State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Aquatic
Resources Honolulu, Hawaii
96813

April 8, 2022

Board of Land
and Natural Resources
Honolulu, Hawaii

Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National Monument Conservation and Management Permit to Ms. Michelle Lino, NOAA Fisheries, Pacific Islands Fisheries Science Center, for Access to State Waters to Conduct Hawaiian Monk Seal Management and Recovery Activities, Inclusive of the Removal of Individual Sharks at French Frigate Shoals Displaying Predatory Behavior Towards Monk Seal Pups

The Division of Aquatic Resources (DAR) hereby submits a request for your authorization and approval for issuance of a Papahanaumokuakea Marine National Monument Conservation and Management Permit to Ms. Michelle Lino, NOAA Fisheries, Pacific Islands Fisheries Science Center, pursuant to §187 A-6, Hawai'i Revised Statutes (HRS), Chapter 13-60.5, Hawai'i Administrative Rules (HAR), and all other applicable laws and regulations.

The Conservation and Management Permit, as described below, would allow entry and activities to occur in Papahanaumokuakea Marine National Monument, including the NWHI State Marine Refuge and the waters (0-3 nautical miles) surrounding the following sites:

- Nihoa Island
- Necker Island (Mokumanamana)
- French Frigate Shoals
- Gardner Pinnacles
- Laysan Island
- Lisianski Island
- Pearl and Hermes Atoll
- Midway Atoll
- Kure Atoll

The activities covered under this permit would be authorized to occur between April 2022 and April 2023.

INTENDED ACTIVITIES

Michelle Lino (applicant) proposes to continue conservation and management activities by NOAA NMFS Pacific Islands Fisheries Science Center (PIFSC) Hawaiian Monk Seal Research Program (HMSRP) for monitoring and recovery of the Hawaiian monk seal (*Neomonachus schauinslandi*) in Papahānaumokuākea. 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 affect the survival and recovery of the species.

Proposed activities would be conducted by up to 25 individuals between April, 2022 – April, 2023.

Everything proposed in this renewal permit has been reviewed and approved in previous permits (most recent is PMNM-2022-002). Trail cameras and all associated equipment will be retrieved before field staff leave PHA at the end of the season.

General information on monk seal research and recovery initiatives, methods and tools are located on pgs. 2-17. Detailed information on methods, protocol, consultation and the minimization of impacts of the shark predation mitigation activities are located under B) Recovery Intervention - section xii. Shark Predation Mitigation Activities (pgs. 6-12). Clarification and updates of the results thus far of shark predation mitigation activities at French Frigate Shoals are located on pgs. 19-20 (questions 2 & 3).

Information on Monk Seal Research and Recovery Initiatives

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 approximately 1,400 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 22677 (and associated NEPA docs etc.) and supported by the Revised Recovery Plan for Hawaiian Monk Seals.

- This permit also supports efforts conducted by the State and Federal partners that are directed towards monk seal research and recovery.

• To maximize the benefit from the researchers limited time in this remote place, the Program will use a suite of methods to ensure that all areas are well-surveyed (including using technology to expand data collection, and requesting access to all monk seal haul-out areas).

• Unmanned aerial systems (UAS) will be used to conduct ecological surveys including surveying and monitoring monk seals, marine debris, and possibly other flora and fauna in the NWHI (as a by-product of habitat mapping or as requested by partners).

• UAS will be launched and recovered from land, NOAA ships, or small boats launched from those ships, and will be flown at altitude below 400 feet.

• UAS efforts will provide the ability to survey and map resources on the remote islands without (1) interference; (2) the potential for the introduction of invasive species; and (3) human disturbance to the natural resources. The UAS would increase the monitoring and surveying capacity in the Monument.

• While the researchers work to minimize human presence on Mokumanamana, trained biologists familiar with the island may traverse Mokumanamana, using paths delineated by archaeologists and cultural practitioners familiar with the island, in the event that all seal haul-out areas cannot be surveyed through boat-landings or UAS flights at haul-out sites.

• This permit is comprehensive and includes ALL monk seal recovery activities that occur in the Monument including the mitigation of predation by Galapagos sharks on monk seal pups at French Frigate Shoals (FFS); the primary source of seal mortality at FFS.

• This is a continuation of permitted shark removal activities for monk seal conservation. The initial target of 20 sharks was determined based on data from the field whereby individually identifiable sharks (through tags or naturally acquired markings on their dorsal fins) that were engaged in predatory behavior on monk seal pups were enumerated. Shark biologists were consulted and ecosystem modeling efforts indicated that the Galapagos shark population, which is neither threatened nor endangered, was capable of sustaining this level of population reduction. Hence, the initial request of 20 sharks was based on an agreed upon minimum number of sharks that were exhibiting this behavior, paired with ecosystem based support.

Since the initial request of 20 made at the beginning of this project 7 Galapagos sharks have been caught and removed, leaving 13 remaining. The request for this year is for 13 Galapagos sharks. This is the balance of initially requesting removal of 20 sharks, minus the 7 that have been removed historically to-date. Fishing requires a great deal of effort, and catch-per-unit-effort is low, therefore the researchers expect that reaching this initial target number is still a long-term goal.

Published data and consultation with Carl Meyer puts the population somewhere between 668 to just over 1000 sharks. The estimated removal would be between 1.3 – 1.9% of the population. Generally, the researchers don't remove more than 1 shark per season or 0.1% of the population.

• Predation peaked in 1997-1999; it continued at a rate of 5-11 pups per year from 2000-2019 (usually 15-25% of the pup cohort each year). In 2019, 35 pups were born at FFS during the field season and Galapagos shark predation was confirmed in 3 pup deaths and strongly

suspected in 6 additional disappearances, accounting for 25% of the pups born. Information from 2020 is not available because the researcher's field camps were not deployed due to COVID-19. There were no direct observations of predatory behavior towards pups or evidence of predation (injury/disappearance of seal pups) throughout the atoll in 2021. This means that no triggers for shark removal were met, no fishing occurred and no sharks were removed. Furthermore the Program halted their main predation mitigation effort, which is seal translocation from at-risk islets to Tern Island, because there was no predation to avoid and thus no benefit to this activity in 2021. An important caveat here is that in 2021, the field teams were deployed for ~ 2 fewer months than a typical season, meaning that surveillance was only about half of a normal year. The researchers look forward to finding out if observations during the full length field season in 2022 will be consistent with the observations in 2021, and will be sure to report on that after the teams return.

• Between 1997 and 2019, shark predation affected over 270 pups out of roughly 1150 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. Translocating pups remains the researcher's most common intervention and in 2019, 14 pups were translocated.

• 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 and the HMSRP will continue to be mindful and respectful of the historical and cultural significance of sharks when conducting these activities. .

• 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.

<u>Activities for Monk Seal Research and Recovery</u>

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 the attached document MMPA/ESA Permit 22677. 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 22677 will occur across the NWHI.

b. Deploying field staff in camps for months at a time at Lalo, Kamole, Kapou, Manawai, and Hōlanikū. Our presence at Kuaihelani will be brief, during 1-2 day visits based off of the research vessel when deploying and recovering camps nearby and will be coordinated with USFWS. Also in coordination with USFWS this year, the researchers expect to have staff at Kuaihelani supporting monitoring activities for Hawaiian monk seals during the mouse eradication effort planned for summer 2022.

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 22677.

d. Use UAS (APH-22 hexacopter or Mavic Pro GE) to monitor Hawaiian monk seal populations (including counts, individual identification, body condition assessment), marine debris, and possibly other flora and fauna on or around islets in the monument.

The APH-22 has a pilot in command (PIC) and a ground station operator (GSO) visual observer (VO) and is launched from land or the GSO/VO's hand. The Mavic Pro Ge is a vertical take-off and landing UAS that can be launched from land or boat but does not necessitate the use of a ground station or GSO. Operation of the Mavic Pro GE will also involve a VO other than the PIC. Once any UAS is launched, the VO monitors the UAS flight and scans the sky to see if there is any air traffic or bird activity requiring the landing of the UAS. The UAS will fly for a maximum of 30 minutes and will remain at all times within the pilot's visual line of sight and less than 0.5-nm.

General Operation Guidelines will include:

- Operation in daylight hours only.
- Operation in winds less than 25kts.
- Only NOAA Certified Pilots trained specifically for the APH-22 or the Mavic Pro GE will operate the system.
- Pilots will minimize multiple takeoffs and landing in a single location if birds are present to minimize repeat disturbance to birds.

DJI Mavic Pro GE Specifications:

- Body: Quadcopter with 4 foldable arms
- Diagonal size (excluding propellers): 13.2" (335mm)
- Weight (including battery and propellers: 1.62 lbs (734 g)
- Max Flight Time: 27 minutes
- Range, Physical: 8 miles (13km, no wind)
- Range, Max Transmission: 4.3 mi (7km)
- Payload: Integrated camera on gimbal
- Max Speed: 40 mph (65 kph)

For Mokumanamana visits, the researchers will follow all appropriate Mokumanamana and PMNM Best Practices, as well as adhere to these General

Guidelines:

- Only traverse Mokumanamana when full surveys cannot be completed by multiple boat landings or UAS activities.
- A qualified and experienced Resource Monitor would be present.
- Minimum number of personnel would go ashore and undertake the hike.

e. Deployment of acoustic recording devices to capture underwater vocalizations of Hawaiian monk seals.

Passive acoustic monitoring via SoundTraps is a non-invasive method for studying underwater sounds. This study will use two SoundTrap ST500 HF underwater acoustic recorders at two sites (Lalo and Manawai) to record the underwater vocalizations of Hawaiian monk seals and seasonal trends in their typical aquatic soundscape. It is important for increasing the baseline knowledge of their communication system and for measuring the level of man-made noise they encounter. Assessing the impacts of man-made sound on monk seal communication can inform conservation decisions, particularly the development of noise mitigation measures and population monitoring through passive acoustics.
The first year of deployment (2021) was successful in obtaining underwater vocalization data and thus this project will continue into 2022 with no modifications.

Other monk seal directed research as needed and authorized by MMPA/ESA permit 22677. 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 cestodicides and nematocides (e.g. praziquantel, fenebendazole, 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. The researchers 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.

a. In 2021, the researchers began a project to incorporate the Huli ʻIa into their field camps which is intended to extend into 2022 and beyond. The intent is to open dialogue and recognize, record and ultimately share seasonal observations about Papahānaumokuākea made when teams are deployed.

xi. Collect and 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 Monument BMPs (especially BMPs 005, 007, 011 and those being refined specific to *Chondria* mitigation at Manawai and Kuahelani).

a. Disentanglement of threatened and endangered species by authorized personnel, monitoring of sites that have been cleared of debris for recovery rates and effects of removal;

b. Location and removal of debris. The team will cooperate with partners leading marine debris efforts on how to best integrate and support their activities. Of particular note: *If* any debris removal activities do occur at Manawai and Kuahelani, the researchers will abide by best practices for *Chondria* biocontrol and work with the State and other partners to ensure coordination and compliance with those practices.

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 Galapagos sharks that they encounter within 700m of shore of any islet at Lalo where predatory behavior is observed. 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**.

b. Fishing Methods: Four different methods will serve as a “toolbox” of options to safely remove a maximum of 13 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 catch per unit effort (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 harpoon will be used in shallow water, from shore or close to shore or from a small boat; bottomsets and drumlines will be used in deeper water, over sandy substrate at distances farther 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.

Handlines and harpoons have the advantage of being very specific and have been successful in the past. Bottomsets and drumlines are, by design, restricted by habitat characteristics due to the potential for lines to become 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 single 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 the researchers employ more than one method at a time, the researchers still expect that the total number of removals will be low based on the low CPUE in the shallow lagoon.

The researchers will monitor the total number of baited hooks deployed across methods in order to remain within the proposed catch quota of 13 additional sharks. The researchers 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.

The researchers 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 the researcher's 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 the program's 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, the researchers will ensure that they 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; the researchers 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 the researchers 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 conducts 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 prior to fishing activities will occur boat-side on inert material.

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 and that will continue unless directed otherwise by the OHA partners.

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.

Evaluation of Shark Removal Activities, Consultation with Monument Co-Trustees/Partners, and Efforts to Minimize the Impacts of the Removal Activity

All monk seal conservation and management activities conducted by the permittees 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.

The Program has conducted monk seal research and conservation activities in the NWHI for decades. The researchers have a large presence in the NWHI and with that comes the potential to negatively impact a number of cultural and natural resources. The researchers have worked hard over the decades to develop and refine the 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 the researchers direct considerable energy to share information with the Monument partners on the need and justification for each activity. For example, the researchers have consulted extensively with the MMB and native Hawaiian partners in past years for the shark predation mitigation that is included in this project and has been permitted multiple times.

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, the researchers consulted with and received quality input from OHA and the Monument's Native Hawaiian Cultural Working Group (CWG). The feedback from the CWG and others was not homogenous with a diverse array of perspectives and opinions both supporting and opposing the activity. The CWG determined it was unable to offer an endorsement or censure of the proposed management activity and has not reviewed the activity since. In 2020, the

researchers were invited to meet with a representative of the CWG and answered some questions related to this activity. It was a good opportunity to reconnect and the researchers welcome any opportunity to provide further information to the CWG 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 the proposed work. From these meetings, the researchers also supported the participation of a number of Native Hawaiians in the shark predation mitigation work in 2010 and 2011.

In 2013 with the addition of seal flesh as bait, the researchers were encouraged by the State of Hawaii Board of Land and Natural Resources to communicate with, and be responsive to, stakeholders regarding this activity. The researchers alerted approximately 35 organizations and individuals about the field activities during the 2013 field season (including shark fishing) and updated them on the plans for the 2014 season. To date, none of these entities has expressed questions or concerns.

The researchers also undertook consultations regarding the use of tissue from previously deceased monk seals as bait with several Native Hawaiians with whom the researchers have been working with on other monk seal issues. In this regard, the researchers have held one-on-one discussions with several individuals (cultural practitioners, partners, and/or advisors). Input the researchers received during these one-on-one discussions ranged from full support and understanding to acceptance without expressed support. No one the researchers spoke with regarding the use of seal tissue has voiced opposition or indicated that the use of seal tissue as proposed would adversely affect their productive relationships with the Program or otherwise diminish their support for monk seal conservation. The overarching sentiment the researchers have heard has been that as long as the seals would be dead of a cause beyond the researchers 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, the researchers propose to limit the scope of the 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.

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

<u>Proposed fixed installations and instrumentation proposed to be set in the Monument</u>

A) The researchers propose to install:

i. Temporary Installation polyvinyl tents for housing monk seal field teams at French Frigate Shoals, Laysan, Lisianski, Pearl and Hermes Reef and Kure. One tent at each site will also have a radio antenna extending upwards <10ft.

ii. Trail Cameras at Lalo (Tern Island) and Manawai (North and Little North Islands). Trail cameras are compact, self-contained systems that are programmed to take a certain number of pictures per day capturing the presence or absence of animals in

specific locations. Sizes of trail camera systems including external solar panels will be no larger than 16" x 12" x 12". Weights of systems including solar panels will be no more than 5 lbs. These are used to monitor for threats to seals, specifically entrapment (Tern Island) and male aggression (Manawai).

Cameras will be mounted via padded tripod or T-post, no more than 5' in height. Plastic or steel bird deterrent spikes will be added to the camera systems to deter birds from blocking the camera's view and excreting on solar panels.

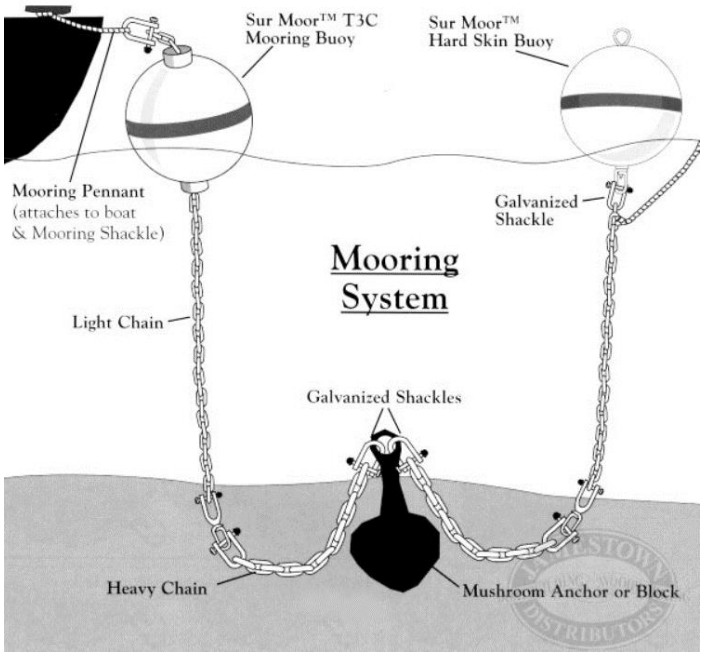
The cameras will be deployed staff from approximately May-August (during the field season) at North and Little North Islands (Manawai). Inclement weather at Manawai often prevents boating for multiple days at a time, resulting in less observation time on North and Little North Islands. These cameras help to fill in gaps in survey coverage. Images will be reviewed weekly during the season to provide close to real-time information on male aggression to HMSRP leadership, which will help guide management and recovery decisions within the season, such as pup translocation. Additionally, the majority of pups at Manawai are born at North and Little North, and the trail cameras may also provide incidental population assessment data on births and weaning events. The cameras will be facing areas of previously observed or suspected male aggression, mainly near the southern portion of North Island, the northern portions of the North Island spits, and the northern portion of Little North Island. Weekly visits will be conducted, in which SD cards will be swapped out in the trail cameras to continue recording during the field season. Trail cameras and all associated equipment will be retrieved before field staff Manawai at the end of the season.

