

UNITED STATES DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration PROGRAM PLANNING AND INTEGRATION Silver Spring, Maryland 20910

AUG 1 0 2010

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act (NEPA), an environmental review has been performed on the following action.

TITLE:	Supplemental Environmental Assessment on Issuance of a Permit for Field Research and Enhancement Activities on the Endangered Hawaiian Monk Seal
LOCATION:	Hawaiian Archipelago and Johnston Atoll
SUMMARY:	The National Marine Fisheries Service (NMFS) proposes to issue Permit No. 10137-04 to the NMFS Pacific Islands Fisheries Science Center Marine Mammal Research Program to modify drug treatments in a de-worming study concurrent with already permitted field research and enhancement activities on Hawaiian monk seals to support recovery efforts. Based on the analyses in the supplemental environmental assessment (SEA), it is unlikely that activities carried out under the proposed amendment would have significant cumulative effects when considered with other factors affecting Hawaiian monk seals.
RESPONSIBLE	
OFFICIAL:	James H. Lecky
	Director, Office of Protected Resources
	National Marine Fisheries Service

The environmental review process led us to conclude that this action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared. A copy of the finding of no significant impact (FONSI) including the supporting SEA is enclosed for your information. Although NOAA is not soliciting comments on this completed SEA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the responsible official named above.

1315 East-West Highway Silver Spring, MD 20910 Phone: 301-713-2289

Sincerely, Paul N. Doremus, Ph.D. NOAA NEPA Coordinator

Enclosure



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#### SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT ON ISSUANCE OF A PERMIT FOR FIELD RESEARCH AND ENHANCEMENT ACTIVITIES ON THE ENDANGERED HAWAIIAN MONK SEAL (PERMIT NO. 10137-04)

Lead Agency:	National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), Office of Protected Resources
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For Further Information Contact:	Office of Protected Resources National Marine Fisheries Service 1315 East West Highway Silver Spring, MD 20910 (301) 713-2289
Location:	Hawaiian Archipelago and Johnston Atoll
Supplements the EA Entitled:	Environmental Assessment on Issuance of a Permit for Field Research and Enhancement Activities on the Endangered Hawaiian Monk Seal

**Abstract**: NMFS proposes to issue a minor amendment to scientific research and enhancement Permit No. 10137-03, issued to the NMFS Pacific Islands Fisheries Science Center, Marine Mammal Research Program for takes of endangered Hawaiian monk seals (*Monachus schauinslandi*) in the wild, pursuant to the Marine Mammal Protection Act and the Endangered Species Act. The minor amendment would authorize the substitution of one anti-parasitic drug for another, to increase efficacy and reduce handling stress. This modification would be carried out during currently permitted activities and would be valid for the remainder of the permit, expiring on June 30, 2014.

August 2010

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### CHAPTER 1 PURPOSE OF AND NEED FOR ACTION

# 1.1 DESCRIPTION OF ACTION

In response to receipt of a request from the Pacific Islands Fisheries Science Center, Marine Mammal Research Program (MMRP) NMFS proposes to issue a minor amendment (Permit No. 10137-04) that authorizes "takes"<sup>1</sup> of Hawaiian monk seals (*Monachus schauinslandi*) in the wild pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 *et seq.*), the regulations governing the taking and importing of marine mammals (50 CFR Part 216), the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq.*), and the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR Parts 222-226).

# 1.1.1 Background

Permit No. 10137-03 authorizes takes of Hawaiian monk seals to (1) assess survivorship, reproductive rates, pup production, condition, abundance, movements among subpopulations, and incidence and causes of injury or mortality; (2) diagnose disease, monitor exposure to disease, and develop normal baseline hematology and biochemistry parameters; (3) conduct activities to increase survival of individuals; and (4) investigate foraging ecology to determine foraging locations, diving parameters, characteristics of foraging substrate, and prey identification and foraging behaviors. The proposed minor changes to the de-worming protocol would occur concurrently with already authorized takes of Hawaiian monk seals.

# 1.1.2 Purpose and Need

The purpose of issuing the permit amendment is the same as issuing the original permit, to provide an exemption from prohibitions under the MMPA and ESA to allow takes of an endangered marine mammal for bona fide scientific research and enhancement activities. MMPA and ESA regulatory issuance criteria require that permitted take activities are consistent with the purposes and polices of these federal laws and would not have significant adverse impacts on the species or stock.

The purpose for modifying the current de-worming treatment to include the use of injectable drugs is to ensure that the seals receive the intended medication dosage for their weight while keeping handling time and stress to a minimum. In order to treat both nematodes and cestodes, the MMRP is currently permitted to treat seals with two medications: praziquantel (injectable) and fenbendazole (oral). Fenbendazole and ivermectin are both broad-spectrum nematodicides. However, only ivermectin is commercially available as an injectable and thus could replace the use of fenbendazole

<sup>1</sup> Under the MMPA, "take" is defined as to "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." [16 U.S.C. 1362(18)(A)] The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

paste. Ivermectin would be administered as a single subcutaneous dose of 0.2 mg/kg. Both medications can be injected during the same handling event. Administering medications orally proved to be challenging during the initial phase of research, for the following reasons:

- Seals' tendency for jaw clenching
- Seals' tendency to spit out paste (medications)
- Estimating the amount of paste lost
- Dispensing the correct dosage for a seal's weight given the fact that medications must be prepared (premixed and packed in the syringe) before handling commenced.

An all-injectable method of administering the medications would alleviate these challenges while increasing human safety, decreasing seal stress, and increasing efficacy of treatments.

# 1.2 OTHER EA/EIS THAT INFLUENCE SCOPE OF THIS EA

The NMFS Permits Division prepared an environmental assessment (EA; NMFS 2009) for issuance of Permit No. 10137 to the MMRP for takes of Hawaiian monk seals, including but not limited to ground, vessel, and aerial surveys; marking and measuring; capture, restraint, sedation, health assessment sampling, instrumentation, de-worming; translocations of pups to increase survival (including establishing/re-establishing maternal association and risk alleviation); removal of adult male seals known to kill other seals; disentanglement and de-hooking; necropsies and opportunistic sample collection; and import/export of parts. Geographic locations of the take include the Hawaiian Archipelago (MHI and NWHI) and Johnston Atoll. Specimen samples may be imported/exported world-wide.

Permit No. 10137 was amended on three occasions.

- Permit No. 10137-01 replaced the original permit and added authorization for translocations of 6 pups from French Frigate Shoals to Nihoa Island within the NWHI; for this amendment, a new finding of no significant impact (FONSI) resulted and the original EA appropriately analyzed the effects of this action.
- Permit No. 10137-02 replaced Permit No. 10137-01 and amended the method of administering one of the de-worming drugs, praziquantel, without changing the dose or effects of the drug. NMFS determined that no additional NEPA documentation was needed as the effects were considered in the original EA and FONSI.
- For Permit No. 10137-03, the addition of ultrasound to currently permitted activities, a supplemental EA (NMFS 2010) was prepared to assess the effects of ultrasound on monk seals, which also resulted in a FONSI.

This supplemental EA will analyze the biological and environmental effects of using an injectable de-worming drug, ivermectin, in place of the oral de-wormer, fenbendazole, to treat intestinal parasites in young, wild Hawaiian monk seals.

# 1.3 SCOPING SUMMARY

The purpose of scoping is to identify issues to be addressed and significant issues related to the proposed action, and identify and eliminate from detailed study issues that are not significant or that have been covered by prior environmental review. An additional purpose of the scoping process is to identify concerns of the affected public and Federal agencies, states, and Indian tribes. CEQ regulations implementing the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) do not require that a draft supplemental environmental assessment (SEA) be made available for public comment as part of the scoping process. A draft of this SEA was not made available for public comment.

