instances of pup switches);

vi. Mitigation of male aggression towards pups and juveniles (individual and multiple male-based aggression), including utilizing all federally permitted techniques (including, but not limited to, poles, rocks, slingshots and air horns). Mitigation tools will be applied as appropriate for the given context (i.e. the intensity, severity and frequency of aggression and the location, with regard to other species in the area such as birds). Mitigation may include temporarily separating males from juveniles by placing either in temporary shore-pens (see below). Mitigation also may include removal of the male(s) from the area by:

a. Translocation to a location where no pups or juveniles will be harmed;

b. Placement in an appropriate, federally permitted facility that is agreeable and permitted to care for a male indefinitely; or

c. Lethal removal; this type of removal will only be applied when the above two options are not feasible, possible or exhausted. The preferred technique for euthanasia will be via physical means (e.g. firearm, captive bolt, etc.), in order for the carcass to remain in PMNM and for culturally appropriate and environmentally proper disposal to occur. When necessary, chemical euthanasia and removal of the carcass from PMNM will be allowed;

vii. Rehabilitation and care of compromised seals to administer veterinary care and/or food supplementation. Captive care may include the capture and transport of seals to shore-pens (in the NWHI) or facilities in the MHI. We will aim to return NWHI seals under care in the MHI to the NWHI when a licensed veterinarian deems them rehabilitated and transport is feasible. The seals will then be released to the NWHI site deemed most appropriate for their subsequent survival (determined on the basis of such factors as the intensity and severity of imminent threats to the seals and recent survival trends at each atoll/island);

viii. Monitoring shark activity at French Frigate Shoals. Monitoring may include camping on islets with shark incidents on nursing pups and recording shark activity and shark-seal interactions via hand-held or mounted cameras (cameras will be mounted on a pole 15' or less with no guy wires to be used only during the field season and attended daily by field staff);

ix. Placement of temporary shore pens at selected NWHI breeding sites to facilitate monk seal recovery activities described here within (e.g. translocations, captive care, or male aggression mitigation); and

x. Establishment of field staff residence at all monk seal breeding sites to perform the monk seal activities described here within.

xi. Remove marine debris, trash, and other materials (land and ocean-based) that pose threats to Monument resources, including but not limited to derelict fishing gear and following established Monument BMPs.

a. Disentanglement of threatened and endangered species by authorized personnel, debris tracking via drifter buoys and Unmanned Aerial Vehicles, and monitoring of sites that have been cleared of debris for recovery rates and effects of removal;

b. Location and removal of debris .

xii. Shark Predation Mitigation Activities:

a. Fishing personnel and location: A team of 3-5 staff experienced and trained in safe and effective methods for shark fishing/removal will be tasked with monitoring and removal of G. sharks that they encounter within 700m of shore of Trig, Gin, Little Gin and Round islets. As such, capturing sharks will only occur in what is considered the shallow lagoon inside the atoll in close proximity to islets with the highest rate of shark predation. Handlines and harpoon will be used in shallow water, from shore or close to shore; bottomsets and drumlines will be used in deeper water, over sandy substrate at distances !#\$!&her from shore (up to 700m away). Ability to set the gear as far out as 700m from shore will help ensure that it performs as designed by Meyer in 2009. Shallow depth, coral and snags make setting the bottomset at closer distances a challenge.

b. Fishing Methods: Four different methods will serve as a “toolbox” of options to safely remove a maximum of 17 Galapagos sharks: handline, harpoon, bottomset, and drumline. Each method has its advantages and drawbacks. The potential for shark wariness to humans in combination with extremely low CPUE near pupping sites indicates that such a “toolbox” is needed to successfully capture sharks at the numbers and in the areas we desire.

Handlines and harpoons have the advantage of being very specific. Handlines were successful in the past.

Bottomsets and drumlines are, by design, restricted by habitat characteristics, otherwise lines can get tangled, etc. Thus, bottomsets and drumlines are not recommended to be effective in very shallow depths. Bathymetry and currents are islet-sector specific; therefore, the distance from shore to achieve a feasible depth (approx. 25 feet) and appropriate substrate (sandy bottom) is also islet-sector specific; a zone of 700m around each islet will provide for this.

No one method is guaranteed to be successful given the unpredictability and individualistic nature of sharks. However, together, all the methods provide the greatest chance of success. The order in which the different methods will be applied will be at the discretion of the team and will be highly dependent on a variety of environmental and biological factors. If we employ more than one method at a time, we still expect that the total number of removals will be low based on the low CPUE in the shallow lagoon.