Cameras will be deployed similarly at Tern Island (Lalo), but will remain in place until the following field season because their purpose is to support post-season entrapment monitoring. Cameras may be mounted on the seawall but will more likely be mounted via padded tripod or T-post. In 2020-2021, seawall mounted cameras failed due to the heavy wave action encountered by the seawall in the winter.

iii. Temporary (season-long) mooring systems to anchor two small boats at Southeast Island, Pearl and Hermes Reef and, in instances when the davit is unavailable, potentially at Tern Island, French Frigate Shoals. These systems are recommended over traditional anchoring for leaving boats unattended for long intervals, i.e. overnight, in high surge areas. etc. In many cases, a mooring system is the safest way to leave a boat in the water to prevent it from breaking free and coming ashore, which will cause damage to the boat and shoreline environment.

Permanent and/or semi-permanent moorings use less scope than traditional anchoring which reduces the "footprint" on the bottom, risk of damage to the environment and risk of wildlife entanglement/entrapment. Appropriate moorings are comprised of a suitable anchor, a light chain, and surface float. Additional line will be attached to an anchor onshore at Southeast Island and to the pier at Tern Island to ensure the vessels cannot float away if the mooring system were to fail in inclement weather. These mooring systems will be deployed on sandy substrate directly off the north side of Southeast Island and from the dock at Tern Island. The following image (credit to

Jamestown Distribution) illustrates the type of system that would be temporarily installed if necessary.



iv. Underwater Acoustic Recorders. Recording Hawaiian monk seal underwater vocalizations using the SoundTrap ST500 HF

Study Objective

This study aims to record and describe the underwater vocal repertoire and seasonal trends in sound production for Hawaiian monk seals in PMNM using two SoundTrap ST500 HF underwater acoustic recorders. One recorder would be deployed at each of two locations: Lalo and Manawai. In 2021, the instruments were successfully deployed for the first time and data were successfully obtained and thus will continue into 2022 with no modifications. Specific *Chondria* protocol modifications for cleaning this sensitive equipment at Manawai were discussed and followed prior to the 2021 field season, and the researchers will review those protocols with appropriate SMEs again before deployment in 2022.

Equipment

The recording units are Ocean Instruments SoundTrap ST500 HF (serial number to be determined). The full-scale response of this model is 173 dB re 1 µPa and the bandwidth is 20 Hz - 150 kHz ± 3 dB. A SoundTrap user manual and specification sheet are attached to this protocol.

Software

SoundTrap Host software will be used to configure the instrument before and after each deployment. This software can be downloaded from the Ocean Instruments website (http://www.oceaninstruments.co.nz/downloads/). The first time the SoundTrap and then the device will be visible in the SoundTrap Host software. It will be listed as "SoundTrap serial number TBD" or "SoundTrap device is connected to the computer (via USB), drivers will be installed serial number TBD" depending upon the unit you have.

Data Storage – To be determined

Environment

Both SoundTraps should be deployed at 5-10 m depth in sandy substrates as close to land as possible. GPS locations for the SoundTraps must be taken immediately after deployment, and again when the units are "checked" to verify they have not drifted.

Duration of Deployment

Units would be deployed during the first month of the field team's arrival. Units will remain in the water for the duration of the field camp and be retrieved prior to departing the camp.

Maintenance

Units will be checked regularly during the first week of deployment. If no issues are encountered (i.e., unit not drifting and still intact) within the first week, units will be checked once a week for the remainder of the camp duration. "Checked" means seeing the unit from the boat. GPS locations for the SoundTraps must be taken when the units are "checked" to verify they have not drifted.

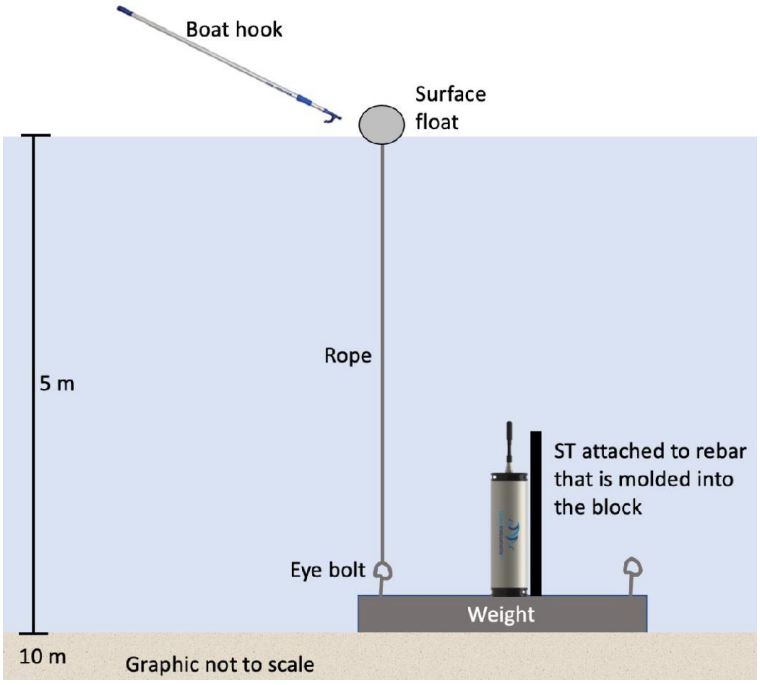
Equipment Configuration

Single anchored line with surface or sub-surface float (10 m total depth). The SoundTrap will be attached to a rebar stand molded into a concrete block (weight) with

the hydrophone facing the surface. The rope with the float will be tied to an eyebolt molded into the concrete block. Another eye bolt at the opposite side of the concrete block can be used for lowering the unit during deployment. Two grooves at the top and bottom of the SoundTrap housing provide attachment points for cable ties. The cable ties should be threaded through the associated holes so they cannot slip off. To minimize any possible entanglement risk of the rope, supportive padding material may be attached to it.

Deployment: Unit will be lowered down by rope threaded through the eyebolt. Once the unit is stationary, one side of the rope can be dropped into the water while the other side is pulled up through the eyebolt.

Retrieval: Grappler anchor or boat hook catches buoy and unit is pulled upward towards vessel.



B) The researchers propose to maintain/repair:

a. Tern Island Entrapment Camera Project

In 2020, the researchers initiated a pilot project to deploy rugged trail cameras on Tern Island, Lalo in order to monitor wildlife entrapments. The camera systems were deployed in fall 2020 and retrieved in 2021. Unfortunately, they were swamped by the winter conditions, making the imagery unusable. In 2022, we aim to replace the camera systems using T-posts rather than attaching them to the seawall.

Disposition of organisms or samples after collection:

- In the case of living seals collected for rehabilitation, these seals will be released back in the NWHI upon completion of rehabilitation (and clearance by veterinary examination).

- In the case of samples collected from seals (either biological specimens such as blood or tissue samples from living animals, or necropsy samples from dead animals), these will either be sent to appropriate research / diagnostic collaborators or archived in appropriate storage facilities at the NOAA IRC in Honolulu.

- In the case of samples collected from sharks (necropsy samples from dead animals), these will either be sent to appropriate research / diagnostic collaborators or cultural practitioners.

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

- 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 the researcher's MMPA/ESA permit 22677 and then are distributed to their partners. A complete list of partners is included in the attached document MMPA/ESA Permit 22677. This eliminates the likelihood of duplicative sampling or research happening related to monk seals. The researchers collaborate with a wide variety of programs to share samples and conduct research. Requests can be made to the HMSRP for samples, and sufficient biological/recovery justification samples are often shared.

Rehabilitation/Translocation of Seals

Select monk seals taken into rehabilitation outside of Monument waters and then released. Some seals will be held for a short time in shoreline pens while waiting for veterinarian assessment and possible pickup or to help them acclimate to the wild prior to release after translocation or rehabilitation. Seals that are captured and brought in for rehabilitation or transported as part of the translocation program will be housed with other monk seals. Monk seals will be released after rehabilitation or translocation. Comprehensive information on monk seal rehabilitation or translocation activities and protocols can be found under the researcher's MMPA/ESA permit 22677.

Sample and Data Analysis, Write-ups and Publication of Information

Population assessment data will be analyzed in 6 months (typically preliminary data will become available late winter/early spring of each year). Telemetry and UAS data will analyzed within 12 months.

Monument Management Plan Strategies

The activity will benefit the conservation and management of the Monument by supporting the following strategies under the Monument Management Plan (PMNM MMP Vol. 1, 2008):

• TES-1: Support Activities that advance recovery of the Hawaiian monk seal for the life of the plan.

• MD-1: Remove and prevent marine debris throughout the life of the plan.

The activities described above may require the following regulated activities to occur in State waters:

☒ Removing, moving, taking, harvesting, possessing, injuring, disturbing, or damaging any living or nonliving monument resource
☒ Anchoring a vessel
☒ Possessing fishing gear except when stowed and not available for immediate use during passage without interruption through the Monument
☒ Touching coral, living or dead
☒ Attracting any living Monument resource

The applicant would abide by the following PMNM Best Management Practices (BMPs) while conducting the aforementioned activities within the PMNM: Best Management Practices for Human Hazards to Seabirds (BMP#003); Boat Operations and Diving Activities (BMP #004); The Laysan Finch Protocol (BMP 005); Special Conditions and Rules for Moving Between Islands/Atolls and Packing for Field Camps (BMP#007); Best Practices for Minimizing the Impact of Artificial Light on Sea Turtles (BMP#009); Marine Wildlife Viewing Guidelines (BMP #010); Disease and Introduced Species Prevention Protocol for Permitted Activities in the Marine Environment (BMP #011); Precautions for Minimizing Human Impacts on Endangered Land Birds (BMP 012); Best Management Practices for Maritime Heritage Sites (BMP#017); and Best Management Practices to Minimize the Spread of *Chondria tumulosa* (BMP #20).

REVIEW PROCESS:

The permit application was sent out for review and comment to the following scientific and cultural entities: Hawaii Division of Aquatic Resources, Hawaii Division of Forestry and Wildlife, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), United States Fish and Wildlife Service Hawaiian and Pacific Islands National Wildlife Refuge Complex Office, and the Office of Hawaiian Affairs (OHA). In addition, the permit application has been posted on the Monument Web site since February/March, 2022, giving the public an opportunity to comment. The application was posted within 40 days of its receipt, in accordance with the Monument's Public Notification Policy.

MMB Agency Reviewer Questions and Applicant Responses:

1. When will the sound trap at Manawai be deployed and recovered? When it is recovered how it is going to be transported and is there any associated rigging being removed with the recorded? Please be sure to follow current Chondria protocols.

a. The SoundTrap will be deployed at Manawai by the field teams during their routine activities at the start of the field season in mid-May. It will be left in place (visually monitored) during the field season until camps conclude in mid-August. The equipment will be retrieved and packed by the field teams as with all other gear and supplies and will not be left in place after the field season.

The SoundTrap lies horizontally on top of a concrete weight and is secured to the weight using hose clamps and zip ties woven through embedded eyebolts. The concrete weight is approximately 20" x 12". The concrete weight with SoundTrap will be placed on sand and will not be anchored into the substrate. Retrieving the equipment will be done by locating the buoy with a boat hook and pulling the entire weight, SoundTrap and buoy up by hand from the boat. No one will be swimming or diving in the water to retrieve it and there will be no additional rigging needed to pull the instrument up.

At the end of the field season, the SoundTrap and associated items that were deployed under water (e.g. concrete block, buoy, etc.) will be disinfected following the BMPs for Chrondria. Last year, a modified disinfection protocol was agreed upon for the hydrophone component. This year we will not need to use any alternative and will be able to follow the disinfection protocol as stated in the BMPs completely. After disinfection, the equipment will be placed on the Sette and transported back to Honolulu consistent with protocols for all other field equipment that was in contact with the water. None of the SoundTrap items will be used in other Monument or State of Hawaii waters for at least 30 days after recovery.

2. From the permit application (pg. 22): "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 Lalo. Seal tissue and shark tissue bait will also be collected within the Monument as available."

> Was the type of bait discussed or modified last year during the processing of the application or is this wording still correct to include in the documents for the BLNR submittal?

a. There was no discussion or modification to the type of bait last year during processing of the application. This wording is correct. It may be useful to note that the predominant source of bait this year and in most years is fish bait that is brought out each year from Honolulu.

3. From the permit application (pgs. 5 – 6): "Since the initial request of 20 made at the beginning of this project, 7 Galapagos sharks have been caught and removed, leaving 13 remaining. The request for this year is for 13 Galapagos sharks. This is the balance of initially requesting removal of 20 sharks, minus the 7 that have been removed historically to-date. Fishing requires a great deal of effort, and catch-per-unit-effort is low, therefore we expect that reaching this initial target number is still a long-term goal.

Published data and consultation with Carl Meyer puts the population somewhere between 668 to just over 1000 sharks. The estimated removal would be between 1.3 – 1.9% of the population. Generally, we don't remove more than 1 shark per season or 0.1% of the population.

Predation peaked in 1997-1999; it continued at a rate of 5-11 pups per year from 2000-2019 (usually 15-25% of the pup cohort each year). In 2019, 35 pups were born at FFS during the field season and Galapagos shark predation was confirmed in 3 pup deaths and strongly suspected in 6 additional disappearances, accounting for 25% of the pups born. Information from 2020 is not available because our field camps were not deployed due toCOVID-19.

Between 1997 and 2019, shark predation affected over 270 pups out of roughly 1150 born at Lalo. Sharks have killed many pups and others were permanently maimed by severe shark bites and subsequently died."

> Was there any update or change to this information above from the 2021 field season, in terms of monk seal pups affected/killed or sharks removed?

a. Thanks for asking that question. Here is an update from the 2021 field season:

There were no direct observations of predatory behavior towards pups or evidence of predation (injury/disappearance of seal pups) throughout the atoll in 2021. This means that no triggers for shark removal were met, no fishing occurred and no sharks were removed. Furthermore the program halted our main predation mitigation effort, which is seal translocation from at-risk islets to Tern Island, because there was no predation to avoid and thus no benefit to this activity in 2021.

An important caveat here is that in 2021, our field teams were deployed for ~ 2 fewer months than a typical season, meaning that surveillance was only about half of a normal year. We look forward to finding out if observations during our full length field season in 2022 will be consistent with the observations in 2021, and will be sure to report on that after the teams return. We don't want to remove sharks, but if those triggers are met, we want our efforts to be as specific and targeted as possible and this is best achieved when fishing occurs immediately after a trigger is met. We therefore include shark removal in our application so that our teams are nimble enough to respond to shark predation at Lalo if/when the need arises again in the future.

An additional observation that was unique in 2021 and is worth mentioning is that a Galapagos shark was observed patrolling the shallow waters around Tern Island by turtle researchers on shore in spring 2021. We grew concerned when the turtle research team reported this to us, but thankfully there were no pups in the area at that time and no Galapagos sharks were seen from Tern Island for the duration of the field season. The single islet that has historically been free of Galapagos shark predation on seal pups is Tern Island, so we hope this was a rare isolated observation.

4. The U.S. Fish and Wildlife Service, has been involved in the shark culling conversation as it relates to monk seal research and recovery conservation in the Monument since 2008. It has been the approach of the agency that we will abstain from approving or rejecting that particular activity as it is described in the annual proposals, and this remains unchanged.

a. We acknowledge this comment.