In accordance with Federal Regulations (50 CFR 216.39), the proposed action is issuance of a minor amendment. Consistent with these regulations, there will be no changes to the number or species of marine mammals authorized to be taken, imported, or exported. There would be no changes in the locations in which the marine mammals may be taken, from which they may be imported, and to which they may be exported. The duration of the permit will not be extended. The proposed action is authorization to substitute the use of one drug for another (not additional drugs) and the route of administration is less invasive and more accurate, which would lead to reduced handling stress and greater efficacy in treatment. The application was not made available for public comment, consistent with processing a minor amendment.

# 1.4 APPLICABLE LAWS AND NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

NMFS is obligated under NEPA to ascertain whether the applicant is seeking other federal, state, or local approvals for their action. Section 1.4 of the 2009 EA for issuance of Permit No. 10137 summarized applicable laws and federal, state, and local permits, licenses, approvals, and consultation requirements necessary to implement the proposed action, (included in Appendix 1 of the 2009 EA), and there is no change for this amendment; thus, Section 1.4 of the 2009 EA is incorporated by reference.

#### CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the range of potential actions (alternatives) determined reasonable with respect to achieving the stated objective. One alternative is the "No Action" alternative where the proposed permit would not be issued. The No Action alternative is the baseline for the rest of the analyses. The Proposed Action alternative represents the activities proposed in the submitted permit application (as modified), with terms and conditions specified by NMFS.

# 2.1 ALTERNATIVE 1 – NO ACTION

Under the No Action alternative, the permit amendment would not be issued to the applicant for the activities proposed. In absence of such amendment, MMRP activities currently authorized under Permit No. 10137-03 would continue through June 30, 2014.

# 2.2 ALTERNATIVE 2 – PROPOSED ACTION (Issuance of Permit Amendment with Conditions)

Under the Proposed Action alternative, NMFS would issue a permit amendment to the MMRP to use a modified de-worming protocol concurrent with permitted activities described below, with standard permit terms and conditions, conditions specific to pinnipeds, and conditions specific to the actions of the MMRP.

No changes to the permit terms and conditions would change except for the take table (Appendix 1), which would be modified to include the use of injectable ivermectin instead of oral fenbendazole during de-worming studies in the Hawaiian Archipelago (initially at Laysan Is. in the NWHI).

# Overview

The MMRP is currently authorized to undertake the following activities annually:

- Harassment at any location in the Hawaiian Archipelago and Johnston Atoll:
  - **Monitoring**: 1,440 seals of any age/sex may be approached for monitoring activities via ground, aerial, and vessel (includes photo-ID)
  - **Incidental Harassment**: 200 seals of any age/sex may be incidentally disturbed during all other research and enhancement activities
  - **Bleach marking**: 1,315 seals may be approached and bleach marked
- **Capture takes** at locations specified for each activity:
  - **Flipper tagging**: 556 seals of any size or sex except lactating females and nursing pups may be captured, restrained, flipper and PIT tagged, measured, and flipper plugs sampled; this includes retagging; locations include Hawaiian Archipelago and Johnston Atoll; **sonic tags**: up to 35 weaned pups at French Frigate Shoals may also have sonic tags applied concurrent with and on a flipper tag annually for up to three years
  - **Health Screening and Foraging Instrumentation**: 70 healthy seals and 30 unhealthy seals of any age/sex excluding lactating females with pups and nursing pups may be captured, restrained, sedated, sampled for health and disease screening (swabs, fecal loop, blood, blubber biopsies), measured, weighed, ultrasound measurements taken, and flipper tagged if necessary; of the healthy seals, 60 may also be instrumented with external tagging devices and weighed; location is the Hawaiian Archipelago

- **Translocation for enhancement**: immature seals may be relocated or translocated as follows:
  - 20 nursing pups of either sex that are abandoned or have been switched between two lactating females may be captured, restrained by hand or net, and relocated to a prospective foster mother or their natural mother, respectively; multiple attempts may occur to successfully unite pups with appropriate mothers; locations include the Hawaiian Archipelago and Johnston Atoll
  - 35 weaned pups of either sex may be captured, restrained by hand or net, sedated, sampled for health and disease screening, instrumented, and relocated via boat, vehicle, or aircraft from a high risk area (e.g., known shark predation) to a low risk area within the same island or atoll in the NWHI or Johnston Atoll; translocations in the MHI may be to a different location on the same island or to a different island in the MHI; locations include the Hawaiian Archipelago and Johnston Atoll
- **De-worming**: 200 seals of either sex, up to age 3 years, may be captured, weighed, treated for intestinal parasites, and have ultrasound measurements taken; treatment animals may include those captured for health assessments or foraging studies; location is the Hawaiian Archipelago, although the preponderance of activities may occur in the NWHI
- **Disentanglement/de-hooking**: as warranted, seals may be disentangled and de-hooked to prevent injury or death; location is the Hawaiian Archipelago and Johnston Atoll
- **Specimen collection and import/export**: necropsies may be performed on all carcasses; samples (molt, scat, spew, urine, placentae) may be collected opportunistically from beaches; samples may be import/exported/imported for analysis (world-wide); location of necropsies and sample collection is the Hawaiian Archipelago and Johnston Atoll

The following takes are authorized to occur over the 5-year duration of the permit and may occur in the Hawaiian Archipelago and at Johnston Atoll:

- Adult male removal: 10 adult males may be relocated, removed, or euthanized to enhance survival of immature animals and adult females
- **Euthanasia**: 10 moribund seals of any age/sex may be humanely euthanized or die incidental to handling during health assessment
- **Incidental mortality**: 4 incidental mortalities may occur during research and enhancement activities, with no more than 2 occurring in a single year

#### Methodology

The 2009 EA describes in detail methods used for the de-worming project and the 2010 SEA describes the ultrasound methods in detail. A description of the de-worming study with ultrasound use and the proposed modifications are summarized here.

#### De-worming Study

Seals included in this study are weaned pups at least 120 days post-weaning and juveniles aged 1 to 2 years. Seals are identified during standard ground surveys and their health status and body conditions are assessed by visual inspection and examination of digital photos. Emaciated seals too compromised to treat without high risk of mortality are excluded. Seals of these ages are randomly assigned to a treatment or control group, or alternated systematically, with the goal to have equal numbers in each group, matched in age, sex, body condition, and location.

All study subjects are captured by hand and net, feces collected for subsequent determination of parasite burden/presence (voided feces or fecal sample collected via fecal loop or digital extraction; stored in 10 % formalin), measured and weighed, flipper tagged if necessary, and given an intramuscular dose of praziquantel at 5 mg/kg and an oral dose of fenbendazole (Panacur) at 10mg/kg, and released. The proposed amendment would replace the use of oral fenbendazole with a subcutaneous injection of ivermectin (dose of 0.2 mg/kg).

Blubber depth measurements using a SonoSite portable imaging ultrasound (SonoSite, Bothell, WA) would be collected by applying light pressure to the skin to obtain images along the lateral side and dorsum of the animal. Images would be collected in wild seals from both the de-wormed and control.

Control seals are handled exactly as the dosed seals minus the drug administration. No sedation is used for treatment or control seals. Seals are also handled for a follow up assessment (sampling and weighing) approximately 4 weeks post-dosing. Seals are treated at intervals of spring, summer, autumn, and winter.

Post treatment body condition and fecal egg counts are determined by observing the seals, collecting scat from known individuals during MMRP monitoring patrols, and capturing and weighing seals. Parasite load is determined from fecal egg count data, treated as a categorical covariate. Visual assessment of condition is recorded on an ongoing basis throughout the study, using standard MMRP subjective body condition scoring and feces would be preserved for detection of parasites. Subsequent survival is determined through visual re-identification during population assessment field research, supplemented by observations made during additional field sessions.

#### MMRP Mitigation During De-worming Handling Events

The following mitigation measures apply to monk seal de-worming handling events, including the proposed changes.

