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

ENVIRONMENTAL ASSESSMENT FOR ISSUANCE OF A PERMIT AMENDMENT TO CONDUCT RESEARCH ON CAPTIVE AND REHABILITATING THREATENED AND ENDANGERED MARINE MAMMALS (PERMIT NO. 13602-01)

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Lead Agency: National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Office of Protected Resources

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Location: Long Marine Laboratory (Santa Cruz, CA) and other marine mammal captive facilities in the U.S.

Abstract: The National Marine Fisheries Service (NMFS) proposes to issue an amendment to scientific research Permit No. 13602 for takes of marine mammals in captivity, pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 *et seq*.) and the Endangered Species Act of 1973 the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.).

The permit amendment would authorize opportunistic energetic assessments on ESA-listed marine mammals under NMFS jurisdiction that have stranded and are undergoing rehabilitation in California using methods currently approved in Permit No.13602 for non-listed species. The permit holder also proposes to conduct physiological research on permanently captive Hawaiian monk seals (*Monachus schauinslandi*) in facilities in the U.S. The applicant requests the transfer and use of tissues (brain and skeletal muscle) from ESA-listed marine mammal species for assessment of oxygen stores and aerobic dive limits. The amendment is requested for the duration of the permit, which expires in September 2014.

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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 Terrie Williams, Ph.D., University of California at Santa Cruz, Long Marine Laboratory (File No. 13602-01), NMFS proposes to issue an amendment to scientific research Permit No. 13602 to authorize "takes"[1] of threatened and endangered marine mammals undergoing rehabilitation in a captive environment or in permanent captivity, 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. 13602, issued on September 4, 2009, authorizes the permit holder to conduct research on captive and rehabilitating non-listed marine mammals to compare the energetic responses and diving physiology of odontocetes and pinnipeds. Data obtained can be used to determine key physiological factors required for survival and to assist in management decisions for wild populations. The permit expires on September 7, 2014. For this permit, a categorical exclusion memorandum was prepared (NMFS 2009). We are preparing an EA for the subject amendment to assess impacts of physiological research on threatened and endangered species.

1.1.2 Purpose and Need

The primary purpose of the permit amendment is to provide an exemption from prohibitions under the MMPA and ESA to allow "takes" of marine mammals, including threatened and endangered species, for bona fide scientific research. The MMPA and ESA prohibit takes of marine mammals and threatened and endangered species, respectively, with only a few very specific exceptions, including for scientific research and enhancement purposes. Permit issuance criteria requires that research activities are consistent with the purposes and polices of these federal laws and will not have a significant adverse impact on the species or stock.

1.1.3 Research Objectives

Studies on rehabilitating ESA-listed California species and permanently captive Hawaiian monk seals

The proposed energetic measurements on rehabilitating and captive marine mammals would provide two powerful tools to aid in recovery of ESA-listed species: (1) a metabolic/energetics profile that will enable caloric (prey) demands to be predicted based on age of the animal, and (2) swim stroke costs that will enable the impact of different foraging strategies to be defined for animals in food rich and food poor areas.

Additional studies on permanently captive Hawaiian monk seals

The proposed ultrasound validation study on permanently captive Hawaiian monk seals would collect measurements of fat and lean mass as a metric of energy balance. These findings would:

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1 Under the MMPA, "take" is defined as to "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." 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."

(1) validate a non-invasive method for determining body condition of wild monk seals; (2) elucidate how these seals partition resources; and (3) determine the proportions of fat and lean mass needed to maintain a healthy population.

The purposes of the hormone study proposed for permanently captive Hawaiian monk seals are to validate noninvasive fecal hormone measurement of thyroid stimulating hormone (TSH). Thyroid hormones are involved in metabolic functions including protein and energy production, appetite, and heart and nerve functions. Such hormone profiles of metabolic function in free-ranging wildlife would provide crucial insight into how developing individuals respond to natural and human-induced disturbances. This study would validate an important tool to non-invasively determine individual physiological condition that can be examined on a large-scale, across developmental and environmental variables in monk seals in the wild.

1.2 OTHER NEPA ANALYSES THAT INFLUENCE SCOPE OF THIS EA

A categorical exclusion (CE) memorandum was prepared for issuance of Permit No. 13602 (NMFS 2009) for the same physiological research to be conducted on non-listed marine mammals undergoing rehabilitation and in permanent captivity. In the CE analysis, NMFS determined that the action would not result in significant adverse effects, individually or cumulatively, on the human environment. Therefore, the action was appropriately categorically excluded from the requirement to prepare either an environmental assessment or environmental impact statement in accordance with Section 6.03f.2 of NAO 216-6.

The NMFS Marine Mammal Health and Stranding Response Program (MMHSRP) prepared a Final Programmatic Environmental Impact Statement (NMFS 2009) for activities pertaining to emergency response, rescue, rehabilitation, and salvage of stranded marine mammals, including threatened and endangered species. One proposed action is to conduct research on threatened and endangered marine mammals undergoing rehabilitation. The rescue, rehabilitation, and release of such marine mammals are conducted under a separate authorization issued to the MMHSRP, the effects of which have been previously analyzed in the MMHSRP FPEIS. Thus, the analysis in this EA does not include discussions regarding rescue, rehabilitation, or release of rehabilitating marine mammals.

A supplemental EA (NMFS 2010) was prepared for issuance of Permit No. 10137-03 to the NMFS Pacific Islands Fisheries Science Center, Marine Mammal Research Program to include ultrasound measurements during permitted captures of Hawaiian monk seals in the wild.
An EA (NMFS 2006) for issuance of several permits for research on permanently captive Hawaiian monk seals and Steller sea lions examined the effects of administrating deuterium oxide, Evan's blue dye, and TSH, followed by serial blood sampling; use of fecal markers administered in food fish; and, use of stomach temperature telemeters.

1.3 SCOPING SUMMARY

The purpose of scoping is to identify the issues to be addressed and the significant issues related to the proposed action, as well as identify and eliminate from detailed study the issues that are not significant or that have been covered by prior environmental review.

An additional purpose of the scoping process is to identify the 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 EA be made available for public comment as part of the scoping process. A draft EA was not made available for public comment.