5. We look forward to receiving the next round of scientific reports related to these activities listed in the permit.

a. We look forward to sharing that information. At this time, the 2021 population summary is in the internal review process and we would be glad to provide a briefing once that is finalized. Our Stock Assessment Reports are publicly available here (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock#pinnipeds---phocids-(earless-seals-or-true-seals).

Environmental Compliance:

NEPA / HEPA: (check-one)

☐Categorical Exclusion / Exempt Class: 5
☐ EA
☒ EIS Programmatic EIS for NOAA NMFS Hawaiian Monk Seal Recovery Actions (June 2014)

Other Consultations: (ESA/MMPA Section 7; NHPA Section 106, etc.)

- ESA/MMPA permit 22677 has been issued to PIFSC HMSRP for activities associated with this permit.

- Quarantine procedures will be carefully followed at each island where personnel land (BMPs 007, 011). This includes use of gear purchased new and dedicated to each island / atoll. Thorough cleaning, biosecurity, and safe storage protocols are followed between field seasons. To mitigate risk of spreading the *Chondria tumulosa* within the monument and Main Hawaiian Islands, the monk seal team will follow the Best Management Practices to Minimize the Spread of *Chondria tumulosa* (BMP #20); any activities which fall outside of BMP 020 (Best Management Practices to Minimize the Spread of Chondria Tumulosa) are addressed in separate consultations with subject matter experts and the permit coordinator and prior to departure and in a supplemental Chondria biosecurity plan ("PIFSC PSD Biosecurity Plan for Chondria tumulosa"; attached at end of submittal). The supplemental biosecurity plan has been written for approval from the MMB as outlined per draft BMP #20; the researchers will ensure concurrence from the MMB prior to permitted activities occurring. Note: some changes to protocol may occur after final review.

- The proposed activities are in compliance with the National Environmental Policy Act Environmental Assessment for conducting Hawaiian Monk Seal Conservation and Management Activities in PMNM (May 2012).

- NHPA Section 106 consultation completed for archipelagic wide operations (main and northwestern Hawaiian Islands) in November 2013.

- The EA for the original permit resulted in a FONSI (Finding of No Significant Impact) and is titled: Supplemental Environmental Assessment On Issuance Of A Permit For Field Research and Enhancement Activities On The Endangered Hawaiian Monk Seal (Permit No. 10137-04)

The Department has made an exemption determination for this permit in accordance chapter 343, HRS, and Chapter 11-200.1, HAR. See Attachment ("DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS AND CHAPTER 11-200.1 HAR, FOR PAPAHĀNAUMOKUĀKEA MARINE NATIONAL MONUMENT CONSERVATION AND MANAGEMENT PERMIT TO MS.

MICHELLE LINO, NOAA FISHERIES, PACIFIC ISLANDS FISHERIES SCIENCE CENTER, FOR ACCESS TO STATE WATERS TO CONDUCT HAWAIIAN MONK SEAL MANAGEMENT AND RECOVERY ACTIVITIES, INCLUSIVE OF THE REMOVAL OF INDIVIDUAL SHARKS AT FRENCH FRIGATE SHOALS DISPLAYING PREDATORY BEHAVIOR TOWARDS MONK SEAL PUPS UNDER PERMIT PMNM-2022-012")

Has Applicant been granted a permit from the State in the past? Yes ☒ No ☐

The Applicant (NOAA) has been granted a permit to conduct similar activities many different years since the inception of the PMNM permitting process, including the following permits: PMNM-2021-015, PMNM-2020-006, PMNM-2018-014, PMNM-2017-012, PMNM-2011-029, PMNM-2010-018, PMNM-2009-030, PMNM-2008-016, and to conduct associated Hawaiian monk seal recovery work.

If so, please summarize past permits:

Have there been any	a) violations:	Yes ☐	No ☒
	b) Late/incomplete post-activity reports:	Yes ☐	No ☒

Are there any other relevant concerns from previous permits? Yes ☐ No ☒

STAFF OPINION:

DAR staff is of the opinion that Applicant has properly demonstrated valid justifications for their application and should be allowed to enter the NWHI State waters and to conduct the activities therein as specified in the application with certain special instructions and conditions, which are in addition to the Papahanaumokuakea Marine National Monument Conservation and Management Permit General Conditions. All suggested special conditions have been vetted through the legal counsel of the Co-Trustee agencies (see Recommendation section).

MONUMENT MANAGEMENT BOARD OPINION:

The MMB is of the opinion that the Applicant has met the findings of Presidential Proclamation 8031 and this activity may be conducted subject to completion of all compliance requirements. The MMB concurs with the special conditions recommended by NOAA, USFWS, ONMS, DAR, DOFAW and OHA staff.

RECOMMENDATION:
Based on the attached proposed declaration of exemption prepared by the department after consultation with and advice of those having jurisdiction and expertise for the proposed permit actions:

1. That the Board declare that the actions which are anticipated to be undertaken under this permit will have little or no significant effect on the environment and is therefore exempt from the preparation of an environmental assessment.

2. Upon the finding and adoption of the department's analysis by the Board, that the Board delegate and authorize the Chairperson to sign the declaration of exemption for purposes of recordkeeping requirements of chapter 343, HRS, and chapter 11-200.1, HAR.

3. That the Board authorize and approve a Conservation and Management Permit to Ms. Michelle Lino, NOAA Fisheries, Pacific Islands Fisheries Science Center, for Access to State Waters to Conduct Hawaiian Monk Seal Management and Recovery Activities, Inclusive of the Removal of Individual Sharks at French Frigate Shoals Displaying Predatory Behavior Towards Monk Seal Pups, with the following special conditions:

    a. That the permittee provides, to the best extent possible, a summary of their Monument access, including, but not limited to, any initial findings to the DLNR for use at educational institutions and outreach events.

    b. This permit is not to be used for nor does it authorize the sale of collected organisms. Under this permit, the authorized activities must be for noncommercial purposes not involving the use or sale of any organism, by-products, or materials collected within the Monument for obtaining patent or intellectual property rights.

    c. The permittee may not convey, transfer, or distribute, in any fashion (including, but not limited to, selling, trading, giving, or loaning) any coral, live rock, or organism collected under this permit without the express written permission of the Co-Trustees.

    d. To prevent introduction of disease or the unintended transport of live organisms, the permittee must comply with the disease and transport protocol attached to this permit.

    e. Tenders and small vessels must be equipped with engines that meet EPA emissions requirements.

    f. Refueling of tenders and all small vessels must be done at the support ships and outside the confines of lagoons or near-shore waters in the State Marine Refuge.

    g. No fishing is allowed in State Waters except as authorized under State law for subsistence, traditional and customary practices by Native Hawaiians.

    h. To mitigate risk of spreading the *Chondria tumulosa* within the monument and Main Hawaiian Islands, the permittee will follow the Best Management Practices to Minimize the Spread of *Chondria tumulosa* (BMP #20); any activities which fall outside of BMP 020 (Best Management Practices to Minimize the Spread of Chondria Tumulosa) are addressed in separate consultations with subject matter experts and the permit coordinator and prior to departure and in a supplemental Chondria biosecurity plan (PIFSC PSD Biosecurity Plan for *Chondria tumulosa*). The researchers will ensure approval of the supplemental biosecurity plan from the MMB prior to permitted activities occurring.

i. The permittee is required to follow all applicable Federal, State, and County laws with respect to the COVID-19 emergency response that apply at the time of departure and return. In issuance of this permit, the State of Hawaii is not otherwise monitoring or regulating permittee's compliance with COVID-19 laws and is not responsible for the health and safety of crew members, researchers or other occupants of the vessel associated with this permit.

Respectfully submitted,

Brian J. Neilson, Administrator
Division of Aquatic Resources

APPROVED FOR SUBMITTAL

Suzanne D. Case, Chairperson
Board of Land and Natural Resources

Attachments:

1) Declaration of Exemption ("DE") from the Preparation of an Environmental Assessment under the Authority of Chapter 343, HRS & Chapter 11-200.1 HAR
2) PMNM Application
3) Compliance Information Sheet (CIS FORM)
4) Pacific Islands Fisheries Science Center (PIFSC) - Protected Species Division (PSD) Biosecurity Plan for *Chondria tumulosa*

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 8, 2022

TO: Division of Aquatic Resources File

THROUGH: Suzanne D. Case, Chairperson

FROM: Brian J. Neilson, Administrator
Division of Aquatic Resources

SUBJECT:

DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS AND CHAPTER 11-200.1 HAR, FOR A PAPAHĀNAUMOKUĀKEA MARINE NATIONAL MONUMENT CONSERVATION AND MANAGEMENT PERMIT TO MS. MICHELLE LINO, NOAA FISHERIES, PACIFIC ISLANDS FISHERIES SCIENCE CENTER, FOR ACCESS TO STATE WATERS TO CONDUCT HAWAIIAN MONK SEAL MANAGEMENT AND RECOVERY ACTIVITIES, INCLUSIVE OF THE REMOVAL OF INDIVIDUAL SHARKS AT FRENCH FRIGATE SHOALS DISPLAYING PREDATORY BEHAVIOR TOWARDS MONK SEAL PUPS UNDER PERMIT PMNM-2022-002.

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The following permitted activities are found to be exempted from preparation of an environmental assessment under the authority of Chapter 343, HRS and Chapter 11-200.1, HAR:

Project Title: Papahānaumokuākea Marine National Monument Conservation and Management Permit to Ms. Michelle Lino, NOAA Fisheries, Pacific Islands Fisheries Science Center, for Access to State Waters to Conduct Hawaiian Monk Seal Management and Recovery Activities, Inclusive of the Removal of Individual Sharks at French Frigate Shoals Displaying Predatory Behavior Towards Monk Seal Pups.

Permit Number: PMNM-2022-002

Project Description: Michelle Lino (applicant) proposes to continue conservation and management activities by NOAA NMFS Pacific Islands Fisheries Science Center (PIFSC) Hawaiian Monk Seal Research Program (HMSRP) for monitoring and recovery of the Hawaiian monk seal (*Neomonachus schauinslandi*) in Papahānaumokuākea. 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 affect the survival and recovery of the species.

The Conservation and Management Permit, as described below, would allow entry and activities to occur in Papahanaumokuakea Marine National Monument, including the NWHI State Marine Refuge and the waters (0-3 nautical miles) surrounding the following sites:

- Nihoa Island
- Necker Island (Mokumanamana)
- French Frigate Shoals
- Gardner Pinnacles
- Laysan Island
- Lisianski Island
- Pearl and Hermes Atoll
- Midway Atoll
- Kure Atoll

Proposed activities would be conducted by up to 25 individuals and would be authorized to occur between April, 2022 – April, 2023.

Everything proposed in this renewal permit has been reviewed and approved in previous permits (most recent is PMNM-2021-015), with the exception of the supplemental Chondria biosecurity plan ("PIFSC PSD Biosecurity Plan for *Chondria tumulosa*), attached at the end of the submittal. The newest activity added to this permit consists of installing trail cameras at Pearl and Hermes Atoll (PHA) (proposed and approved in 2021). Trail cameras and all associated equipment will be retrieved before field staff leave PHA at the end of the season.

General information on monk seal research and recovery initiatives, methods and tools are located on pgs. 2-17. Detailed information on methods, protocol, consultation and the minimization of impacts of the shark predation mitigation activities are located under B) Recovery Intervention - section xii. Shark Predation Mitigation Activities (pgs. 6-12). Clarification and updates of the results thus far of shark predation mitigation activities at French Frigate Shoals are located on pgs. 19-20 (questions 2 & 3).

<u>Information on Monk Seal Research and Recovery Initiatives</u>
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 approximately 1,400 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 22677 (and associated NEPA docs etc.) and supported by the Revised Recovery Plan for Hawaiian Monk Seals.

• This permit also supports efforts conducted by the State and Federal partners that are directed towards monk seal research and recovery.

• To maximize the benefit from the researchers limited time in this remote place, the Program will use a suite of methods to ensure that all areas are well-surveyed (including using technology to expand data collection, and requesting access to all monk seal haul-out areas).

• Unmanned aerial systems (UAS) will be used to conduct ecological surveys including surveying and monitoring monk seals, marine debris, and possibly other flora and fauna in the NWHI (as a by-product of habitat mapping or as requested by partners).

• UAS will be launched and recovered from land, NOAA ships, or small boats launched from those ships, and will be flown at altitude below 400 feet.

• UAS efforts will provide the ability to survey and map resources on the remote islands without (1) interference; (2) the potential for the introduction of invasive species; and (3) human disturbance to the natural resources. The UAS would increase the monitoring and surveying capacity in the Monument.

• While the researchers work to minimize human presence on Mokumanamana, trained biologists familiar with the island may traverse Mokumanamana, using paths delineated by archaeologists and cultural practitioners familiar with the island, in the event that all seal haul-out areas cannot be surveyed through boat-landings or UAS flights at haul-out sites.

• This permit is comprehensive and includes ALL monk seal recovery activities that occur in the Monument including the mitigation of predation by Galapagos sharks on monk seal pups at French Frigate Shoals (FFS); the primary source of seal mortality at FFS.

• This is a continuation of permitted shark removal activities for monk seal conservation. The initial target of 20 sharks was determined based on data from the field whereby individually identifiable sharks (through tags or naturally acquired markings on their dorsal fins) that were engaged in predatory behavior on monk seal pups were enumerated. Shark biologists were consulted and ecosystem modeling efforts indicated that the Galapagos shark population, which is neither threatened nor endangered, was capable of sustaining this level of population reduction. Hence, the initial request of 20 sharks was based on an agreed upon minimum number of sharks that were exhibiting this behavior, paired with ecosystem based support.

Since the initial request of 20 made at the beginning of this project 7 Galapagos sharks have been caught and removed, leaving 13 remaining. The request for this year is for 13 Galapagos sharks. This is the balance of initially requesting removal of 20 sharks, minus the 7 that have been removed historically to-date. Fishing requires a great deal of effort, and catch-per-unit-effort is low, therefore the researchers expect that reaching this initial target number is still a long-term

goal.

Published data and consultation with Carl Meyer puts the population somewhere between 668 to just over 1000 sharks. The estimated removal would be between 1.3 – 1.9% of the population. Generally, the researchers don't remove more than 1 shark per season or 0.1% of the population.

• Predation peaked in 1997-1999; it continued at a rate of 5-11 pups per year from 2000-2019 (usually 15-25% of the pup cohort each year). In 2019, 35 pups were born at FFS during the field season and Galapagos shark predation was confirmed in 3 pup deaths and strongly suspected in 6 additional disappearances, accounting for 25% of the pups born. Information from 2020 is not available because the researcher's field camps were not deployed due to COVID-19. There were no direct observations of predatory behavior towards pups or evidence of predation (injury/disappearance of seal pups) throughout the atoll in 2021. This means that no triggers for shark removal were met, no fishing occurred and no sharks were removed. Furthermore the Program halted their main predation mitigation effort, which is seal translocation from at-risk islets to Tern Island, because there was no predation to avoid and thus no benefit to this activity in 2021. An important caveat here is that in 2021, the field teams were deployed for ~ 2 fewer months than a typical season, meaning that surveillance was only about half of a normal year. The researchers look forward to finding out if observations during the full length field season in 2022 will be consistent with the observations in 2021, and will be sure to report on that after the teams return.

• Between 1997 and 2019, shark predation affected over 270 pups out of roughly 1150 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. Translocating pups remains the researcher's most common intervention and in 2019, 14 pups were translocated.

• 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 and the HMSRP will continue to be mindful and respectful of the historical and cultural significance of sharks when conducting these activities. .

• 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.

<u>Activities for Monk Seal Research and Recovery</u>

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 the attached document MMPA/ESA Permit 22677. 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 22677 will occur across the NWHI.

b. Deploying field staff in camps for months at a time at Lalo, Kamole, Kapou, Manawai, and Hōlanikū. Our presence at Kuaihelani will be brief, during 1-2 day visits based off of the research vessel when deploying and recovering camps nearby and will be coordinated with USFWS. Also in coordination with USFWS this year, the researchers expect to have staff at Kuaihelani supporting monitoring activities for Hawaiian monk seals during the mouse eradication effort planned for summer 2022.

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 22677.

d. Use UAS (APH-22 hexacopter or Mavic Pro GE) to monitor Hawaiian monk seal populations (including counts, individual identification, body condition assessment), marine debris, and possibly other flora and fauna on or around islets in the monument.

The APH-22 has a pilot in command (PIC) and a ground station operator (GSO) visual observer (VO) and is launched from land or the GSO/VO's hand. The Mavic Pro Ge is a vertical take-off and landing UAS that can be launched from land or boat but does not necessitate the use of a ground station or GSO. Operation of the Mavic Pro GE will also involve a VO other than the PIC. Once any UAS is launched, the VO monitors the UAS flight and scans the sky to see if there is any air traffic or bird activity requiring the landing of the UAS. The UAS will fly for a maximum of 30 minutes and will remain at all times within the pilot's visual line of sight and less than 0.5-nm.