The capture team has a briefing prior to an event to discuss roles of each team member and contingencies and responsibilities in the event of unanticipated results or action by the animal. Researchers minimize stress from captures and restraint by keeping the handling procedures as short as possible and cooling the animal with water as necessary. Prior to any animal capture, the location is evaluated for presence of environmental hazards that could present a risk of injury to the animal or the handlers.

Procedures requiring physical contact with seals include precautions to ensure that humans handling seals do not inadvertently transfer pathogens between animals. All personnel who come into contact with a seal wear protective clothing that is sterile or has been disinfected. All instruments/gear (e.g., nets) are cleaned and disinfected. All personnel involved in restraining seals, prior to handling another animal, wash their hands in anti-bacterial soap, don a fresh pair of gloves, coveralls, and mask, and dip their "rubber booties" in a 1:20 solution of Clorox.

Seals are observed for five to 20 or more minutes after being handled to ensure they resume normal behavior (either going into water with normal ambulation or resuming normal respiration rates on land). In the event of adverse reactions, emergency procedures are initiated under the advice of an on-site veterinarian, as described in the 2009 EA. Regular patrols and censuses of the area are conducted to resight and monitor individuals to determine the effects (positive or negative) of worming treatments.

#### CHAPTER 3 AFFECTED ENVIRONMENT

The action area for the proposed action is the same as for the original action, which includes the Hawaiian Archipelago and Johnston Atoll. Chapter 3 of the 2009 EA for issuance of Permit No. 10137 described the affected environment, including the social, economic, physical, and biological environment, and background information on the target species, Hawaiian monk seals, and non-target species including other marine mammals, sea turtles, birds, and plants. That section is incorporated by reference and is summarized here.

Activities undertaken by the MMRP in the NWHI require entrance into the Papahānaumokuākea Marine National Monument (hereinafter "Monument"). There are cultural and historic resources in the Monument, and it is considered a unique and ecologically critical area with numerous marine species. The MMRP is required to obtain annual permits from the Monument to access the islands to conduct research on Hawaiian monk seals. The NWHI contains critical habitat for Hawaiian monk seals and certain endangered plants.

The 2009 U.S. Pacific Marine Mammal Stock Assessments (Caretta et al. 2009) indicates the current best estimate for the population is 1,146, showing an expected decline (NMFS

2007). No additional takes of Hawaiian monk seals are requested in the proposed action. The spinner dolphin (*Stenella longirostris*), green sea turtle (*Chelonia mydas*), and Laysan finch (*Telespyza cantans*) were identified in the 2009 EA to be non-target species that may be affected by the MMRP research activities. An analysis of potential impacts to the target and these and other non-target species (e.g., invertebrates) within the action area, including the Monument, is provided in Chapter 4, below.

### CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

Chapter 4 of the original 2009 EA characterized and evaluated the environmental impacts of the suite of research and enhancement activities currently permitted, and that section is incorporated by reference and summarized. In addition, environmental considerations of the effects of using a different antiparasitic drug are included.

Monument permits obtained by the MMRP contain mitigation requirements to minimize impacts to resources in the NWHI, including physical, historical, and cultural resources. Any work conducted in the Monument requires strict quarantine procedures when transiting to islands within the Monument (i.e., in the NWHI) to prevent the introduction or spread of non-indigenous species.

None of the activities proposed are likely to have a significant impact on designated critical habitat of the Hawaiian monk seal. MMRP would not erect permanent structures or otherwise modify critical habitat of endangered plants in the NWHI or affect endangered plants in any way. None of the activities in the proposed action are likely to impact designated essential fish habitat.

As discussed in the 2009 EA, the only other marine mammal affected by research conducted by the MMRP is the spinner dolphin; up to 500 dolphins may be harassed during research activities in the NWHI, which is currently permitted. Research activities may cause incidental disturbance of to up to 140 basking green sea turtles (under the jurisdiction of the USFWS) annually in the NWHI. Annually, up to 200 Laysan finches may be disturbed and unintentional mortality or serious injury of two Laysan finches is possible during monk seal research and enhancement activities in the NWHI, primarily from the presence of field camps. NMFS consulted with the USFWS on this incidental take for issuance of the original permit, as discussed further below. Harassment of these species would not change as a result of the proposed amendment.

#### **Environmental Effects of Ivermectin**

#### Reduction in Environmental Exposure

The proposed switch to injectable ivermectin from oral fenbendazole is expected to result in reduced environmental exposure to antihelmintics. The analysis of the use of fenbendazole and praziquantel provided in the 2009 EA is incorporated by reference and summarized here. Based on the analysis in the 2009 EA, NMFS determined that administration of these two drugs to Hawaiian monk seals in the wild would not have a significant impact to the target and non-target species in the environment. The active and inactivated metabolites of these two drugs would be greatly diluted in the marine environment; and therefore, would not be expected to have significant effects on nontarget species in the water, such as fish, invertebrates, or reptiles.

Researchers have observed that some fenbendazole paste was lost during and subsequent to administration if the study subject spews or if the medication passively drips from the mouth. Injection would ensure that all the medication is delivered. Environmental exposure to ivermectin would only occur through its (and its metabolites') excretion through feces onto land or in the ocean. The potential effects on the environment are summarized in the following sections.

#### Chemistry and Fate of Ivermectin

Ivermectin is not fully metabolized by mammals; a range of 39%-61% of drug residue in feces of cattle, sheep and pigs was unaltered ivermectin (Halley *et al.* 1989*a*). The substance is not toxic to mammals, microorganisms, and plants but is toxic to the aquatic invertebrate, *Daphnia magna* and to some fish. There are as many as 13 metabolites of ivermectin (Halley et al. 1989*a*). For aquatic organisms these metabolites seem to be less toxic than the parent compound (Bloom and Matheson 1993).

Ivermectin is nonvolatile and has low water solubility with a strong affinity to attach to lipids, soils and organic matter. Therefore, when excreted terrestrially in feces it tends to bind to the organic matter in the feces and can persist for months unless acted upon by environmental variables (primarily sunlight and temperature). Halley et al. (1989a) found that when exposed to summer weather, ivermectin in soil and a soil/feces mixture degraded rapidly, with half-lives of 1-2 weeks. Given the sunny climate of Hawaii, it is likely the drug residues would degrade more rapidly. In addition, researchers would routinely collect fecal material during field camps and would remain approximately two weeks or more after treatment to monitor seals and collect feces. Researchers would likely remove a majority of feces on the beach during daily walks around the perimeter of the island. Ivermectin is relatively insoluble in water and is highly photolytic (Halley et al. 1989a). Data on the structurally similar abamectin suggests that ivermectin would be resistant to hydrolysis resulting in a relatively long half-life in water (>28 days) (Wislocki et al. 1989). However, if excreted in the water column, ivermectin would degrade more rapidly due to photolysis. The estimated photolysis rate for ivermectin in water is less than 12 hours (Halley et al. 1989b). However, since ivermectin binds tightly to sediments, any that reached the sea floor would be expected to remain there until it degraded (Halley et al. 1989a). Therefore, there could be temporary, localized effects to sediment based organisms.

Canavan et al. (2000) found quantifiable residues of ivermectin (measured as  $H_2B_{1a}$ , the secondary butyl compound of ivermectin) in sediments under and adjacent to salmon cages situated off the west coast of Ireland. Sediment cores were collected on the final day of a four-month period in which the drug was administered orally twice weekly to farmed salmon. Even in this setting where inputs of ivermectin were far greater and more spatially concentrated than proposed for Hawaiian monk seals, only 1.4 to 6.8  $\mu$ g/kg

(0.0014 to 0.0068 mg/kg) of ivermectin was detected in sediment collected from under cages and up to 31 m away from the edge of the cage block.

