PROPOSED ACTION:	Issuance of an Incidental Harassment Authorization to the U.S. Department of the Air Force, 86 Fighter Weapons Squadron to Take Marine Mammals by Harassment Incidental to the Skagway Gateway Initiative Project
TYPE OF STATEMENT:	Environmental Assessment
LEAD AGENCY:	U.S. Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service
RESPONSIBLE OFFICIAL:	Donna S. Wieting, Director Office of Protected Resources, National Marine Fisheries Service
FOR FURTHER INFORMATION:	Laura McCue National Marine Fisheries Service Office of Protected Resources Permits and Conservation Division 1315 East West Highway Silver Spring, MD 20910 301-427-8401
LOCATION:	Kauai, Hawaii
ABSTRACT:	This Environmental Assessment analyzes the environmental impacts of the National Marine Fisheries Service, Office of Protected Resources proposals to issue an Incidental Harassment Authorization (IHA) to the U.S. Department of the Air Force, 86 Fighter Weapons Squadron for the taking, by Level B and Level A harassment, of marine mammals incidental to the Long Range Strike Weapon Systems Evaluation Program in the Barking Sands Underwater Range Extension area of the Pacific Missile Range Facility at Kauai, Hawaii. The IHA would be valid from September 1, 2016 through August 31, 2017.
DATE:	June 2016

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LIST OF ACRONYMS AND ABBREVIATIONS

µPa	microPascal
Authorization	Incidental Harassment Authorization
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dB	decibel
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
FONSI	Finding of No Significant Impact
FR	Federal Register
HTC	Huna Totem Corporation
Km	kilometer
m	meter
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation Management Act
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OPR	Office of Protected Resources
OMB	Office of Management and Budget
rms	root-mean-square
ACOE	US Army Corp of Engineers
USFWS	US Fish and Wildlife Service
WSDOT	Washington State Department of Transportation

Chapter 1 Introduction and Purpose and Need

1.1. Background

The Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1631 et seq.) prohibits the incidental taking of marine mammals. The incidental take of a marine mammal falls under three categories: mortality, serious injury or harassment (i.e., injury and behavioral effects). Harassment[1] is any act of pursuit, torment or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns (Level B harassment). Disruption of behavioral patterns includes but is not limited to, migration, breathing, nursing, breeding, feeding or sheltering. In the case of military readiness activities, harassment[2] is any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns. Disruption of behavioral patterns includes but is not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered (Level B harassment). However, there are exceptions to the prohibition on take in Section 101(a)(5)(D) of the MMPA that gives the National Marine Fisheries Service (NMFS) the authority to authorize the incidental but not intentional take of small numbers[3] of marine mammals by harassment provided certain determinations are made and statutory and regulatory procedures are met. Refer to Chapter 2 for details regarding this exception and NMFS' incidental harassment authorization (IHA) criteria.

NMFS also promulgated regulations to implement the provisions of the MMPA governing the taking and importing of marine mammals, 50 Code of Federal Regulations (CFR) Part 216 and produced Office of Management and Budget (OMB)-approved application instructions (OMB Number 0648-0151) that prescribe the procedures necessary to apply for permits. All applicants must comply with these regulations and application instructions in addition to the provisions of the MMPA.

1.1.1. Applicant's Incidental Take Authorization Request

The U.S. Department of the Air Force (USAF), 86 Fighter Weapons Squadron (86 FWS) proposes to conduct operational evaluations of air-to-surface weapons in the Barking Sands Underwater Range Extension (BSURE) area of the Pacific Missile Range Facility (PMRF) at Kauai, Hawaii. The 86 FWS test objective is to conduct operational evaluations of long-range strike weapons and other munitions as part of Long Range Strike Weapon Systems Evaluation Program (LRS WSEP) to properly train units to execute requirements within Designed Operational Capability Statements, which describe units' real-world operational expectations in a time of war. Due to threats to national security, increased missions involving air-to-surface activities have been directed by the Department of Defense (DoD). Accordingly, the USAF seeks the ability to conduct operational evaluations of all phases of LRS weapons within the U.S. Navy's Hawaii Range Complex (HRC). The actions would fulfill the Air Force's requirement to

[1] As defined in the MMPA, Section 3(18)(A) for non-military readiness activities.
[2] As defined in the MMPA, Section 3(18)B)) for military readiness activities
[3] The National Defense Authorization Act of 2004 (NDAA; Public Law 108–136) removed the "small numbers" and "specified geographical region" limitations for military readiness activities.

evaluate full-scale maneuvers for such weapons, including scoring capabilities under operationally realistic scenarios. WSEP objectives are to evaluate air-to-surface and maritime weapon employment data, evaluate tactics, techniques, and procedures in an operationally realistic environment, and to determine the impact of tactics, techniques, and procedures on combat Air Force training. The munitions associated with the proposed activities are not part of a typical unit's training allocations, and prior to attending a WSEP evaluation, most pilots and weapon systems officers have only dropped weapons in simulators or used the aircraft's simulation mode. Without WSEP operations, pilots would be using these weapons for the first time in combat. On average, half of the participants in each unit drop an actual weapon for the first time during a WSEP evaluation. Consequently, WSEP is a military readiness activity and is the last opportunity for squadrons to receive operational training and evaluations before they deploy. Project activities are proposed to occur over one day, on September 1, 2016, with a backup day the next day.

1.1.2. Marine Mammals in the Action Area

Table 1 (below) lists the marine mammals under NMFS' jurisdiction that could inhabit the general region and location of 86 FWSs proposed air-to-surface weapons evaluation activities. In summary, there are 25 marine mammal species with the potential or confirmed occurrence in Hawaiian waters. However, not all of these species occur within or during the timeframe 86 FWS is proposing to conduct air-to-surface weapons training. Of these 25 species, six are listed as endangered under the ESA and as depleted throughout its range under the MMPA, only two species are likely to occur within the impact area, and the other 22 species are either island-associated or do not occur at the depths of the impact area. Because 22 species are unlikely to occur within the impact area, 86 FWS did not request and NMFS is not proposing to authorize "take" of these species. Therefore, only the two species likely to occur within the impact area are analyzed in the proposed IHA and this draft EA. Refer to Chapters 3 and 4, which provide the detailed information about these marine mammals.

Table 1. Marine mammal species likely to occur near the project area

Species	Stock	ESA*/MMPA** status; Strategic (Y/N)[1]	Stock abundance (CV, Nmin, most recent abundance survey)	PBR[3]	Occurrence in BSURE Area
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)					
Family: Balaenopteridae					
Humpback whale (*Megaptera novaeangliae*)[4]	Central North Pacific	Y; Y	10,103 (0.300; 7,890; 2006)	83	Seasonal; throughout known breeding grounds during winter and spring (most common November through April)
Blue Whale (*Balaenoptera musculus)*	Central North Pacific	Y; Y	81 (1.14; 38; 2010)	0.1	Seasonal; infrequent winter migrant; few sightings, mainly fall and winter; considered rare
Fin whale (*Balaenoptera physalus*	Hawaii	Y; Y	58 (1.12; 27; 2010)	0.1	Seasonal, mainly fall and winter; considered rare
Sei whale (*Balaenoptera borealis)*	Hawaii	Y; Y	178 (0.90; 93; 2010)	0.2	Rare; limited sightings of seasonal migrants that feed at