General Operation Guidelines will include:

- Operation in daylight hours only.
- Operation in winds less than 25kts.
- Only NOAA Certified Pilots trained specifically for the APH-22 or the Mavic Pro GE will operate the system.
- Pilots will minimize multiple takeoffs and landing in a single location if birds are present to minimize repeat disturbance to birds.

DJI Mavic Pro GE Specifications:

- Body: Quadcopter with 4 foldable arms
- Diagonal size (excluding propellers): 13.2" (335mm)

- Weight (including battery and propellers: 1.62 lbs (734 g)
- Max Flight Time: 27 minutes
- Range, Physical: 8 miles (13km, no wind)
- Range, Max Transmission: 4.3 mi (7km)
- Payload: Integrated camera on gimbal
- Max Speed: 40 mph (65 kph)

For Mokumanamana visits, the researchers will follow all appropriate Mokumanamana and PMNM Best Practices, as well as adhere to these General Guidelines:

- Only traverse Mokumanamana when full surveys cannot be completed by multiple boat landings or UAS activities.
- A qualified and experienced Resource Monitor would be present.
- Minimum number of personnel would go ashore and undertake the hike.

e. Deployment of acoustic recording devices to capture underwater vocalizations of Hawaiian monk seals.

Passive acoustic monitoring via SoundTraps is a non-invasive method for studying underwater sounds. This study will use two SoundTrap ST500 HF underwater acoustic recorders at two sites (Lalo and Manawai) to record the underwater vocalizations of Hawaiian monk seals and seasonal trends in their typical aquatic soundscape. It is important for increasing the baseline knowledge of their communication system and for measuring the level of man-made noise they encounter. Assessing the impacts of man-made sound on monk seal communication can inform conservation decisions, particularly the development of noise mitigation measures and population monitoring through passive acoustics.

The first year of deployment (2021) was successful in obtaining underwater vocalization data and thus this project will continue into 2022 with no modifications.

Other monk seal directed research as needed and authorized by MMPA/ESA permit 22677. 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 cestodicides and nematocides (e.g. praziquantel, fenebendazole, 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. The researchers 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.

a. In 2021, the researchers began a project to incorporate the Huli ʻIa into their field camps which is intended to extend into 2022 and beyond. The intent is to open dialogue and recognize, record and ultimately share seasonal observations about Papahānaumokuākea made when teams are deployed.

xi. Collect and 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 Monument BMPs (especially BMPs 005, 007, 011 and those being refined specific to *Chondria* mitigation at Manawai and Kuahelani).

a. Disentanglement of threatened and endangered species by authorized personnel, monitoring of sites that have been cleared of debris for recovery rates and effects of removal;

b. Location and removal of debris. The team will cooperate with partners leading marine debris efforts on how to best integrate and support their activities. Of particular note: *If* any debris removal activities do occur at Manawai and Kuahelani, the researchers will abide by best practices for *Chondria* biocontrol and work with the State and other partners to ensure coordination and compliance with those practices.

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 Galapagos sharks that they encounter within 700m of shore of any islet at Lalo where predatory behavior is observed. 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**.

b. Fishing Methods: Four different methods will serve as a “toolbox” of options to safely remove a maximum of 13 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 catch per unit effort (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 harpoon will be used in shallow water, from shore or close to shore or from a small boat; bottomsets and drumlines will be used in deeper water, over sandy substrate at distances farther 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.

Handlines and harpoons have the advantage of being very specific and have been successful in the past. Bottomsets and drumlines are, by design, restricted by habitat characteristics due to the potential for lines to become 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 single 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 the researchers employ more than one method at a time, the researchers still expect that the total number of removals will be low based on the low CPUE in the shallow lagoon.

The researchers will monitor the total number of baited hooks deployed across methods in order to remain within the proposed catch quota of 13 additional sharks. The researchers 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.

The researchers 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 the researcher's 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 the program's 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, the researchers will ensure that they 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; the researchers 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 the researchers 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 conducts 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 prior to fishing activities will occur boat-side on inert material.

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 and that will continue unless directed otherwise by the OHA partners.

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.

<u>Evaluation of Shark Removal Activities, Consultation with Monument Co-Trustees/Partners, and Efforts to Minimize the Impacts of the Removal Activity</u>

All monk seal conservation and management activities conducted by the permittees 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.

The Program has conducted monk seal research and conservation activities in the NWHI for decades. The researchers have a large presence in the NWHI and with that comes the potential to negatively impact a number of cultural and natural resources. The researchers have worked hard over the decades to develop and refine the 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 the researchers direct considerable energy to share information with the Monument partners on the need and justification for each activity. For example, the researchers have consulted extensively with the MMB and native Hawaiian partners in past years for the shark predation mitigation that is included in this project and has been permitted multiple times.

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, the researchers consulted with and received quality input from OHA and the Monument's Native Hawaiian Cultural Working Group (CWG). The feedback from the CWG and others was not homogenous with a diverse array of perspectives and opinions both supporting and opposing the activity. The CWG determined it was unable to offer an endorsement or censure of the proposed management activity and has not reviewed the activity since. In 2020, the researchers were invited to meet with a representative of the CWG and answered some questions related to this activity. It was a good opportunity to reconnect and the researchers welcome any opportunity to provide further information to the CWG 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 the proposed work. From these meetings, the researchers also supported the participation of a number of Native Hawaiians in the shark predation mitigation work in 2010 and 2011.

In 2013 with the addition of seal flesh as bait, the researchers were encouraged by the State of Hawaii Board of Land and Natural Resources to communicate with, and be responsive to, stakeholders regarding this activity. The researchers alerted approximately 35 organizations and individuals about the field activities during the 2013 field season (including shark fishing) and updated them on the plans for the 2014 season. To date, none of these entities has expressed questions or concerns.

The researchers also undertook consultations regarding the use of tissue from previously deceased monk seals as bait with several Native Hawaiians with whom the researchers have been working with on other monk seal issues. In this regard, the researchers have held one-on-one discussions with several individuals (cultural practitioners, partners, and/or advisors). Input the researchers received during these one-on-one discussions ranged from full support and understanding to acceptance without expressed support. No one the researchers spoke with regarding the use of seal tissue has voiced opposition or indicated that the use of seal tissue as proposed would adversely affect their productive relationships with the Program or otherwise diminish their support for monk seal conservation. The overarching sentiment the researchers have heard has been that as long as the seals would be dead of a cause beyond the researchers 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, the researchers propose to limit the scope of the 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.

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

Proposed fixed installations and instrumentation proposed to be set in the Monument

A) The researchers propose to install:

i. Temporary Installation polyvinyl tents for housing monk seal field teams at French Frigate Shoals, Laysan, Lisianski, Pearl and Hermes Reef and Kure. One tent at each site will also have a radio antenna extending upwards <10ft.

ii. Trail Cameras at Lalo (Tern Island) and Manawai (North and Little North Islands). Trail cameras are compact, self-contained systems that are programmed to take a certain number of pictures per day capturing the presence or absence of animals in specific locations. Sizes of trail camera systems including external solar panels will be no larger than 16" x 12" x 12". Weights of systems including solar panels will be no more than 5 lbs. These are used to monitor for threats to seals, specifically entrapment (Tern Island) and male aggression (Manawai).

Cameras will be mounted via padded tripod or T-post, no more than 5’ in height. Plastic or steel bird deterrent spikes will be added to the camera systems to deter birds from blocking the camera’s view and excreting on solar panels.

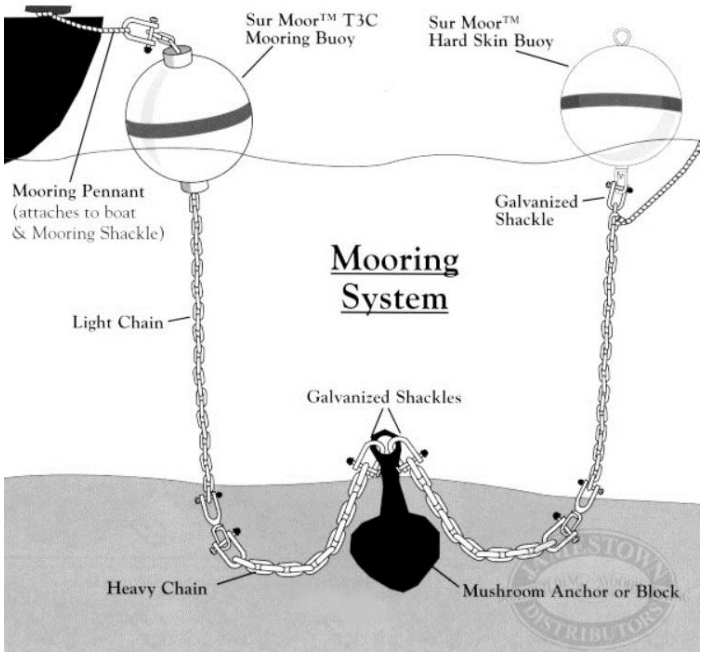
The cameras will be deployed staff from approximately May-August (during the field season) at North and Little North Islands (Manawai). Inclement weather at Manawai often prevents boating for multiple days at a time, resulting in less observation time on North and Little North Islands. These cameras help to fill in gaps in survey coverage. Images will be reviewed weekly during the season to provide close to real-time information on male aggression to HMSRP leadership, which will help guide management and recovery decisions within the season, such as pup translocation. Additionally, the majority of pups at Manawai are born at North and Little North, and the trail cameras may also provide incidental population assessment data on births and weaning events. The cameras will be facing areas of previously observed or suspected male aggression, mainly near the southern portion of North Island, the northern portions of the North Island spits, and the northern portion of Little North Island. Weekly visits will be conducted, in which SD cards will be swapped out in the trail cameras to continue recording during the field season. Trail cameras and all associated equipment will be retrieved before field staff Manawai at the end of the season.

Cameras will be deployed similarly at Tern Island (Lalo), but will remain in place until the following field season because their purpose is to support post-season entrapment monitoring. Cameras may be mounted on the seawall but will more likely be mounted via padded tripod or T-post. In 2020-2021, seawall mounted cameras failed due to the heavy wave action encountered by the seawall in the winter.

iii. Temporary (season-long) mooring systems to anchor two small boats at Southeast Island, Pearl and Hermes Reef and, in instances when the davit is unavailable, potentially at Tern Island, French Frigate Shoals. These systems are recommended over traditional anchoring for leaving boats unattended for long intervals, i.e. overnight, in high surge areas. etc. In

many cases, a mooring system is the safest way to leave a boat in the water to prevent it from breaking free and coming ashore, which will cause damage to the boat and shoreline environment.

Permanent and/or semi-permanent moorings use less scope than traditional anchoring which reduces the "footprint" on the bottom, risk of damage to the environment and risk of wildlife entanglement/entrapment. Appropriate moorings are comprised of a suitable anchor, a light chain, and surface float. Additional line will be attached to an anchor onshore at Southeast Island and to the pier at Tern Island to ensure the vessels cannot float away if the mooring system were to fail in inclement weather. These mooring systems will be deployed on sandy substrate directly off the north side of Southeast Island and from the dock at Tern Island. The following image (credit to Jamestown Distribution) illustrates the type of system that would be temporarily installed if necessary.



iv. Underwater Acoustic Recorders. Recording Hawaiian monk seal underwater vocalizations using the SoundTrap ST500 HF

Study Objective

This study aims to record and describe the underwater vocal repertoire and seasonal trends in sound production for Hawaiian monk seals in PMNM using two SoundTrap ST500 HF underwater acoustic recorders. One recorder would be deployed at each of two locations: Lalo and Manawai. In 2021, the instruments were successfully deployed for the first time and data were successfully obtained and thus will continue into 2022 with no modifications. Specific *Chondria* protocol modifications for cleaning this sensitive equipment at Manawai were discussed and followed prior to the 2021 field season, and the researchers will review those protocols with appropriate SMEs again before deployment in 2022.

Equipment

The recording units are Ocean Instruments SoundTrap ST500 HF (serial number to be determined). The full-scale response of this model is 173 dB re 1 µPa and the bandwidth is 20 Hz - 150 kHz ± 3 dB. A SoundTrap user manual and specification sheet are attached to this protocol.

Software

SoundTrap Host software will be used to configure the instrument before and after each deployment. This software can be downloaded from the Ocean Instruments website (http://www.oceaninstruments.co.nz/downloads/). The first time the SoundTrap and then the device will be visible in the SoundTrap Host software. It will be listed as "SoundTrap serial number TBD" or "SoundTrap device is connected to the computer (via USB), drivers will be installed serial number TBD" depending upon the unit you have.

Data Storage – To be determined

Environment

Both SoundTraps should be deployed at 5-10 m depth in sandy substrates as close to land as possible. GPS locations for the SoundTraps must be taken immediately after deployment, and again when the units are "checked" to verify they have not drifted.

Duration of Deployment

Units would be deployed during the first month of the field team's arrival. Units will remain in the water for the duration of the field camp and be retrieved prior to departing the camp.

Maintenance

Units will be checked regularly during the first week of deployment. If no issues are encountered (i.e., unit not drifting and still intact) within the first week, units will be

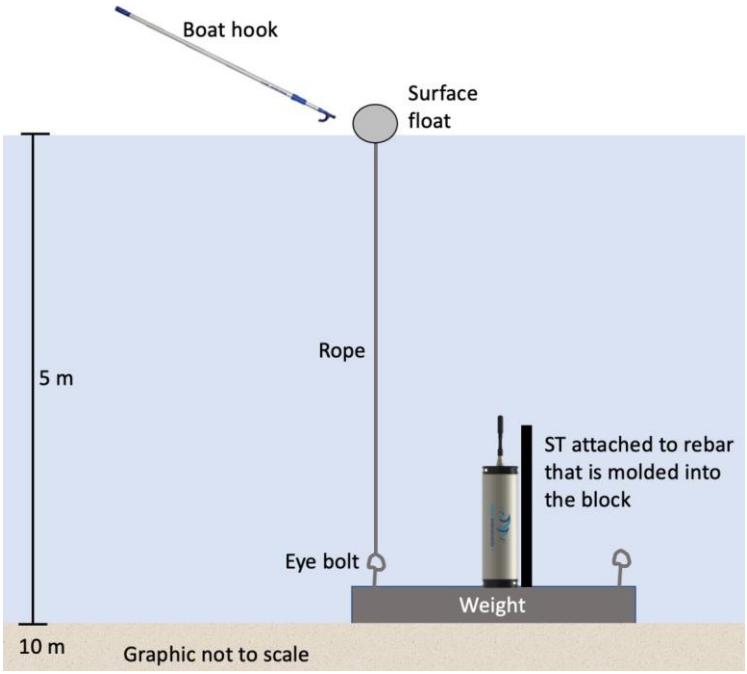
checked once a week for the remainder of the camp duration. "Checked" means seeing the unit from the boat. GPS locations for the SoundTraps must be taken when the units are "checked" to verify they have not drifted.

Equipment Configuration

Single anchored line with surface or sub-surface float (10 m total depth). The SoundTrap will be attached to a rebar stand molded into a concrete block (weight) with the hydrophone facing the surface. The rope with the float will be tied to an eyebolt molded into the concrete block. Another eye bolt at the opposite side of the concrete block can be used for lowering the unit during deployment. Two grooves at the top and bottom of the SoundTrap housing provide attachment points for cable ties. The cable ties should be threaded through the associated holes so they cannot slip off. To minimize any possible entanglement risk of the rope, supportive padding material may be attached to it.

Deployment: Unit will be lowered down by rope threaded through the eyebolt. Once the unit is stationary, one side of the rope can be dropped into the water while the other side is pulled up through the eyebolt.

Retrieval: Grappler anchor or boat hook catches buoy and unit is pulled upward towards vessel.



B) The researchers propose to maintain/repair:

a. Tern Island Entrapment Camera Project

In 2020, the researchers initiated a pilot project to deploy rugged trail cameras on Tern Island, Lalo in order to monitor wildlife entrapments. The camera systems were deployed in fall 2020 and retrieved in 2021. Unfortunately, they were swamped by the winter conditions, making the

imagery unusable. In 2022, we aim to replace the camera systems using T-posts rather than attaching them to the seawall.

Disposition of organisms or samples after collection:

- In the case of living seals collected for rehabilitation, these seals will be released back in the NWHI upon completion of rehabilitation (and clearance by veterinary examination).