Regarding the proposed use of ivermectin in Hawaiian monk seals, several factors lead to a conclusion of very low environmental risk. First, the average mass of monk seals recently treated with praziquantel and/or fendbendazole was approximately 59 kg (maximum 105 kg). The proposed ivermectin dosage for these animals at 0.2 mg/kg would be 12 mg on average (maximum 21 mg).

These small amounts of ivermectin would be administered initially to only a few dozen seals at one location, with repeat treatments separated by 12 weeks and monitoring in between treatments. If the study proves effective, more seals may be treated at more island locations to enhance survival of young seals. The proposed permit amendment would authorize treatment with praziquantel and ivermectin on up to 200 animals annually across the entire Hawaiian archipelago, up to four times per year. However, the permit is conditioned to require the MMRP to provide evidence that the treatments are effective and have no adverse impacts to monk seals and non-target species prior to initiating larger-scaled treatments. MMRP biologists would be observant of the monk seal's environment and likely aware of die offs of fish and invertebrates; and would observe and report any abnormalities in other non-target species regularly encountered (e.g., sea birds, sea turtles).

Also, treatments would not be grouped together in areas and would be spread out in time and space. Some fraction of the drug and its less toxic metabolites would be excreted through feces distributed on both land and in the water. Feces on land would be collected by researchers to the maximum extent possible and these lower concentrations remaining in the environment would likely be rapidly further degraded due to exposure to sunlight. Any excreted drug that reaches the sediment floor would likely have a very low concentration and any effects would be temporary and localized. All of these factors would tend to result in diffuse, dilute and ephemeral environmental dispersal of ivermectin, such that impacts on the physical environment are expected to be extremely low.

Based on this information and the analysis in the 2009 EA, we conclude that no significant impact would occur to any component of the physical environment from the use of ivermectin in combination with praziquantel.

# 4.1 EFFECTS OF ALTERNATIVE 1: No Action

Under the No Action alternative, the minor amendment would not be issued, and the MMRP would be authorized to conduct research/enhancement activities as currently permitted through 2014, and as analyzed in the 2009 EA as Alternative 2 and in the 2010 SEA, which analyzed the effects of using ultrasound (Permit No. 10137-03). Section 4.2.2 of the original 2009 EA and Section 4.2 of the 2010 SEA is incorporated by reference into Section 4.1 of this SEA.

Section 4.2.2 of the 2009 EA provided information on the effects of research and enhancement procedures authorized by Permit No. 10137. In summary, capture and handling seals causes temporary stress and could cause injury or death. Baker and Johanos (2002) reported that there were no effects on survival, migration, or condition of seals that were handled, sedated, tagged, blood sampled, and instrumented a year following the handling event. This study concluded that conservative selection procedures and careful handling techniques had no deleterious effects on Hawaiian monk seals. The 2009 EA further concluded that the use of anti-parasitic drugs (fenbendazole and praziquantel) would not have a significant adverse impact on monk seals or other components of the environment. Information provided in the 2010 SEA indicated that the use of ultrasound, which would be combined with the de-worming study, would not adversely impact the subject animals above that previously analyzed for the original permit.

# 4.2 EFFECTS OF ALTERNATIVE 2: Issue Permit Amendment with Conditions

The MMRP proposes to replace the use of an oral anti-parasitic drug, fenbendazole, with an injectable drug, ivermectin, to minimize the duration of restraint and ensure proper dosing of seals. Fenbendazole, which is currently used to treat intestinal nematodes, is not available in an injectable form; however, ivermectin, another broad-spectrum nematocide, is commercially available as an injectable and thus could replace the use of fenbendazole paste. Ivermectin would be administered as a subcutaneous dose of 0.2 mg/kg and would be administered during the same handling event to inject praziquantel.

Ivermectin is an insecticidal, acaricidal and nematicidal pesticide that has been used in agriculture and horticulure to control parasites of domestic animals and pests of cotton, citrus, pears, vegetables, and ornamentals. It is used regularly as an anti-parasitic agent for cattle, horses, swine and dogs with activity against the organisms in the phyla Nemathelminthes and Arthropoda (Campbell et al. 1983, Forbes 1993).

Ivermectin is a high molecular weight, hydrophobic compound that works by amplifying the effect of ligand glutamate on the chloride ion channels of invertebrates. At high concentrations, ivermectin can cause irreversible opening of these channels (Rohrer and Arena 1995). This disrupts inhibitory neuromuscular synapses, resulting in hyperpolarization of the muscles, producing paralysis and eventual death of the parasite.

#### Effects of Ivermectin on Monk seals and Other Pinnipeds

Ivermectin (dose of 0.3 mg/kg) has been used previously on Hawaiian monk seals during captive care enhancement programs in 1987, 1992 and 1993, with no noticeable adverse reactions observed (NMFS unpublished data). Ivermectin has been used broadly on pinniped species around the world. Ivermectin (injectable, dose of 0.2 mg/kg) is routinely administered to pinnipeds at the Marine Mammal Center (TMMC) in Sausalito CA, and has been deemed effective in killing intestinal worms (as evidenced by worm balls eliminated by these animals after treatment) (Frances Gulland, pers. comm.). Over 300 pinnipeds have been treated with ivermectin at TMMC, with no documented adverse

effects (F. Gulland, pers. comm.). A case study of a stranded immature elephant seal treated at TMMC was documented by Dailey *et al.* (2002), where an infestation by the parasitic copepod *Pennella balaenopterae* was successfully treated with a subcutaneous injection of ivermectin.

Delong et al. (2009) injected wild northern fur seal pups (*Callorhinus ursinus*) subcutaneously with ivermectin (at a dose rate of 0.2 mg/kg) or 0.9 % saline (volume dose equal to that of ivermectin for a pup at the same weight). The prevalence of hookworm eggs in fecal samples was identical (24%) for control and treated pups at the time of treatment in July. By August, only 6% of pups from the ivermectin treatment group had feces positive for hookworm eggs, whereas the sample of control pups showed a significantly higher prevalence of infection at 67% (Fisher's exact test, P < 0.0001), demonstrating the effectiveness of ivermectin in clearing the hookworm infections. The conclusion of the study was that a single injection of ivermectin in northern fur seal pups for the treatment of nematodes proved highly effective in reducing worm burden and significantly improving weight gain and survivorship in these animals (DeLong et al. 2009). No adverse effects of the drug or complications from the injection were detected.

The 2009 annual report for Permit No. 10137 indicated that one juvenile seal injected intramuscularly with praziquantel developed a small abscess at the injection site. The abscess was lanced and cleaned in the field, and the animal recovered without complications. Abscesses are common in monk seals in the wild and previously identified mitigation measures were implemented. The MMRP additionally reported three seals developed minor swellings near their injection sites within days of treatment; these swellings subsided on their own within 1-3 weeks in each case with no medical intervention.

Based on previous use in monk seals and other pinniped species, the use of ivermectin in place of fenbendazole is not likely to increase the overall risk of adverse impacts to monk seals. Handling time would be reduced substantially, thus reducing the risk of complications from stress associated with restraint. Complications with administering the drug orally in the field would be removed. A more accurate dose of drug would be administered, thus increasing the efficacy of treatment. While there is risk of abscesses from injecting drugs, MMRP would be able to observe and successfully treat them. The permit is conditioned to require the MMRP to stop de-worming if at any time during treatments there is any indication that handling, treatments, or any other artifact of the deworming study has compromised the health and welfare of seals. Also, prior to initiating full-scale de-worming treatments of up to 200 animals annually, the Permit Holder must provide evidence that treatments administered during the experimental phase are beneficial and have no significant adverse effects to seals and non-target species. These conditions would remain in the proposed amendment.