The application was made available for public review and comment for 30 days and was provided to the Marine Mammal Commission and the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS). Comments received on the application, as summarized in section 1.3.1 below, were considered as part of the scoping for this EA.

1.3.1 Comments on application

A Notice of Receipt of the application was published in the *Federal Register*, announcing the availability of both documents for public comment (75 FR 28236, May 20, 2010). No public comments were received on the application.

Pursuant to 50 CFR §216.33 (d)(2), NMFS consulted with the Marine Mammal Commission (MMC) in reviewing the application for a scientific research permit under the MMPA. After review of the application, the MMC recommended the amendment be issued provided that the proposed activities have been reviewed and approved by the permit holder's Institutional Animal Care and Use Committee in accordance with Animal Welfare Act (AWA) regulations and the conditions in the original permit remain in effect. The applicant has obtained the recommended approval and the conditions in the original permit would remain in effect.

NMFS consulted with APHIS regarding compliance with AWA regulations. APHIS had no objections to issuance of the permit amendment.

NMFS also consulted with the Hawaiian monk seal Recovery Team, which commented that

- The proposed research is a useful activity for non-releasable seals;
- Dr. Williams has a solid research record; and
- Data produced by this study will advance our understanding of the physiology and swimming energetics of seals.

The recovery team did not support bringing animals into captivity specifically to conduct this research or funding this research from the Hawaiian monk seal program budget, neither of which would occur under the proposed action.

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

Appendix 1 summarizes federal permits, licenses, approvals, and consultation requirements necessary to implement the proposed action, as well as who is responsible for obtaining them. For this action, this includes: NEPA, MMPA, ESA, and AWA. Even when it is the applicant's responsibility to obtain such permissions, NMFS is obligated under NEPA to ascertain whether the applicant is seeking other federal, state, or local approvals for their action.

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, as well as alternatives eliminated from detailed study. This chapter also summarizes the expected outputs and any related mitigation of each alternative.

One alternative is the "No Action" alternative where the proposed permit amendment would not be issued, but the currently permitted activities on non-listed marine mammals would continue. The No Action alternative is the baseline for rest of the analyses. The Proposed Action alternative represents the research proposed in the submitted application for a permit amendment, with standard permit terms and conditions specified by NMFS.

2.1 ALTERNATIVE 1 – NO ACTION

Under the No Action alternative, the permit amendment would not be issued for the activities proposed by the applicant. The following would continue to be authorized:

- The applicant would still be authorized under Permit No. 13602 to conduct metabolic research on rehabilitating and permanently captive non-listed marine mammals until 2014.

- Captive Hawaiian monk seals would continue to be held at their respective facilities under separate permits, incidentally displayed to the public, but would not undergo the proposed research. Separate research studies would continue to occur at one facility, the Waikiki Aquarium, pursuant to Permit No. 455-1760-01.

- Rescue and rehabilitation of listed marine mammals would continue pursuant to the MMHSRP Permit No. 932-1905 and sections 109(h) and 112 of the MMPA. Diagnostic and similar health-related research on rehabilitating animals may occur under this permit.

2.2 ALTERNATIVE 2 – PROPOSED ACTION (ISSUANCE OF PERMIT WITH STANDARD CONDITIONS)

Under the Proposed Action alternative, a permit amendment would be issued for activities as proposed by the applicant, with the permit terms and conditions standard to such permits as issued by NMFS.

The applicant, Dr. Terrie Williams, requests an amendment to Permit No 13602 to:

(1) Opportunistically conduct energetic assessments on rehabilitating ESA-listed marine mammals under NMFS jurisdiction in rehabilitation at Long Marine Laboratory in California, using methods described in the original application for Permit No. 13602. Species could include Guadalupe fur seals (*Arctocephalus townsendi*) and Steller sea lions (*Eumetopias jubatus*); and less likely, Southern Resident killer whales (*Orcinus orca*). Up to 10 animals per species per year may be included in the research. Up to 2 incidental mortalities over the life of the permit would be authorized for the ESA-listed species in rehabilitation.

(2) Conduct research on non-releasable (i.e., permanently captive) Hawaiian monk seals (*Monachus schauinslandi*) as follows:

- Conduct physiological research (energetic assessments) currently permitted under Permit No. 13602 on up to 18 captive Hawaiian monk seals [up to 3 seals at any given time at Long Marine Laboratory, and up to 15 other non-releasable, captive adult monk seals held in facilities at the Waikiki Aquarium (Honolulu, HI), Sea Life Park (Waimanalo, HI), and Sea World (San Antonio, Texas) or at other facilities in the U.S.];

- Monitor the health of non-releasable seals potentially held at LML over the duration of the permit, as per veterinary specifications to include: growth and body condition (body mass, length, girth, and blubber thickness) and blood parameters (health panels as determined necessary by attending veterinarian, blood volume via Evan's blue dilution);

- Conduct deuterium oxide studies in conjunction with blubber ultrasound measurements to validate the use of ultrasound as a measure of body condition, using all Hawaiian monk seals in captivity; and

- Conduct TSH hormone challenge studies on all captive monk seals to validate use of fecal TSH measurements to monitor metabolic function.

- Up to one (1) incidental mortality of permanently captive Hawaiian monk seals per year is proposed to be authorized.

(3) Receive and use of tissues (brain and skeletal muscle) from Hawaiian monk seal carcasses and other ESA-listed species that will be used for an assessment of oxygen stores and Aerobic Dive Limits.

(1) Physiology Study Methods

The proposed energetic measurements on rehabilitating and captive marine mammals will provide two powerful tools to aid in recovery of listed species: (1) a metabolic/energetics profile that will enable caloric (prey) demands to be predicted based on age of the animal, and (2) swim stroke costs that will enable the impact of different foraging strategies to be defined for seals in food rich and food poor areas. Key physiological measurements for use with ESA-listed marine mammals will include methods currently in practice at LML on non-listed marine mammals (captive and rehabilitating), authorized under Permit No. 13602 and listed in Tables 1 and 2.

Table 1. Proposed research on rehabilitating ESA-listed species.