We will monitor the total number of baited hooks deployed across methods in order to remain within the proposed catch quota of 17 additional sharks. We will use the same bait type (large tuna heads, shark remains and tissue from previously deceased seals) and hook type (circle hook, size 18/0 to 20/0) as previously approved. Fish and seal tissue bait will be brought from outside the Monument. There may not be the opportunity to collect tissue from a deceased seal at French

Frigate Shoals. Seal tissue and shark tissue bait will also be collected within the Monument as available.

We will tend the gear to avoid bycatch mortality (non-target species will be dehooked and released). It is assumed that bycatch will be minimal and primarily shark species, based on Meyer's crew's experience in 2009 and our bycatch in 2010-2015. Fishing staff will avoid lethal removal of non-target sharks through their proper identification. The only shark species that is likely to be confused with the G. shark is the grey reef shark. However, in G. sharks, there is a very distinct ridge along the back between the first and second dorsal fins. Also, the maximum size of 20 grey reef sharks caught across the NWHI was 159 cm (total length) in a 2003 study and in 2011 at Trig and Gin by our staff (3 5-foot grey reefs were caught and released). So, based on the absence of the dorsal ridge and a threshold size requirement above 200cm for removal, we will ensure that we do not misidentify and cull a shark that is actually a grey reef.

For handlines, a line will be baited from shore or small boat. A hand-held harpoon will be used from shore or small boat when a shark is observed. A barbed shaft, on the end of the harpoon pole will be delivered by hand and the tip will be attached to wire cable and connecting line that will be used to retrieve the shark. For these methods, captured sharks will be hauled out on to the beach for euthanasia.

Bottomsets will be made to the specifications identical to those used in the Meyer's project permitted in the Monument to catch sharks in 2009. Meyer's bottomsets had 10 hooks; we propose to use this many or less on each set. The gear is designed for sandy substrate with no potential for snagging. Approximately 200- 350m long 1/2 inch polypropylene mainline with overhand loops at regular intervals (40-60m) for gangion (branch line with hook) attachment will be used. Each end of the mainline will have a buoy line consisting of 1/2-inch polypropylene with a cleat at the top and a Danforth anchor (9-12 lb) at the bottom. The buoy line length will be contingent on target set depth (45-75 feet depending on depth of deployment allowed). Gangions will consist of a stainless steel lobster trap clip (snaps onto mainline loops) with 2m of 1/2 inch polypropylene, a large swivel, 2m of 7/19 strand stainless steel aircraft cable (bite leader) to a 20/0 Mustad circle hook. Sets will be made from a small boat, and with short soak times of a maximum of 3 hours (in the daytime only).

The drumline will be of either of the following 2 designs. It may consist of a large buoy, with a chain trace attached to it and single baited hook, shackled to the other end of the chain trace. A baited hook will be suspended approximately 10 feet above the sea floor. A groundline will be shackled to the drum with a swivel, attached to a Danforth or CQR anchor and anchored to the bottom substrate. A scope of 3-4 times the water depth will be used. Alternatively, it may consist of 20ft of 1/2 in. polypropylene substituting for a chain trace, connected to the same branchline type used for the bottomsets described above. The opposite end of this mainline will be shackled to a float-line buoy that serves as the 'drum'. A chain will be run through this buoy with the other end shackled to an 8' yellow marker line. The other end of the yellow line will then be shackled to a large red buoy with the connected float line (same used for bottomsets). The drumline set-up is a modification of what was used in 2010 so that the single baited hook rests on the bottom and does not suspend in the water column. This is preferred because we are targeting a species that spends most of its time on the bottom feeding on demersal fishes. With this design, the drum-buoy functions as a 'bobber' that will sink or move when an animal is hooked.

c. Post-catch procedures:

When a shark is hooked or harpooned it will be brought to shore or to the side of the small boat and tail-roped and euthanized with a .44 caliber bang stick. HMSRP has established bangstick training and safety protocols and conduct an annual Operational Risk Management (ORM) for shark fishing operations. ORM is a continual process which includes risk assessment, risk decision making, and implementation of risk controls, which results in acceptance, mitigation, or avoidance of risk. It is standard for HMSRP to conduct ORM and risk assessment for projects that may involve risks such as this shark predation mitigation work.

Refresher training on use of the bang stick will occur boat side on inert material here in Oahu.