#### Impacts of Ivermectin on Other Species

Fish – The toxicity of ivermectin to fish appears to vary with species. The drug has been tested in some studies and used in aquaculture to control for parasites such as sea lice. Significant reductions in lice numbers with no fish mortality were achieved in Atlantic

salmon smolts at oral doses up to 0.2 mg/kg (Smith et al. 1993). The exception was a group given an accidental overdose (0.75 mg/kg), which experienced 26% mortality. No toxic effects were detected in sea bass (*Dicentrarchus labrax* L.) given oral ivermectin up to 0.7 mg/kg, though toxic effects were found when given via intubation or injection (Athanassopoulou et al. 2002). When administered by injection at a dose rate of 0.2 mg/kg, ivermectin was found to be highly toxic to mottled sculpins, *Cottus bairdi* (Heckman 1985), and eels *Anguilla anguilla* (Taraschewski et al. 1988), but not to channel catfish *Ictalurus punctatus* (Lorio 1989) or gold fish (Hyland & Adams 1987). For bluegill sunfish and rainbow trout, the respective LC<sub>50</sub> values were 4.8 (95% CI 4.0-5.8) and 3.0 (95% CI 2.5-3.6) ppb, respectively, in a 96 hr assay where the fish were kept in water with various concentrations of ivermectin (Halley et al. 1989*a*). These above studies involved concentrations, dosages or exposures far above what any single fish is likely to encounter in the NWHI through exposure from seal feces.

Ivermectin has a low bioconcentration factor suggesting it is not expected to accumulate in fish (Halley et al. 1989*b*). Although there is no available laboratory-derived data on invermectin bioaccumulation in fishes, the structurally similar abamectin was found not to bioaccumulate in bluegill sunfish, *Lepomis macrochirus* (Wislocki et al. 1989).

*Invertebrates* – The available data on the toxicity of ivermectin to non-target marine invertebrates is limited. Data on abamectin, a similar pesticide to ivermectin, suggests that the avermectins, in general, are relatively less toxic to molluscs than crustacea, but the toxicity to crustaceans is variable and given the small number of species tested no firm conclusions can be made (Wislocki et al. 1989).

The most sensitive marine crustacean to abamectin, to date, is the mysid shrimp, *Mysidopsis bahia* (Wislocki et al. 1989). However, in acute toxicity studies on the water flea, *Daphnia magna*, ivermectin was found to be more toxic than abamectin, demonstrating that comparisons between ivermectin and abamectin should be made with caution. The main metabolic degradation products of ivermectin have been studied for acute toxicity and were found to be much less toxic than the parent compound to *D. magna* (Halley *et al.* 1989*a*). The toxicity of ivermectin to sediment dwelling marine organisms also appears variable, as tested amphipods and starfish (Davies et al. 1998) were far less sensitive than the marine annelid, *Arenicola marina*, (10 day LC<sub>50</sub> of 18  $\mu$ g/kg , Thain et al. 1997). As discussed above, if a seal defecates in the water, the excreted drug could reach the sediment floor, and therefore, could impact sediment dwelling organisms. However, it would be of low concentration and any effects would likely be temporary and localized. Seals will not be held in pens (such as with aquaculture) and treatments would be dispersed in time and space.

*Other Biota* – There is little or no data on the effect of ivermectin on primary productivity or marine sediment microbes. Ivermectin appears to have no effect on the growth of the freshwater alga *Chlorella pyrenoidosa* (Halley et al. 1989*a*). Furthermore, in a series of tests evaluating the degradation of ivermectin in terrestrial soil systems, the compound was found to possess no antifungal, antibacterial or antiprotozoal activity (Halley et al. 1989*a*). Similar studies on marine sediments have not been conducted.

#### Other Impacts

*Discontinuing use of Fenbendazole* – The use of an injectable drug to treat for intestinal round worms would mean that the drug fenbendazole would no longer be administered to seals and would not be put into the seals' environment (directly through spitting out of a seal's mouth or indirectly through excretion), thus removing any potential environmental impacts from the use of that drug on the seals, non-target organisms, and the environment, as described in the 2009 EA.

*Removing Feces From Beaches* – The 2009 EA discussed potential effects of de-worming drugs excreted in feces on a beach on non-target species such as flies. Ivermectin excreted in cow dung is known to inhibit dung degradation in the pasture environment (Floate et al. 2005). Cross-trophic effects could occur if flies that ingested the drugs while feeding on seal fecal matter were subsequently eaten by an insectivorous species, but it is unknown if this would occur, and likely accumulated concentrations in flies would be low. However, as discussed in the 2009 EA, researchers would collect feces excreted by treated seals whenever possible, thus removing any potential impacts to organisms on the beach. Collection of seal feces has been conducted by the MMRP routinely during population monitoring efforts for other studies such as diet analysis, and is not unique to this study. There are no plants that rely on monk seal feces as a source of nitrogen for fertilization, and it is not likely that the removal of feces would significantly impact any flora or fauna in the environment.

# 4.3 SUMMARY OF COMPLIANCE WITH APPLICABLE LAWS, NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

#### 4.3.1 Endangered Species Act

This section summarizes conclusions resulting from consultations as required under section 7 of the ESA. NMFS consulted with the NMFS Endangered Species Division and a biological opinion was prepared (NMFS 2010). The opinion concluded that the proposed issuance of Permit No. 10137-04 is not likely to jeopardize the continued existence of Hawaiian monk seals, and critical habitat is not expected to be adversely modified or destroyed as a consequence of the proposed actions.

NMFS also received a biological opinion from the USFWS regarding disturbance and incidental mortality of Laysan finch, which concluded that issuance of Permit No. 10137 was not likely to jeopardize the continued existence of Laysan finch. The proposed action would not change the manner or extent of take of Laysan finch; therefore, consultation was not re-initiated for the proposed amendment.

For the original permit, NMFS also informally consulted with the USFWS regarding incidental disturbance of basking green sea turtles in the NWHI. Best management practices are included in Permit No. 10137-04 to minimize and avoid the unintentional harassment of basking and/or nesting green sea turtles while conducting research or camping on various islands. USFWS concurred with NMFS' determination for the

original permit that conducting research on Hawaiian monk seals "may affect, but is not likely to adversely affect" terrestrial green sea turtles because researchers will adhere to best management practices to avoid basking and nesting green sea turtles.

# 4.3.2 Marine Mammal Protection Act

The research and enhancement proposed in the submitted application and additional information provided by the applicant is consistent with permit issuance criteria in the MMPA and NMFS' implementing regulations.

The permit amendment would contain the same standard terms and conditions included in Permit No. 10137-03, as required by the MMPA and NMFS regulations. These include (1) the effective date of the permit; (2) the number and kinds of marine mammals that may be taken; (3) the location and manner in which they may be taken; and (4) other terms and conditions related to minimizing potential adverse impacts of specific activities (e.g., capture, sampling), monitoring of impacts of research, and reporting to ensure permit compliance.

# 4.3.3 Other Applicable Laws

Compliance with other applicable laws was discussed in Section 4.3.3 of the original EA. This section is incorporated by reference and includes the National Historic Preservation Act, National Marine Sanctuaries Act, Migratory Bird Treaty Act, Magnuson-Stevens Fishery Conservation and Management Act, Coastal Zone Management Act, Convention on International Trade in Endangered Species of Wild Fauna, and Animal Welfare Act. Issuance of this amendment does not change which laws are applicable and NMFS has concluded that the amendment does not change what other permits are required.

# 4.5 MITIGATION MEASURES

# 4.5.1 Physical Environment

Section 4.5.1 of the 2009 EA is incorporated by reference. It provides a discussion of measures to minimize impacts to the physical environment in the NWHI (Monument). This includes such measures as prevention of spread of non-indigenous species from island to island in the NWHI (e.g., cleaning boat hulls, special preparation of gear, clothes, and food), cleaning up areas after field camps, and ensuring safe shipments of biological samples.