					higher latitudes
Bryde's whale (*Balaenoptera brydei/edeni)*	Hawaii	-; N	798 (0.28; 633; 2010)	6.3	Uncommon; distributed throughout the Hawaiian EEZ
Minke whale (*Balaenoptera acutorostrata)*	Hawaii	-; N	n/a (n/a; n/a; 2010)	Undet.	Regular but seasonal (October-April)
Order Cetartiodactyla – Cetacea – Superfamily Odontoceti (toothed whales, dolphins, and porpoises)					
Family: Physeteridae					
Sperm whale (*Physeter macrocephalus*)	Hawaii	Y; Y	3,354 (0.34; 2,539; 2010)	10.2	Widely distributed year round; more likely in waters > 1,000 m depth, most often > 2,000 m
Order Cetartiodactyla – Cetacea – Superfamily Odontoceti (toothed whales, dolphins, and porpoises)					
Family: Kogiidae					
Pygmy sperm whale (*Kogia breviceps*)	Hawaii	-; N	n/a (n/a; n/a; 2010)	Undet.	Widely distributed year round; more likely in waters > 1,000 m depth
Dwarf sperm whale (*Kogia sima*)	Hawaii	-; N	n/a (n/a; n/a; 2010)	Undet.	Widely distributed year round; more likely in waters > 500 m depth
Order Cetartiodactyla – Cetacea – Superfamily Odontoceti (toothed whales, dolphins, and porpoises)					
Family delphinidae					
Killer whale (*Orcinus orca*)	Hawaii	-; N	101 (1.00; 50; 2010)	1	Uncommon; infrequent sightings
False killer whale (*Pseudorca crassidens*)	Hawaii Pelagic NWHI Stock	-; N -; N	1,540 (0.66; 928; 2010) 617 (1.11; 290; 2010)	9.3 2.3	Regular Regular
Pygmy killer whale (*Feresa attenuata*)	Hawaii	-; N	3,433 (0.52; 2,274; 2010)	23	Year-round resident
Short-finned pilot whale (*Globicephala macrorhynchus*)	Hawaii	-; N	12,422 (0.43; 8,872; 2010)	70	Commonly observed around Main Hawaiian Islands and Northwestern Hawaiian Islands
Melon headed whale (*Peponocephala electra)*	Hawaii Islands stock	-; N	5,794 (0.20; 4,904; 2010)	4	Regular
Bottlenose dolphin (*Tursiops truncatus*)	Hawaii pelagic	-; N	5,950 (0.59; 3,755; 2010)	38	Common in deep offshore waters
Pantropical spotted dolphin (*Stenella attenuata*)	Hawaii pelagic	-; N	15,917 (0.40; 11,508; 2010)	115	Common; primary occurrence between 100 and 4,000 m depth
Striped dolphin (*Stenella coeruleoala*)	Hawaii	-; N	20,650 (0.36; 15,391; 2010)	154	Occurs regularly year round but infrequent sighting during survey
Spinner dolphin (*Stenella longirostris*)	Hawaii pelagic	-; N	n/a (n/a; n/a; 2010)	Undet.	Common year-round in offshore waters
Rough-toothed dolphins (*Steno bredanensis*)	Hawaii stock	-; N	6,288 (0.39; 4,581; 2010)	46	Common throughout the Main Hawaiian Islands and Hawaiian Islands

					EEZ
Fraser's dolphin (*Lagenodelphis hosei*)	Hawaii	-; N	16,992 (0.66; 10,241; 2010)	102	Tropical species only recently documented within Hawaiian Islands EEZ (2002 survey)
Risso's dolphin (*Grampus griseus*)	Hawaii	-; N	7,256 (0.41; 5,207; 2010)	42	Previously considered rare but multiple sightings in Hawaiian Islands EEZ during various surveys conducted from 2002-2012
Order Cetartiodactyla – Cetacea – Superfamily Odontoceti (toothed whales, dolphins, and porpoises)					
Family:Ziphiidae					
Cuvier's beaked whale (*Ziphius cavirostris*)	Hawaii	-; N	1,941 (n/a; 1,142; 2010)	11.4	Year-round occurrence but difficult to detect due to diving behavior
Blainville's beaked whale (*Mesoplodon densirostris*)	Hawaii	-; N	2,338 (1.13; 1,088; 2010)	11	Year-round occurrence but difficult to detect due to diving behavior
Longman's beaked whale (*Indopacetus pacificus*)	Hawaii	-; N	4,571 (0.65; 2,773; 2010)	28	Considered rare; however, multiple sightings during 2010 survey
Order – Carnivora — Superfamily Pinnipedia (seals, sea lions)					
Family: Phocidae					
Hawaiian monk seal (*Neomonachus schauinslandi*)	Hawaii	Y; Y	1,112 (n/a; 1,088; 2013)	Undet.	Predominantly occur at Northwestern Hawaiian Islands; approximately 138individuals in Main Hawaiian Islands

[1] 2015 marine mammal Stock Assessment Reports at http://www.nmfs.noaa.gov/pr/sars/species.htm.
*Endangered Species Act
**Marine Mammal Protection Act

1.2. Purpose and Need

1.2.1. Description of the Proposed Action

NMFS proposes to issue an IHA to the 86FWS pursuant to Section 101(a)(5)(A) of the MMPA and 50 CFR Part 216. The IHA will be valid from September 1, 2016 to August 31, 2016 and authorizes takes, by harassment, of marine mammals incidental to air-to-surface weapons evaluations. The impact of the underwater noise associated with the explosives have the potential to cause marine mammals within or near the proposed retrieval sites to be behaviorally disturbed, thus warrant an IHA from NMFS. NMFS proposed action is a direct outcome of 86FWS's request for an IHA to take marine mammals.

1.2.2 Purpose

The purpose of our proposed action is to authorize take of marine mammals incidental to the 86FWS's proposed LRS WSEP activities at the BSURE area of PMRF, Kauai, Hawaii. The IHA, if issued, would provide an exception to 86FWS from the take prohibitions contained in the MMPA. To authorize the incidental take of marine mammals, NMFS evaluates the best available scientific information to determine whether the take would have a negligible impact on marine mammals or stocks and whether the activity would have an unmitigable impact on the availability of affected marine mammal species for subsistence use. NMFS cannot issue this IHA if it cannot make those findings in the affirmative. In addition, we must prescribe, the permissible methods of taking and other means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance. If appropriate, we must prescribe means of effecting the least practicable impact on the availability of the species or stocks of marine mammals for subsistence uses. IHAs must also include requirements or conditions pertaining to monitoring and reporting.

1.2.3 Need

U.S. citizens seeking to obtain authorization for the incidental take of marine mammals under NMFS jurisdiction must submit such a request (in the form of an application). On May 12, 2016 86 FWS submitted an application requesting an IHA for the possible harassment of two marine mammal species. On June 9, 2016 and June 17, 2016, 86 FWS submitted revisions to their application to provide updated information on modeling and take numbers. NMFS considered the revisions to their application as adequate and complete, demonstrating both the need and potential eligibility for an IHA under the MMPA. NMFS now has a corresponding duty to determine whether and how to authorize take of marine mammals incidental to the activities described 86FWS's application. NMFS' responsibilities under section 101(a)(5)(D) of the MMPA and its implementing regulations establish and frame NMFS proposed action.

Any alternatives considered under NEPA must meet the agency's statutory and regulatory requirements. Our described purpose and need guide us in developing reasonable alternatives for consideration, including alternative means of mitigating potential adverse effects.

1.3. The Environmental Review Process

In accordance with the Council on Environmental Quality (CEQ) Regulations for implementing the National Environmental Policy Act (NEPA), NMFS, to the fullest extent possible, integrates the requirements of NEPA with other regulatory processes required by law or by agency practice so that all procedures run concurrently, rather than consecutively. This includes coordination within National Oceanic Atmospheric Administration (NOAA), (e.g., the Office of the National Marine Sanctuaries) and with other regulatory agencies (e.g., the U.S. Fish and Wildlife Service), as appropriate, during NEPA reviews prior to implementation of a proposed action to ensure that requirements are met. Regarding the issuance of IHAs, we rely substantially on the public process required by the MMPA for preparing proposed IHAs to develop and evaluate relevant environmental information and provide a meaningful opportunity for public participation when we prepare corresponding NEPA documents. We fully consider public comments received in response to the publication of proposed IHAs during the corresponding NEPA review process.

1.3.1. National Environmental Policy Act

NEPA requires federal agencies to examine the environmental impacts of their proposed actions within the United States and its territories. A NEPA analysis is a public document that provides an assessment of the potential effects a major federal action may have on the human environment, which includes the natural and physical environment. Major federal actions include activities that federal agencies fully or partially fund, regulate, conduct or approve. Because our issuance of an IHA would allow for the taking of marine mammals, consistent with provisions under the MMPA and incidental to the applicant's activities, we consider this a major federal action subject to NEPA; therefore, NMFS analyzes the environmental effects associated with authorizing incidental takes of protected species and prepares the appropriate NEPA documentation.

1.3.2. Scoping and Public Involvement

The NEPA process is intended to enable NMFS to make decisions based on an understanding of the environmental consequences and take actions to protect, restore, and enhance the environment. An integral part of the NEPA process is public involvement. Public involvement facilitates the development of an EA and informs the scope of issues to be addressed in the EA. Although agency procedures for the implementation of NEPA do not require public involvement prior to finalizing an EA; NMFS determined the publication of the draft EA along with the proposed IHA was the appropriate step to involve the public. This allows us to understand the public concerns for the proposed action, identify significant issues related to the proposed action and obtain the necessary information to complete an analysis.