Species	Life Stage and sex	Number of Animals	Number of Takes per Individual	Take Action	Location	Dates/Time Period
ESA-listed pinnipeds **Typical species include but not limited to Guadalupe fur seals, Steller sea lions and Southern Resident killer whales stranded on West Coast and in rehab**	All, M/F	10 animals per species per year with no more than 6 animals of any species (including ESA-listed and non-listed species) in rehab at Long Marine Laboratory at any one time	30 20 20 20 20 20 20 20 20 20	BC RO2 RPPO2 AO2 DO2 EXO2 TNZ BG HR/SR HF/BT	Long Marine Laboratory via The Marine Mammal Center or NMFS Stranding Coordinator	Takes each month per take action

Table 1 Key:

- BC = Body condition and morphometrics
- RO2 = Resting metabolic rate at ambient water temperature
- RPPO2 = resting metabolic rate post-prandial
- AO2 = active metabolic rates
- DO2 = diving metabolic rate
- EXO2 = swimming exercise metabolic rates
- TNZ = resting metabolic rate to determine thermal neutral zone
- BG = blood gases, pH and lactate determination
- HR/SR = heart rate and stroke swimming rate
- HF/BT = heat flow and body temperature measurement

Table 2. Proposed research on permanently captive Hawaiian monk seals.

Species	Life Stage and sex	Number of Animals	Number of Takes per Individual	Take Action	Location	Dates/Time Period
Hawaiian Monk Seal	All, M/F	18 seals	30 20 20 20 20 20 20 20 20 20 1 1 1	BC RO2 RPPO2 AO2 DO2 EXO2 TNZ BG HR/SR HF/BT TBV D20/ULT TSH	LML (up to 3 seals), Waikiki Aquarium, Sea Life Park, Sea World, or other facilities permitted to hold monk seals	Takes each month per take action except TBV (via Evan's blue), D20/ultrasound, and TSH challenge will only be performed 1 time each per animal

Table 2 Key:

- BC = Body condition and morphometrics via weight, tape measurements, ultrasound
- RO2 = Resting metabolic rate at ambient water temperature
- RPPO2 = resting metabolic rate post-prandial
- AO2 = active metabolic rates
- DO2 = diving metabolic rate
- EXO2 = swimming exercise metabolic rates
- TNZ = resting metabolic rate to determine thermal neutral zone
- BG = blood gases, pH and lactate determination
- HR/SR = heart rate and stroke swimming rate
- HF/BT = heat flow and body temperature measurements
- TBV = total blood volume
- D20/ULT = deuterium oxide, blood sampling, ultrasound
- TSH = thyroid stimulating hormone administration and fecal sampling

Physiology Methods Descriptions (for Rehabilitating and Permanently Captive Animals)

For animals in rehabilitation programs, researchers design protocols that incorporate testing into daily husbandry tasks. In this way potential stress on an injured or sick animal is reduced. For example, (1) metabolic domes are large enough to cover small pools or the entire animal and in most cases are ignored by the animals, and (2) blood samples, temperature measurements, and morphological data are collected during veterinary examinations. Because of this attention to the potential effect of research protocols on the recovering animal, the applicant has found that the proposed research tests are "invisible" during the rehabilitation process. In addition to avoiding detrimental effects on the animal, these tests result in data providing the best representation of the physiological condition of the animal. Permanently captive animals in the studies are trained to voluntarily participate in specific research tasks for the physiology studies.

BC - Body Condition, Morphometrics and Caloric Intake: To assess the general body condition and dietary demands of each subject, the following parameters will be monitored at monthly intervals, and at the beginning and end of the experimental period: morphometrics (body mass from a digital scale, length and girths using a tape measure) and blubber deposition (from surface ultrasound, Sonosite, Inc.). Body mass measurements will either involve trained haulout behaviors by animals onto a platform scale (cetaceans and large pinnipeds) or placement in a kennel on a scale (small or untrained pinnipeds). Ultrasound will be performed on trained animals or using light restraint for untrained animals.

RO2, RPPO2, TNZ, AO2, DO2, and EXO2 - Oxygen consumption - Resting and active metabolic rates: Resting and active metabolic rates will be determined for post-absorptive (12 hour overnight fast) animals as in previous studies (Yeates et al. 2007; Williams et al. 2004). Briefly, the rate of oxygen consumption is measured by open flow respirometry designed for aquatic mammals. Air is pulled through a metabolic dome and sub-samples of dome exhaust are drawn through a series of columns filled with a desiccant and a CO_2 scrubber before entering an oxygen analyzer. For metabolic measurements, the animals are conditioned over several weeks to enter a saltwater pool of known water temperature, over which a Plexiglas metabolic hood is mounted. The saltwater pool used for these tests is often the routine holding pool of the animal. The size of the hood is tailored for each species accounting for the approximate size of an exhalation. For

example, the hood size is 114 cm wide x 175 cm long x 25 cm high for most pinnipeds and proportionately larger based on animal morphometrics for cetaceans.

The above methods for oxygen consumption measurements will be determined when animals are (1) resting at ambient water temperature (RO2); (2) resting after eating (RPPO2); (3) at rest for thermal neutral zone determination (TNZ) by altering water temperature in the metabolic chamber; (4) naturally active (AO2) (e.g., grooming); (4) diving (DO2; for animals trained to dive; and (5) exercised (EXO2)(i.e., after swimming).

BG – Blood Gases, pH and Lactate Concentration: On the last dive of a test sequence or following exercise bouts, the animals will station beside the pool ledge for blood sampling rather than below the metabolic hood. Briefly, for small cetaceans the animal is inverted and a butterfly catheter inserted into the fluke vein. Pinnipeds are sedated and/or restrained as necessary and sampled in the large extradural vein or caudal gluteal vein using standard blood sampling protocols for pinnipeds. For animals in rehabilitation, depending on the age, behavior and physical condition, a combination of manual restraint or sedation may be used when obtaining blood samples.

For animals in rehabilitation, the schedule of blood samples would be dictated by the need for medical evaluation rather than research. Sampling for blood parameters in rehabilitating animals would be limited to opportunistic data. In all cases, the attending veterinarian would determine the exact blood sampling procedure to use. Hawaiian monk seals in permanent captivity are either trained for voluntary blood sampling or sedated and restrained as needed, per veterinary direction.

HR and SR - Heart Rate and Stroke Rate: Diving and swimming marine mammals would wear either an electrocardiograph recorder or a heart rate-dive depth-accelerometer microprocessor throughout the tests. Because muscle noise can interfere with electrocardiograph (ECG) signals recorded by standard heart rate microprocessors, tests will be conducted with the ECG monitors.