# 4.5.2 Biological Environment

Section 4.5.2 of the 2009 EA discusses mitigation used to minimize impacts to the biological environment, including monk seals and other non-target species. This section is incorporated by reference and includes a summary of permit conditions for Permit No. 10137, which would not change for the proposed amendment. In addition to the researchers' self-imposed mitigation measures, permits issued by NMFS for research on

marine mammals and threatened and endangered species contain terms and conditions to minimize potential adverse impacts to the target species, monitoring of impacts of research, and reporting to ensure permit compliance.

No additional mitigation measures would be added to the permit for the substitution of one treatment drug for another. Conditions are already included in the permit to:

- stop de-worming treatments if negative impacts are observed;
- avoid disturbance to pregnant and lactating females and nursing pups;
- monitor seals during handling and post-release;
- terminate activities if they are life threatening to seals;
- use trained and experienced personnel to minimize handling time and disturbance;
- use an experienced marine mammal veterinarian for activities involving the sedatives or anesthesia; and
- use sterile or appropriately sanitized equipment to sample seals.

# 4.6 UNA VOIDABLE ADVERSE EFFECTS

Section 4.6 of the original EA incorporates the unavoidable adverse effects from all permitted activities, and is incorporated by reference. These would not change significantly based on the use of a different de-worming drug during already permitted captures. Adverse effects from captures include stress, injury, and unintentional mortalities. Disturbance to non-target animals, including green sea turtles, spinner dolphins, and Laysan finch, would unavoidably result from the presence and actions of the researchers. Serious injury or mortality of no more than two Laysan finch is possible.

# 4.7 CUMULATIVE EFFECTS

The cumulative effects of issuing this minor amendment are no different than issuing original permit, since this proposed action is a minor modification to the original permit analyzed by the 2009 EA. The substitution of one de-worming drug for another is not anticipated to significantly change the effects to the physical, social, economic, and biological environment, other than a minimal additional impact to the target species, which is likely to be insignificant.

Section 4.7 of the 2009 EA is incorporated by reference and summarized here. Permit requirements of the Monument would be in place to ensure preservation of the NWHI ecosystem and the resources it holds. Activities in the MHI are not likely to have a measurable impact to the environment relative to those activities that already exist (e.g., recreational boating and fishing, use of beaches by tourists), and no permanent damage to the physical environment (e.g., construction) is proposed.

The analysis presented in the 2009 EA provides evidence that if conducted conservatively and with caution, capture activities (where most stress is incurred to the target animal) will not have significant long-term adverse effects for the species; and based on pastperformance, if these measures are implemented in the future, the probability that incidental mortalities would occur during handling events is low. The use of ivermectin in monk seals is not expected to increase the risk of adverse effects to the seals.

In the present proposed use of ivermectin in Hawaiian monk seals, several factors lead to a conclusion of very low environmental risk. First, the average mass of monk seals recently treated with praziquantel and/or fendbendazole was approximately 59 kg (maximum 105 kg). The proposed dosage for these animals at 0.2 mg/kg would be 12 mg on average (maximum 21 mg). Some fraction of the drug and its less toxic metabolites would be excreted through feces distributed on both land and in the water. These lower concentrations would likely be rapidly further degraded due to exposure to sunlight and feces would be removed from the beaches. All of these factors would tend to result in diffuse, dilute and ephemeral environmental dispersal of ivermectin, such that impacts on the environment and non-target organisms are expected to be extremely low.

The MMRP's assessment of the status of the MHI and NWHI subpopulations, research programs on health and foraging, and enhancement activities provide critical data and actions necessary for the management and recovery of this species. Based on this and the analysis in the 2009 EA, it is highly unlikely that activities carried out by the MMRP under the proposed amendment would have significant cumulative impacts when considered with other factors affecting monk seals.

CHAPTER 5 LIST OF PREPARERS AND AGENCIES CONSULTED

Preparer: NMFS Permits, Conservation and Education Division, Office of Protected Resources, 1315 East-West Highway, Silver Spring, MD 20910.

Agencies Consulted: The Monument and the USFWS were consulted on issuance of the original Permit No. 10137.

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# APPENDIX 1: TABLE SPECIFYING THE PROTECTED SPECIES, LOCATIONS, AND MANNER OF TAKING PROPOSED FOR PERMIT NO. 10137-04

Changes appear in **bold** 

Table 1. Authorized annual takes of Hawaiian monk seals. Locations: Hawaiian Archipelago=Main Hawaiian Islands (MHI) and adjacent islets, Kaula Rock, Necker Island (Is.), Nihoa Is., and the Northwestern Hawaiian Islands (NWHI). MHI=Hawaii, Maui, Molokai, Kahoolawe, Lanai, Oahu, Kauai, and Niihau. NWHI=French Frigate Shoals, Laysan Is., Lisianski Is., Pearl and Hermes Reef, Midway Atoll, and Kure Atoll.									
Task	Size (Age)	Sex	No. Seals Taken/ Year	No. Takes/ Seal/Year	Type of Takes	Locations	Dates/Time Period And Details		
1. Monitoring	Any	Both	150	3	Disturbance from visual	MHI	Annually at any time of		
			50	1	identification during	Nihoa Is.	year.		
			50	1	ground monitoring and aerial and vessel surveys	Necker Is.			
			250	5		French Frigate Shoals			
			10	1		Gardner Pinnacles			
			250	3		Laysan Is.			
			225	3		Lisianski Is.			
			200	3		Pearl and Hermes Reef			
			100	2		Midway Atoll			
			150	2		Kure Atoll			
			5	1		Johnston Atoll			

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Task	Size (Age)	Sex	No. Seals Taken/ Year	No. Takes/ Seal/Year	Type of Takes	Locations	Dates/Time Period And Details		
2a. Tagging	Any except	Both	30	3	Restraint, tagging (flipper	MHI <sup>1</sup>	Annually at any time of		
	pups,		25	1	plugs, morphometrics	Nihoa Is.	summer field camps).		
	lactating or obviously		15	1	(length and girth)	Necker Is.	All of the animals may also be taken by Tasks 1 and 3.		
	pregnant females.		150	3		French Frigate Shoals <sup>2</sup>	<sup>1</sup> Weaned pups in the MHI may also have ultrasound performed concurrent with flipper tagging		
			75	3		Laysan Is.			
			50	3		Lisianski Is.	<sup>2</sup> At French Frigate Shoals, 35 weaned pups of either		
				50	3		Pearl and Hermes Reef	sex may have a sonic tag deployed on a third flipper tag (annually over three	
			25	2		Midway Atoll y	years).		
			35	2		Kure Atoll			
			1	1		Johnston Atoll			
2b. Retagging	Any except nursing pups, lactating or obviously pregnant females.	Both	100	1	Restraint, retagging (flipper), flipper plugs, morphometrics	Hawaiian Archipelago	Annually at any time of year. Seals may have been taken by disturbance (Task 1) and may have been tagged in previous years.		
3. Marking	Any	Both	75	2	Temporary bleach	MHI	Annually at any time of		

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Task	Size (Age)	Sex	No. Seals Taken/ Year	No. Takes/ Seal/Year	Type of Takes	Locations	Dates/Time Period And Details		
			30	2	marking	Nihoa Is.	year.		
			30	2		Necker Is.	All of the animals may also be taken by disturbance		
			250	2		French Frigate Shoals	(Task 1) and tagging (Task 2).		
			250	2		Laysan Is.			
			225	2		Lisianski Is.			
			200	2		Pearl and Hermes Reef			
			100	2		Midway Atoll			
			150	2		Kure Atoll			
			5	1		Johnston Atoll			
4. Health Screening and Foraging Studies	Any healthy seal excluding lactating females with pups and nursing pups	Both	70	2	Restraint, sedation, tagging, blood sampling, swabs, blubber biopsy, weight, morphometrics, ultrasound, instrumentation	Hawaiian Archipelago	Annually any time of year. Sixty (60) healthy seals may be instrumented. Recaptures for instrument removal and sampling. All animals may have been taken by Tasks 1-3.		