On July 7, 2016 we published the proposed IHA in the Federal Register (81 FR 44277) with our preliminary determinations. The notice included a detailed description of the proposed action resulting from the MMPA consultation process; consideration of environmental issues and impacts of relevance related to the proposed issuance of the IHA; and potential mitigation and monitoring measures to avoid and minimize potential adverse impacts to marine mammals and their habitat. The notice of the proposed IHA and the corresponding public comment period were instrumental in providing the public with information on relevant environmental issues and offering the public a meaningful opportunity to provide comments for our consideration in both the MMPA and NEPA decision-making processes.

1.4 Other Environmental Laws or Consultations

NMFS must comply with all applicable federal environmental laws, regulations, and Executive Orders (EO) necessary to implement a proposed action. NMFS evaluation of and compliance with environmental laws, regulations and EOs is based on the nature and location of the applicants proposed activities and NMFS proposed action. Therefore, this section only summarizes environmental laws and consultations applicable to NMFS issuance of an IHA to 86 FWS. There are no other environmental laws, regulations, EOs, consultations, federal permits or licenses applicable NMFS issuance of an IHA to 86 FWS.

1.4.1 Magnuson-Stevens Fishery Conservation and Management Act

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Federal agencies are required to consult with the Secretary of Commerce with respect to any proposed action that may adversely affect essential fish habitat (EFH) identified under the MSFCMA. The WPRFMC (Western Pacific Regional Fishery Management Council) has recently shifted toward

an ecosystem-based approach, focusing fishery management activities on geographic areas that support various habitats and their associated species complexes rather than on individual species. Accordingly, the WPRFMC is in the process of replacing FMPs with Fishery Ecosystem Plans (FEPs). Five FEPs have been completed. FEPs associated with resources in the study area include the Hawaii Archipelago FEP and the Pacific Pelagic Fisheries FEP. The Hawaii Archipelago FEP does not establish new fishery management regulations but rather consolidates existing regulations contained in previous FMPs. The FEP identifies all demersal species (living on or near the seafloor) known to occur around the Hawaii Archipelago, designates them as one management unit, and incorporates all management provisions of the previous Bottomfish and Seamount Groundfish FMPs. The FEP also incorporates provisions of the previous Crustaceans, Precious Corals, and Coral Reef Ecosystems FMPs that are applicable to the area. EFH management units presently include bottomfish species (deep-slope and seamount species complexes consisting of snappers, groupers, jacks, pelagic armorhead, ratfish, and other similar taxa); crustaceans (spiny and slipper lobster species complex, deepwater shrimps, and Kona crab [*Ranina ranina*]); precious corals (non-reef-building corals occurring below the euphotic zone, historically important in the jewelry trade); and coral reef ecosystems (separate designations for currently harvested and potentially harvested coral taxa). 86 FWS's LRS WSEP missions in the BSURE area could potentially impact EFH by alteration of water quality through introduction of metals and chemical materials. Explosion byproducts, petroleum products, and battery acid deposited in the water or on substrates could have temporary and localized effects but would be quickly dispersed and diluted by water currents. Metals, explosives associated with UXO, and plastics could be present at the mission site for long time periods, but effects to the water column would be limited to a small area around such items. Solid items could become corroded, encrusted, or covered with sediment, and constituents of unconsumed explosives would be subject to several physical, chemical, and biological processes that render the materials harmless or would otherwise dissipate them to undetectable levels. Physical disturbance of the water column would be temporary and would not alter the water in any measurable or lasting manner. However, effects to EFH from NMFS proposed authorization is expected to be temporary and minor. Therefore, NMFS has preliminarily determined authorizing take of marine mammals incidental to 86 FWS's LRS WSEP activities in the BUSRE area would not have an adverse impact on EFH and an EFH consultation is not required.

1.4.2 Endangered Species Act

The Endangered Species Act (ESA) established protection over and conservation of threatened and endangered species (T&E) and the ecosystems upon which they depend. An endangered species is a species in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered within the near future throughout all or in a significant portion of its range. The USFWS and NMFS jointly administer the ESA and are responsible for the listing of species (designating a species as either threatened or endangered) and designating geographic areas as critical habitat for T&E species. The ESA generally prohibits the "take" of an ESA-listed species unless an exception or exemption applies. The term "take" as defined in Section 3 of the ESA means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Section 7(a)(2) requires each federal agency to ensure that any action it authorizes, funds or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a federal agency's action may affect a listed species, that agency is required to consult with NMFS and/or the USFWS under procedures set out in 50 CFR Part 402. NMFS and USFWS can also be action agencies

under Section 7. Informal consultation is sufficient for species the action agency determines are not likely to be adversely affected if NMFS or USFWS concurs with the action agency's findings, including any additional measures mutually agreed upon as necessary and sufficient to avoid adverse impacts to listed species and/or designated critical habitat.

NMFS issuance of an IHA is a federal action that is also subject to the requirements of section 7 of the ESA. As a result, we are required to ensure that the issuance of an IHA to the 86 FWS is not likely to jeopardize the continued existence of any T&E species or result in the destruction or adverse modification of critical habitat for these species. There are no marine mammal species listed as endangered or threatened under the ESA for which take is requested; therefore, consultation under the ESA is not necessary.

1.5 Scope of Environmental Analysis

This EA was prepared in accordance with NEPA (42 USC 4321, et seq.) and CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508). The analysis in this EA addresses potential impacts to the human environment and natural resources, specifically marine mammals and their habitat, resulting from NMFS' proposed action to authorize incidental takes associated with the 86 FWS proposed activities. We analyze direct, indirect, and cumulative impacts related to authorizing incidental take of marine mammals under the MMPA. The scope of our analysis is limited to the decision for which we are responsible (i.e. whether or not to issue the IHA). This EA is intended to provide focused information on the primary issues and impacts of environmental concern, which is our issuance of the IHA authorizing the take of marine mammals incidental to 86 FWS's proposed activities, and the mitigation and monitoring measures to minimize the effects of that take. For these reasons, this EA does not provide a detailed evaluation of the effects to the elements of the human environment listed in Table 2 below.

Table 2. Components of the human environment not affected by our issuance of an Authorization.

Biological	Physical	Socioeconomic / Cultural
Amphibians	Air Quality	Commercial Fishing
Humans	Geography	Military Activities
Non-Indigenous Species	Land Use	Oil and Gas Activities
Seabirds	Oceanography	Recreational Fishing
	State Marine Protected Areas	Shipping and Boating
	Federal Marine Protected Areas	National Historic Preservation Sites
	National Estuarine Research Reserves	National Trails and Nationwide Inventory of Rivers
	National Marine Sanctuaries	Low Income Populations
	Park Land	Minority Populations
	Prime Farmlands	Indigenous Cultural Resources
	Wetlands	Public Health and Safety
	Wild and Scenic Rivers	Historic and Cultural Resources
	Ecologically Critical Areas	

Chapter 2 Alternatives

2.1. Introduction

As described in Chapter 1, the National Marine Fisheries Service (NMFS) Proposed Action is to issue an Incidental Harassment Authorization (IHA) to authorize the take of small numbers of marine mammals incidental to 86 FWS's proposed air-to-surface weapons evaluation activities. NMFS Proposed Action is triggered by 86 FWS's request for an IHA per the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 *et seq.*). In accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) Regulations, NMFS is required to consider alternatives to the Proposed Action. This includes the no action and other reasonable course of action associated with authorizing incidental take of protected species. The evaluation of alternatives under NEPA assists NMFS with ensuring that any unnecessary impacts are avoided through an assessment of alternative ways to achieve the purpose and need for our Proposed Action that may result in less environmental harm. To warrant detailed evaluation under NEPA, an alternative must be reasonable along with meeting the stated purpose and need for the proposed action. For the purposes of this EA, an alternative will only meet the purpose and need if it satisfies the requirements under section 101(a)(5)(D) the MMPA. Therefore, NMFS applied the following screening criteria to the alternatives to identify which alternatives to carry forward for analysis. Accordingly, an alternative must meet the following criteria to be considered "reasonable."