For pinnipeds heart rate is monitored with the two electrodes placed either laterally by the front flippers or along the dorsal surface. Rather than suction cups the electrodes are held in place with a neoprene patch glued (using flexible neoprene glue for easy removal) to a shaved area (see Williams et al. 1991).

For cetaceans, heart rate signals will be obtained from two cross-thorax surface electrodes placed on the sternum between the pectoral fins and/or on the mid-lateral axillary area according to Williams et al. (1999a). Each electrode consists of a 3.0 cm diameter silver plate mounted in an 8.5 cm suction cup. Insulated wires from the electrodes are connected to the monitors and records ECG signals continuously and a custom fitted neoprene vest or harness will be used to carry the ECG instrumentation.

HF and BT - Heat Flow and Body Temperature: Thermal condition of resting and active animals will be determined by measuring heat flow and skin temperature with a handheld surface probe placed on the flukes, dorsal fin, pectoral fin and trunk of the sedentary animals before and

after trial sessions. Body temperature is determined at the same time using a flexible rectal probe. Details are according to Williams et al. (1999b) and Noren et al. (1999).

To reduce stress on non-trained animals, body temperature may be monitored continuously during metabolic trials with an ingested stomach temperature pill. These small temperature recorders (< 63mm length x 21.5mm diameter depending on epoxy casting and size of the animal) will be introduced in a fish, which is then swallowed by the subject. Retention of the pill is generally 1-14 days with retrieval in the feces or regurgitate.

Tissue Analysis: The applicant also requests the transfer and use of tissues (brain and skeletal muscle) from Hawaiian monk seal carcasses and other ESA-listed species that will be used for an assessment of oxygen stores and aerobic dive limits. No live animals would be affected by this study; thus, there will be no impacts or adverse effects to ESA-listed species as a result of analyzing tissues from animals that died of natural causes or incidental to research.

LETHAL TAKE: Permit No. 13602 authorizes up to 10 mortalities or serious injuries per year for all rehabilitating individuals, any species. The applicant is not requesting to increase mortalities and proposes a limit on the number incidental mortalities of ESA-listed rehabilitating animals to only two (2) over the life of the permit.

In the event of unintentional death, the carcass will undergo a complete necropsy to determine cause of death, and to collect tissues for globin studies as well as for the UCSC marine mammal teaching collection. For animals at collaborating facilities, deposition of the carcass will be according to the attending veterinarian of that facility.

Additional Studies on Permanently Captive Hawaiian Monk Seals

Blubber depth via ultrasound as a non-invasive measure of body composition in monk seals: validation with permanently captive animals

The proposed ultrasound validation study on permanently captive Hawaiian monk seals will collect measurements of fat and lean mass as a metric of energy balance. These findings will: (1) validate a non-invasive method for determining body condition of wild monk seals; (2) elucidate how these seals partition resources; and (3) determine the proportions of fat and lean mass needed to maintain a healthy population.

Ultrasound Methods: Blubber depth will be measured using a portable imaging ultrasound. Eight ultrasound measurements will be taken from each animal (4 dorsal, 4 lateral). Animals will require mild restraint or will be trained to station for measurements. Measurements take approximately 5 minutes depending on the position of the animal and may occur in conjunction with other procedures.

Deuterium Oxide (D_2O) Methods: Body composition will be determined by deuterium assessment through the use D_2O, isotopically labeled water. This procedure requires an initial blood draw followed by an injection of deuterium oxide (up to 0.7g/kg +10% IM). Between 2

and 2 ½ hours after the injection, when the deuterium has equilibrated in the system, a second blood draw is required.

Fecal Hormone Validation Studies

In order to validate the measurement of thyroid hormone metabolites [triiodothyronine (T3) and thyroxin (T4)] in the Hawaiian monk seal, a thyroid stimulating hormone (TSH) challenge will be performed to stimulate secretion of thyroid hormones by the thyroid gland respectively. All feces excreted prior to and after the injections will be collected and T3 and T4 extracted and assayed.

(1) *Pre-administration:* Opportunistically collect all available fecal samples 2 weeks prior to hormone administration to establish baseline hormone values, though some fecal material may dissipate in the animal's holding pool before it can be collected.

(2) *Dry holding:* Ensure that the animal is in dry holding for a 6-day time period to run this experiment: 2 days prior to injection of the hormone and 4 days after injection. During dry holding, all feces would be collected; seals would have access to a spray mist, or similar access to water for cooling, and shade to avoid overheating.

(3) *TSH administration:* Administer 2 injections of 0.1 ug /kg up to a maximum of 10 IU of TSH (synthetic TSH, e.g. Genzyme Corporation, Cambridge, MA, USA), 24 hours apart. A trained veterinarian will administer injections intramuscularly. Hormone will be administered on the third morning of the 6-day dry holding necessary for the challenge.

(4) *Analysis:* Extract hormones and assay all samples at the Center for Conservation Biology at the University of Washington, Seattle, Washington.

Monk seal Sedation or Restraint: The requested work is with multiple facilities and animals. Each facility and animal has its own requirements for training and handling. For procedures the seals will be stationed for voluntary collection, restrained, or sedated dependant on consultation with the attending veterinarian and the facility protocols. Sedation for monk seals may include intravenous diazepam, intramuscular (IM) midazolam, and/or IM butorphenol (dosages to be determined by attending veterinarians).

LETHAL TAKE: Permit No. 13602 authorizes incidental mortality or serious injury of up to one (1) animal per year of any species for permanently captive animals. The applicant is not requesting to increase mortalities of captive animals. Therefore, the permit would authorize mortality of up to one monk seal per year as a result of research procedures (note, only one mortality of any species in captivity would be authorized annually).

In the event of unintentional death, the carcass will undergo a complete necropsy to determine cause of death, and to collect tissues for globin studies as well as for the UCSC marine mammal teaching collection. For animals at collaborating facilities, deposition of the carcass will be according to the attending veterinarian of that facility.