- In the case of samples collected from seals (either biological specimens such as blood or tissue samples from living animals, or necropsy samples from dead animals), these will either be sent to appropriate research / diagnostic collaborators or archived in appropriate storage facilities at the NOAA IRC in Honolulu.

- In the case of samples collected from sharks (necropsy samples from dead animals), these will either be sent to appropriate research / diagnostic collaborators or cultural practitioners.

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

- 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 the researcher's MMPA/ESA permit 22677 and then are distributed to their partners. A complete list of partners is included in the attached document MMPA/ESA Permit 22677. This eliminates the likelihood of duplicative sampling or research happening related to monk seals. The researchers collaborate with a wide variety of programs to share samples and conduct research. Requests can be made to the HMSRP for samples, and sufficient biological/recovery justification samples are often shared.

Rehabilitation/Translocation of Seals

Select monk seals taken into rehabilitation outside of Monument waters and then released. Some seals will be held for a short time in shoreline pens while waiting for veterinarian assessment and possible pickup or to help them acclimate to the wild prior to release after translocation or rehabilitation. Seals that are captured and brought in for rehabilitation or transported as part of the translocation program will be housed with other monk seals. Monk seals will be released after rehabilitation or translocation. Comprehensive information on monk seal rehabilitation or translocation activities and protocols can be found under the researcher's MMPA/ESA permit 22677.

Sample and Data Analysis, Write-ups and Publication of Information

Population assessment data will be analyzed in 6 months (typically preliminary data will become available late winter/early spring of each year). Telemetry and UAS data will analyzed within 12 months.

Monument Management Plan Strategies

The activity will benefit the conservation and management of the Monument by supporting the following strategies under the Monument Management Plan (PMNM MMP Vol. 1, 2008):

• TES-1: Support Activities that advance recovery of the Hawaiian monk seal for the life of the plan.
• MD-1: Remove and prevent marine debris throughout the life of the plan.

The activities described above may require the following regulated activities to occur in State waters:

☒ Removing, moving, taking, harvesting, possessing, injuring, disturbing, or damaging any living or nonliving monument resource
☒ Anchoring a vessel
☒ Possessing fishing gear except when stowed and not available for immediate use during passage without interruption through the Monument
☒ Touching coral, living or dead
☒ Attracting any living Monument resource

The applicant would abide by the following PMNM Best Management Practices (BMPs) while conducting the aforementioned activities within the PMNM: Best Management Practices for Human Hazards to Seabirds (BMP#003); Boat Operations and Diving Activities (BMP #004); The Laysan Finch Protocol (BMP 005); Special Conditions and Rules for Moving Between Islands/Atolls and Packing for Field Camps (BMP#007); Best Practices for Minimizing the Impact of Artificial Light on Sea Turtles (BMP#009); Marine Wildlife Viewing Guidelines (BMP #010); Disease and Introduced Species Prevention Protocol for Permitted Activities in the Marine Environment (BMP #011); Precautions for Minimizing Human Impacts on Endangered Land Birds (BMP 012); Best Management Practices for Maritime Heritage Sites (BMP#017); and Best Management Practices to Minimize the Spread of *Chondria tumulosa* (BMP #20).

REVIEW PROCESS:

The permit application was sent out for review and comment to the following scientific and cultural entities: Hawaii Division of Aquatic Resources, Hawaii Division of Forestry and Wildlife, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), United States Fish and Wildlife Service Hawaiian and Pacific Islands National Wildlife Refuge Complex Office, and the Office of Hawaiian Affairs (OHA). In addition, the permit application has been posted on the Monument Web site since February/March, 2022, giving the public an opportunity to comment. The application was posted within 40 days of its receipt, in accordance with the Monument's Public Notification Policy.

MMB Agency Reviewer Questions and Applicant Responses:

1. When will the sound trap at Manawai be deployed and recovered? When it is recovered how it is going to be transported and is there any associated rigging being removed with the recorded? Please be sure to follow current Chondria protocols.

a. The SoundTrap will be deployed at Manawai by the field teams during their routine activities at the start of the field season in mid-May. It will be left in place (visually monitored) during the field season until camps conclude in mid-August. The equipment will be retrieved and packed by the field teams as with all other gear and supplies and will not be left in place after the field season.

The SoundTrap lies horizontally on top of a concrete weight and is secured to the weight using hose clamps and zip ties woven through embedded eyebolts. The concrete weight is approximately 20" x 12". The concrete weight with SoundTrap will be placed on sand and will not be anchored into the substrate. Retrieving the equipment will be done by locating the buoy with a boat hook and pulling the entire weight, SoundTrap and buoy up by hand from the boat. No one will be swimming or diving in the water to retrieve it and there will be no additional rigging needed to pull the instrument up.

At the end of the field season, the SoundTrap and associated items that were deployed under water (e.g. concrete block, buoy, etc.) will be disinfected following the BMPs for Chrondria. Last year, a modified disinfection protocol was agreed upon for the hydrophone component. This year we will not need to use any alternative and will be able to follow the disinfection protocol as stated in the BMPs completely. After disinfection, the equipment will be placed on the Sette and transported back to Honolulu consistent with protocols for all other field equipment that was in contact with the water. None of the SoundTrap items will be used in other Monument or State of Hawaii waters for at least 30 days after recovery.

2. From the permit application (pg. 22): "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 Lalo. Seal tissue and shark tissue bait will also be collected within the Monument as available."

> Was the type of bait discussed or modified last year during the processing of the application or is this wording still correct to include in the documents for the BLNR submittal?

a. There was no discussion or modification to the type of bait last year during processing of the application. This wording is correct. It may be useful to note that the predominant source of bait this year and in most years is fish bait that is brought out each year from Honolulu.

3. From the permit application (pgs. 5 – 6): "Since the initial request of 20 made at the beginning of this project, 7 Galapagos sharks have been caught and removed, leaving 13 remaining. The request for this year is for 13 Galapagos sharks. This is the balance of initially requesting removal of 20 sharks, minus the 7 that have been removed historically to-date. Fishing requires a great deal of effort, and catch-per-unit-effort is low, therefore we expect that reaching this initial target number is still a long-term goal.

Published data and consultation with Carl Meyer puts the population somewhere between 668 to just over 1000 sharks. The estimated removal would be between 1.3 – 1.9% of the population. Generally, we don't remove more than 1 shark per season or 0.1% of the population.

Predation peaked in 1997-1999; it continued at a rate of 5-11 pups per year from 2000-2019 (usually 15-25% of the pup cohort each year). In 2019, 35 pups were born at FFS during the field season and

Galapagos shark predation was confirmed in 3 pup deaths and strongly suspected in 6 additional disappearances, accounting for 25% of the pups born. Information from 2020 is not available because our field camps were not deployed due toCOVID-19.

Between 1997 and 2019, shark predation affected over 270 pups out of roughly 1150 born at Lalo. Sharks have killed many pups and others were permanently maimed by severe shark bites and subsequently died."

> Was there any update or change to this information above from the 2021 field season, in terms of monk seal pups affected/killed or sharks removed?

a. Thanks for asking that question. Here is an update from the 2021 field season:

There were no direct observations of predatory behavior towards pups or evidence of predation (injury/disappearance of seal pups) throughout the atoll in 2021. This means that no triggers for shark removal were met, no fishing occurred and no sharks were removed. Furthermore the program halted our main predation mitigation effort, which is seal translocation from at-risk islets to Tern Island, because there was no predation to avoid and thus no benefit to this activity in 2021.

An important caveat here is that in 2021, our field teams were deployed for ~ 2 fewer months than a typical season, meaning that surveillance was only about half of a normal year. We look forward to finding out if observations during our full length field season in 2022 will be consistent with the observations in 2021, and will be sure to report on that after the teams return. We don't want to remove sharks, but if those triggers are met, we want our efforts to be as specific and targeted as possible and this is best achieved when fishing occurs immediately after a trigger is met. We therefore include shark removal in our application so that our teams are nimble enough to respond to shark predation at Lalo if/when the need arises again in the future.

An additional observation that was unique in 2021 and is worth mentioning is that a Galapagos shark was observed patrolling the shallow waters around Tern Island by turtle researchers on shore in spring 2021. We grew concerned when the turtle research team reported this to us, but thankfully there were no pups in the area at that time and no Galapagos sharks were seen from Tern Island for the duration of the field season. The single islet that has historically been free of Galapagos shark predation on seal pups is Tern Island, so we hope this was a rare isolated observation.

4. The U.S. Fish and Wildlife Service, has been involved in the shark culling conversation as it relates to monk seal research and recovery conservation in the Monument since 2008. It has been the approach of the agency that we will abstain from approving or rejecting that particular activity as it is described in the annual proposals, and this remains unchanged.

a. We acknowledge this comment.

5. We look forward to receiving the next round of scientific reports related to these activities listed in the permit.

a. We look forward to sharing that information. At this time, the 2021 population summary is in the internal review process and we would be glad to provide a briefing once that is finalized. Our Stock

Assessment Reports are publicly available here (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock#pinnipeds---phocids-(earless-seals-or-true-seals).

Environmental Compliance:

NEPA / HEPA: (check-one)

☐ Categorical Exclusion / Exempt Class: 5
☐ EA
☒ EIS Programmatic EIS for NOAA NMFS Hawaiian Monk Seal Recovery Actions (June 2014)

Other Consultations: (ESA/MMPA Section 7; NHPA Section 106, etc.)

- ESA/MMPA permit 22677 has been issued to PIFSC HMSRP for activities associated with this permit.

- Quarantine procedures will be carefully followed at each island where personnel land (BMPs 007, 011). This includes use of gear purchased new and dedicated to each island / atoll. Thorough cleaning, biosecurity, and safe storage protocols are followed between field seasons. To mitigate risk of spreading the *Chondria tumulosa* within the monument and Main Hawaiian Islands, the monk seal team will follow the Best Management Practices to Minimize the Spread of *Chondria tumulosa* (BMP #20); any activities which fall outside of BMP 020 (Best Management Practices to Minimize the Spread of Chondria Tumulosa) are addressed in separate consultations with subject matter experts and the permit coordinator and prior to departure and in a supplemental Chondria biosecurity plan ("PIFSC PSD Biosecurity Plan for Chondria tumulosa"; attached at end of submittal). The supplemental biosecurity plan has been written for approval from the MMB as outlined per draft BMP #20; the researchers will ensure concurrence from the MMB prior to permitted activities occurring. Note: some changes to protocol may occur after final review.

- The proposed activities are in compliance with the National Environmental Policy Act Environmental Assessment for conducting Hawaiian Monk Seal Conservation and Management Activities in PMNM (May 2012).

- NHPA Section 106 consultation completed for archipelagic wide operations (main and northwestern Hawaiian Islands) in November 2013.

- The EA for the original permit resulted in a FONSI (Finding of No Significant Impact) and is titled: Supplemental Environmental Assessment On Issuance Of A Permit For Field Research and Enhancement Activities On The Endangered Hawaiian Monk Seal (Permit No. 10137-04)

Has Applicant been granted a permit from the State in the past? Yes ☒ No ☐

The Applicant (NOAA) has been granted a permit to conduct similar activities many different years since

the inception of the PMNM permitting process, including the following permits: PMNM-2021-015, PMNM-2020-006, PMNM-2018-014, PMNM-2017-012, PMNM-2011-029, PMNM-2010-018, PMNM-2009-030, PMNM-2008-016, and to conduct associated Hawaiian monk seal recovery work (note: in earlier years, shark removal activities were authorized under separate permits from monk seal activities – therefore some permit numbers differ from monk seal management permit numbers – these permit number are listed in section 3. Cumulative Impacts of Actions below on pages 23 -24).

If so, please summarize past permits:

Have there been any	a) violations:	Yes ☐	No ☒
	b) Late/incomplete post-activity reports:	Yes ☐	No ☒
Are there any other relevant concerns from previous permits?		Yes ☐	No ☒

Consulted Parties: The permit application was sent out for review and comment to the following scientific and cultural entities: Hawaii Division of Aquatic Resources, Hawaii Division of Forestry and Wildlife, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), United States Fish and Wildlife Service Hawaiian and Pacific Islands National Wildlife Refuge Complex Office, and the Office of Hawaiian Affairs (OHA). In addition, the permit application has been posted on the Monument Web site, giving the public an opportunity to comment. The application was posted within 40 days of its receipt, in accordance with the Monument's Public Notification Policy.

Exemption Determination: After reviewing §11-200.1-15, HAR, including the criteria used to determine significance under §11-200.1-13, HAR, DLNR has concluded that the activities under this permit would have minimal or no significant effect on the environment and that issuance of the permit is categorically exempt from the requirement to prepare an environmental assessment based on the following analysis:

1. All activities associated with this permit have been evaluated as a single action. Since this permit involves an activity that is precedent to a later planned activity, i.e., the same methodology used throughout the permit period, the categorical exemption determination here will treat all planned activities as a single action under §11-200.1-10, HAR. This permit may involve an activity that is precedent to a later planned activity, i.e. the continued removal of sharks next year if thirteen (13) sharks are not removed this year, or removal of twenty (20) sharks in total over a multi-year period since the project's inception. Subsequent activities will depend largely on the results achieved under this permit.

2. The General Exemption Type #5 for Basic Data Collection, Research and Experimental Management with no Serious or Major Environmental Disturbance Appears to Apply. §11-200.1-16 (a) (1) and §11-200.1-16 (a) (2), HAR, exempts the class of actions that involve "basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource." This exemption type has been interpreted to include the conservation and management activities conducted by NOAA NMFS Pacific Islands Fisheries Science Center (PIFSC) Hawaiian Monk Seal Research Program (HMSRP) for monitoring and recovery of the Hawaiian monk seal, such as those being proposed.

The proposed activities here appear to fall squarely under the general exemption type identified under HAR §11-200.1-16 (a) (1) and §11-200.1-16 (a) (2), as described under the revised 2020 DLNR Exemption List (Concurred on by the Environmental Council on November 10, 2020), under the general exemption type #5 (Part 1), items #13 and #15 and (Part 2), item #4, which includes, respectively, "research that the Department declares is designed specifically to monitor, conserve, or enhance native species or native species' habitat", "game and non-game wildlife surveys, vegetation and rare plant surveys, aquatic life surveys, inventory studies, new transect lines, photographing, recording, sampling, collection, culture, and captive propagation" and "experimental management actions that the Department declares are designed specifically to monitor, conserve, or enhance native species or native species' habitat."

The Applicants would follow Monument Best Management Practices (BMPs) to mitigate threats activities could have on listed species, sea birds, and terrestrial birds. The BMPs include Human Hazards to Seabirds (BMP 003), the Laysan Finch Protocol (BMP 005), Artificial Light on Sea Turtles (BMP 009), Marine Wildlife Viewing Guidelines (BMP 010), and Precautions for Minimizing Human Impacts on Endangered Land Birds (BMP 012). Bycatch would be expected to be minimal based on experience from previously approved permits from 2010 to 2015 (PMNM-2012-013 and PMNM-2013- 017, PMNM-2014-023, PMNM-2015-009) and research done by Meyer in 2009 (PMNM-2009-009 and PMNM-2009-036). To avoid the misidentification between Galapagos sharks and grey reef sharks, the minimum size requirement would be set to about 160 cm for removal and an absence of the dorsal ridge seen in grey reef sharks.

As discussed below, no significant disturbance to any environmental resource is anticipated. Thus, so long as the below considerations are met, the general exemption types should include the action now contemplated.

3. Cumulative Impacts of Actions in the Same Place and Impacts with Respect to the Potentially Particularly Sensitive Environment Will Not be Significant. Even where a categorical exemption appears to include a proposed action, the action cannot be declared exempt if "the cumulative impact of planned successive actions in the same place, over time, is significant, or when an action that is normally insignificant in its impact on the environment may be significant in a particularly sensitive environment." §11-200.1-15 (d), HAR. To gauge whether a significant impact or effect is probable, an exempting agency must consider every phase of a proposed action, any expected primary and secondary consequences, the long-term and short-term effects of the action, the overall and cumulative effect of the action, and the sum effects of an action on the quality of the environment. §11-200.1-13, HAR.