- The action must not violate any federal laws or regulations.
- The action is consistent with the goals and requirements of MMPA and its implementing regulations.
- The action includes NMFS authorization criteria, specifically:
    - Prescribing permissible methods of take
    - Addressing other means of effecting the least practicable adverse impact on the species or stocks of marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance.
- The action includes proposed mitigation measures (including consideration of the following factors in relation to one another):
    - The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals;
    - The proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and
    - The practicability of the measure for applicant implementation

Based on this evaluation, only one alternative was identified as reasonable and, along with the no-action alternative, is evaluated in this EA.

2.1.1. Description of Applicant's Activity

We presented a general overview of 86 FWS's project in our *Federal Register* notice of proposed Authorization (81 FR 44277; July 7, 2016). We incorporate those descriptions and those found in 86 FWS's request for incidental take authorization (2016) by reference in this EA and briefly summarize them here.

2.1.2. Specified Time and Specified Area

The Long Range Strike Weapon System Evaluation Program (LRS WSEP) activities are to occur in the Barking Sands Underwater Range Extension (BSURE) area of the Pacific Missile Range Facility (PMRF) off Kauai, HI. Mission activities will include LRS WSEP test missions of the Joint Air-To-Surface Stand-

off Missile (JASSM) and the Small Diameter Bomb-I/II (SDB-I/II) including detonations at the water surface. Initial phases of the LRS WSEP operational evaluations consist of releasing only one live JASSM/JASSM-ER and up to eight SDBs in military controlled airspace. All mission activities will occur on one day, September 1, 2016, with a backup day the next day.

2.1.3. Description of Mission Activities

The LRS WSEP test objective is to conduct operational evaluations of long range strike weapons and other munitions as part of LRS WSEP operations to properly train units to execute requirements within Designed Operational Capability Statements, which describe units' real-world operational expectations in a time of war. Due to threats to national security, increased missions involving air-to-surface activities have been directed by the Department of Defense (DoD). Accordingly, the U.S. Air Force seeks the ability to conduct operational evaluations of all phases of long range strike weapons within the U.S. Navy's Hawaii Range Complex (HRC). The actions would fulfill the Air Force's requirement to evaluate full-scale maneuvers for such weapons, including scoring capabilities under operationally realistic scenarios. WSEP objectives are to evaluate air-to-surface and maritime weapon employment data, evaluate tactics, techniques, and procedures in an operationally realistic environment, and to determine the impact of tactics, techniques, and procedures on combat Air Force training. The munitions associated with the proposed activities are not part of a typical unit's training allocations, and prior to attending a WSEP evaluation, most pilots and weapon systems officers have only dropped weapons in simulators or used the aircraft's simulation mode. Without WSEP operations, pilots would be using these weapons for the first time in combat. On average, half of the participants in each unit drop an actual weapon for the first time during a WSEP evaluation. Consequently, WSEP is a military readiness activity and is the last opportunity for squadrons to receive operational training and evaluations before they deploy.

The LRS WSEP training missions, classified as military readiness activities, include air-to-surface activities refer to the deployment of live (containing explosive charges) missiles from aircraft toward the water surface. The actions include air-to-surface test missions of the Joint Air-to-Surface Stand-off Missile (JASSM) and the Small Diameter Bomb-I/II (SDB-I/II) including detonations at the water surface.

Aircraft used for munition releases would include bombers and fighter aircraft. Additional airborne assets, such as the P-3 Orion or the P-8 Poseidon, would be used to relay telemetry (TM) and flight termination system (FTS) streams between the weapon and ground stations. Other support aircraft would be associated with range clearance activities before and during the mission and with air-to-air refueling operations. All weapon delivery aircraft would originate from an out base and fly into military-controlled airspace prior to employment. Due to long transit times between the out base and mission location, air-to-air refueling may be conducted in either W-188 or W-189. Bombers, such as the B-1, would deliver the weapons, conduct air-to-air refueling, and return to their originating base as part of one sortie. However, when fighter aircraft are used, the distance and corresponding transit time to the various potential originating bases would make return flights after each mission day impractical. In these cases, the aircraft would temporarily (less than one week) park overnight at Hickam Air Force Base (AFB) and would return to their home base at the conclusion of each mission set. Multiple weapon release aircraft would be used during some missions, each potentially releasing multiple munitions. The LRS WSEP missions

scheduled for 2016 are proposed to occur in one day, with the following day reserved as a back-up day. Approximately 10 Air Force personnel would be on temporary duty to support the mission.

Aircraft flight maneuver operations and weapon release would be conducted in W-188A. Chase aircraft may be used to evaluate weapon release and to track weapons. Flight operations and weapons delivery would be in accordance with published Air Force directives and weapon operational release parameters, as well as all applicable Navy safety regulations and criteria established specifically for PMRF. Aircraft supporting Long Range Strike WSEP missions would primarily operate at high altitudes—only flying below 3,000 feet for a limited time as needed for escorting non-military vessels outside the hazard area or for monitoring the area for protected marine species (e.g., marine mammals, sea turtles). Protected marine species aerial surveys would be temporary and would focus on an area surrounding the weapon impact point on the water. Post-mission surveys would focus on the area down current of the weapon impact location. Range clearance procedures for each mission would cover a much larger area for human safety. Weapon release parameters would be conducted as approved by PMRF Range Safety. Daily mission briefs would specify planned release conditions for each mission. Aircraft and weapons would be tracked for time, space, and position information. The 86 FWS test director would coordinate with the PMRF Range Safety Officer, Operations Conductor, Range Facility Control Officer, and other applicable mission control personnel for aircraft control, range clearance, and mission safety.

Joint Air-to-Surface Stand-off Missile/Joint Air-to-Surface Stand-Off Missile-Extended Range (JASSM/JASSM-ER)

The JASSM is a stealthy precision cruise missile designed for launch outside area defenses against hardened, medium-hardened, soft, and area type targets. The JASSM has a range of more than 200 nautical miles (NM) (370 kilometers [km]) and carries a 1,000-pound warhead with approximately 300 pounds of 2,4,6-trinitrotoluene (TNT) equivalent net explosive weight (NEW). The specific explosive used is AFX-757, a type of plastic bonded explosive (PBX). The weapon has the capability to fly a preprogrammed route from launch to a target, using Global Positioning System (GPS) technology and an internal navigation system (INS) combined with a Terminal Area Model when available. Additionally, the weapon has a Common Low Observable Auto-Routing function that gives the weapon the ability to find the route that best utilizes the low observable qualities of the JASSM. In either case, these routes can be modeled prior to weapon release. The JASSM-ER has additional fuel and a different engine for a greater range than the JASSM (500 NM [926 km]) but maintains the same functionality of the JASSM.

Small Diameter Bomb-I/Small Diameter Bomb-II (SDB-I/SDB-II)

The SDB I is a 250-pound air-launched GPS-INS guided weapon for fixed soft to hardened targets. SDB II expands the SDB I capability with network enabling and uses a tri-mode sensor infrared, millimeter, and semi-active laser to attack both fixed and movable targets. Both munitions have a range of up to 60 NM (111 km). The SDB-I contains 37 pounds of TNT-equivalent NEW, and the SDB-II contains 23 pounds NEW. The explosive used in both SDB-I and SDB-II is AFX-757.

Initial phases of the Long Range Strike WSEP operational evaluations are proposed for September 2016 and would consist of releasing only one live JASSM/JASSM-ER and up to eight SDBs in military controlled airspace. Immediate evaluations for JASSM/JASSM-ER and SDB I are needed. Weapon

release parameters for 2016 missions would involve a B-1 bomber releasing one live JASSM and fighter aircraft, such as F-15, F-16, or F-22, releasing live SDB-I. Up to four SDB-I munitions would be released simultaneously, similar to a ripple effect, each hitting the water surface within a few seconds of each other; however the SDB-I releases would occur separate from the JASSM. All releases would occur on the same mission day.

A typical mission day would consist of pre-mission checks, safety review, crew briefings, weather checks, clearing airspace, range clearance, mitigations/monitoring efforts, and other military protocols prior to launch of weapons. Potential delays could be the result of multiple factors including, but not limited to, adverse weather conditions leading to unsafe take-off, landing, and aircraft operations, inability to clear the range of non-mission vessels or aircraft, mechanical issues with mission aircraft or munitions, or presence of protected species in the impact area. If the mission is cancelled due to any of these, one back-up day has also been scheduled as a contingency. These standard operating procedures are usually done in the morning, and live range time may begin in late morning once all checks are complete and approval is granted from range control. The range would be closed to the public for a maximum of four hours per mission day.