CHAPTER 3 AFFECTED ENVIRONMENT

This chapter presents baseline information necessary for consideration of the alternatives, and describes the resources that would be affected by the alternatives, as well as environmental components that would affect the alternatives if they were to be implemented.
No component of the ecosystem or physical environment where the target species of marine mammals inhabit the wild would be affected by the proposed action. The rescue and release of stranded ESA-listed marine mammals in the wild in California would be done under a separate permit authorization (Permit No. 932-1905 issued to the MMHSRP) in conjunction with MMPA section 109h and 112c authorizations. The proposed action would involve research on marine mammals already in captivity, either in a rehabilitation facility, research facility, or public display facility. The proposed action does not involve regulating the facilities involved, such as regulating treatment of effluent from tanks holding marine mammals. Other authorities regulate such activities. Therefore, no further analysis on the effects of the alternatives on the environment is discussed.

3.1 SOCIAL AND ECONOMIC ENVIRONMENT

Economic and social factors are listed in the definition of effects in the NEPA regulations. An EA must include a discussion of a proposed action's economic and social effects when these effects are related to effects on the natural or physical environment.

For the proposed action, there are no social or economic factors related to effects on the natural or physical environment. There are no anticipated effects on public health or human safety, traffic and transportation, housing, noise, etc. from this action. Research on a limited number of marine mammals in captivity would not result in inequitable distributions of environmental burdens or risk of exposure to hazardous materials or wastes. Researchers minimize the risk of contracting disease from marine mammals by adhering to protocols for safe handling and animal husbandry. The species proposed for this action are not taken for subsistence; thus, there would be no impacts on availability and suitability for subsistence use. Therefore, no further analysis on the effects to the social and economic environment is included in this EA.

3.2 PHYSICAL ENVIRONMENT

The physical environment of the action area only includes captive facilities housing marine mammals for rehabilitation, research, or public display. No area in the wild including critical habitat, sanctuaries, parks, historic sites, essential fish habitat, etc., would be affected by the proposed action. Any considerations regarding the captive environment, such as how effluent from the facilities is treated, is not a part of the proposed federal action, issuance of a permit amendment to conduct research on captive marine mammals. Therefore, no further consideration of these resources is made in this EA.

3.3 BIOLOGICAL ENVIRONMENT

Only animals in captivity (permanently held in facilities or held for rehabilitation and release under separate Federal authorizations) would be affected by the proposed action. No non-target species or critical habitat would be affected by the proposed action; therefore, these are not discussed further. Descriptions of the target species follow.

Guadalupe Fur Seals

Guadalupe fur seals are listed as threatened under the ESA. NMFS considers the entire population of Guadalupe fur seals as a single stock because all are recently descended from the Guadalupe Island breeding colony (Caretta et al. 2009). Guadalupe fur seals were hunted to near extinction by the late 1800's, with population estimates prior to this of 20,000 to 100,000 individuals. The most recent estimate is 7,400 animals in 1993 with a population growth rate of approximately 13.7% per year (Caretta et al. 2009).

The majority of Guadalupe fur seals mainly breed on Guadalupe Island, Mexico, 250 km off the Pacific coast of Baja California. A smaller breeding colony, discovered in 1997, appears to have been established at Isla Benito del Este, Baja California, Mexico (Belcher and Lee 2002). In addition, a single female gave birth to a pup on the Channel Islands in 1997; and, there are reports of individual animals being sighted in the California Channel Islands, Farralones Islands, Monterey Bay, and other areas on the coast of California and Mexico (Belcher and Lee 2002; Caretta et al 2009; Reeves et al. 2002).

Drift and set gillnet fisheries may cause incidental mortality in the U.S. and Mexico; however, there are no reports in the U.S. and no information is available in Mexico. Injuries from nets, fish hooks and monofilament line, and polyfilament string have been reported from stranded juveniles in central and northern California (Caretta et al. 2009). Hanni et al. (1997) summarized strandings of nine Guadalupe fur seals in California from 1988 to 1995 and found cases of emaciation were common, and other findings included bacterial pneumonia, septicemia, an umbilical hernia, and three of the stranded fur seals had evidence of entanglement in fishing gear or marine debris.

Steller Sea Lions

NMFS recognizes two distinct population segments (DPSs) of Steller sea lions under the ESA. The regulatory division between DPSs is Cape Suckling (144º west [W] longitude) in the northeast Gulf of Alaska. The eastern DPS includes Steller sea lions born on rookeries from California north through southeast Alaska; the western DPS includes those animals born on rookeries from Prince William Sound westward (Bickham et al. 1996; Loughlin 1997). However, frequent movement is seen across this boundary by animals from both populations, particularly juvenile animals (Raum-Suryan et al. 2002). The western DPS is classified as endangered under the ESA and the eastern DPS is listed as threatened.

The estimated minimum population size for the western DPS is 41,197 individuals (Caretta et al. 2009). Counts of Steller sea lions for the western DPS have decreased by 40% from 1991-2000 (Loughlin and York 2000). The estimated minimum population size of the eastern DPS is 44,404 individual (Caretta et al. 2009). In California, Steller sea lion numbers have declined by over 50% from historic numbers, with estimates of 1,500-2,000 non-pup individuals in 2004. Overall, non-pup counts in California and Oregon have been stable or slowly increasing since the 1980’s (Caretta et al. 2009).

Peak pupping and breeding occur during June and July on rookeries located on relatively remote islands, rocks, and reefs. In general, Steller sea lions seem to have a high degree of site fidelity; they return to breed at or near their natal rookeries (Calkins and Pitcher 1982; Alaska Sea Grant 1993; Loughlin et al. 1984; Raum-Suryan et al. 2002).

Sources of mortality and injury to both DPSs of Steller sea lions include fisheries-related mortality, entanglement in fishing gear and other materials leading to live strandings, illegal shootings, mortality incidental to permitted research, subsistence hunting, and other sources of mortalities (e.g., blunt trauma) (Caretta et al. 2009).

Southern Resident Killer Whales

Southern Resident killer whales are listed as endangered under the ESA. They are primarily found in inland and coastal waters off Washington and southern British Columbia and have been sighted as far south as Monterey Bay and central California (Caretta et al. 2009). The minimum population estimate is 85 animals.

Three of the most likely explanations for the decline include prey decline (Ford and Ellis, 2006), toxin exposure from PCBs and PBDEs (Ross et al. 2000; Rayne et al. 2004; Ross 2006) and disturbance from boat traffic (Kruse 1991, Erbe 2002,Williams et al. 2002a, Williams et al. 2002b, Foote et al. 2004). However, there are few definitive studies that have linked any of these pressures to killer whale health.