This project would continue shark removal activities that were undertaken in 2007 and 2010 to 2020, under permits (in earlier years, shark removal activities were authorized under separate permits from monk seal activities – therefore some permit numbers differ from monk seal management permit numbers) PMNM-2007-025, PMNM-2010-014, PMNM-2011-007, PMNM-2012-013, and PMNM- 2013-017, PMNM-2014-023, PMNM-2015-009, PMNM-2016-008, PMNM-2018-014, PMNM-2020-006 (monk seal teams not deployed due to COVID) and PMNM-2021-015; these activities had no deleterious effects on Monument resources. Possible adverse effects on the coral reef ecosystem at French Frigate Shoals (FFS) from shark removals were investigated using the EcoSim model (Parrish, NMFS). Results from that work indicated that the removal of 20 sharks had a nearly imperceptible effect on the dynamics of the FFS ecosystem. With that in mind, significant cumulative impacts are not anticipated as a result of this activity,

and numerous safeguards further ensure that the potentially sensitive environment of the project area will not be significantly affected. All activities will be conducted in a manner compatible with the management direction of the Monument Proclamation in that the activities do not diminish monument resources, qualities, and ecological integrity, or have any indirect, secondary, cultural, or cumulative effects. The joint permit review process did not reveal any anticipated indirect or cumulative impacts that would occur as a result of these activities. These activities would be conducted from the seasonal monk seal field camp based on FFS. The operation of the field camp, and associated monitoring activities, are covered under the Manager's permit PMNM-2022-001.

Since no significant cumulative impacts or significant impacts with respect to any particularly sensitive aspect of the project area are anticipated, the categorical exemptions identified above should remain applicable.

4. Overall Impacts will Probably have a Minimal or No Significant Effect on the Environment. Any foreseeable impacts from the proposed activity will probably be minimal, and further mitigated by general and specific conditions attached to the permit. Specifically, all research activities covered by this permit will be carried out with strict safeguards for the natural, historic, and cultural resources of the Monument as required by Presidential Proclamation 8031, other applicable law and agency policies and standard operating procedures.

Conclusion. Upon consideration of the permit to be approved by the Board of Land and Natural Resources, the potential effects of the above listed project as provided by Chapter 343, HRS and Chapter 11-200.1 HAR, have been determined to be of probable minimal or no significant effect on the environment and exempt from the preparation of an environmental assessment.

Papahānaumokuākea Marine National Monument
CONSERVATION AND 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:
NOAA/Inouye Regional Center
NOS/ONMS/PMNM/Attn: Permit Coordinator
1845 Wasp Blvd, Building 176
Honolulu, HI 96818
nwhipermit@noaa.gov
PHONE: (808) 725-5800 FAX: (808) 455-3093

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

Papahānaumokuākea Marine National Monument
Permit Application Cover Sheet

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

Summary Information

Applicant Name: Michelle Barbieri Lino

Affiliation: NOAA Fisheries (Hawaiian Monk Seal Research Program)

Permit Category: Conservation and Management

Proposed Activity Dates: 7/1/2022-6/30/2023
Note: At the time of application, field camp deployment scheduled for NOAA ship *Sette* departing Honolulu on 4/28/2022; field camp recovery scheduled for NOAA ship *Sette* returning to Honolulu on 9/2/2022.

Proposed Method of Entry (Vessel/Plane):

NOAA RVs Oscar Elton Sette, possibly Searcher, Imua, Kahana II,or US Coast Guard C130.

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:

125

Description of proposed activities: (complete these sentences):

a.) The proposed activity would…

support 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 continuing 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 …

conducting population assessment and monitoring efforts across the 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 better survival, rehabilitation of undernourished seals, disentanglement from marine debris, rescue from entrapment risks at Lalo, mitigation of shark predation risks to pups at Lalo, removal of marine debris, vaccination against morbillivirus, reuniting mothers and pups, treating injured seals, and providing support to co-Management partners as requested.

We recognize that our access to Papahānaumokuākea is a privilege and that with that access comes an obligation to share what we see, do and learn. We share our activities during the field season through web based stories, science blogs, and social media with the support of the NOAA PIFSC communications team and, when appropriate in coordination with other applicable partners such as the State of Hawaii, USFWS, The Marine Mammal Center, and the U.S. Coast Guard. While space is limited, over the years we have welcomed artists, teachers, cultural practitioners,

documentary film teams, journalists, and others to accompany us. This both enriches the science and cultural significance of our operations in Papahānaumokuākea and enables us to share outwardly in many ways. In 2021, due to COVID precautions when operating in remote locations, we were unable to accommodate any elective additions to our team. We look forward to when that time is appropriate again and we will continue to share our science and activities through incorporating the Huli ʻIa into our camps and giving presentations in virtual webinars, conferences, classrooms, and other outreach and education activities.

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 Recovery Plan for the Hawaiian Monk Seal, located here.

• The Hawaiian monk seal is an endangered species numbering approximately 1,400 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 Hawaiian Monk Seal Research 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 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 22677 (and associated NEPA docs etc.) and supported by the Revised Recovery Plan for Hawaiian Monk Seals.

• This permit also supports efforts conducted by our State and Federal partners that are directed towards monk seal research and recovery.

• To maximize the benefit from our limited time in this remote place, the HMSRP will use a suite of methods to ensure that all areas are well-surveyed (including using technology to expand data collection, and requesting access to all monk seal haul-out areas).

• Unmanned aerial systems (UAS) will be used to conduct ecological surveys including surveying and monitoring monk seals, marine debris, and possibly other flora and fauna in Papahānaumokuākea (as a by-product of habitat mapping or as requested by partners).

• UAS will be launched and recovered from land, NOAA ships, or small boats launched from those ships, and will be flown at altitude below 400 feet.

• UAS efforts will provide the ability to survey and map resources on the remote islands without (1) interference; (2) the potential for the introduction of invasive species; and (3) human disturbance to the natural resources. The UAS would increase the monitoring and surveying capacity in Papahānaumokuākea. While our protocols focus specifically on monk seals and thus shorelines, we are happy to share any imagery we collect that is useful to co-Management partners interested in using it for education, outreach, or other purposes.

• While we work to minimize human presence on Mokumanamana, trained biologists familiar with the island may traverse Mokumanamana, using paths delineated by archaeologists and cultural practitioners familiar with the island, in the event that all seal haul-out areas cannot be surveyed through boat-landings or UAS flights at haul-out sites.

• This permit is comprehensive and includes ALL monk seal recovery activities that occur in the Monument including the mitigation of predation by Galapagos sharks on monk seal pups at Lalo (French Frigate Shoals); the primary source of seal mortality at this site.

• This is a continuation of permitted shark removal activities for monk seal conservation. The initial target of 20 sharks was determined based on data from the field whereby individually identifiable sharks (through tags or naturally acquired markings on their dorsal fins) that were engaged in predatory behavior on monk seal pups were enumerated. Shark biologists were consulted and ecosystem modeling efforts indicated that the Galapagos shark population, which is neither threatened nor endangered, was capable of sustaining this level of population reduction. Hence, the initial request of 20 sharks was based on an agreed upon minimum number of sharks that were exhibiting this behavior, paired with ecosystem based support.

Since the initial request of 20 made at the beginning of this project 7 Galapagos sharks have been caught and removed, leaving 13 remaining. The request for this year is for 13 Galapagos sharks. This is the balance of initially requesting removal of 20 sharks, minus the 7 that have been removed historically to-date. Fishing requires a great deal of effort, and catch-per-unit-effort is low, therefore we expect that reaching this initial target number is still a long-term goal.

Published data and consultation with Carl Meyer puts the population somewhere between 668 to just over 1000 sharks. The estimated removal would be between 1.3 – 1.9% of the

population. Generally, we don't remove more than 1 shark per season or 0.1% of the population.

• Predation peaked in 1997-1999; it continues at a rate of 5-11 pups per year from 2000-2019 (usually 15-25% of the pup cohort each year). In 2019, 35 pups were born at FFS during the field season and Galapagos shark predation was confirmed in 3 pup deaths and strongly suspected in 6 additional disappearances, accounting for 25% of the pups born. Information from 2020 is not available because our field camps were not deployed due to COVID-19.

• Between 1997 and 2019, shark predation affected over 270 pups out of roughly 1150 born at Lalo. 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 Galapagos sharks. Translocating pups remains our most common intervention and in 2019, 14 pups were translocated.

  • 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 and the HMSRP will continue to be mindful and respectful of the historical and cultural significance of sharks when conducting these activities.

  • Successful removal of these individuals could have a profound effect on the monk seal population at Lalo while having negligible impact on the Galapagos shark population.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Lino, Michelle Barbieri

Title: Lead Scientist, Hawaiian Monk Seal Research Program

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

Hope Ronco (CV attached)
NOAA / NMFS / PIFSC / Hawaiian Monk Seal Research Program
SEE ORIGINAL APP FOR CONTACT INFO
Phone SEE ORIGINAL APP FOR CONTACT INFO
Email: SEE ORIGINAL APP FOR CONTACT INFO

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

SEE ORIGINAL APP FOR CONTACT INFO
Phone: SEE ORIGINAL APP FOR CONTACT INFO
Email: SEE ORIGINAL APP FOR CONTACT INFO

For students, major professor's name, telephone and email address:
Student: Kirby Parnell
Major Professor: Lars Bejder
Phone: SEE ORIGINAL APP FOR CONTACT INFO
Email: SEE ORIGINAL APP FOR CONTACT INFO

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):

Michelle Barbieri Lino, Veterinarian
Jessica Bohlander, Scientist

Claudia Cedillo, Scientist
Brenda Becker, Scientist
Thea Johanos, Scientist
Christy Kozama, Scientist
Tracy Mercer, Scientist
Paige Mino, Scientist
Marylou Staman, Scientist
Mark Sullivan, Scientist
Stacie Robinson, Scientist
Hope Ronco, Scientist and Field PI
TBD x 14, Scientist (seasonal field staff and program members)
TBD, Scientist (for collaborators/partners as priorities and berthing allows)
TBD, Vet Support

Note - this is a maximum list for all possible missions combined; berthing limitations will affect final head count for each mission and an updated CIS form will be provided prior to entry to the Monument.

Section B: Project Information

5a. Project location(s):	**Ocean Based**	
☒ Nihoa Island	☒ Land-based ☒ Shallow water	☐ Deep water
☒ Necker Island (Mokumanamana)	☒ Land-based ☒ Shallow water	☐ Deep water
☒ French Frigate Shoals	☒ Land-based ☒ Shallow water	☐ Deep water
☒ Gardner Pinnacles	☐ Land-based ☒ Shallow water	☐ Deep water
☐ Maro Reef		
☒ Laysan Island	☒ Land-based ☒ Shallow water	☐ Deep water
☒ Lisianski Island, Neva Shoal	☒ Land-based ☒ Shallow water	☐ Deep water
☒ Pearl and Hermes Atoll	☒ Land-based ☒ Shallow water	☐ Deep water
☒ Midway Atoll	☒ Land-based ☒ Shallow water	☐ Deep water
☒ Kure Atoll	☒ Land-based ☒ Shallow water	☐ Deep water
☐ Other		

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

☒ Remaining ashore on any island or atoll (with the exception of Sand Island at MidwayAtoll 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 ☐

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

Hawaiian monk seals

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 safeguard and minimize impacts to other natural and cultural resources. This will be further supported through providing Resource Monitor training for key field staff whenever possible as outlined by MMB recommendations.

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

Quarantine procedures will be carefully followed at each island where personnel land (BMPs 007, 011). This includes use of gear purchased new and dedicated to each island / atoll. Thorough cleaning, biosecurity, and safe storage protocols are followed between field seasons. ***Chondria*** **mitigations are being addressed in separate consultations with subject matter experts and the permit coordinator; we will ensure concurrence from the MMB prior to permitted activities occurring.**

In 2015, the UAS research team (including members from NOAA and USFWS) demonstrated that the APH-22 UAS systems could operate with virtually no impacts to cultural and natural resources within Papahānaumokuākea. In 2018, use of UAS to count monk seals allowed us to obtain full monk seal counts without a second boat landing or overland traverse, demonstrating how UAS can help to minimize human presence and impact and collect an important subset of the data that can be obtained during land surveys. As in all previous years, the UAS will be operated by trained NOAA staff and affiliates and all relevant Monument Best Management Practices and protocols specific to deployment and retrieval will be followed (specifically BMPs 003, 007, 016, 019). The minimum altitude we will fly over monk seals will be 25 ft or 7.5 meters. Interactions with birds and other wildlife will be closely monitored and should significant interactions occur, UAS operations will be halted.

We are requesting the use of the APH-22 (used in 2015 and 2018) and DJI Mavic Pro GE at all PMNM locations, including Nihoa and Mokumanamana. These islands, especially Nihoa and Mokumanamana are of great cultural significance to the native Hawaiian community. Past discussions about Nihoa and Mokumanamana have identified at least two areas of concern to Hawaiian cultural practitioners: 1) capturing images of cultural sites and 2) generally operating over the islands themselves as it is the land, sea and air around the islands that are sacred. We hope to continue to have access to conduct UAS operations by only conducting flights over the coastal areas of these islands (rocky shelves and beaches) where monk seals and turtles haul out. We have no research need

to fly over the upper reaches of the islands and we will not photograph any cultural sites. We can also work to minimize the amount of time for operations.

All photos and imagery captured by the UAS will be used internally for purposes of conservation and management activities. Images will be shared with all Co-Trustee agencies upon request and not disseminated for public consumption without first ensuring the appropriateness, from a cultural and natural resource perspective, of the information being disseminated.

To protect sensitive upland sites when traversing Mokumanamana, we will use minimal staff (typically 3 survey staff and up to 2 veterinary staff) which will include a qualified and experienced Resource Monitor and observe the PMNM Best Practices for Mokumanamana (BMP 019).

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 conducted monk seal research and conservation activities in the NWHI for decades. We have a large presence in Papahānaumokuākea and with that comes 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 and emerging 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 in past years.

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 (CWG). The feedback from the CWG and others was not homogenous with a diverse array of perspectives and opinions both supporting and opposing the activity. The CWG determined it was unable to offer an endorsement or censure of the proposed management activity. In 2020-2021, we were invited to meet with a representative of the CWG and answered some questions related to this activity. It was a

good opportunity to reconnect and we welcome any opportunity to provide further information to the CWG 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 Papahānaumokuākea, we propose to limit the scope of our removal actions as described in this permit application and also to avoid by-catch of any other wildlife to the greatest degree possible. Possible adverse effects on the coral reef ecosystem at Lalo 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 Lalo 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 Papahānaumokuākea because this threat to the recovery of the endangered Hawaiian monk seal has only been identified in Papahānaumokuākea. While a small portion of the

monk seal population lives outside of Papahānaumokuākea, in the MHI, the species will not likely avoid extinction without a healthy population in the Northwestern Hawaiian Islands. Recovery requires at least 2900 seals in the NWHI (current abundance is approx. 1400) with at least 5 of the 6 main sub-populations above 100 individuals and increasing.

Specifically related to the shark predation mitigation component of these recovery activities: shark predation must be mitigated to recover the Lalo population. Losing a high number of nursing and newly weaned pups to shark predation is a unique phenomenon at Lalo 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 under very specific circumstances, including targeting only the shallow nearshore waters adjacent to monk seal pupping beaches where evidence of Galapagos shark predatory behavior is observed.

Related to UAS operations, the work proposed here is intended to be a regular part of Hawaiian monk seal research and recovery activities. The recovery of Hawaiian monk seals requires us to conduct this work in Papahānaumokuākea. The use of UAS will help us to be more successful in obtaining full population counts (particularly of hard-to-observe areas) during more visits to Papahānaumokuākea in the future.

Related to traversing Mokumanamana, the difficulty of landing at Mokumanamana has hindered our ability to fully assess the monk seal population in recent years. The ability to traverse the island in 2019 and 2021 allowed us to conduct complete reliable ground counts whereas in 4 of the previous 5 years, we were unable to land at one site and only obtained partial counts. Cultural practitioners from the Office of Hawaiian Affairs (OHA) were included in 2019 to help our scientists identify and avoid disturbance to areas of cultural sensitivity. There has been continued dialogue between NOAA and OHA since that initial visit, resulting in the development of a more detailed landing/access map, protocol and risk assessment. Gaining this complete data is essential to accurately tracking trends in the species and making informed management decisions.

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 Papahānaumokuākea (i.e. biosecurity measures). To date our recovery activities have had a significant benefit to the monk seal population and we 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.

Some activities will be much more limited in scope. For example, Nihoa and Mokumanamana are typically only visited during our two research cruises each year (for field camp deployment and pick up).

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. All seasonal staff receive extensive training in research activities, boat operations and safety, Monument BMPs and biosecurity protocols before being deployed to Papahānaumokuākea.

Staff involved in UAS operations will be trained UAS pilots with previous experience working in the monument and have all necessary training and experience necessary to pilot the specific UAS platform (APH-22 or Mavic Pro GE as appropriate). The HMSRP intends to use UAS as a future tool to aid in their research, monitoring and emergency response of monk seals. All pilots and partners associated with this project will have training and experience relevant to the role they will play on the team.