Each long range strike weapon would be released in W-188A and would follow a given flight path with programmed GPS waypoints to mark its course in the air. Long range strike weapons would complete their maximum flight range (up to 500-NM distance for JASSM-ER) at an altitude of approximately 18,000 feet mean sea level (MSL) and terminate at a specified location for scoring of the impact. The cruise time would vary among the munitions, but would be about 45 minutes for JASSM/JASSM-ER and 10 minutes for SDB-I/II. The time frame between employments of successive munitions would vary, but releases could be spaced by approximately one hour to account for the JASSM cruise time. The routes and associated safety profiles would be contained within W-188A boundaries. The objective of the route designs is to complete full-scale evasive maneuvers that avoid simulated threats and would, therefore, not consist of a standard “paper clip” or regularly shaped route. The final impact point on the water surface would be programmed into the munitions for weapons scoring and evaluations.

All missions would be conducted in accordance with applicable flight safety, hazard area, and launch parameter requirements established for PMRF. A weapon hazard region would be established, with the size and shape determined by the maximum distance a weapon could travel in any direction during its descent. The hazard area is typically adjusted for potential wind speed and direction, resulting in a maximum composite safety footprint for each mission (each footprint boundary is at least 10 NM from the Kauai coastline). This information is used to establish a Launch Exclusion Area and Aircraft Hazard Area. These exclusion areas must be verified to be clear of all non-mission and non-essential vessels and aircraft before live weapons are released. In addition, a buffer area must also be clear on the water surface so that vessels do not enter the exclusion area during the launch window. Prior to weapon release, a range sweep of the hazard area would be conducted by participating mission aircraft or other appropriate aircraft, potentially including S-61N helicopter, C-26 aircraft, fighter aircraft (F-15E, F-16, F-22), or the Coast Guard’s C-130 aircraft.

PMRF has used small water craft docked at the Port Allen public pier to keep nearshore areas clear of tour boats for some mission launch areas. However, for missions with large hazard areas that occur far offshore from Kauai, it would be impractical for these smaller vessels to conduct range clearance

activities. The composite safety footprint weapons associated with Long Range Strike WSEP missions is anticipated to be rather large; therefore, it is likely that range clearing activities would be conducted solely by aircraft.

The Range Facility Control Officer is responsible for establishing hazard clearance areas, directing clearance and surveillance assets, and reporting range status to the Operations Conductor. The Control Officer is also responsible for submitting all Notice to Airmen (NOTAMs) and Notice to Mariners (NOTMARs), and for requesting all Federal Aviation Administration airspace clearances.

2.2. Description of Alternatives

2.2.1. Alternative 1 – Issuance of an Authorization with Mitigation Measures

The Proposed Action constitutes Alternative 1 and is the Preferred Alternative. Under this alternative, we would issue an Authorization to 86 FWS (valid from September 1, 2017 through August 31, 2017) allowing the incidental take, by Level B harassment of two species of marine mammals, and by and Level A harassment of one species of marine mammal, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the proposed IHA, if issued, along with any additions based on consideration of public comments.

MITIGATION, MONITORING, AND REPORTING MEASURES

As described in Section 1.2.1, we must prescribe the means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat. In order to do so, we must consider 86 FWS's proposed mitigation measures, as well as other potential measures, and assess how such measures could benefit the affected species or stocks and their habitat. Our evaluation of potential measures includes consideration of the following factors in relation to one another: (1) the manner in which, and the degree to which, we expect the successful implementation of the measures to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the measures to minimize adverse impacts as planned; and (3) the practicability of the measures for applicant implementation.

Any additional mitigation measure proposed by us beyond what the applicant proposes should be able to or have a reasonable likelihood of accomplishing or contributing to the accomplishment of one or more of the following goals:

- Avoidance or minimization of marine mammal injury, serious injury, or death wherever possible;
- A reduction in the numbers of marine mammals taken (total number or number at biologically important time or location);
- A reduction in the number of times the activity takes individual marine mammals (total number or number at biologically important time or location);
- A reduction in the intensity of the anticipated takes (either total number or number at biologically important time or location);
- Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base; activities that block or limit passage to or from biologically important areas;

permanent destruction of habitat; or temporary destruction/disturbance of habitat during a biologically important time; and

- For monitoring directly related to mitigation, an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

To reduce the potential for disturbance associated with the activities, 86 FWS has proposed to implement several monitoring and mitigation measures for marine mammals. The proposed monitoring and mitigation measures include:

- Missions will only occur during daylight hours
- Pre- and post- mission aerial monitoring for marine mammals
- Postponing missions if observers detect marine mammals within the impact zones

86 FWS is required to submit a draft monitoring report to NMFS Office of Protected Resources within 90 days after the conclusion of the activities. A final report shall be prepared and submitted within 30 days following resolution of any comments on the draft report from NMFS. A description of the activities conducted by 86 FWS and the monitoring protocols would be included in the report.

In our *Federal Register* notice of proposed Authorization, which we incorporate by reference, we preliminarily determined that the measures included in the proposed Authorization were sufficient to reduce the effects of 86 FWS's activity on marine mammals to the level of least practicable impact. In addition, we described our analysis of impacts and preliminarily determined that the taking of small numbers of marine mammals, incidental to 86 FWS's project would have a negligible impact on the relevant species or stocks and would not have an unmitgable adverse impact on affected species or stocks for taking for subsistence uses. Accordingly, this Preferred Alternative would satisfy the purpose and need of our proposed action under the MMPA–issuance of an Authorization, along with required mitigation measures and monitoring that meets the standards set forth in section 101(a)(5)(D) of the MMPA and the implementing regulations. These proposed mitigation, monitoring, and reporting measures may change based on public comments received on the proposed Authorization and/or this Draft EA.

2.2.2. Alternative 2 – No Action Alternative

For NMFS, denial of an MMPA authorization constitutes the NMFS No Action Alternative, which is consistent with our statutory obligation under the MMPA to grant or deny permit applications and to prescribe mitigation, monitoring and reporting with any authorizations. Under the NMFS No Action Alternative, there are two potential outcome scenarios. One is that the LRS WSEP activities in BSURE area of PMRF occur in the absence of an MMPA authorization. In that case, (1) 86 FWS would be in violation of the MMPA if takes occur; (2) mitigation, monitoring and reporting would not be prescribed by NMFS; and 3) mitigation measures might not be performed voluntarily by the applicant. Another outcome scenario is 86 FWS would not to proceed with their proposed activities.

By prescribing measures to minimize impacts on marine mammal species or stocks, we can potentially lessen the impacts of these activities on the marine environment. NMFS authorizes the incidental

unintentional take of marine mammals (under its jurisdiction) in connection with these activities and prescribes, where applicable, the methods of taking and other means of effecting the least practicable impact on the species and stocks and their habitats. Although the No Action Alternative would not meet the purpose and need to allow incidental takes of marine mammals under certain conditions, the CEQ's regulations require consideration and analysis of a No Action Alternative for the purposes of presenting a comparative analysis to the action alternatives.

2.3. Alternatives Considered but Eliminated from Further Consideration

NMFS considered whether other alternatives could meet the purpose and need and support 86 FWS's proposed project. An alternative that would allow for the issuance of an Authorization with no required mitigation or monitoring was considered but eliminated from further consideration, as it would not be in compliance with the MMPA and therefore would not meet the purpose and need.

Chapter 3 Affected Environment

The National Marine Fisheries Service (NMFS) reviewed all possible environmental, cultural, historical, social, and economic resources based on the geographic location associated with NMFS proposed action and alternatives and the 86 FWS's request for an incidental take authorization for the proposed LRS WSEP activities. Based on this review, this chapter describes the affected environment and existing (baseline) conditions for select resource categories. As explained in Chapter 1, certain resource categories not affected by NMFS' proposed action and alternatives were not carried forward for further consideration or evaluation in this EA (See Table 2). Chapter 4 provides an analysis and description of environmental impacts associated with the affected environment

3.1 Physical Environment

The specific planned impact area is approximately 44 nautical miles (nm) (81 kilometers (km)) offshore of Kauai, Hawaii, in a water depth of about 15,240 feet (ft) (4,645 meters (m)) (see Figure 2-2 of 86 FWS's application). All activities will take place within the PMRF, which is located in Hawaii off the western shores of the island of Kauai and includes broad ocean areas to the north, south, and west (see Figure 2-1 of 86 FWS's application).