Hawaiian Monk Seals

Hawaiian monk seals are listed as endangered under the ESA. With few exceptions, low juvenile survival primarily due to starvation has been widespread in the Northwestern Hawaiian Islands since 2000, resulting in the continued population decline. In contrast, the subpopulation in the Main Hawaiian Islands appears to be increasing (Baker and Johanos 2003). The minimum population estimate for Hawaiian monk seals in the Northwestern Hawaiian Islands is 1,183 seals and the estimate for the Main Hawaiian Island subpopulation is 83 (Caretta et al. 2009).

Additional threats to the species include shark predation, especially at French Frigate Shoals, and entanglements in marine debris. Commercial fishing operations in the Northwestern Hawaiian Islands are limited and will close in 2011. In contrast, fishery interactions are increasing in the Main Hawaiian Islands. Interactions observed include hookings and entanglement in near shore gillnets. Additional threats in the Main Hawaiian Islands include potential spread of disease (e.g., leptospirosis and toxoplasmosis) from humans and domestic and feral animals; human disturbance and physical interactions with seals, especially on popular tourist beaches; and potential collisions and oil spills associated with high boat and ship traffic (Caretta et al. 2009).

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter represents the scientific and analytic basis for comparison of the direct, indirect, and cumulative effects of the alternatives. Regulations for implementing the provisions of NEPA

require consideration of both the context and intensity of a proposed action (40 CFR Parts 1500-1508).

4.1 EFFECTS OF ALTERNATIVE 1: No Action

The environmental consequences of No Action (not amending the permit) are the same as those identified for the proposed action in the CE memo prepared for Permit No. 13602, which concluded that the action (physiological research on captive and rehabilitating non-listed marine mammals) would not result in significant adverse effects, individually or cumulatively, on the human environment (NMFS 2009). Threatened and endangered marine mammals would continue to be rehabilitated and released in California under the authority of Permit No. 932-1905, the effects of which were analyzed in the PEIS for the MMHSRP program (NMFS 2009).

4.2 EFFECTS OF ALTERNATIVE 2: Issue permit with standard conditions

Physiological Research on Rehabilitating ESA-listed Species and Permanently Captive Hawaiian Monk Seals

All measurements with the exception of blood sampling and administration of drugs are non-invasive and are performed voluntarily by the animals, or during the routine care of the animals in rehabilitation. Most of the captive animals involved in this study are trained for years for participating in the medical and research behaviors described to minimize potential stress. Daily training sessions incorporate these behaviors and ensure the overall well being of the animals. Particular care will be paid to behavioral changes that may occur during sensitive periods such as molt or reproductive activities. For animals trained to participate in the research, experimental sessions will be terminated in the event of refusal by the animal.

Evans blue dye is a diazo dye used for determination of blood volume on the basis of dilution of a standard solution of the dye in plasma following intravenous injection. No adverse reactions have been recorded for the use of Evan's blue dye for the assessment of blood volume in mammals including a wide range of pinniped species. These include successful studies on New Zealand sea lions (Costa et al. 1998) and elephant seal pups (Thorson and LeBeouf 1994). Investigators at LML have pioneered this technique for safe use on both phocids and otariids. Potential adverse effects are associated with those accompanying any injection or blood sampling, such as swelling or infection (i.e., abscess) at the injection site.

To reduce stress on non-trained animals, body temperature may be monitored continuously during metabolic trials with an ingested stomach temperature pill. These recorders are small in size and routinely used in pinniped research, including research on animals in rehabilitation. The temperature recorders are approximately 63mm in length and 21.5mm in diameter depending and are covered in an epoxy casting. They are ingested with a fish and then later regurgitated or expelled in feces within 1-14 days. These temperature monitors are routinely used in research on wild pinnipeds.

Body Condition Assessment via Ultrasound and Deuterium Oxide on Permanently Captive Hawaiian monk seals

Ultrasound is wholly non-invasive and involves light, momentary pressure on the animal's skin. Water may be used to ensure proper transducer-skin contact. A portable ultrasound instrument will be used and a trained technician will be conducting the procedures. Use of ultrasound is common in humans and domesticated animals for diagnostic use, including during pregnancy to monitor fetal development. Ultrasound is also routinely used in pinnipeds to measure blubber thickness as an indication of body condition (Pitcher 1986; Gales and Burton 1987; Beck-Gregor and Smith 1995; Trites and Jonker 2000) and is generally considered a safe imaging modality (Merritt 1989).

Deuterium oxide is a stable, relatively non-toxic and naturally occurring isotope. Up to 20-25% of body water can be replaced by deuterium oxide in mice before toxic effects are observed. The use of deuterium oxide increases the amount of time an individual animal must be handled due to the need for blood sampling prior to and after administration. However, for captive Hawaiian monk seals, the animals would be released in between sampling and in some cases the animals would voluntarily participate in the sampling. No adverse reactions have been recorded for the use of deuterium oxide for the assessment of fat and lean body mass in mammals including a wide range of pinniped species. Examples include gray seals (Reilly and Fedak 1990), ringed seals (Lydersen et al. 1992), and Antarctic fur seals (Arnould et al. 1996). This technique has been used safely in both captive and field settings and is safe for both phocids and otariids. Potential adverse effects are associated with injection and blood sampling, where swelling or infection could occur at the injection site.

Hormone Challenge on Permanently Captive Hawaiian Monk Seals

No adverse reactions have been recorded for the use of TSH to assess physiological response to hormone stimulation in numerous animals (Wasser et al. 2000, Wasser et al. 2010). TSH has been used safely with a number of captive and rehabilitating pinnipeds including harbor seals, elephant seals (Yochem et al. 2008) and Steller sea lions (Hunt et al. 2004, Keech et al. 2010). Potential adverse effects are associated with injection and dry holding. Only feces will be collected and dry holding will occur under the supervision of husbandry staff and an attending veterinarian.