Staff landing on Nihoa and Mokumanamana, and staff traversing Mokumanamana will be led by a team member with experience on the island and will include a trained Resource Monitor.

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 the 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 (specifically identified throughout the application) and regulations that overlap with our activities. We operate only 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.).

In 2021, we began a project to incorporate the Huli ʻIa into our field camps and we intend to continue that in 2022 and beyond. The intent is to open dialogue and recognize, record and ultimately share seasonal observations about Papahānaumokuākea made when our teams are deployed.

We have and will continue to be open to supporting collaborative needs from co-Managers and other partners that are interested in photo/video footage, observational data (e.g., to USFWS regarding invasive plants), collections for cultural practices (e.g., feathers) and collections for scientific needs, provided that the requestors have worked with PMNM to ensure proper permitting.

i. Has your vessel 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.

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 Papahānaumokuākea. For more information about these activities please review attached document MMPA/ESA Permit 22677. 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 22677 will occur across the NWHI.

b. Deploying field staff in camps for months at a time at Lalo, Kamole, Kapou, Manawai, and Hōlanikū. Our presence at Kuaihelani will be brief, during 1-2 day visits based off of the research vessel when deploying and recovering camps nearby and will be coordinated with USFWS. Also in coordination with USFWS this year, we expect to have staff at Kuaihelani supporting monitoring activities for Hawaiian monk seals during the mouse eradication effort planned for summer 2022.

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 22677.

d. Use UAS (APH-22 hexacopter or Mavic Pro GE) to monitor Hawaiian monk seal populations (including counts, individual identification, body condition assessment), marine debris, and possibly other flora and fauna on or around islets in the monument.

The APH-22 has a pilot in command (PIC) and a ground station operator (GSO) visual observer (VO) and is launched from land or the GSO/VO's hand. The Mavic Pro Ge is a vertical take-off and landing UAS that can be launched from land or boat but does not necessitate the use of a ground station or GSO. Operation of the Mavic Pro GE will also involve a VO other than the PIC. Once any UAS is launched, the VO monitors the UAS flight and scans the sky to see if there is any air traffic or bird activity requiring the landing of the UAS. The UAS will fly for a maximum of 30 minutes and will remain at all times within the pilot's visual line of sight and less than 0.5-nm.

General Operation Guidelines will include:

- Operation in daylight hours only.
- Operation in winds less than 25kts.
- Only NOAA Certified Pilots trained specifically for the APH-22 or the Mavic Pro GE will operate the system.
- Pilots will minimize multiple takeoffs and landing in a single location if birds are present to minimize repeat disturbance to birds.

DJI Mavic Pro GE Specifications:
Body: Quadcopter with 4 foldable arms
Diagonal size (excluding propellers): 13.2" (335mm)
Weight (including battery and propellers: 1.62 lbs (734 g)
Max Flight Time: 27 minutes
Range, Physical: 8 miles (13km, no wind)
Range, Max Transmission: 4.3 mi (7km)

Payload: Integrated camera on gimbal
Max Speed: 40 mph (65 kph)

For Mokumanamana visits, we will follow all appropriate PMNM Best Practices, specifically BMP 019, as well as adhere to these General Guidelines:

- Only traverse Mokumanamana when full surveys cannot be completed by multiple boat landings or UAS activities.
- A qualified and experienced Resource Monitor would be present.
- Minimum number of personnel would go ashore and undertake the hike.

e. Deployment of acoustic recording devices to capture underwater vocalizations of Hawaiian monk seals.

Passive acoustic monitoring via SoundTraps is a non-invasive method for studying underwater sounds. This study will use two SoundTrap ST500 HF underwater acoustic recorders at two sites (Lalo and Manawai) to record the underwater vocalizations of Hawaiian monk seals and seasonal trends in their typical aquatic soundscape. It is important for increasing our baseline knowledge of their communication system and for measuring the level of man-made noise they encounter. Assessing the impacts of man-made sound on monk seal communication can inform our conservation decisions, particularly the development of noise mitigation measures and population monitoring through passive acoustics.

Other monk seal directed research as needed and authorized by MMPA/ESA permit 22677. 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 cestodicides and nematocides (e.g. praziquantel, fenebendazole, 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 – PMNM: 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. PMNM-rehabilitation: Seals may be taken into temporary captivity for treatment at appropriate, federally permitted rehabilitation facilities in the MHI for release back in Papahānaumokuākea (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. This may include the capture and transport of seals to shore-pens (in PMNM) or facilities in the MHI. We will aim to return seals from PMNM (under care in the MHI) to PMNM when a licensed veterinarian deems them rehabilitated and transport is feasible. The seals will then be released to the PMNM 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 Lalo. While few, if any, shark-seal interactions are observed directly, monitoring efforts may include 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 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. Collect and 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 Monument BMPs (especially BMPs 005, 007, 011 and those being refined specific to *Chondria* mitigation at Manawai and Kuahelani).

a. Disentanglement of threatened and endangered species by authorized

personnel, monitoring of sites that have been cleared of debris for recovery rates and effects of removal;

b. Location and removal of debris. We will cooperate with partners leading marine debris efforts on how to best integrate and support their activities. Of particular note: *If* any debris removal activities do occur at Manawai and Kuahelani, we will abide by best practices for *Chondria* biocontrol and work with the State and other partners to ensure coordination and compliance with those practices.

xii. Shark Predation Mitigation Activities at Lalo:

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 Galapagos sharks that they encounter within 700m of shore of any islet at Lalo where predatory behavior is observed. 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**.

b. Fishing Methods: Four different methods will serve as a "toolbox" of options to safely remove a maximum of 13 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 catch per unit effort (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 harpoon will be used in shallow water, from shore or close to shore or from a small boat; bottomsets and drumlines will be used in deeper water, over sandy substrate at distances farther 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.

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

Bottomsets and drumlines are, by design, restricted by habitat characteristics due to the potential for lines to become 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 single 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 13 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 Lalo. 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 Galapagos shark is the grey reef shark. However, in Galapagos 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 Northwestern Hawaiian Islands 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.

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 conducts 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 prior to fishing activities will occur boat-side on inert material.

HMSRP will perform a necropsy on captured Galapagos 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 and that will continue unless directed otherwise by our OHA partners.

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 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: Neomonachus schauinslandi
& size of specimens: 1000 varied
Collection location: All Locations
Collection type: Non-lethal (living organism, or naturally deceased)
☒ Whole Organism ☒ Partial Organism

Common Name: Galapagos Shark
Scientific Name: Carcharinus galapagensis
& size of specimens: 13 varied
Collection location: Lalo/French Frigate Shoals

Collection type: Lethal (living organism)
☒ Whole Organism ☐ Partial Organism

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

- In the case of living seals collected for rehabilitation, these seals will be released back in PMNM upon completion of rehabilitation (and clearance by veterinary examination).

- In the case of samples collected from seals (either biological specimens such as blood or tissue samples from living animals, or necropsy samples from dead animals), these will either be sent to appropriate research / diagnostic collaborators or archived in appropriate storage facilities at the NOAA IRC in Honolulu.

- In the case of samples collected from sharks (necropsy samples from dead animals), these will either be sent to appropriate research / diagnostic collaborators or cultural practitioners.

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

'Yes' will only apply to live monk seals taken into rehabilitation outside of Monument waters and then released. Some seals will be held for a short time in shoreline pens while waiting for veterinarian assessment and possible pickup or to help them acclimate to the wild prior to release after translocation or rehabilitation.

• General site/location for collections:

All atolls and islets within the Monument.

• 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?

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 will be released after rehabilitation or translocation.

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 or charter 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 22677 and then are distributed to our partners. A complete list of partners is included in the attached document MMPA/ESA Permit 22677. 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:

A complete list of gear and materials is included in the supplemental material.

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

A complete list of hazmat is included in the supplemental material.

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

Propose to Install

a. Temporary Installation polyvinyl tents for housing monk seal field teams at French Frigate Shoals, Laysan, Lisianski, Pearl and Hermes Reef and Kure. One tent at each site will also have a radio antenna extending upwards <10ft.

b. Trail Cameras at Lalo (Tern Island) and Manawai (North and Little North Islands). Trail cameras are compact, self-contained systems that are programmed to take a certain number of pictures per day capturing the presence or absence of animals in specific

locations. Sizes of trail camera systems including external solar panels will be no larger than 16" x 12" x 12". Weights of systems including solar panels will be no more than 5 lbs. These are used to monitor for threats to seals, specifically entrapment (Tern Island) and male aggression (Manawai).

Cameras will be mounted via padded tripod or T-post, no more than 5' in height. Plastic or steel bird deterrent spikes will be added to the camera systems to deter birds from blocking the camera's view and excreting on solar panels.

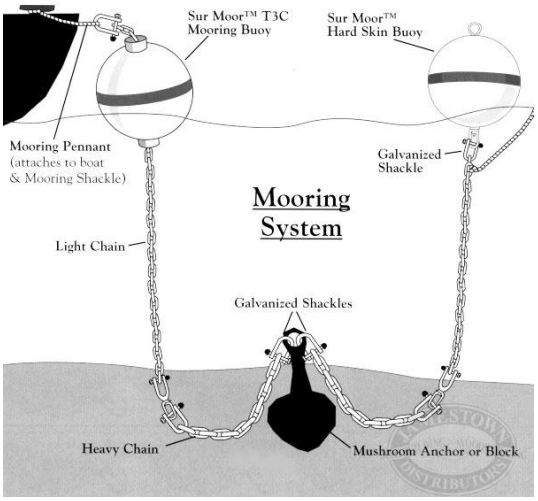
The cameras will be deployed staff from approximately May-August (during the field season) at North and Little North Islands (Manawai). Inclement weather at Manawai often prevents boating for multiple days at a time, resulting in less observation time on North and Little North Islands. These cameras help to fill in gaps in survey coverage. Images will be reviewed weekly during the season to provide close to real-time information on male aggression to HMSRP leadership, which will help guide management and recovery decisions within the season, such as pup translocation. Additionally, the majority of pups at Manawai are born at North and Little North, and the trail cameras may also provide incidental population assessment data on births and weaning events. The cameras will be facing areas of previously observed or suspected male aggression, mainly near the southern portion of North Island, the northern portions of the North Island spits, and the northern portion of Little North Island. Weekly visits will be conducted, in which SD cards will be swapped out in the trail cameras to continue recording during the field season. Trail cameras and all associated equipment will be retrieved before field staff Manawai at the end of the season.

Cameras will be deployed similarly at Tern Island (Lalo), but will remain in place until the following field season because their purpose is to support post-season entrapment monitoring. Cameras may be mounted on the seawall but will more likely be mounted via padded tripod or T-post. In 2020-2021, seawall mounted cameras failed due to the heavy wave action encountered by the seawall in the winter.

c. Temporary (season-long) mooring systems to anchor two small boats at Southeast Island, Manawai and at Tern Island, Lalo. The davit at Tern Island is deteriorating and in 2022, we propose to rely more heavily on moorings to reduce risk of davit failure. Mooring systems are recommended over traditional anchoring for leaving boats unattended for long intervals, i.e. overnight, in high surge areas, etc. In many cases, a mooring system is the safest way to leave a boat in the water to prevent it from breaking free and coming ashore, which will cause damage to the boat and shoreline environment.

   Permanent and/or semi-permanent moorings use less scope than traditional anchoring which reduces the "footprint" on the bottom, risk of damage to the environment and risk of wildlife entanglement/entrapment. Appropriate moorings are comprised of a suitable

anchor, a light chain, and surface float. Additional line will be attached to an anchor onshore at Southeast Island and to the pier at Tern Island to ensure the vessels cannot float away if the mooring system were to fail in inclement weather. These mooring systems will be deployed on sandy substrate directly off the north side of Southeast Island and from the dock at Tern Island. The following image (credit to Jamestown Distribution) illustrates the type of system that would be temporarily installed if necessary.



d. Recording Hawaiian monk seal underwater vocalizations using the SoundTrap ST500 HF

Study Objective
This study aims to record and describe the underwater vocal repertoire and seasonal trends in sound production for Hawaiian monk seals in PMNM using two SoundTrap ST500 HF underwater acoustic recorders. One recorder would be deployed at each of two locations: Lalo and Manawai. In 2021, the instruments were successfully deployed for the first time and data were successfully obtained. Specific *Chondria* protocol modifications for cleaning this sensitive equipment at Manawai were discussed and followed prior to the 2021 field season, and we will review those protocols with appropriate SMEs again before deployment in 2022.

Equipment
The recording units are Ocean Instruments SoundTrap ST500 HF (serial number to be determined). The full-scale response of this model is 173 dB re 1 µPa and the bandwidth is 20 Hz - 150 kHz ± 3 dB. A SoundTrap user manual and specification sheet are attached to this protocol.

Software
SoundTrap Host software will be used to configure the instrument before and after each deployment. This software can be downloaded from the Ocean Instruments website (http://www.oceaninstruments.co.nz/downloads/). The first time the SoundTrap and then the device will be visible in the SoundTrap Host software. It will be listed as "SoundTrap serial number TBD" or "SoundTrap device is connected to the computer (via USB), drivers will be installed serial number TBD" depending upon the unit you have.

Data Storage – To be determined

Environment
Both SoundTraps should be deployed at 5-10 m depth in sandy substrates as close to land as possible. GPS locations for the SoundTraps must be taken immediately after deployment, and again when the units are "checked" to verify they have not drifted.

Duration of Deployment
Units would be deployed during the first month of the field team's arrival. Units will remain in the water for the duration of the field camp and be retrieved prior to departing the camp.

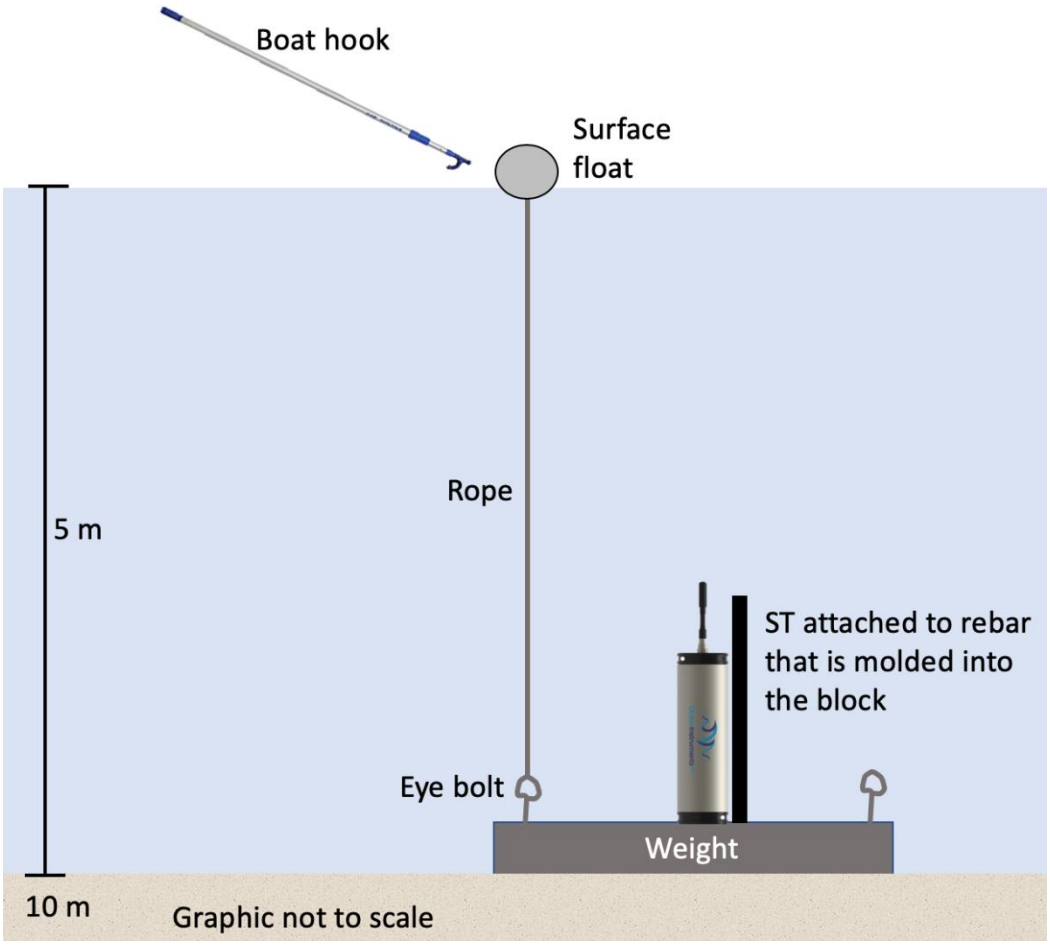
Maintenance
Units will be checked regularly during the first week of deployment. If no issues are encountered (i.e., unit not drifting and still intact) within the first week, units will be checked once a week for the remainder of the camp duration. "Checked" means seeing the unit from the boat. GPS locations for the SoundTraps must be taken when the units are "checked" to verify they have not drifted.