HMSRP will perform a necropsy on captured G. sharks on site, including gut content inspection, morphometric measurements, and identification of sex and reproductive state. Procedures will

mirror those done on monk seals, using the same kits, modified as necessary based on instructions in the Elasmobranch Husbandry Manual (editors M. Smith, D. Warmolts, D. Toney & R. Hueter). The main focus of shark necropsies will be to determine pregnancy and gut contents, provide remains for Native Hawaiian cultural practices (if requested, they have not been for the last several permit cycles), and take samples for scientific analysis.

Samples of muscle, liver, vertebrae for fatty acid and isotope/ diet analysis will be removed from the carcass after the necropsy and stored frozen. Vertebrae samples will likely be sent to Woods Hole Oceanographic Institute to be processed by Greg Skomal's lab for isotope analysis. Fatty acid profiles will likely be analyzed for data on prey recently consumed, likely Sara Iverson's laboratory at Dalhousie University. Stomach contents will be screened for monk seal remains and provided to shark ecologists upon request. Some remaining tissue will possibly be retained for bait.

Thereafter, shark remains will be handled as deemed appropriate by cultural advisors and the State of Hawaii Office of Hawaiian Affairs. In recent years, shark remains have been returned to the ocean outside of the fringing reef.

d. Reporting: The MMB will be notified by NMFS when a shark has been removed. This will be done as quickly as possible and should normally be within 24 hours. A report that summarizes data concerning the removal of each shark will be submitted to the Monument in compliance with the Monument reporting schedules.

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 living specimens - collecting activities (would apply to any activity):
organisms (List of species, if applicable, attach additional sheets if necessary):**

Common Name: Hawaiian monk seal
Scientific Name: Neomonachus schauinslandi
& size of specimens: 1000 varied
Collection location: All Locations
Collection type: Non-lethal (living organism)

Common Name: Galapagos Shark
Scientific Name: Carcharinus galapagensis
& size of specimens: 17 varied
Collection location: French Frigate Shoals
Collection type: Lethal (living organism)

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

- Will these organisms be housed with other organisms? If so, what are the other organisms?

This relates to seals that are captured and brought in for rehabilitation or transported as part of the translocation program. They will be housed with other monk seals.

- Will organisms be released?

Monk seals

**9c. Collection of non-living specimens - collecting activities (would apply to any activity):
non-living materials:**

- General site/location for collections:

- Is it an open or closed system? Open Closed

- Is there an outfall? Yes No

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

Samples will be shipped out of the Monument in appropriate media and containers on board the NOAA research vessels supporting our activities.

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

The Hawaiian Monk Seal Research Program is the primary entity conducting research and recovery work on monk seals in the Northwestern Hawaiian Islands. All samples collected are covered under our MMPA/ESA permit 16632-01 and then are distributed to our partners a complete list of partners is included in attached document MMPA/ESA Permit 16632-01. This eliminates the likelihood of duplicative sampling or research happening related to monk seals. We collaborate with a wide variety of programs to share samples and conduct our research. Requests can be made to the HMSRP for samples and with sufficient biological/recovery justification samples are often shared.

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

Complete lists of gear, materials and hazmat are included in the supplemental material.

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

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

Propose to Install

Temporary Installation polyvinyl tents for housing monk seal field teams at French Frigate Shoals, Laysan, Lisianski, Pearl and Hermes and Kure.

One additional small tent will be deployed at Trig Island during fishing operations.

Propose to Maintain / Repair

Two long-term remote camera boxes are currently in place on the cliffs at Nihoa overlooking the monk seal breeding beach.

Propose to Remove

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

Population assessment data analyzed within 5 months.

Telemetry data analyzed within :

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

More publications can be provided if necessary.

Estimating Hawaiian monk seal range-wide abundance and associated uncertainty

Baker JD, Harting AL, Johanos TC, Littnan CL

[2016] *Endangered Species Research*. 31:317-324. doi:10.3354/esr00782

Protozoal-related mortalities in endangered Hawaiian monk seals *Neomonachus schauinslandi*

Barbieri MM, Kashinsky L, Rotstein DS, Colegrove KM, Haman KH, Magargal SL, Sweeny AR, Kaufman AC, Grigg ME, Littnan CL

[2016] *Diseases of Aquatic Organisms*. 121(2):85-95. doi:10.3354/dao03047

Prevalence of interactions between Hawaiian monk seals (*Neomonachus schauinslandi*) and nearshore fisheries in the main Hawaiian Islands.