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Task	Size (Age)	Sex	No. Seals Taken/ Year	No. Takes/ Seal/Year	Type of Takes	Locations	Dates/Time Period And Details	
	Any unhealthy seal excluding lactating females with pups and nursing pups	Both	30	2	Restraint, sedation, tagging, blood sampling, swabs, blubber biopsy, morphometrics, ultrasound, treatment (lance abscesses), humane euthanasia or incidental mortality of 10 moribund animals	Hawaiian Archipelago	Annually at any time of year. Includes humane euthanasia of up to 10 moribund or severely injured seals at discretion of veterinarian authorized over a five-year period. All animals may have been taken by Tasks 1-3.	
5. Intestinal Parasite Treatment	Pups ≥ 120 days post- weaning and juveniles up to age 3	Both	200	8	Restraint, weight, morphometrics, fecal collection (voided feces or fecal sample collected via fecal loop or digital extraction), treatment (IM praziquantel and <b>SC</b> <b>ivermectin</b> ), ultrasound; post-treatment monitoring at approximately 4 week intervals (visual assessments and recapture for weight, morphometrics, and fecal sampling)	Hawaiian Archipelago	Annually, year-round. Initial study trials to include pups ≥ 120 days post weaning to juveniles ≤ 2 years. Maximum number of seals that may be included in initial study are: French Frigate Shoals: 47 seals; Laysan Island: 41 seals; and Lisianski Island: 29 seals. Treatments may be combined with other activities requiring restraint and sedation	
6. Translocation	Nursing pup	Both	20	6	Capture, restraint, and relocation by hand to natural mother or	Hawaiian Archipelago, Johnston Atoll	Establishing/re-establishing maternal association. Annually at any time of	

Table 1. Authorized annual takes of Hawaiian monk seals. Locations: Hawaiian Archipelago=Main Hawaiian Islands (MHI) and adjacent islets, Kaula Rock, Necker Island (Is.), Nihoa Is., and the Northwestern Hawaiian Islands (NWHI). MHI=Hawaii, Maui, Molokai, Kahoolawe, Lanai, Oahu, Kauai, and Niihau. NWHI=French Frigate Shoals, Laysan Is., Lisianski Is., Pearl and Hermes Reef, Midway Atoll, and Kure Atoll.								
Task	Size (Age)	Sex	No. Seals Taken/ Year	No. Takes/ Seal/Year	Type of Takes	Locations	Dates/Time Period And Details	
					prospective foster mother		year but predominantly during summer field camps. Most takes will occur in the NWHI (intra-island/atoll).	
	Weaned Pup	Both	35	3	Capture, restraint, sampling, and relocation from high risk areas via boat, ship, vehicle, or air craft	Hawaiian Archipelago, Johnston Atoll	Risk alleviation. Annually at any time of year. Most takes occur at French Frigate Shoals (intra-atoll) or within the Main Hawaiian Islands.	
	Weaned Pup	Both	6	3	Capture, restraint, sedation, sampling, instrumentation, temporary holding, translocation from areas of low survival via boat and ship	NWHI	Seals may be translocated from French Frigate Shoals to Nihoa Island in 2009.	
7. Adult Male Removal	Adult	Male	10	2	Capture, restraint, sedation, sampling, instrumentation/trans- location, permanent captivity, or euthanasia	Hawaiian Archipelago; Johnston Atoll	Up to 10 males may be removed over a five year period.	
8. Disentangle	Any	Both	As warranted (likely not to exceed 25/year)	>1	Disentanglement and dehooking (with or without capture, sedation, and release)	Hawaiian Archipelago; Johnston Atoll	Annually at any time of year. All animals may have been taken by Tasks 1-3.	

Table 1. Authorized annual takes of Hawaiian monk seals. Locations: Hawaiian Archipelago=Main Hawaiian Islands (MHI) and adjacent islets, Kaula Rock, Necker Island (Is.), Nihoa Is., and the Northwestern Hawaiian Islands (NWHI). MHI=Hawaii, Maui, Molokai, Kahoolawe, Lanai, Oahu, Kauai, and Niihau. NWHI=French Frigate Shoals, Laysan Is., Lisianski Is., Pearl and Hermes Reef, Midway Atoll, and Kure Atoll.									
Task	Size (Age)	Sex	No. Seals Taken/ Year	No. Takes/ Seal/Year	Type of Takes	Locations	Dates/Time Period And Details		
9. Conduct Necropsies	Any	Both	As warranted	1	Necropsy any seal found dead, that died during restraint, or that was euthanized.	Hawaiian Archipelago; Johnston Atoll	Annually at any time of year.		
10. Opportunistic Retrieval of samples	Any	Both	Unlimited samples	Unlimited samples	Collect parts (placentae, scats, spews, and molted fur/skin) from haul out areas	Hawaiian Archipelago; Johnston Atoll	Annually at any time of year but predominantly during summer field camps.		
11. Import and Export Parts	Any	Both	Unlimited import/ export	Unlimited samples	Export (and re-import) Hawaiian monk seal samples collected under the authority of this permit. Import (and re- export) Mediterranean monk seal specimens for research related to monk seal conservation	World-wide (including but not limited to Canada, the Netherlands, Scotland, Greece, Australia)	Annually at any time of year.		
12. Incidental harassment of monk seals	Any	Both	200	2	Incidental harassment during any research and enhancement activity	Hawaiian Archipelago; Johnston Atoll	Total incidental harassment over all activities.		
13. Accidental Mortality	Any	Both	2 <sup>2</sup>	1	During any research or enhancement activity	Hawaiian Archipelago; Johnston Atoll	<sup>2</sup> Four (4) accidental mortalities over a five-year period is authorized not to exceed 2 deaths in any one year.		



UNITED STATES DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration NATIONAL MARINE FISHERIES SERVICE Silver Spring, MD 20910

### Finding of No Significant Impact On Issuance of a Permit For Field Research and Enhancement Activities on the Endangered Hawaiian Monk Seal (Permit No. 10137-04)

National Marine Fisheries Service

#### Background

The National Marine Fisheries Service (NMFS) proposes to issue a minor amendment to Permit No. 10137-03 to the NMFS Pacific Islands Fisheries Science Center Marine Mammal Research Program (MMRP) to conduct research on Hawaiian monk seals (*Monachus schauinslandi*) in the Hawaiian Archipelago and Johnston Atoll. In accordance with the National Environmental Policy Act, NMFS has prepared a Supplemental Environmental Assessment (SEA) analyzing the impacts on the human environment associated with permit issuance (Supplemental Environmental Assessment on Issuance of a Permit for Field Research and Enhancement Activities on the Endangered Hawaiian Monk Seal (Permit No. 10137-04); August 2010). The minor amendment would authorize the use of ivermectin injections in place of orallyadministered fenbendazole to treat intestinal round worms in wild Hawaiian monk seals. In addition, a Biological Opinion was issued under the Endangered Species Act (August 2010) summarizing the results of interagency consultation regarding the target species, Hawaiian monk seals. The analysis in the SEA, as informed by the Biological Opinion, support the below findings and determination.

National Oceanic and Atmospheric Administration Administrative Order (NAO) 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include the following:

1) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in Fishery Management Plans?

The use of ivermectin is not expected to cause substantial damage to the ocean and coastal habitats or essential fish habitat. The SEA analyzed the environmental



impacts associated with ivermectin. Treatments would not be grouped together in the areas and would be spread out in time and space. Some fraction of the drug and its less toxic metabolites would be excreted through feces distributed on both land and in the water. Feces on land would be collected by researchers and these lower concentrations remaining in the environment would likely be rapidly further degraded due to exposure to sunlight. All of these factors would tend to result in diffuse, dilute and ephemeral environmental dispersal of ivermectin, such that impacts on the physical environment are expected to be extremely low.

2) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

The use of ivermectin is expected to result in dilute and ephemeral environmental dispersal of the drug, such that impacts on the environment and non-target organisms are expected to be extremely low. Any impacts to non-target species, such as potential mortality of zooplankton, are not likely to be significant. The impacts of the activities permitted would primarily be related to direct takes of the target species, Hawaiian monk seals. Short-term responses from disturbance and capture activities are not likely to have a measurable effect on productivity, foraging, predator avoidance or other essential biological functions. One goal of the research is to improve survival of seals by treating seals to decrease intestinal worm burdens. From the de-worming treatments, a proportion of seals may be able to gain weight more efficiently and forage more successfully. However, the activities proposed for this permit amendment are not reasonably expected to substantially alter food-web interactions, or increase or decrease seals' susceptibilities to predation in a manner that substantially impacts the ecosystem.

3) Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety?

NMFS has not identified any aspects of public health and safety (e.g., noise; risk of exposure to hazardous materials, wastes; risk of contracting disease) that could reasonably be expected to be affected by the conduct of the research on Hawaiian monk seals. The majority of activities authorized in the permit amendment would occur in the remote location of the Northwestern Hawaiian Islands, which is a protected area that requires a permit for entrance and is not accessible to the general public. While the research would involve collection and transport of marine mammal tissues (including tissues preserved in hazardous materials), treatment with anti-parasitic drugs, and handling of wild animals, these activities would be conducted by trained individuals and would be performed using specific protocols to ensure the health and safety of humans and to minimize potential for zoonotic disease transmission.

4) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?

The activities proposed for this amendment include harassment, capture, treatment, and sampling activities directed on Hawaiian monk seals. Risks inherent to capturing wild animals include animals dying from capture stress or other factors. The researchers have standardized their handling techniques over decades of work with Hawaiian monk seals, and determined that if conducted in a conservative manner, the risk of incidental mortality is low. The use of ivermectin has proven to be safe in monk seals and other pinnipeds. A Biological Opinion for issuance of the minor amendment concluded that issuance of the permit amendment for use of ivermectin in place of fenbendazole on Hawaiian monk seals was not likely to jeopardize the continued existence of this species.

5) Are significant social or economic impacts interrelated with natural or physical environmental effects?

There are no significant social or economic impacts directly related to potential impacts of permit amendment issuance. Issuance of the amendment would not substantially impact short- or long-term use of the environment or result in use of natural or depletable resources, such as might be expected from construction or resource extraction activities. There would be no significant social or economic impacts as a result of the work conducted on the target species, Hawaiian monk seals. Hawaiian monk seal are not permitted to be harvested for economic purposes; therefore, there is no impact to socio-economic resources (e.g., business, industry, etc.) associated with the activities conducted on this biological resource. Issuance of the amendment and conduct of the research would not result in inequitable distributions of environmental burdens or access to environmental goods. NMFS does not expect issuance of the permit to adversely affect low-income or minority populations.

6) Are the effects on the quality of the human environment likely to be highly controversial?

The effects on the quality of the human environment are not likely to be highly controversial. Minor amendments are not made available for public comment (50 CFR 216.39). The original application, which included the use of de-worming drugs praziquantel and fenbendazole, was made available to the public during a 30-day comment period, and no comments from the general public were received.

7) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas?

The proposed action is not expected to result in substantial impacts to such unique areas. The proposed de-worming study would be conducted in the Monument,

which encompasses the Northwestern Hawaiian Islands. There are cultural and historic resources in the Monument, and it is considered a unique and ecologically critical area. The applicant is required to obtain permits from the Monument to access the islands and conduct research and enhancement activities on Hawaiian monk seals. The Monument permits contain mitigation requirements to minimize impacts to resources in the Northwestern Hawaiian Islands. The annual Monument permit for this action is in process.

8) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

The potential risks of amendment issuance and conduct of the permitted research and enhancement activities are not unique or unknown, nor is there significant uncertainty about impacts. NMFS has permitted the use of ivermectin on northern fur seals, and is considered a routine treatment in pinnipeds undergoing rehabilitation and in treatment of domestic animals.

9) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Issuance of the proposed amendment is not related to other actions with individually insignificant but cumulatively significant impacts. There are no activities proposed that are interrelated with or interdependent on other federal, state or local actions that could have cumulatively significant impacts.

10) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

The activities proposed in the amendment would occur in the Monument where cultural and historic resources occur, and the applicant is required to obtain annual permits from the Monument to access the islands and conduct research on Hawaiian monk seals. The Monument permits contain mitigation requirements to minimize impacts to cultural and historic resources within this area.

11) Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?

Any work conducted in the Monument requires strict quarantine procedures when transiting to islands within the Monument (i.e., in the Northwestern Hawaiian Islands), such as freezing field camp supplies for 24 hours prior to landing on an island, and thoroughly cleaning boat hulls in between landing on islands. The Monument permits contain conditions researchers must follow to prevent the introduction or spread of non-indigenous species.

12) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

Issuance of the proposed permit amendment is not likely to establish a precedent for future actions with significant effects or represent a decision in principle about future considerations. NMFS has been issuing research permits pursuant to section 104 of the MMPA since 1972. Nothing about NMFS' decision making process pursuant to the statutory and regulatory criteria is unique to this amendment. Issuance of this permit amendment does not involve any irreversible or irretrievable commitments of resources.

13) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Issuance of the permit amendment is not expected to violate any Federal, State, or local laws or requirements related to environmental protection. NMFS has jurisdiction for issuance of permits for research on endangered pinnipeds and has determined the proposed research and enhancement to be consistent with all applicable provisions of the MMPA and ESA. Conduct of the activities authorized by the amendment requires the researchers to obtain permits from other environmental resource management agencies, such as the Monument. Obtaining such permits is the responsibility of the researchers, and they have demonstrated that such permits have been consistently obtained in the past. The researchers must also obtain approvals consistent with the Animal Welfare Act, and have demonstrated that such approval has previously been obtained and will be obtained for the proposed activities. NMFS has not identified anything about the proposed research that would prohibit securing such permits and approvals.

14) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Activities proposed in the amendment would result in disturbance of the target species, and capture activities could result in unintentional mortality. Injection of drugs can result in abscesses to seals. The analysis presented in the SEA and the EA for the original Permit No. 10137 (NMFS 2009) provides evidence that if conducted conservatively and with caution, capture activities will not have significant long-term adverse effects for the species; and based on past-performance, the probability that incidental mortalities would occur during handling events is low. The use of ivermectin in place of fenbendazole is not expected to increase adverse impacts to the seals treated. The use of ivermectin is expected to result in dilute and temporary dispersal of the drug, such that impacts on non-target organisms are expected to be extremely low and cumulative impacts are not expected. Limited other activities occur in the Northwestern Hawaiian Islands to add to the effects from activities conducted by the MMRP, the only entity permitted to enter the Northwestern Hawaiian Islands to take Hawaiian monk seals for research and enhancement purposes. One other permit issued to

the NMFS Marine Mammal Health and Stranding Response Program (MMHSRP; Permit No. 932-1905) authorizes takes of Hawaiian monk seals. However, these take activities do not duplicate or overlap with those proposed by the MMRP in this amendment. Overall, based on the analyses in the SEA, it is highly unlikely that activities carried out by the MMRP under the proposed amendment would have significant cumulative effects when considered with other factors affecting monk seals.

#### DETERMINATION

In view of the information presented in this document and the analysis contained in the SEA prepared on the Effects of the Issuance a Permit Amendment for Field Research and Enhancement Activities on the Endangered Hawaiian Monk Seal, it is hereby determined that the issuance of the proposed Permit No. 10137-04 will not significantly impact the quality of the human environment as described above and in the SEA. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an environment impact statement for this action is not necessary.

James H. Lecky

Director, Office of Protected Resources

AUG 0 5 2010

Date