Equipment Configuration
Single anchored line with surface or sub-surface float (10 m total depth). The SoundTrap

will be attached to a rebar stand molded into a concrete block (weight) with the hydrophone facing the surface. The rope with the float will be tied to an eyebolt molded into the concrete block. Another eye bolt at the opposite side of the concrete block can be used for lowering the unit during deployment. Two grooves at the top and bottom of the SoundTrap housing provide attachment points for cable ties. The cable ties should be threaded through the associated holes so they cannot slip off. To minimize any possible entanglement risk of the rope, supportive padding material may be attached to it.

Deployment: Unit will be lowered down by rope threaded through the eyebolt. Once the unit is stationary, one side of the rope can be dropped into the water while the other side is pulled up through the eyebolt.

Retrieval: Grappler anchor or boat hook catches buoy and unit is pulled upward towards vessel.



Propose to Maintain / Repair

a. Tern Island Entrapment Camera Project
In 2020, we initiated a pilot project to deploy rugged trail cameras on Tern Island, Lalo in order to monitor wildlife entrapments. The camera systems were deployed in fall 2020 and retrieved in 2021. Unfortunately, they were swamped by the winter conditions, making the imagery unusable. In 2022, we aim to replace the camera systems using T-posts rather than attaching them to the seawall.

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

Population assessment data analyzed in 6 months (typically preliminary data available late winter/early spring of each year).

Telemetry and UAS data analyzed within 12 months.

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

More publications can be provided if necessary.

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Gobush KS
[2010] U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-21, 43 p. + appendices

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Harting AL
[2010] Pacific Islands Fisheries Science Center Administrative Report H-10-02C, 36 p. + appendices

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Johanos TC, Becker BL, Baker JD, Ragen TJ, Gilmartin WG, Gerrodette T
[2010] Endangered Species Research 11: 123-132. doi:10.3354/esr00259

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Hanson MT, Aguirre AA, Braun RC
[2009] U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-18, 9 p.

Organochlorine contaminants in endangered Hawaiian monk seals from four subpopulations in the Northwestern Hawaiian Islands
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 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.

1/20/2022

Signature Date

SEND ONE SIGNED APPLICATION VIA MAIL TO THE MONUMENT OFFICE BELOW:

NOAA/Inouye Regional Center
NOS/ONMS/PMNM/Attn: Permit Coordinator
1845 Wasp Blvd, Building 176
Honolulu, HI 96818
FAX: (808) 455-3093

DID YOU INCLUDE THESE?

☒ Applicant CV/Resume/Biography
☒ Intended field Principal Investigator CV/Resume/Biography
☒ Electronic and Hard Copy of Application with Signature
NA☐ Statement of information you wish to be kept confidential
☒ Material Safety Data Sheets for Hazardous Materials

Papahānaumokuākea Marine National Monument
Compliance Information Sheet

1. Updated list of personnel to be covered by permit. List all personnel names and their roles here (e.g. John Doe, Diver; Jane Doe, Field Technician, Jerry Doe, Medical Assistant):
Hope Ronco – Chief Scientist
Marylou Staman –Operations Lead
Claudia Cedillo—Field scientist
Michelle Barbieri—Program lead/veterinarian
Tracy Mercer—Field scientist
TBN—veterinarian
TBN—veterinary technician
Jon Schneiderman – Field scientist
Leah Kershner – Field scientist
Robert McLean – Field scientist
Christy Kozama – Field scientist
Shannon Vasquez– Field scientist
Jimmy Stilley– Field scientist
Megan Ely – Field scientist
Sarah Glover– Field scientist
Rachel Hein– Field scientist
Michele Bane– Field scientist
Paige Mino– Field scientist
James Yost– Field scientist
Meagan Selvig– Field scientist
Sanna Matheny– Field scientist
Jon Rosen– Field scientist
Chelsey Taylor– Field scientist

2. Specific Site Location(s): (Attach copies of specific collection locations): The operating area includes the main Hawaiian Islands (MHI) and Papahānaumokuākea Marine National Monument from the island of Oahu to Kure Atoll with Hawaiian monk seal surveys and/or camp deployment at Nihoa Island, Mokumanamana Island, French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, Midway Atoll, and Kure Atoll.

3. Other permits (list and attach documentation of all other related Federal or State permits): NMFS permit 22677 (Permit to take protected species[1] for scientific research

and enhancement purposes), NMFS permit 18786-06 (MMPA/ESA Marine Mammal Stranding permit issued to NOAA Office of Protected Resources)

3a. For each of the permits listed, identify any permit violations or any permit that was suspended, amended, modified or revoked for cause. Explain the circumstances surrounding the violation or permit suspension, amendment, modification or revocation. None

4. Funding sources (Attach copies of your budget, specific to proposed activities under this permit and include funding sources. See instructions for more information): NOAA Federal funds

5. Time frame:
Activity start: 4/28/2022
Activity completion: 9/2/2022

Dates actively inside the Monument:
From: 4/29/2022
To: 9/1/2022

Describe any limiting factors in declaring specific dates of the proposed activity at the time of application: Weather conditions (e.g. hurricanes), COVID test results, or ship related mechanical issues and delays may impact our proposed sailing dates.

Personnel schedule in the Monument:

Name/Role	Date entering PMNM	Date leaving PMNM
Hope Ronco	SE 22-03: 4/28/2022 SE 22-06: 8/6/2022	SE 22-03: 5/25/2022 SE 22-06: 9/2/2022
Marylou Staman	4/28/2022	5/25/2022
Claudia Cedillo	4/28/2022	5/25/2022
Michelle Barbieri	5/5/2022	5/25/2022
Tracy Mercer	5/5/2022	5/25/2022
Robert McLean	4/28/2022	5/25/2022
TBN—veterinarian	8/6/2022	9/2/2022
TBN—veterinary	8/6/2022	9/2/2022

technician		
Jon Schneiderman	4/28/2022	9/2/2022
Leah Kershner	4/28/2022	9/2/2022
Christy Kozama	4/28/2022	9/2/2022
Shannon Vasquez	4/28/2022	9/2/2022
Jimmy Stilley	4/28/2022	9/2/2022
Megan Ely	4/28/2022	9/2/2022
Sarah Glover	4/28/2022	9/2/2022
Rachel Hein	4/28/2022	9/2/2022
Michele Bane	4/28/2022	9/2/2022
Paige Mino	4/28/2022	9/2/2022
James Yost	4/28/2022	9/2/2022
Meagan Selvig	4/28/2022	9/2/2022
Sanna Matheny	4/28/2022	9/2/2022
Jon Rosen	4/28/2022	9/2/2022
Chelsey Taylor	4/28/2022	9/2/2022

6. Indicate (with attached documentation) what insurance policies, bonding coverage, and/or financial resources are in place to pay for or reimburse the Monument trustees for the necessary search and rescue, evacuation, and/or removal of any or all persons covered by the permit from the Monument:

7. Check the appropriate box to indicate how personnel will enter the Monument:

☒ Vessel
☐ Aircraft

Provide Vessel and Aircraft information: NOAA Oscar Elton Sette

8. The certifications/inspections (below) must be completed prior to departure for vessels (and associated tenders) entering the Monument. Fill in scheduled date (attach documentation):

☐ Rodent free, Date:
☐ Tender vessel, Date:
☐ Ballast water, Date:
☐ Gear/equipment, Date:
☐ Hull inspection, Date:

9. Vessel information (NOTE: if you are traveling aboard a National Oceanic and Atmospheric Administration vessel, skip this question):
Vessel name:
Vessel owner:
Captain's name:
IMO#:
Vessel ID#:
Flag:
Vessel type:
Call sign:
Embarkation port:
Last port vessel will have been at prior to this embarkation:
Length:
Gross tonnage:
Total ballast water capacity volume (m3):
Total number of ballast water tanks on ship:
Total fuel capacity:
Total number of fuel tanks on ship:
Marine Sanitation Device:
Type:

Explain in detail how you will comply with the regulations regarding discharge in the Monument. Describe in detail. If applicable, attach schematics of the vessel's discharge and treatment systems:

Other fuel/hazardous materials to be carried on board and amounts: See separate attachment.

Provide proof of a National Oceanic and Atmospheric Administration (NOAA) Office of Law Enforcement-approved Vessel Monitoring System (VMS). Provide the name and contact information of the contractor responsible for installing the VMS system. Also describe VMS unit name and type: To be provided by NOAA ship Oscar Elton Sette

VMS Email:
Inmarsat ID#:

* Individuals MUST ENSURE that a type-approved VMS unit is installed and that its automatic position reports are being properly received by the NOAA OLE system prior to the issuance of a permit. To make sure your VMS is properly configured for the NOAA OLE system, please contact NOAA OLE at (808) 725-6110 or (808) 725-6100.

* PERMITS WILL NOT BE ISSUED TO INDIVIDUALS ENTERING THE MONUMENT VIA VESSEL UNTIL NOAA OLE HAS CONTACTED THE MONUMENT PERMIT COORDINATOR WITH A 'POSITIVE CHECK' READING.

10. Tender information:

On what workboats (tenders) will personnel, gear and materials be transported within the Monument? List the number of tenders/skiffs aboard and specific types of motors: TBD

Additional Information for Land Based Operations

11. Proposed movement of personnel, gear, materials, and, if applicable, samples: Personnel, gear, materials, and samples will be transported to and from the Monument on the NOAA ship Oscar Elton Sette

12. Room and board requirements on island: None

13. Work space needs: None

DID YOU INCLUDE THESE?
☐ Map(s) or GPS point(s) of Project Location(s), if applicable
☐ Funding Proposal(s)
☐ Funding and Award Documentation, if already received
☐ Documentation of Insurance, if already received
☐ Documentation of Inspections
☐ Documentation of all required Federal and State Permits or applications for permits

Biosecurity Measures for PIFSC PSD NWHI field camp cruises and deployments
Oscar Sette Cruises SE-22-03, SE-22-06
Field season: April 28, 2022 - September 2, 2022

The following document outlines the mitigation steps PSD cruise participants will follow to ensure adequate biosecurity measures are followed to mitigate the risk associated with accessing Manawai (Pearl and Hermes Atoll, PHR) and Midway Atoll (Kuaihelani) for research activities defined in permits: PMNM-2021-001 Co-Trustee Managers Permit (and associate memo to file) and PMNM-2022-002.

The activities that will be conducted by PIFSC PSD staff during this deployment are essential to the research and management of the Hawaiian monk seal and the Hawaiian green sea turtle.

The steps outlined below apply to the activities during the field camp deployment cruise (SE-22-03), field season, and pick up cruise (SE-22-06) which fall outside of BMP 020 (Best Management Practices to Minimize the Spread of *Chondria Tumulosa*) If any subsequent changes or edits are made to the BMP020 during the duration of permitted activities, the permittees will revisit relevant activities which may fall outside the scope of revised BMP and discuss with permit POC.

At Midway Atoll, there will be 1-2 operational days per cruise (total of 2-4 operational days) using small boats working off of the NOAA ship Oscar Elton Sette. Field staff may be deployed to Midway Atoll for longer periods of time without ship support, and they will follow any additional USFWS Midway *Chondria* mitigation protocols while on-island. At PHR, there will be 2-3 operational days per cruise (total of 4-6 operational days) to deploy and recover the field camp. The camp will be deployed from approximately mid-May to mid-August.

All Operations conducted by PIFSC PSD in the course of these cruises and deployment will follow the Chondria BMP with the exception of what is outlined in the table below. Supplemental mitigation steps are outlined for these exceptions.

Research Activities:	**Description of Activities & Supplemental Mitigation Steps:**
Cruise Itinerary	● The ship may need to stop for mission essential operations at sites down the chain after operations in the *C. tumulosa* Mitigation Zone (CMZ). These are activities that cannot be rescheduled earlier in the mission but are critical conservation actions (i.e. rescuing seals that will not survive without intervention and transporting them to rehabilitation facilities). This may also include going to Kona to drop off seals before returning to Honolulu. ● Such essential operations would use "clean" boats not used in a CMZ. Operations would generally be a day or less, and may include recovery of field camps, though we will make every effort to do all operations possible prior to visiting PHR and Midway.
Ship Operations and Disinfection	● Upon final departure from PHR and Midway, the "dirty" boat and deck will be disinfected per the BMP. ● The *Sette* will need to exit the Monument each night to dump waste due to a non functional Marine Sanitation Device (MSD). During transit in

	and out of the Monument, the ship will not pass near any other shallow reef environments and will remain in abyssal depths between visits to the same site. The "dirty" boat and deck spaces will not be bleached between consecutive days of operations at a specific site. After daily operations are complete, the boat and deck spaces will be inspected carefully for *Chondria* fragments and thoroughly rinsed with freshwater. Inaccessible deck spaces (i.e. grated decks) will be flushed completely with freshwater. The boat will be stored on deck with scuppers up and a cover or tarp over the top. If *Chondria* fragments are found at any time during the inspection process, the "dirty" boat and deck will be fully disinfected per the BMP020.
Small Boat Operations and Disinfection	● Designated "dirty" boats with safety and emergency equipment will be utilized to transport teams and equipment between the ship and PHR/Midway and will not be used at any other site after use in the CMZ. ● The ship-based small boat is a 19ft Safeboat, and the two field camp boats are 17ft Zodiac RHIBs. The boats have no interior hull spaces or voids below the deck where water can collect. Boats are equipped with scuppers for drainage which can be easily inspected and disinfected, and have no other bilge systems. ● "Dirty" boats will not be used in the Monument or State of Hawai'i waters free of *C. tumulosa* for at least 30 days after use in a CMZ, even after disinfection. Two "clean" boats aboard the *Sette* will be utilized for operations at other sites. ● Following initial deployment, the two field camp Zodiac RHIBs will remain in the water at PHR until the end of the season, and will only need to be disinfected per the BMP020 onboard the *Sette* once, upon recovery at the end of the season. Both boats will be treated with an effective antifouling paint prior to the season. All anchors, lines, safety, and emergency equipment are designated for use at PHR only and will be disinfected by soaking in a 6% bleach solution per BMP020. ● During the season, at least daily during boating operations and when moving between sites within the atoll, the field camp small boats, motors, and all equipment onboard will be visually inspected for and removed of any algal fragments. Boat hulls will be cleaned at least every two weeks as possible if not impacted by weather and wildlife hazards.
Dry Equipment - General Survey and Camping Supplies	● Nearly all research and camping equipment to be used or deployed at Midway and PHR will be addressed under the definition of "dry equipment" per the BMP. This equipment will be rinsed with freshwater upon return to the ship and allowed to completely dry before storage. Soft field camp gear will be placed into hard containers or trash bags for transport. ● Dry gear will not be dunked into the ocean to remove sand prior to loading onto the "dirty" boat. Instead, a pallet tub or large bin will be set up onshore with leftover fresh drinking water to rinse items of sand before placing them into boats. Sprayers filled with freshwater may also be used. ● Clothing, shoes, PPE, or other items that are worn into the water and any

	equipment that is accidentally submerged will either remain on-island following deployment, or be returned to the ship for daily disinfection per BMP020. Soft items will additionally be washed via washer/dryer on the ship where possible.
Submerged Equipment	● All submerged equipment and objects used within PHR and Midway (anchors, moorings, etc.) will be disinfected by soaking in a 6% bleach solution for a minimum of 10 minutes per BMP020. This includes a soundrap acoustic recorder and associated equipment (concrete blocks, line, floats, etc.) that will be deployed and recovered within PHR during the 2022 field season. ● Disinfection may be completed on-island prior to departure and items placed in sealed containers for transport to the ship, or disinfection will take place on the ship. Disinfection on the ship will be completed in a pallet tub or similar, and the bleach mixture will be diluted and disposed of outside of the PHR SPA or Midway Atoll SMA per BMP020. ● No equipment submerged at PHR or Midway equipment will be used in the Monument or State of Hawai‘i waters free of *C. tumulosa* for at least 30 days, even after disinfection.
Marine Debris	● Marine debris will not be removed from PHR or Midway during either PSD cruise. Collection of marine debris from the water at both sites will be minimized. Nets and entanglement hazards will be pulled up above the high tide line onto the closest island and left to dry out as much as possible to be retrieved by partners conducting marine debris work in the Monument.