Within the PMRF, activities would occur in the BSURE area, which lies in Warning Area 188 (W-188). The BSURE consists of about 900 nm^2 of instrumented underwater ranges, encompassing the deepwater portion of the PMRF and providing over 80 percent of PMRF's underwater scoring capability. The BSURE facilitates training, tactics, development, and test and evaluation for air, surface, and subsurface weapons systems in deep water. It provides a full spectrum of range support, including radar, underwater instrumentation, telemetry, electronic warfare, remote target command and control, communications, data display and processing, and target/weapon launching and recovery facilities. The underwater tracking system begins 9 nm (17 km) from the north shore of Kauai and extends out to 40 nm (74 km) from shore. LRS WSEP missions would employ live weapons with long flight paths requiring large amounts of airspace and conclude with weapon impact and surface detonations within the BSURE instrumented range.

3.2 Biological Environment

We rely on and incorporate by reference, the information provided in the *Federal Register* notice of the proposed IHA (81 FR 44277) about the occurrence, distribution, population size, and conservation status for each of the species of marine mammals, including all marine mammal species under our jurisdiction that may occur in the area proposed for long range strike weapons evaluation. These species include two cetaceans: dwarf sperm whale (*Kogia sima*) and pygmy sperm whale (*Kogia breviceps*). Both of these species occur in very deep waters (>500m) and may be present in the action location of the BSURE area.

3.2.1 Marine Mammals and Marine Mammal Habitat

The marine mammals most likely to be harassed incidental to 86 FWS's mission activities associated with the project are dwarf sperm whale and pygmy sperm whale (Table 2). NMFS' 2015 Stock Assessment Reports (Caretta et al 2016), *http://www.nmfs.noaa.gov/pr/sars/species.htm*, provide the latest abundance and life history information about each species/stock in Hawaii. We provided information on the distribution, population size, and conservation status for each species in the proposed Authorization

Federal Register notice, and we incorporate those descriptions by reference here. We briefly summarize this information here.

3.2.1.1 Dwarf sperm whale

Dwarf sperm whales are found throughout the world in tropical to warm-temperate waters (Caretta et al 2014). They are usually found in waters deeper than 500 m, most often sighted in depths between 500 and 1,000 m, but they have been documented in depths as shallow as 106 m and as deep as 4,700 m (Baird, in press). This species is often alone or in small groups of up to two to four individuals (average group size of 2.7 individuals), with a maximum group size observed of eight individuals (Baird, in press). When there are more than two animals together, they are often loosely associated, with up to several hundred meters between pairs of individuals (Baird, in press).

There is one stock of dwarf sperm whales in Hawaii. Sighting data suggests a small resident population off Hawaii Island (Baird, in press). There are no current abundance estimates for this stock. In 2002, a survey off Hawaii estimated the abundance at 17,159; however, this data is outdated and is no longer used. PBR cannot be calculated due to insufficient data. It has been suggested that this species is probably one of the more abundant species of cetaceans in Hawaiian waters (Baird, in press). One of their main threats is interactions with fisheries; however, dwarf sperm whales are also sensitive to high-intensity underwater sounds and navy sonar testing. This stock if not listed as endangered under the ESA, and is not considered strategic or designated as depleted under the MMPA (Caretta et al 2013).

3.2.1.2 Pygmy sperm whale

Pygmy killer whales are found in tropical and subtropical waters throughout the world (Caretta et al 2016). This species prefers deeper waters, with observations of this species in greater than 4,000 m depth (Baird et al, 2013), and based on stomach contents from stranded individuals, pygmy sperm whales forage between 600 and 1,200 m depth (Baird, in press). Sightings are rare of this species, but observations include lone individuals or pairs, with an average group size is 1.5 individuals (Baird, in press).

There is a single stock of Pygmy killer whales. Current abundance estimates for this stock are unknown. A 2002 survey in Hawaii estimated 7,138 animals; however, this data is outdated and is no longer used. PBR cannot be calculated due to insufficient data. (Caretta et al, 2014). The main threats to this species are fisheries interactions and effects from underwater sounds such as active sonar (Caretta et al, 2014). This stock if not listed as endangered under the ESA, and is not considered strategic or designated as depleted under the MMPA (Caretta et al 2014).

Chapter 4 Environmental Consequences

This chapter of the EA analyzes the impacts of two alternatives on the human environment including the potential impacts of 86 FWS activities have on the affected marine mammal species or stocks to assist with whether or not to authorize incidental take of marine mammals. The 86 FWS application and our *Federal Register* notice of the proposed IHA inform our analysis of the direct, indirect, and cumulative effects of our proposed issuance of an IHA.

4.1. Effects of Alternative 1 – Issuance of an Authorization with Mitigation Measures

Alternative 1 is the Preferred Alternative under which we would issue an IHA to 86 FWS allowing the incidental take, by Level B harassment, of two species of marine mammals, and by Level A harassment of one species of marine mammal. We would incorporate the mitigation and monitoring measures and reporting described earlier in this EA into the Final IHA. The *Federal Register* notice requesting comments on the proposed IHA describes the potential effects of the long range strike weapons evaluation activities on marine mammals. We incorporate those descriptions by reference and briefly summarize or supplement the relevant information in the following subsections.

4.1.1. Impacts to Marine Mammal Habitat

The proposed activities in the BSURE area of PMRF would not result in permanent negative impacts to habitats used directly by marine mammals. The main impact issue associated with the proposed activity would be detonation effects (overpressure and acoustic components) and potential short-term effects to water and sediment quality.

The need to understand the marine acoustic environment is critical when assessing the effects of anthropogenic noise on marine wildlife. Sounds generated by military readiness activities such as detonations on the surface of the water can affect its inhabitants' behavior (e.g., deflection from loud sounds) or ability to effectively live in the marine environment (e.g., masking of sounds that could otherwise be heard).

Ambient sound levels are the result of numerous natural and anthropogenic sounds that can propagate over large distances and vary greatly on a seasonal and spatial scale. These ambient sounds occupy all frequencies and contributions in ocean soundscape from a few hundred Hz to 200 kHz (NRC, 2003). In typical urban coastal waters such as the one at the proposed action area, the main sources of underwater ambient sound would be associated with:

- Wind and wave action
- Precipitation
- Vessel activities
- Biological sounds (e.g. fish, snapping shrimp)

The contribution of these sources to the background sound levels differs with their spectral components and local propagation characteristics (e.g., water depth, temperature, salinity, and ocean bottom conditions). In deep water, low-frequency ambient sound from 1-10 Hz mainly comprises turbulent pressure fluctuations from surface waves and the motion of water at the air-water interfaces. At these infrasonic frequencies, sound levels depend only slightly on wind speed. Between 20-300 Hz, distant anthropogenic sound (ship transiting, etc.) dominates wind-related sounds. Above 300 Hz, the ambient

sound level depends on weather conditions, with wind- and wave-related effects mostly dominating sounds. Biological sounds arise from a variety of sources (e.g., marine mammals, fish, and shellfish) and range from approximately 12 Hz to over 100 kHz. The relative strength of biological sounds varies greatly; depending on the situation, biological sound can be nearly absent to dominant over narrow or even broad frequency ranges (Richardson et al. 1995).

Detonations of live ordnance would result in temporary changes to the water environment. An explosion on the surface of the water from these weapons could send a shock wave and blast noise through the water, release gaseous by-products, create an oscillating bubble, and cause a plume of water to shoot up from the water surface. However, these effects would be temporary and not expected to last more than a few seconds. Similarly, 86 FWS does not expect any long-term impacts with regard to hazardous constituents to occur.

Metals typically used to construct bombs and missiles include aluminum, steel, and lead, among others. Aluminum is also present in some explosive materials. These materials would settle to the seafloor after munitions detonate. Metal ions would slowly leach into the substrate and the water column, causing elevated concentrations in a small area around the munitions fragments. Some of the metals, such as aluminum, occur naturally in the ocean at varying concentrations and would not necessarily impact the substrate or water column. Other metals, such as lead, could cause toxicity in microbial communities in the substrate. However, such effects would be localized to a very small distance around munitions fragments and would not significantly affect the overall habitat quality of sediments in the BSURE area. In addition, metal fragments would corrode, degrade, and become encrusted over time.

Chemical materials include explosive byproducts and also fuel, oil, and other fluids associated with remotely controlled target boats. Explosive byproducts would be introduced into the water column through detonation of live munitions. Explosive materials would include 2,4,6-trinitrotoluene (TNT) and research department explosive (RDX), among others. Various byproducts are produced during and immediately after detonation of TNT and RDX. During the very brief time that a detonation is in progress, intermediate products may include carbon ions, nitrogen ions, oxygen ions, water, hydrogen cyanide, carbon monoxide, nitrogen gas, nitrous oxide, cyanic acid, and carbon dioxide (Becker, 1995). However, reactions quickly occur between the intermediates, and the final products consist mainly of water, carbon monoxide, carbon dioxide, and nitrogen gas, although small amounts of other compounds are typically produced as well.

Chemicals introduced into the water column would be quickly dispersed by waves, currents, and tidal action, and eventually become uniformly distributed. A portion of the carbon compounds such as carbon monoxide and carbon dioxide would likely become integrated into the carbonate system (alkalinity and pH buffering capacity of seawater). Some of the nitrogen and carbon compounds, including petroleum products, would be metabolized or assimilated by phytoplankton and bacteria. Most of the gas products that do not react with the water or become assimilated by organisms would be released into the atmosphere. Due to dilution, mixing, and transformation, none of these chemicals are expected to have significant impacts on the marine environment.

Explosive material that is not consumed in a detonation could sink to the substrate and bind to sediments. However, the quantity of such materials is expected to be inconsequential. Research has shown that if

munitions function properly, nearly full combustion of the explosive materials will occur, and only extremely small amounts of raw material will remain. In addition, any remaining materials would be naturally degraded. TNT decomposes when exposed to sunlight (ultraviolet radiation), and is also degraded by microbial activity (Becker, 1995). Several types of microorganisms have been shown to metabolize TNT. Similarly, RDX decomposes by hydrolysis, ultraviolet radiation exposure, and biodegradation.

While we anticipate that the specified activity may result in marine mammals avoiding certain areas due to temporary ensonification, this impact to habitat and prey resources would be temporary and reversible. The main impact associated with the proposed activity would be temporarily elevated noise levels and the associated direct effects on marine mammals, previously discussed in this notice. Marine mammals are anticipated to temporarily vacate the area of live detonations. However, these events are usually of short duration, and animals are anticipated to return to the activity area during periods of non-activity. Thus, based on the preceding discussion, we do not anticipate that the proposed activity would have any habitat-related effects that could cause significant or long-term consequences for individual marine mammals or their populations.

Mission Activity Effects on Potential Prey

A wide variety of marine fish species occur in the vicinity of the BSURE area. Distribution and occurrence is primarily influenced by the presence or absence of a species' preferred habitat and by physical and biological factors such as salinity, temperature, dissolved oxygen, population dynamics, predator and prey interactions, seasonal movements, reproduction and life cycles, and recruitment success. Marine mammals in the Study Area feed on various fish and invertebrates. Physical effects from pressure and acoustic waves generated by surface detonations could affect these prey species near the detonation point, potentially decreasing their availability to marine mammals. In particular, the rapid oscillation between high and low-pressure peaks has the potential to burst the swim bladders and other gas-containing organs of fish (Keevin and Hemen, 1997). Sublethal effects, such as changes in behavior of fish, have been observed in several occasions as a result of noise produced by explosives (National Research Council, 2003; Wright, 1982). The abundances of various fish and invertebrates near the detonation point could be altered for a few hours before animals from surrounding areas repopulate the area; however, these populations would be replenished as waters near the detonation point are mixed with adjacent waters. Munition fragments resulting from testing activities could potentially result in minor long-term changes to benthic habitat. Similar to an artificial reef structure, such materials could be colonized over time by benthic organisms that prefer hard substrate and could provide structure that could attract some species of fish.

Mission Activity Effects on Potential Foraging Habitat

Short term impacts to marine mammal foraging habitat could include acoustic and pressure waves resulting from live weapon detonations. However, neither the sound nor overpressure constitutes a long-term physical alteration of the water column or ocean floor. Further, these effects are not expected to substantially affect prey availability, are of limited duration, and are intermittent in time. Therefore, it is not anticipated that marine mammals will stop utilizing the waters of the Study Area, either temporarily or permanently, as a result of mission activities.

Other factors that could potentially affect marine mammal habitat include the introduction of metals, explosives and explosion by-products, other chemical materials, and debris into the water column and substrate due to the use of munitions; and effect to prey distribution. No significant effects to marine

mammal foraging habitat from metals, explosives and explosion by-products, other chemical materials, and debris are anticipated. Refer to Section 3.2.1 for more detailed discussion of these components.

4.1.2. Impacts to Marine Mammals

We expect that behavioral disturbance, temporary threshold shift, and one instance of potential permanent threshold shift resulting from exposure to overpressure and acoustic components of detonations at the water surface have the potential to impact marine mammals and comprise the only likely source of effects to marine mammals. These activities are not anticipated to result in serious injury or mortality of any marine mammal species and none is proposed to be authorized. The current explosive exposure criteria are summarized in Table 3. Our notice of proposed Authorization and 86 FWS's application (2016) provide detailed descriptions of these potential effects of the proposed project activities on marine mammals. That information is incorporated herein by reference and summarized next.

Table 3. Current Explosive Exposure Criteria.

Group	**Species**	**Level B**		**Level A**			**Mortality**
		Behavioral (for ≥ 2 pulses/24 hours)	**TTS**	**PTS**	**Gastro-Intestinal Tract Injury**	**Lung Injury**	
Low-Frequency Cetaceans	Mysticetes	167 dB SEL	172 dB SEL or 224 dB peak SPL	187 dB SEL or 230 dB peak SPL	237 dB SPL / 104 psi	39.1 $M^{1/3}$ $(1+[D_{Rm}/10.081]^{1/2}$ Pa-sec Where: M=mass of the animal in kg D_{Rm}=depth of the receiver in meters	91.4 $M^{1/3}$ $(1+[D_{Rm}/10.081]^{1/2}$ Pa-sec Where: M=mass of the animal in kg D_{Rm}=depth of the receiver in meters
Mid-Frequency Cetaceans	Most delphinids, medium & large toothed whales	167 dB SEL	172 dB SEL or 224 dB peak SPL	187 dB SEL or 230 dB peak SPL			
High-Frequency Cetaceans	Porpoises and *Kogia* spp.	141 dB SEL	146 dB SEL or 195 dB peak SPL	161 dB SEL or 201 dB peak SPL			
Phocids	Elephant & harbor seal	172 dB SEL	177 dB SEL or 212 dB peak SPL	192 dB SEL or 218 Db peak SPL			
Otariids	Sea lions & fur seals	195 dB SEL	200 dB SEL or 212 Db peak	215 dB SEL or 218 Db peak			

			SPL	SPL			

Based on this information, we expect that the proposed activities would result, at worst, in a temporary modification in behavior and/or temporary changes in animal distribution (Level B harassment) of certain species or stocks of marine mammals and potential permanent threshold shift (Level A harassment) in one individual in one species of marine mammal. We expect these impacts to be minor because we do not anticipate measurable changes to the population or impacts to rookeries, mating grounds, and other areas of similar significance. We expect no long-term or substantial adverse effects on marine mammals, their habitats, or their role in the environment.

4.1.3. Estimated Take of Marine Mammals by Level B and Level A Incidental Harassment

The 86 FWS has requested take by Level A and Level B harassment as a result of overpressure and acoustic components of detonations at the water surface associated with the project. We expect that the proposed project would cause short-term behavioral disturbance and/or displacement for marine mammals in the proposed areas, temporary threshold shift, and potential permanent threshold shift.

The NDAA amended the definition of harassment as it applies to a "military readiness activity" to read as follows (Section 3(18)(B) of the MMPA): (i) any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].

86 FWS calculated take by multiplying the density of the stock by the area of ensonification. An animal is considered "exposed" to a sound if the received sound level at the animal's location is above the background ambient acoustic level within a similar frequency band. The exposure calculations from the model output resulted in decimal values, suggesting in most cases that a fraction of an animal was exposed. To eliminate this, the acoustic model results were rounded to the nearest whole animal to obtain the exposure estimates from 2016 missions. Furthermore, to eliminate "double-counting" of animals, exposure results from higher impact categories (e.g., mortality) were subtracted from lower impact categories (e.g., Level A harassment).

86 FWS thresholds used for onset of temporary threshold shift (TTS; Level B Harassment) and onset of permanent threshold shift (PTS; Level A Harassment) are consistent with the thresholds outlined in the Navy's report titled, "Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis Technical Report," which the Navy coordinated with NMFS. NMFS believes that the thresholds outlined in the Navy's report represent the best available science. The report is available on the internet at:

http://nwtteis.com/Portals/NWTT/DraftEIS2014/SupportingDocs/NWTT_NMSDD_Technical_Report_23_January%202014_reduced.pdf

Density estimates for marine mammals were derived from the Navy's 2014 Marine Species Density Database (NMSDD), which provides the most relevant and comprehensive density information for waters associated with the HRC.

Table 4 outlines the number of Level B and Level A harassment takes that we propose to authorize in the Authorization. Our proposed Authorization notice and 86 FWS's application (refer to Appendix A) contain complete descriptions of how these take estimates were derived.

Table 4. Modeled number of marine mammals potentially affected by LRS WSEP operations.

Species	Mortality	Level A Harassment (PTS only)	Level B Harassment (TTS)	Level B Harassment (Behavioral)
Dwarf sperm whale	0	1	9	64
Pygmy sperm whale	0	0	3	26
TOTAL	0	1	12	90

4.2. Effects of Alternative 2 – No Action Alternative

Under the No Action Alternative, we would not issue an IHA to 86 FWS. As a result, 86 FWS would not receive an exemption from the MMPA prohibitions against the take of marine mammals and would be in violation of the MMPA if take of marine mammals occurs. The impacts to elements of the human environment resulting from the No Action alternative – conducting LRS WSEPP activities in the absence of required protective measures for marine mammals under the MMPA – would be greater than those impacts resulting from Alternative 1, the Preferred Alternative.

4.2.1. Impacts to Marine Mammal Habitat

Under the No Action Alternative, the effects on the physical environment or on components of the biological environment that function as marine mammal habitat would result from 86 FWS's planned mission activities, are similar to those described in Section 3.2.1. These impacts include a shock wave and blast noise through the water, release of gaseous by-products, which may create an oscillating bubble, and cause a plume of water to shoot up from the water surface, as well as chemicals and metal being exposed to the water column and sediment. Even without mitigation measures, however, impacts to marine mammal habitat (including prey species) would be minimal and temporary for the following reasons:

- Detonations will only occur on one day,
- The area of potential effect is limited in both space and time ; and
- There are no rookeries or major haul-out sites nearby or ocean bottom structure of significant biological importance to marine mammals that may be present in the ensonified area.

The most likely impact to marine mammal habitat would be temporary effects to the water column and potential impacts to the sediment, which may have beneficial long term effects (see section 4.4.1). This

Alternative would result in similar effects on the physical environment and components of the biological environment that function as marine mammal habitat as Alternative 1.

4.2.2. Impacts to Marine Mammals

Under the No Action Alternative, 86 FWS's planned mission activities could result in increased amounts of Level B harassment to marine mammals, and one instance of PTS (Level A harassment) although no takes serious injury or mortality would be expected even in the absence of mitigation and monitoring measures. While it is difficult to provide an exact number of takes that might occur under the No Action Alternative, the numbers would be expected to be larger than those presented in Table 4 above because 86 FWS would not be required to implement mitigation measures designed to reduce impacts to marine mammals from mission activities because 86 FWS would not be required to monitor the area for marine mammals.

If the activities proceeded without the protective measures and reporting requirements required by Alternative 1, the direct, indirect, and cumulative effects on the human or natural environment of not issuing the Authorization would include the following:

- Increases in the number of behavioral responses and potential takes to additional species, because of the lack of mitigation measures required in the Authorization. Thus, the incidental take of marine mammals would likely occur at higher levels than we have already identified and evaluated in our *Federal Register* notice on the proposed Authorization; and
- We would not be able to obtain the monitoring and reporting data needed to assess the anticipated impact of the activity upon the species or stock; and increased knowledge of the species as required under the MMPA.

4.3. Unavoidable Adverse Impacts

86 FWS's application, our notice of a proposed IHA, and other environmental analyses identified previously summarize unavoidable adverse impacts to marine mammals or the populations to which they belong or on their habitats occurring in the proposed project area. We incorporate those documents by reference.

We acknowledge that the incidental take authorized would potentially result in unavoidable adverse impacts including marine mammal behavioral responses and alterations in the distribution of local populations. However, we do not expect 86 FWS's activities to have adverse consequences on the annual rates of recruitment or survival of marine mammal species or stocks in Hawaii waters, and we do not expect the marine mammal populations in that area to experience reductions in reproduction, numbers, or distribution that might appreciably reduce their likelihood of surviving and recovering in the wild. We expect that the take resulting from the proposed project activities would have a negligible impact on the affected species or stocks of marine mammals.

4.4. Cumulative Effects

NEPA defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR

§1508.7). Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

This cumulative effects analysis focuses on activities that may temporally or geographically overlap with 86 FWS's activities and would most likely impact the marine mammals present in the proposed areas. We consider the impact of 86 FWS's presence and effects of conducting activities in the proposed action areas to be insignificant when compared to other human activities in the area.

Past, present, and reasonably foreseeable impacts to marine mammal populations include the following: climate change; marine pollution; disease, and other military readiness activities. These activities account for cumulative impacts to regional and worldwide populations of marine mammals, many of which are a small fraction of their former abundance. However, quantifying the biological costs for marine mammals within an ecological framework is a critical missing link to our assessment of cumulative impacts in the marine environment and assessing cumulative effects on marine mammals (Clark *et al*., 2009). Despite these regional and global anthropogenic and natural pressures, available trend information indicates that most local populations of marine mammals in the Pacific Ocean are stable or increasing (Carretta *et al*., 2016).

The proposed project would add another, albeit temporary, activity in the waters of Hawaii. This activity would be limited to a small area off the northwest coast of Kauai for just one day. This section provides a brief summary of the human-related activities affecting the marine mammal species in the action area.

4.4.1. Climate Change

Global climate change could significantly affect the marine resources of Hawaii. Possible impacts include temperature and rainfall changes and potentially rising sea levels and changes to ocean conditions. These changes may affect the coastal marine ecosystem in the proposed action area by increasing the vertical stratification of the water column and changing the intensity and rhythms of coastal winds and upwelling. Such modifications could cause ecosystem regime shifts as the productivity of the regional ecosystem undergoes various changes related to nutrients input and coastal ocean process.

The precise effects of global climate change on the action area, however, cannot be predicted at this time because the coastal marine ecosystem is highly variable in its spatial and temporal scales.

4.4.2.Marine Pollution

Marine mammals are exposed to contaminants via the food they consume, the water in which they swim, and the air they breathe. Point and non-point source pollutants from coastal runoff, offshore mineral and gravel mining, at-sea disposal of dredged materials and sewage effluent, marine debris, and organic compounds from aquaculture are all lasting threats to marine mammals in the project area. The long-term impacts of these pollutants, however, are difficult to measure.

The persistent organic pollutants (POPs) tend to bioaccumulate through the food chain; therefore, the chronic exposure of POPs in the environment is perhaps of the most concern to high trophic level predators such as cetaceans.

86 FWS's activities associated with the LRS WSSP activities are not expected to cause increased exposure of POPs to marine mammals in the project vicinity due to the small scale and localized nature of the activities.

4.4.3. Disease

Disease is common in many marine mammal populations and has been responsible for major die-offs worldwide, but such events are usually relatively short-lived. 86 FWS's activities are not expected to affect the disease rate among marine mammals in the project vicinity.

4.4.4. Other Military Readiness Activities

The Hawaii Range Complex (HRC) is an area that in which many other military readiness activities have occurred. Currently, there is one active project in the HRC by the U.S. Navy. There have also been several activities that were authorized by NMFS that have currently expired. NMFS has also received applications for projects in the future in this area. Because there are so many activities in this area (e.g. active sonar, etc), there could be cumulative effects to the marine mammals in this area. However, because 86 FWS's missions do not include sonar activities, and they are only to occur on one day, the impacts to marine mammals in the area is expected to be minimal.

4.4.5. Conclusion

Based on the summation of activity in the area provided in this section, NMFS determined that the incremental impact of an Authorization for the proposed mission activities in the BSURE area of PMRF would not be expected to result in a cumulative significant impact to the human environment from past, present, and reasonably forseeable future activities. The potential impacts to marine mammals, their habitats, and the human environment in general are expected to be minimal based on the limited and temporary footprint and mitigation and monitoring requirements of the Authorization.

Chapter 5 List of Preparers and Agencies Consulted

Agencies Consulted
No other persons or agencies were consulted in preparation of this EA.

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