Risk of Mortality

Some procedures such as blood sampling may require restraint and sedation for captive animals, including animals in rehabilitation. Any capture event for a wild animal is stressful and can lead to death. Also, animals in rehabilitation would be stranded animals taken into captive care for health reasons such as illness or injury. Therefore, the applicant has requested incidental mortality of up to one Hawaiian monk seal annually and up to two rehabilitating ESA-listed species over the duration of the permit.

Previous NEPA Analyses on the Proposed Research

An EA (NMFS 2006) for issuance of several permits for research on permanently captive Hawaiian monk seals and Steller sea lions examined the effects of administrating deuterium oxide, Evan's blue dye, and TSH; serial blood sampling; fecal sampling; and, use of stomach temperature telemeters. The analysis in that EA concluded that conducting these research procedures on captive and wild pinnipeds would not have a significant impact on the target species or the environment.

A supplemental EA (NMFS 2010) was prepared for issuance of Permit No. 10137-03 to the NMFS Pacific Islands Fisheries Science Center to include ultrasound measurements on Hawaiian monk seals in the wild. The analysis in that SEA concluded that conducting ultrasound on Hawaiian monk seals would not have a significant impact on the target species or the environment.

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

As summarized below, NMFS has determined that the proposed research is consistent with the purposes, policies, and applicable requirements of the MMPA, ESA, and NMFS regulations.

4.3.1 Endangered Species Act

This section summarizes conclusions resulting from consultation as required under section 7 of the ESA. The consultation process was concluded after close of the comment period on the application and draft EA to ensure that no relevant issues or information were overlooked during the initial scoping process summarized in Chapter 1. For the purpose of the consultation, the draft EA represented NMFS' assessment of the potential biological impacts. The consultation concluded that issuance of Permit No. 13602-01 is not likely to jeopardize the continued existence of NMFS listed species or result in adverse modification or destruction of critical habitat.

4.3.2 Marine Mammal Protection Act

The applicant submitted an application, which included responses to all applicable questions in the application instructions. The requested research is consistent with applicable issuance criteria in the MMPA and NMFS implementing regulations. The views and opinions of scientists or other persons or organizations knowledgeable of the marine mammals that are the subject of the application or of other matters germane to the application were considered, and support NMFS's initial determinations regarding the application.

The permit would contain standard terms and conditions stipulated in the MMPA and NMFS's regulations. As required by the MMPA, the permit would specify: (1) the effective date of the permit; (2) the number and kinds (species and stock) of marine mammals that may be taken; (3) the location and manner in which they may be taken; and (4) other terms and conditions deemed appropriate. Other terms and conditions deemed appropriate relate 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 Animal Welfare Act

The applicant has demonstrated compliance with the Animal Welfare Act (AWA)'s requirements for housing, transporting, and caring for marine mammals in captivity, and requirements for IACUC (Institutional Animal Care and Use Committee) review and approval. UCSC's Chancellor's Animal Research Committee has approved this research project, including research on rehabilitating animals as well as permanent captives (approval granted May 28, 2008). Long Marine Laboratory also has an Animal Welfare Assurance on file with the National Institute of Health, Office for Protection from Research Risks (Assurance #A-3859-01). Additionally, the Office of Naval Research Animal Use Division has approved this research.

4.4 MITIGATION MEASURES

Animals in Rehabilitation

Data obtained from rehabilitating animals will be opportunistic in nature so as not to interfere with the rehabilitation process; but rather, to occur concurrently with the rehabilitation. Researchers design sampling protocols for rehabilitation animals to make the procedures invisible relative to other husbandry tasks. Specific care is taken to avoid creating additional stress on an injured or sick animal. This includes incorporating the research measurements into the veterinary examinations and creating research areas within the rehabilitation space. Together, these steps help to circumvent the need to acclimate the animals to novel research areas or tasks.

Furthermore, the schedule, duration and number of tests conducted on a rehabilitation animal may differ from those involving healthy subjects. Testing animals in rehabilitation is dictated by several factors: (1) the behavioral stability and cooperation of the animal, (2) veterinary or animal husbandry oversight, and (3) the demand for information needed in the rehabilitation process (e.g., daily body mass measurements to ensure nutritional requirements for growth are met; metabolic rates determined several times in one week to assess changes in caloric demands and subsequent changes in diet). A flexible research schedule taking these factors into account ensures that the rehabilitation process is not compromised. Behavioral responses of the animals to each procedure or test are used to tailor each trial to match changes in the condition of the animal along the rehabilitation process.

Research on rehabilitating animals will be halted in the event that the collection of data interferes with the progress for rehabilitation or is deemed stressful to the animal. Indicators of interference or stress include behavioral (e.g., nervousness, aggression) and physiological (e.g., increased heart rate or respiration rate, panting, anorexia) changes. These will be monitored pre- and post- research testing by the husbandry staff and veterinarian for all research procedures to ensure the safety of the animal and people.

Rehabilitation animals deemed releasable will be trained to avoid human imprinting and to ensure independent foraging in the wild using a program of behavioral transitioning from research to pre-release. Throughout the research phase human contact is minimized whenever possible. Generally, several pinnipeds are housed simultaneously to allow social skills to

develop. For all animals, the training program gradually reduces human contact following the research phase, particularly during feeding. Animals are evaluated daily by the training staff and the behavioral steps modified according to the animal's response. Release of animals will be conducted under separate authorization from the NMFS stranding network.

Animals in Rehabilitation and Permanent Captivity

Staff will carefully monitor the behavior and overall condition of the animals before and after testing. This is to ensure the long-term health of the animal. This entails daily health and behavioral assessments combined with routine medical assessments to include morphometrics (body mass, length, and girths), and blood samples when deemed appropriate by the veterinarian. Behavioral changes are closely monitored by professional trainers who are usually the long term caregivers for the animals specifically used in these trials.

The permit amendment would contain the same conditions in Permit No. 13602, which includes requirements to halt research should the animals exhibit signs of stress, pain, or suffering resulting from the authorized activities.

4.5 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects could include transient pain and potential for infection from blood sampling and administration of drugs. Some procedures may require restraint, which can be stressful and could lead to death. Animals undergoing rehabilitation could die in captivity due to underlying health problems. Under the proposed action, unintentional mortality of up to one Hawaiian monk seal annually and up to two rehabilitating ESA-listed species over the duration of the permit would be authorized.