Gobush KS, Wurth TA, Henderson JR, Becker BL, Littnan CL

[2016] *Pacific Conservation Biology*. doi:10.1071/PC15029

Estimating contact rates of Hawaiian monk seals (*Neomonachus schauinslandi*) using social network analysis

Baker JD, Harting AL, Barbieri MM, Johanos TC, Robinson SJ, Littnan CL

[2016] *Journal of Wildlife Diseases* 52(3):533-543. doi:10.7589/2015-10-286

Range-wide patterns in Hawaiian monk seal movements among islands and atolls

Johanos TC, Harting AL, Wurth TL, Baker JD

[2015] U.S. Dept. of Commerce, NOAA Technical Memorandum
NOAA-TM-NMFS-PIFSC-44, 26 p. doi:10.7289/V5FT8J02

Benefits derived from opportunistic survival-enhancing interventions for the Hawaiian monk seal:
the silver BB paradigm

Harting AL, Johanos TC, Littnan CL

[2014] Endangered Species Research 25: 89-96. doi:10.3354/esr00612

Geographic variation of persistent organic pollutants in Hawaiian monk seals *Monachus
schauinslandi* in the main Hawaiian Islands

Lopez J, Hyrenbach KD, Littnan C, Ylitalo GM

[2014] Endangered Species Research 24: 249-262. doi:10.3354/esr00602

Range-wide movement patterns of Hawaiian monk seals

Johanos TC, Harting AL, Wurth TA, Baker JD

[2014] Marine Mammal Science 30(3): 1165-1174. doi:10.1111/mms.12084

Validation and application of noninvasive glucocorticoid and thyroid hormone measures in free-ranging Hawaiian monk seals

Gobush KS, Booth RK, Wasser SK

[2014] *General and Comparative Endocrinology* 195: 174-182.
doi:10.1016/j.ygcen.2013.10.020

A two-stage translocation strategy for improving juvenile survival of Hawaiian monk seals

Baker JD, Harting AL, Littnan CL

[2013] *Endangered Species Research* 21: 33-44. doi:10.3354/esr00506

Dietary comparison of two Hawaiian monk seal populations: the role of diet as a driver of divergent population trends

Cahoon MK, Littnan CL, Longenecker K, Carpenter JR

[2013] *Endangered Species Research* 20: 137-146. doi:10.3354/esr00491

Body growth in Hawaiian monk seals

Baker JD, Johanos TC, Wurth TA, Littnan CL

[2014] *Marine Mammal Science* 30(1): 259-271. doi:10.1111/mms.12035

U.S. Pacific marine mammal stock assessments: 2012

Carretta JV, Oleson E, Weller DW, Lang AR, Forney KA, Baker J, Hanson B, Martien K, Muto MM, Lowry MS, Barlow J, Lynch D, Carswell L, Brownell Jr. RL, Mattila DK, Hill MC

[2013] U.S. Dept. of Commerce, NOAA Technical Memorandum
NOAA-TM-NMFS-SWFSC-504, 378 p

Identification of ciguatoxins in Hawaiian monk seals *Monachus schauinslandi* from the
Northwestern and main Hawaiian Islands

Bottein M-Y D, Kashinsky L, Wang Z, Littnan C, Ramsdell JS

[2011] Environmental Science and Technology 45(12): 5403-5409. doi:10.1021/es2002887

Relative influence of climate variability and direct anthropogenic impact on a sub-tropical Pacific
top predator, the Hawaiian monk seal

Baker JD, Howell EA, Polovina JJ

[2012] Marine Ecology Progress Series 469: 175-189. doi:10.3354/meps09987

Non-lethal efforts to deter shark predation of Hawaiian monk seal pups

Gobush KS, Farry SC

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doi:10.1002/aqc.2272

Persistent organic pollutants in the endangered Hawaiian monk seal (*Monachus schauinslandi*)
from the main Hawaiian Islands

Lopez J, Boyd D, Ylitalo GM, Littnan C, Pearce R

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Effectiveness of an antihelminthic treatment in improving the body condition and survival of
Hawaiian monk seals

Gobush KS, Baker JD, Gulland FMD

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The Hawaiian monk seal in the Northwestern Hawaiian Islands, 2004

Johanos TC, Baker JD (comps. and eds.)

[2011] U.S. Dept. of Commerce, NOAA Technical Memorandum
NOAA-TM-NMFS-PIFSC-28, 112 p. + Appendices

Recovery of the Hawaiian monk seal (*Monachus schauinslandi*): A review of conservation efforts,
1972 to 2010, and thoughts for the future

Lowry LF, Laist DW, Gilmartin WG, Antonelis GA

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Evaluation of the captive care and post-release behavior and survival of seven juvenile female Hawaiian monk seals (*Monachus schauinslandi*)

Norris TA, Littnan CL, Gulland FMD

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Short Note: Hawaiian monk seals at Kure Atoll: Some life history effects following efforts to enhance pup survival

Gilmartin WG, Johanos TC, DeMaster DP, Henderson JR

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Rehabilitation and relocation of young Hawaiian monk seals (*Monachus schauinslandi*)

Gilmartin W, Sloan AC, Harting AL, Johanos TC, Baker JD, Breese M, Ragen TJ

[2011] Aquatic Mammals 37(3): 332-341. doi:10.1578/AM.37.3.2011.332

Translocation as a tool for conservation of the Hawaiian monk seal

Baker JD, Becker BL, Wurth TA, Johanos TC, Littnan CL, Henderson JR

[2011] *Biological Conservation* 144: 2692-2701. doi:10.1016/j.biocon.2011.07.030

Estimating the carrying capacity of French Frigate Shoals for the endangered Hawaiian monk seal using Ecopath and Ecosim

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[2012] *Marine Mammal Science* 28(3): 522-541. doi:10.1111/j.1748-7692.2011.00502.x

Aversive conditioning and monk seal-human interactions in the Main Hawaiian Islands Aversive Conditioning Workshop, Honolulu, Hawaii, November 10-11, 2009

Jenkinson EM

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U.S. Pacific marine mammal stock assessments: 2010

Carretta JV, Forney KA, Oleson E, Martien K, Muto MM, Lowry MS, Barlow J, Baker J, Hanson B, Lynch D, Carswell L, Brownell Jr. RL, Robbins J, Mattila DK, Ralls K, Hill MC (with contributions from Patrick Opay, Brent Norberg, Jeff Laake, Dan Lawson, Joe Cordaro, Elizabeth Petras, Dale Sweetnam, and Chris Yates)

[2011] U.S. Dept. of Commerce, NOAA Technical Memorandum
NOAA-TM-NMFS-SWFSC-476, 352 p

Dizygotic twinning in the Hawaiian monk seal

Schultz JK, Becker BL, Johanos TC, Lopez JU, Kashinsky L

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Range-wide genetic connectivity of the Hawaiian monk seal and implications for translocation

Schultz JK, Baker JD, Toonen RJ, Harting AL, Bowen BW

[2011] Conservation Biology 25(1): 124-132. doi:10.1111/j.1523-

Hawaiian monk seals and their prey: assessing characteristics of prey species fatty acid signatures and consequences for estimating monk seal diets using fatty acid signature analysis

Iverson S, Piche J, Blanchard W

[2011] U.S. Dept. of Commerce, NOAA Technical Memorandum
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Report on validation and calibration of fatty acid signatures in blubber as indicators of prey in

Hawaiian monk seal diet (A report submitted under Contract No. AB133F-030SE-1195,
September 2003)

Iverson SJ, Stewart BS, Yochem PK

[2010] Pacific Islands Fisheries Science Center Administrative Report H-10-05, 19 p

Characterization of forage fish and invertebrates in Northwestern Hawaiian Islands using fatty acid
signatures: species and ecological groups

Piche J, Iverson SJ, Parrish FA, Dollar R

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Genome-wide loss of diversity in the critically endangered Hawaiian monk seal

Schultz JK, Marshall AJ, Pfunder M

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Impacts of sex ratio reduction on male aggression in the Critically Endangered Hawaiian monk seal
Monachus schauinslandi

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Hanson MT, Aguirre AA, Braun RC

[2009] U.S. Dept. of Commerce, NOAA Technical Memorandum
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Organochlorine contaminants in endangered Hawaiian monk seals from four subpopulations in the
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Ylitalo GM, Myers M, Stewart BS, Yochem PK, Braun R, Kashinsky L, Boyd D, Antonelis GA,
Atkinson S, Aguirre AA, Krahn MM

[2008] *Marine Pollution Bulletin* 56(2): 231-244. doi:10.1016/j.marpolbul.2007.09.034

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 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