The Hawaiian monk seals in permanent captivity have already been removed from the wild population; therefore, death of one of these seals will have no effect on survival of the species in the wild. Animals would not be captured from the wild to replace a captive seal that may die as a result of research; if such action were proposed, a separate Federal permit would be required.

The loss of two ESA-listed animals (e.g., one Guadalupe fur seal and one Steller sea lion) over the life of the permit is also not considered significant, since these animals were already removed from the wild into rehabilitation because of significant injury, illness, or other debilitating condition (e.g., starvation).

4.7 CUMULATIVE EFFECTS

Cumulative effects are defined those that result from incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

The proposed action is likely to adversely affect the ESA-listed species in rehabilitation and permanently captive Hawaiian monk seals at the captive facilities in some ways. The actions would cause stress during restraint, if used, and minor wounds from biological sampling of the captive animals. The intrusive procedures such as blood sampling could result in infection, but

sampled sites would be monitored daily and any infections would be treated as appropriate. The risk of injury or mortality resulting from the procedures is anticipated to be low based on the experience of the researchers and intended procedures, as well as the permit conditions to mitigate the effects. In addition, the risks of adverse effects are reduced by training permanently captive animals to voluntarily participate in the research and conducting procedures on rehabilitating animals concurrent with husbandry and medical care under veterinary oversight.

The rehabilitating animals involved would not be subject to additional research other than that described for the physiology studies. Animals would be provided husbandry and medical care with the goal of releasing the animals back to the wild (under separate authorization). A limited number of incidental mortalities (no more than 2 of any species over the life of the permit) of ESA-listed species in rehabilitation would be permitted. These animals would have already been removed from the wild due to illness or injury and the rehabilitation and release would be conducted under separate federal authorization. It is not likely that the research conducted on these individuals will lead to significant cumulative impacts to the target species or the human environment.

For research on permanently captive Hawaiian monk seals, from the perspective of population dynamics, these individuals are no longer members of the wild population. The proposed action may adversely affect some of these individual animals, but the actions would not result in significant cumulative impacts to the species or human environment.

CHAPTER 5 LIST OF PREPARERS AND AGENCIES CONSULTED

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Appendix 1: Applicable Laws

National Environmental Policy Act

The National Environmental Policy Act (NEPA) was enacted in 1969 and is applicable to all "major" federal actions significantly affecting the quality of the human environment. A major federal action is an activity that is fully or partially funded, regulated, conducted, or approved by a federal agency. NMFS issuance of permits for research represents approval and regulation of activities. The procedural provisions outlining federal agency responsibilities under NEPA are provided in the Council on Environmental Quality's (CEQ) implementing regulations (40 CFR Parts 1500-1508).

NMFS has, through NOAA Administrative Order (NAO) 216-6, established agency procedures for complying with NEPA and the implementing regulations issued by CEQ. NAO 216-6 specifies that issuance of scientific research permits under the MMPA and ESA is among a category of actions that are generally exempted (categorically excluded) from further environmental review, except under extraordinary circumstances. When a proposed action that would otherwise be categorically excluded may have an adverse effect upon endangered or threatened species or their habitats, among other things, preparation of an EA or EIS is required.

NMFS is preparing an EA for this action to provide a more detailed analysis of effects to ESA-listed species. This Environmental Assessment is prepared in accordance with NEPA, its implementing regulations, and NOAA 216-6.

Endangered Species Act

Section 9 of the ESA, as amended, and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption such as by a permit. Permits to take ESA-listed species for scientific purposes may be granted pursuant to section 10(a)(1)(A) of the ESA and in accordance with implementing regulations (50 CFR Part 222).

Section 10(d) of the ESA stipulates that, for NMFS to issue permits under section 10(a)(1)(A) of the ESA, the Agency must find that the permit: was applied for in good faith; if granted and exercised will not operate to the disadvantage of the species; and will be consistent with the purposes and policy set forth in Section 2 of the ESA.

Section 2 of the ESA sets forth the purposes and policy of the Act. The purposes of the ESA are to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in section 2(a) of the ESA. All Federal agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA.

NMFS issuance of a permit affecting ESA-listed species is a federal action subject to ESA section 7 consultation requirements. NMFS is required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any threatened or

endangered species or result in destruction or adverse modification of habitat for such species under its jurisdiction. Regulations specify the procedural requirements for these consultations (50 Part CFR 402).

Marine Mammal Protection Act

The MMPA prohibits takes of all marine mammals in the U.S. (including territorial seas) with a few exceptions. Permits for *bona fide*[2] scientific research on marine mammals issued pursuant to section 104 of the MMPA is one such exception. These permits must specify the number and species of animals that can be taken, and designate the manner (method, dates, locations, etc.) in which the takes may occur, and are issued in accordance with implementing regulations (50 CFR Part 216).

NMFS may issue a permit or authorization pursuant to section 104 of the MMPA to an applicant who submits with their application information indicating that the taking is required to further a bona fide scientific purpose. An applicant must demonstrate to NMFS that the taking will be consistent with the purposes of the MMPA and applicable regulations. NMFS must find that the manner of taking is "humane"3 as defined in the MMPA. In the case of proposed lethal taking of a marine mammal from a stock listed as "depleted" NMFS must also determine that the results of the research will directly benefit the species or stock, or otherwise fulfill a critically important research need.

Animal Welfare Act

The Animal Welfare Act (AWA; 7 U.S.C. 2131 – 2156) sets forth standards and certification requirements for the humane handling, care, treatment, and transportation of mammals. Enforcement of these requirements for non-federal facilities is under jurisdiction of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service. Each research facility is required to establish an Institutional Animal Care and Use Committee (IACUC) which reviews study areas and animal facilities for compliance with the AWA standards. The IACUC also reviews research protocols and provides written approvals for those that comply with AWA requirements. For federal research facilities, the head of the federal agency is responsible for ensuring compliance with the AWA requirements. It is the responsibility of the researcher to seek and secure IACUC reviews and approvals for their research.

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2 The MMPA defines bona fide research as "scientific research on marine mammals, the results of which – (A) likely would be accepted for publication in a refereed scientific journal; (B) are likely to contribute to the basic knowledge of marine mammal biology or ecology; or (C) are likely to identify, evaluate, or resolve conservation problems."

3 The MMPA defines humane in the context of the taking of a marine mammal, as "that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved."