DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 219

[Docket No. 210301–0032]

RIN 0648–BG31

Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Pacific Islands Fisheries Science Center Fisheries Research

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Proposed rule; request for comments.

SUMMARY: NMFS's Office of Protected Resources (OPR) has received a request from NMFS's Pacific Islands Fisheries Science Center (PIFSC) for a Letter of Authorization (LOA) to take marine mammals incidental to fisheries research conducted in multiple specified geographical regions, over the course of five years from the date of issuance. As required by the Marine Mammal Protection Act (MMPA), NMFS is proposing regulations to govern that take, and requests comments on the proposed regulations. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorization and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than April 21, 2021.

ADDRESSES: You may submit comments on this document, identified by NOAA–NMFS–2021–0026, by the following method:

- Electronic submission: Submit all public comments via the Federal e-Rulemaking Portal. Go to *www.regulations.gov* and enter NOAA–NMFS–2021–0026 in the Search box. Click on the ''Comment'' icon, complete the required fields, and enter or attach your comments.

Instructions: Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered by NMFS. All comments received are a part of the public record and will generally be posted for public viewing on *www.regulations.gov* without change. All personal identifying information (*e.g.,* name, address), confidential business information, or otherwise sensitive information submitted voluntarily by the sender will be publicly accessible. NMFS will accept anonymous comments (enter ''N/A'' in the required fields if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word, Excel, or Adobe PDF file formats only.

FOR FURTHER INFORMATION CONTACT: Amy Fowler, Office of Protected Resources, NMFS, (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Availability

A copy of PIFSC's application and any supporting documents, as well as a list of the references cited in this document, may be obtained online at: *www.fisheries.noaa.gov/action/incidental-take-authorization-noaa-fisheries-pifsc-fisheries-and-ecosystem-research.* In case of problems accessing these documents, please call the contact listed above (see **FOR FURTHER INFORMATION CONTACT**).

Purpose and Need for Regulatory Action

This proposed rule would establish a framework under the authority of the MMPA (16 U.S.C. 1361 *et seq.*) to allow for the authorization of take of marine mammals incidental to the PIFSC's fisheries research activities in the Hawaiian Archipelago, Mariana Archipelago, American Samoa Archipelago, and Western and Central Pacific Ocean.

We received an application from the PIFSC requesting five-year regulations and LOA to take multiple species of marine mammals. Take would occur by Level B harassment incidental to the use of active acoustic devices, as well as by visual disturbance of pinnipeds, and by Level A harassment, serious injury, or mortality incidental to the use of fisheries research gear. Please see ''Background'' below for definitions of harassment.

Legal Authority for the Proposed Action

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1371(a)(5)(A)) directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region for up to five years if, after notice and public comment, the agency makes certain findings and issues regulations that set forth permissible methods of taking pursuant to that activity and other means of effecting the ''least practicable adverse impact'' on the affected species or stocks and their habitat (see the discussion below in the ''Proposed Mitigation'' section), as well as monitoring and reporting requirements. Section 101(a)(5)(A) of the MMPA and the implementing regulations at 50 CFR part 216, subpart I provide the legal basis for issuing this proposed rule containing five-year regulations, and for any subsequent LOAs. As directed by this legal authority, this proposed rule contains mitigation, monitoring, and reporting requirements.

Summary of Major Provisions Within the Proposed Rule

Following is a summary of the major provisions of this proposed rule regarding PIFSC fisheries research activities. These measures include:

- Monitor the sampling areas to detect the presence of marine mammals before and during deployment of certain research gear;
- Delay setting or haul in gear if marine mammal interaction may occur;
- Haul gear immediately if marine mammals may interact with gear; and
- Required implementation of the mitigation strategy known as the ''move-on rule mitigation protocol'' which incorporates best professional judgment, when necessary during certain research fishing operations.

Background

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1361 *et seq.*) directs the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made, regulations are issued, and notice is provided to the public.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has defined ''negligible impact'' in 50 CFR 216.103 as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

The MMPA states that the term ''take'' means to harass, hunt, capture, kill or attempt to harass, hunt, capture, or kill any marine mammal.

Except with respect to certain activities not pertinent here, the MMPA defines ''harassment'' as: Any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) and NOAA Administrative Order (NAO) 216–6A, NMFS must evaluate our proposed action (*i.e.,* the promulgation of regulations and subsequent issuance of incidental take authorization) and alternatives with respect to potential impacts on the human environment.

Accordingly, NMFS has prepared a draft Environmental Assessment (EA; *Draft Programmatic Environmental Assessment for Fisheries and Ecosystem Research Conducted and Funded by the Pacific Islands Fisheries Science Center*) to consider the environmental impacts associated with the PIFSC's proposed activities as well as the issuance of the regulations and subsequent incidental take authorization. A notice of availability of a Draft Programmatic EA and request for comments was published in the **Federal Register** on December 4, 2015 (80 FR 75856). The draft EA is posted online at: *www.fisheries.noaa.gov/action/incidental-take-authorization-noaa-fisheries-pifsc-fisheries-and-ecosystem-research.* Information in the EA, PIFSC's application, and this document collectively provide the environmental information related to proposed issuance of these regulations and subsequent incidental take authorization for public review and comment. We will review all comments submitted in response to this document prior to concluding our NEPA process or making a final decision on the request for incidental take authorization.

Summary of Request

On November 30, 2015, we received an adequate and complete application from PIFSC requesting authorization to take small numbers of marine mammals incidental to fisheries research activities. On December 7, 2015 (80 FR 75997), we published a notice of receipt of PIFSC's application in the **Federal Register**, requesting comments and information related to the PIFSC request for thirty days. We received comments jointly from The Humane Society of the United States and Whale and Dolphin Conservation (HSUS/WDC). These comments were considered in development of this proposed rule and are available online at: *www.fisheries.noaa.gov/action/incidental-take-authorization-noaa-fisheries-pifsc-fisheries-and-ecosystem-research.* While it has been multiple years since the PIFSC's application was received, the description of the activity remains accurate. Further, science and information necessary to evaluate this request that has become available since the PIFSC submitted their application has been considered and is addressed in this proposed rule.

PIFSC proposes to conduct fisheries research using trawl gear used at various levels in the water column, hook-and-line gear (including longlines with multiple hooks, bottomfishing, and trolling), and deployed instruments (including various traps). If a marine mammal interacts with gear deployed by PIFSC, the outcome could potentially be Level A harassment, serious injury (*i.e.,* any injury that will likely result in mortality), or mortality. Although any given gear interaction could result in an outcome less severe than mortality or serious injury, we do not have sufficient information to allow parsing these potential outcomes. Therefore, PIFSC presents a pooled estimate of the number of potential incidents of gear interaction and, for analytical purposes we assume that gear interactions would result in serious injury or mortality. PIFSC also uses various active acoustic while conducting fisheries research, and use of some of these devices has the potential to result in Level B harassment of marine mammals. Level B harassment of pinnipeds hauled out may also occur, as a result of visual disturbance from vessels conducting PIFSC research.

PIFSC requests authorization to take individuals of 15 species by Level A harassment, serious injury, or mortality (hereafter referred to as M/SI) and of 25 species by Level B harassment. The proposed regulations would be valid for five years from the date of issuance.

Description of the Specified Activity

Overview

The Federal Government has a responsibility to conserve and protect living marine resources in U.S. waters and has also entered into a number of international agreements and treaties related to the management of living marine resources in international waters outside the United States. NOAA has the primary responsibility for managing marine finfish and shellfish species and their habitats, with that responsibility delegated within NOAA to NMFS.

In order to direct and coordinate the collection of scientific information needed to make informed fishery management decisions, Congress created six regional fisheries science centers, each a distinct organizational entity and the scientific focal point within NMFS for region-based Federal fisheries-related research. This research is aimed at monitoring fish stock recruitment, abundance, survival and biological rates, geographic distribution of species and stocks, ecosystem process changes, and marine ecological research. The PIFSC is the research arm of NMFS in the Pacific Islands region of the United States. The PIFSC conducts research and provides scientific advice to manage fisheries and conserve protected species in the geographic research area described below and provides scientific information to support the Western Pacific Fishery Management Council and other domestic and international fisheries management organizations.

The PIFSC collects a wide array of information necessary to evaluate the status of exploited fishery resources and the marine environment. PIFSC scientists conduct fishery-independent research onboard NOAA-owned and operated vessels or on chartered vessels. Such research may also be conducted by cooperating scientists on non-NOAA vessels when the PIFSC helps fund the research. The PIFSC proposes to administer and conduct approximately 19 survey programs over the five-year period, within four separate research areas (some survey programs are conducted across more than one research area; see Table 1–1 in PIFSC's application). The gear types used fall into several categories: Towed trawl nets fished at various levels in the water column, hook-and-line gear (including longline gear), traps, and other instruments. Only use of trawl nets, longlines, and deployed instruments and traps are likely to result in interaction with marine mammals via entanglement. Many of these surveys also use active acoustic devices that may result in Level B harassment.

Dates and Duration

The specified activity may occur at any time during the five-year period of validity of the proposed regulations. Dates and duration of individual surveys are inherently uncertain, based on congressional funding levels for the PIFSC, weather conditions, or ship contingencies. In addition, cooperative

research is designed to provide flexibility on a yearly basis in order to address issues as they arise. Some cooperative research projects last multiple years or may continue with modifications. Other projects only last one year and are not continued. Most cooperative research projects go through an annual competitive selection process to determine which projects should be funded based on proposals developed by many independent researchers and fishing industry participants. PIFSC survey activity occurs during most months of the year. Trawl surveys occur primarily during May through June and September but may occur during any month, and hook-and-line surveys generally occur during fall.

Specified Geographical Region

The PIFSC conducts research in the Pacific Islands within four research areas: The Hawaiian Archipelago Research Area (HARA), the Mariana Archipelago Research Area (MARA), the American Samoa Archipelago Research Area (ASARA), and the Western and Central Pacific Research Area (WCPRA). The first three research areas are considered to extend approximately 24 nautical miles (nmi; 44.5 kilometers (km)) from the baseline of the respective archipelagos (*i.e.,* approximately the outer limit of the contiguous zone). The WCPRA is considered to include the remainder of archipelagic U.S. Exclusive Economic Zone (EEZ) waters, the high seas between the archipelagic U.S. EEZ waters, and waters around the Pacific remote islands. Please see Figures 1.2 and 2.1 through 2.4 in the PIFSC application for maps of the four research areas. We note here that, while the specified geographical regions within which the PIFSC operates may extend outside of the U.S. EEZ, the NMFS' authority under the MMPA does not extend into foreign territorial waters. For further information about the specified geographical regions, please see the descriptions found in Sherman and Hempel (2009) and Wilkinson *et al.* (2009).

In general, the Pacific region encompassing the PIFSC research areas is a complex oceanographic system. The equatorial area has relatively steady weather patterns and surface currents, but these can change based on ocean-atmospheric conditions. The El Niño-Southern Oscillation (ENSO) largely drives the climate in the tropical Pacific (Wood *et al.,* 2006), with warm El Niño or cold La Niña phases, occurring every 2–7 years, impacting equatorial upwelling and ecological systems (Barber, 1988; Glynn and Ault, 2000). ENSO results in the reduction of trade winds, which reduces the intensity of the westward flowing equatorial surface current. When this occurs, the eastward-flowing countercurrent dominates oceanic circulation and brings warm, low-nutrient waters to eastern margins of the Pacific, which in turn can influence marine mammal presence. Trade winds play a vital role in dictating sea level, thermal conditions, and nutrient distribution (Wytki and Meyers, 1976).

Habitat throughout the four specified geographical regions include seamounts, atolls, reef habitat, and pelagic waters. Oceanic islands generally lack an extensive shelf area of relatively shallow water extending beyond the shoreline. Instead, most often have a deep reef slope, angled between 45 and 90 degrees toward the ocean floor. Species compositions along deep reef slopes, banks, and seamounts all can vary widely based on depth, light, temperature, and substrate.

HARA—The Hawaiian Archipelago is one of the most geographically isolated island systems in the world, stretching over 2,450 km and consisting of eight main volcanic oceanic islands, 124 smaller islands, atolls, banks, and numerous seamounts. The region is considered part of the Insular Pacific-Hawaiian Large Marine Ecosystem (LME). Due to its isolation, the region is characterized overall by relatively low faunal diversity but unusually high endemism. The region is divided into the inhabited Main Hawaiian Islands (the eight high volcanic islands), where many watersheds and nearshore areas have been significantly modified, and the uninhabited Northwestern Hawaiian Islands (NWHI), with some of the most pristine coral reefs in the world. The archipelago is formed by the northwest movement of the Pacific plate over a stationary ''hotspot.'' The main islands are younger, higher, and more volcanically active, while the NWHI have largely undergone submergence and exist as coral atolls, small sand islands, and submerged banks stretching to Kure Atoll, the northernmost atoll in the world. The major oceanographic influence on the region is the North Equatorial Current, which branches along the Hawaiian Ridge into a North Hawaiian Ridge Current and gyres in the lee of the islands. The region is also seasonally influenced by the Subtropical Front (STF), which corresponds to a shallow subtropical countercurrent that transects the LME in winter and summer (Kobashi *et al.,* 2006). The region has relatively consistent and tropical meteorological and oceanographic conditions, with average sea surface temperatures (SST) of 23–24°C, and is considered to be of low productivity. The region is subject to high wave energy produced from weather systems generated off the Aleutian Islands and other areas of the North Pacific, which can have major effects on nearshore habitat.

MARA—The Mariana Archipelago, which is approximately 4,115 km west-southwest of Hawaii, includes volcanic and raised limestone islands and submerged banks stretching 825 km from Guam Island north to Farallon de Pajaros (which is about 550 km south of Iwo Jima). The region is divided politically into the Commonwealth of the Northern Mariana Islands and the Territory of Guam. The archipelago is flanked by the Mariana Trench, which include the deepest water on Earth (11,034 m) in its southern end near Guam. The archipelago, as well as a chain of submerged seamounts located approximately 120 nmi west of the Mariana Islands, and the trench were formed approximately 43 million years ago by the subduction of the Pacific tectonic plate under the Philippine plate. Geological faulting of large areas in the older southern portion of the region has created large, oblique shallow-water surfaces that have supported extensive reef growth and the development of reef flats and lagoons over time. In contrast, the islands in the north are younger with more vertical profiles that do not provide the basis for extensive reef development. As a result, this spectrum of physical conditions creates a suite of different habitats that in turn support a variety of biological communities. The primary surface current affecting the region is the North Equatorial Current, which flows westward through the islands; however, the Subtropical Counter Current also influences the Northern Mariana Islands and generally flows in a easterly direction. SST ranges from approximately 27–29°C.

ASARA—The American portion of the Samoan Archipelago, approximately 14° south of the equator, includes five volcanic islands and two remote atolls within the U.S. EEZ (the broader Samoan Archipelago also includes islands in the independent country of Samoa and the French protectorate of Wallis and Futuna). The largest island, Tutuila, is nearly bisected by Pago Pago Harbor, the deepest and one of the most sheltered embayments in the South Pacific. The primary surface current affecting the region is the Equatorial Current, which flows westward through the islands. The region experiences southeast trade winds that result in frequent rains and a warm tropical climate.

WCPRA—In addition to EEZ waters beyond the contiguous zones of the regions described above, the WCPRA also includes the high seas and the Pacific Remote Islands Area, comprised of Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Wake Atoll, and Palmyra Atoll. Palmyra Atoll, Kingman Reef, and Baker, Howland, and Jarvis Islands are all part of the U.S. Fish and Wildlife Service's National Wildlife Refuge System.

Howland and Baker Islands are uninhabited U.S. possessions in the Phoenix Island Archipelago. Baker Island is located approximately 21 km north of the equator and approximately 2,963 km to the southwest of Honolulu. It is a coral-topped seamount surrounded by a narrow fringing reef that drops steeply close to shore.

Jarvis Island, a relatively flat, sandy coral island, is approximately 2,092 km south of Honolulu and 1,609 km east of Baker Island. Although the westward-flowing South Equatorial Current is the primary surface current, the eastward-flowing Equatorial Undercurrent drives strong, topographically influenced equatorial upwelling in these islands. However, species diversity is much lower than in the Northern Line Islands, reflecting the influence of primary currents that originate in the species-poor eastern Pacific. Jarvis Island is considered part of the Southern Line Islands, but is biogeographically more similar to Baker and Howland Islands as its primary influence is the South Equatorial Current.

Johnston Atoll lies approximately 800 km south of French Frigate Shoals in the NWHI. Johnston Atoll, a coral reef and lagoon complex on a relatively flat, shallow platform, shares biogeographic affinities with the Hawaiian Archipelago, with evidence of larval transport between the two. Because of faunal affinities and because both occur in the oceanic North Pacific Transition Zone Province (Longhurst, 1998), the two areas may be considered part of the same ecoregion. Johnston Atoll has been used for military purposes since World War II.

Kingman Reef consists of a series of fringing reefs around a central lagoon that does not have any emergent land to support vegetation.

Wake Atoll, comprised of three different islets, is located about 3,380 km west of Hawaii, at the northern end of the Marshall Islands archipelago in the North Pacific Tropical Gyre Province (Longhurst, 1998). Wake Atoll has primarily been used for military and emergency aviation purposes since World War II.

Palmyra Atoll (1,956 km south of Honolulu) and Kingman Reef (61 km northwest of Palmyra) are part of the Northern Line Islands (other islands in this archipelago belong to the Republic of Kiribati), and are sporadically influenced by the North Equatorial Countercurrent, which flows from high biodiversity regions of the western Pacific. Palmyra Atoll consists of 52 islets surrounding three central lagoons.

Detailed Description of Activities

The Federal Government has a trust responsibility to protect living marine resources in waters of the United States. These waters extend to 200 nmi from the shoreline and include the EEZ. The U.S. government has also entered into a number of international agreements and treaties related to the management of living marine resources in international waters outside of the EEZ (*i.e.,* the high seas). To carry out its responsibilities over U.S. and international waters, Congress has enacted several statutes authorizing certain Federal agencies to administer programs to manage and protect living marine resources. Among these Federal agencies, NOAA has the primary responsibility for protecting marine finfish and shellfish species and their habitats. Within NOAA, NMFS has been delegated primary responsibility for the science-based management, conservation, and protection of living marine resources under statutes including the Magnuson-Stevens Fishery Management Act (MSA), MMPA, and the Endangered Species Act (ESA).

Within NMFS, six regional fisheries science centers direct and coordinate the collection of scientific information needed to inform fisheries management decisions. Each science center is a distinct entity and is the scientific focal point for a particular region. PIFSC conducts research and provides scientific advice to manage fisheries and conserve protected species in the Pacific Islands. PIFSC provides scientific information to support the Western Pacific Fishery Management Council and other domestic and international fisheries management organizations.

The PIFSC collects a wide array of information necessary to evaluate the status of exploited fishery resources and the marine environment. PIFSC scientists conduct fishery-independent research onboard NOAA-owned and operated vessels or on chartered vessels, and some PIFSC-funded research is conducted by cooperative scientists. The PIFSC proposes to administer and conduct approximately 19 survey programs over the five-year period (see Table 1.1 in PIFSC's application).

Given the vast geographic scope of the PIFSC region of responsibility, not all areas will be visited each year (nor will all surveys be conducted each year) within the five-year period the proposed regulations and LOA would be effective. Instead, surveys will rotate depending on funding, random sampling design, or immediate research needs. Research surveys are generally focused on one research area every year and that research area is visited every second, third, or fourth year. For example, over the course of five years, this research cycle might be presented as HARA→ASARA→MARA→WCPRA→HARA. This cycle inherently includes some overlap of any one research area (*e.g.,* Wake Atoll in the WCPRA is usually visited when the ship is transiting to MARA because it is on the way and makes for the most cost-efficient model). Furthermore, a specific survey may be prioritized every year, for several years in a row, in one research area because of a defined management need. In general, each research area coverage depends on funding, ship logistics, weather systems, research priorities, and geographic coverage during ship transit. Research is conducted more frequently in the HARA due to PIFSC's physical location in the main Hawaiian Islands.

The fishing gear types used by PIFSC fall into several categories: towed nets fished at various levels in the water column, hook-and-line gear, and traps. The PIFSC also deploys a variety of moored instruments. The use of trawl nets and longlines is likely to result in interaction with marine mammals. In addition, the PIFSC anticipates that its deployment of instruments and traps may result in the entanglement of some animals. Many of the proposed surveys also use active acoustic devices that may result in Level B harassment.

Surveys may be conducted aboard NOAA-operated research vessels (R/V), including the *Oscar Elton Sette* and *Okeanos Explorer,* as well as the University of Hawai'i research vessel *Ka'imikai-o-Kanoloa* (KoK) and assorted other small vessels owned by PIFSC. Surveys could also be conducted aboard vessels owned and operated by cooperating agencies and institutions, or aboard charter vessels.

In the following discussion, we summarily describe various gear types used by PIFSC, with reference to specific fisheries and ecosystem research activities conducted by the PIFSC. This is not an exhaustive list of gear and/or devices that may be utilized by PIFSC but is representative of gear categories and is complete with regard to all gears with potential for interaction

with marine mammals. Additionally, relevant active acoustic devices, which are commonly used in PIFSC survey activities, are described separately in a subsequent section. Please see Appendix A of PIFSC's application for further description, pictures, and diagrams of research gear and vessels. Full details regarding planned research activities are provided in Table 1.1 of PIFSC's application, with specific gear used in association with each research project and full detail regarding gear characteristics and usage provided. A summary of PIFSC's proposed research programs that may result in take from interaction with fishing gear is provided below (Table 1).

Trawl nets—A trawl is a funnel-shaped net towed behind a boat to capture fish. The codend (or bag) is the fine-meshed portion of the net most distant from the towing vessel where fish and other organisms larger than the mesh size are retained. In contrast to commercial fishery operations, which generally use larger mesh to capture marketable fish, research trawls often use smaller mesh to enable estimates of the size and age distributions of fish in a particular area. The body of a trawl net is generally constructed of relatively coarse mesh that functions to gather schooling fish so that they can be collected in the codend. The opening of the net, called the mouth, is extended horizontally by large panels of wide mesh called wings. The mouth of the net is held open by hydrodynamic force exerted on the trawl doors attached to the wings of the net. As the net is towed through the water, the force of the water spreads the trawl doors horizontally apart. The top of a net is called the headrope, and the bottom is called the footrope. Bottom trawls may use bobbins or roller gear to protect the footrope as the net is dragged along the seabed.

The trawl net is usually deployed over the stern of the vessel and attached with two cables (or warps) to winches on the deck of the vessel. The cables are played out until the net reaches the fishing depth. Trawl vessels typically travel at speeds of 2–5 knots (kt) while towing the net for time periods up to several hours. The duration of the tow depends on the purpose of the trawl, the catch rate, and the target species. At the end of the tow the net is retrieved and the contents of the codend are emptied onto the deck. For research purposes, the speed and duration of the tow and the characteristics of the net are typically standardized to allow meaningful comparisons of data collected at different times and locations. Active acoustic devices (described later) incorporated into the research vessel and the trawl gear monitor the position and status of the net, speed of the tow, and other variables important to the research design.

PIFSC research trawling activities utilize pelagic (or midwater) and surface trawls, which are designed to operate at various depths within the water column but not to contact the seafloor. Commercial midwater trawls may be 75–136 m in width with opening height of 10–20 m; however, PIFSC uses smaller research trawls. These include a modified Cobb midwater trawl, the Isaacs-Kidd (IK) trawl, and various other small-mesh nets used as surface trawls. The Cobb trawl is generally used to target snapper and grouper species within the 0–250 m depth range, and has a mouth opening of 686 m^2. The IK trawl is used to collect midwater or surface biological specimens larger than those taken by standard plankton nets. The PIFSC uses two sizes of IK trawls for various research purposes, a 6-ft (1.8-m) wide model and a 10-ft (3.0-m) wide model. These nets may be towed either at the surface of the water or at various midwater depths depending on research protocols or where acoustic signals indicate the presence of study organisms. Tow durations are typically 30–60 min for small-mesh surface tows, 60 min for IK surface tows, or 60–240 min for midwater tows, with midwater tow depths varied during a tow to target fish at different water depths. PIFSC trawls are typically towed at 2.5–3.5 kt.

Longline—Longline vessels fish with baited hooks attached to a mainline. The length of the longline and the number of hooks depend on the species targeted, the size of the vessel, and the purpose of the fishing activity. Pelagic longlines, which fish near the surface with the use of floats, may be deployed in such a way as to fish at different depths in the water column. For example, deep-set longlines targeting tuna may have target depths greater than 100 m, while a shallow-set longline targeting swordfish is set at depths shallower than 100 m (see Figure A–7 of PIFSC's application). Hooks are attached to the mainline by another thinner line called a gangion or branch line. The length of the gangion and the distance between gangions depends on the purpose of the fishing activity. PIFSC uses pelagic longline gear, which is deployed near the surface of the water, with buoys attached to the mainline to provide flotation and keep the baited hooks suspended in the water. Radar reflectors, radio transmitters, and light sources are often used to help fishers determine the location of the longline gear prior to retrieval.

A commercial longline can be miles long and have thousands of hooks attached. Although longlines used for research surveys are often shorter, the PIFSC uses some commercial-scale longlines, *i.e.,* 600 to 2,000 hooks attached to a mainline up to 60 miles in length. There are no internationally-recognized standard measurements for hook size, and a given size may be inconsistent between manufacturers. Larger hooks, as are used in longlining, are referenced by increasing whole numbers followed by a slash and a zero as size increases (*e.g.,* 1/0 up to 20/0). The numbers represent relative sizes, normally associated with the gap (the distance from the point tip to the shank).

The time period between deployment and retrieval of the longline gear is the soak time. Soak time is an important parameter for calculating fishing effort. For commercial fisheries the goal is to optimize the soak time in order to maximize catch of the target species while minimizing the bycatch rate and minimizing damage to target species that may result from predation by sharks or other predators. PIFSC pelagic longline soak times range from 600–1,800 min.

Other hook and line gear—Hook and line is a general term used for a range of fishing methods that employ short fishing lines with hooks in one form or another (as opposed to longlines). This gear is similar to methods commonly used by recreational fishers and may generally include handlines, hand reels, powered reels, rod/pole and line, drop lines, and troll lines, all using bait or lures in various ways to attract target species. The gear used in PIFSC bottomfish surveys consists of a main line with a 2–4 kg weight attached to the end. Several 40–60 cm sidelines with circle hooks are attached above the weight at 0.5–1 m intervals. A chum bag containing chopped fish or squid may be suspended above the highest of these hooks. Dead fish and bait would not be discarded from the vessel while actively fishing and would only be discarded after gear is retrieved and immediately before the vessel leaves the sampling location for a new area. The gear is retrieved using hydraulic or electric reels after several fish are hooked. Another hook-and-line fishing method is trolling where multiple lines are towed behind a boat. Trolling gear used by the PIFSC have four troll lines each with 1–2 baited hooks towed at 4–6 kt.

Other nets—PIFSC surveys utilize various small, fine-mesh, towed nets and neuston nets designed to sample

small fish and pelagic invertebrates. These nets can be broadly categorized as small trawls (which are separated from large trawl nets due to small trawls' discountable potential for interaction with marine mammals; see ''Potential Effects of the Specified Activity on Marine Mammals and their Habitat'') and plankton nets.

1. Neuston nets are used to collect zooplankton that live in the top few centimeters of the sea surface (the neuston layer). These nets have a rectangular opening usually two or three times as wide as deep (*e.g.,* one meter by 0.5 meters or 60 centimeters by 20 centimeters). Neuston nets sometimes use hollow piping for construction of the net frame to aid in flotation. They are generally towed half submerged at 1–2 kt from the side of a vessel on a boom to avoid the ship's wake.

2. Ring nets are used to capture plankton with vertical tows. These nets consist of a circular frame and a cone-shaped net with a collection jar at the codend. The net, attached to a labeled dropline, is lowered into the water while maintaining the net's vertical position. When the desired depth is reached, the net is pulled straight up through the water column to collect the sample. The most common zooplankton ring net is one meter in diameter with 0.333 millimeter mesh openings, also known as a 'meter net.'

3. Plankton drop nets are small handheld nets made up of fine mesh attached to a metal hoop with a long rope attached for retrieval. These nets are used for stationary sampling of the surrounding water.

4. Bongo nets are towed through the water at an oblique angle to sample plankton over a range of depths. Similar to ring nets, these nets typically have a cylindrical section coupled to a conical portion that tapers to a detachable codend constructed of nylon mesh. During each plankton tow, the bongo nets are deployed to depth and are then retrieved at a controlled rate so that the volume of water sampled is uniform across the range of depths. A collecting bucket, attached to the codend of the net, is used to contain the plankton sample. Some bongo nets can be opened and closed using remote control to enable the collection of samples from particular depth ranges. A group of depth-specific bongo net samples can be used to establish the vertical distribution of zooplankton species in the water column at a site. Bongo nets are generally used to collect zooplankton for research purposes and are not used for commercial harvest.

Traps—Traps are submerged, three-dimensional devices, often baited, that permit organisms to enter the enclosure but make escape extremely difficult or impossible. Most traps are attached by a rope to a buoy on the surface of the water and may be deployed in series. The trap entrance can be regulated to control the maximum size of animal that can enter, and the size of the mesh in the body of the trap can regulate the minimum size that is retained. In general, the species caught depends on the type and characteristics of the pot or trap used. PIFSC uses lobster traps, crab traps, and other traps of various sizes.

Lobster traps are deployed in the NWHI to study the life history and population dynamics of lobster. The lobster traps consist of one string per site, with 8 or 20 traps per string, separated by 20 fathoms of ground line. The traps are deployed within two separate depth regimes: 10–20 or 21–35 fathoms.

Kona crab traps are nylon, with meshing spaced 2½ inches apart attached to a wire ring with squid or fish bait set in the middle. Up to ten nets can be tied together with a buoy on the end net for retrieval. They are left for approximately 20 min.

Settlement traps are cylindrical with dimensions up to 3 m long and 2 m diameter. The trap frame is composed of semi-rigid plastic mesh of up to 5 cm mesh size. Folded plastic of up to 10 cm mesh is stuffed inside as settlement habitat, and cylinder ends are then pinched shut. The traps are clipped throughout the water column onto a vertical line anchored on bottom at up to 400 m, supported by a surface float.

Conductivity, temperature, and depth profilers—A CTD profiler is the primary research tool for determining chemical and physical properties of seawater. A shipboard CTD is made up of a set of small probes attached to a large (1–2 m diameter) metal rosette wheel. The rosette is lowered through the water column on a cable, and CTD data are observed in real time via a conducting cable connecting the CTD to a computer on the ship. The rosette also holds a series of sampling bottles that can be triggered to close at different depths in order to collect a suite of water samples that can be used to determine additional properties of the water over the depth of the CTD cast. A standard CTD cast, depending on water depth, requires two to five hours to complete. The data from a suite of samples collected at different depths are often called a depth profile. Depth profiles for different variables can be compared in order to glean information about physical, chemical, and biological processes occurring in the water column. Salinity, temperature, and depth data measured by the CTD instrument are essential for characterization of seawater properties.

Expendable bathythermographs (XBT)—PIFSC also uses XBTs to provide ocean temperature versus depth profiles. A standard XBT system consists of an expendable probe, a data processing/recording system, and a launcher. An electrical connection between the probe and the processor/recorder is made when the canister containing the probe is placed within the launcher and the launcher breech door is closed. Following launch into the water, wire de-reels from the probe as it descends vertically through the water. Simultaneously, wire de-reels from a spool within the probe canister, compensating for any movement of the ship and allowing the probe to freefall from the sea surface unaffected by ship motion or sea state.

Remotely operated vehicles (ROV)—ROVs are used to count fish and shellfish, photograph fish for identification, and provide views of the bottom for habitat-type classification studies via still and video camera images. Precise georeferenced data from ROV platforms also enables SCUBA divers to utilize bottom time more effectively for collection of brood stock and other specimens.

PIFSC also uses various other platforms, including gliders, towed systems, and seafloor or moored packages, to conduct passive acoustic monitoring, collect oceanographic data, and collect photographic/video data, among other things. Many such deployments require the use of mooring lines, including the Bottom Camera system (BotCam), Modular Underwater Survey System (MOUSS), Baited Remote Underwater Video System (BRUVS), Underwater Sound Playback System, and High-Frequency Acoustic Recording (HARP) package.

Table 1.1 of the PIFSC's application provide detailed information of all surveys planned by PIFSC; full detail is not repeated here. Below, we provide brief summaries of a selection of surveys using gear expected to have potential for marine mammal interaction (Table 1). Many of these surveys also use small trawls, plankton nets, gear deployed by hand by divers, and/or other gear; however, only gear with likely potential for marine mammal interaction is described. These summaries illustrate projected annual survey effort in the different research areas for those gears that we believe present the potential for marine mammal interaction but are intended only to provide a sense of the level of effort, and actual level of effort may vary from year to year. Gear specifications vary; please see Table 1.1

of PIFSC's application for descriptions of representative equipment. All surveys generally may occur every year in the HARA, but approximately once every three years in the MARA, ASARA, and WCPRA. Figures 2.1–2.4 of PIFSC's application illustrate locations of past survey effort in each of the four research areas.

TABLE 1—SUMMARY DESCRIPTION OF PIFSC FISHERIES AND ECOSYSTEM RESEARCH ACTIVITIES IN THE PACIFIC ISLANDS REGION

Survey name	Survey description	General area of operation	Season, frequency & yearly days at sea (DAS)	Gear used	Gear details	Total number of samples (approximated)
Sampling Pelagic Stages of Insular Fish Species.	Results of sampling inform life history and stock structure studies for pelagic larval and juvenile stage specimens of insular fish. Additional habitat information is also collected. Target species are snapper, grouper, and coral reef fish species within the 0–175 m depth range..	• HARA, MARA, ASARA, WCPRA. • 3–200 nmi from shore	• Year-round ..... • HARA: up to 20 Days at Sea (DAS). • MARA, ASARA, WCPRA: up to 30 DAS. approximately once in research area every three years. • Midwater trawls are conducted at night, surface trawls are conducted day and night.	• Cobb trawl (midwater trawl) or Isaacs-Kidd 10-foot (ft) net (midwater trawl). • Isaacs-Kidd 6-ft net (surface trawl). • Dip net (surface) ..... • Trawl mounted OES Netmind (midwater).	• Tow speed: 2.5–3.5 kt ..... • Duration: 60–240 minutes (min). • Depth: deployed at various depths during same tow to target fish at different water depths, usually to 250 m. • Tow speed: 2.5–3.5 kts ..... • Duration: 60 min ..... • Depth: Surface	• 40 tows per survey per year. • 40 tows per survey per year.
Spawning Dynamics of Highly Migratory Species.	Early life history studies provide larval stages for population genetic studies and include the characterization of habitat for early life stages of pelagic species. Egg and larval collections are taken in surface waters using a variety of plankton gear, primarily Isaac-Kidd 6-foot surface trawl, but also sometimes including 1-meter ring net and surface neuston net..	• HARA, MARA, ASARA, WCPRA. • 1–25 nmi from shore	• Year-round. ..... • HARA: up to 25 DAS. ..... • MARA, ASARA, WCPRA: up to 25 DAS approximately once in research area every three years.. • Surface trawls are conducted day and night..	• Isaacs-Kidd 6-foot net (surface) Neuston tows (surface) 1-m ring net (surface).	• Tow speed: 2.5–3.5 kts ..... • Duration: 60 min ..... • Depth: Surface ..... • Tow Speed: 2.5–3.5 kts ..... • Duration: 30–60 min ..... • Depth: 0–3 m	• 140 tows per survey per year • 140 tows per survey per year.
Cetacean Ecology Assessment.	Survey transects conducted in conjunction with cetacean visual and acoustic surveys within the Hawai'i EEZ to develop ecosystem models for cetaceans. Sampling also includes active acoustics to determine relative biomass density of sound scattering layers; trawls to sample within the scattering layers; cetacean observations; surface and water column oceanographic measurements and water sample collection..	• HARA, MARA, ASARA, WCPRA.	• Variable timing, depending on ship availability, up to 180 DAS. • Usually conducted in non-winter months. • Midwater trawls are conducted at night, surface trawls are conducted day and night.	• Cobb trawl (midwater trawl). • Small-mesh towed net (surface trawl).	• Tow speed: 3 kts ..... • Duration: 60–240 min ..... • Tow Speed: 2.5–3.5 kts ..... • Duration: 30–60 min	• 180 tows total per year. • 180 tows per research area.
Marine Debris Research and Removal.	Surface and midwater plankton tows to quantify floating microplastic in seawater.	• HARA, MARA, ASARA, WCPRA.	• Annually, or on an as- needed basis, up to 30 DAS. • Surface trawls are conducted day and night. • UAS are conducted during the day or night.	• Neuston, or similar, plankton nets surface towed alongside ship and/or small boats.	• Tow Speed: varied ..... • Duration: <1 hour	• Up to 250 tows per survey per year.

TABLE 1—SUMMARY DESCRIPTION OF PIFSC FISHERIES AND ECOSYSTEM RESEARCH ACTIVITIES IN THE PACIFIC ISLANDS REGION—Continued

Survey name	Survey description	General area of operation	Season, frequency & yearly days at sea (DAS)	Gear used	Gear details	Total number of samples (approximated)
Insular Fish Life History Survey and Studies.	Provide size ranges of deep-water eteline snappers, groupers, and large carangids to determine sex-specific length-at-age growth curves, longevity estimates, length and age at 50% reproductive maturity within the Bottomfish Management Unit Species (BMUS) in Hawai'i and the other Pacific Islands regions. Specimens are collected in the field and sampled at markets..	• HARA, MARA, ASARA, WCPRA. • 0.2–5 nmi from shore	• HARA: July–September, up to 15 DAS/yr. • Other areas: Year-round, up to 30 DAS for each research area once every three years. • Day and night	• Hook-and-line	• Hand line, electric or hydraulic reel. • Each operation involves 1–3 lines with.4–6 hooks per line; soaked 1–30 min. • Squid bait on circle hooks (typically 10/0 to 12/0).	• HARA: 350 operations per year. • Other areas: 240 operations per year for each research area.
Pelagic Troll and Handline Sampling.	Surveys would be conducted to collect life history and molecular samples from pelagic species. Other target species would be tagged-and-released. Different tags would used depending upon the species and study, but could include: passive, archival, ultrasonic, and satellite tags..	• HARA, MARA, ASARA. • 0 to 24 nmi from shore (excluding any special resource areas).	• Variable, up to 14 DAS Day and night.	• Pelagic troll and handline (hook and line) fishing.	• Troll fishing with up to 4 troll lines each with 1–2 baited hooks or 1–2 hook trolling lures at 4–10 kts. • Pelagic handline (hook-and-line) fishing at 10–100 m midwater depths, with hand, electric, or hydraulic reels. Up to 4 lines. Each line is baited with 4 hooks.	• A total of up to 2 operations of any of these gear types per DAS, totaling 28 operations (all types combined) for the survey.
Insular fish Abundance Estimation Comparison Surveys.	Comparison of fishery-independent methods to survey bottomfish assemblages in the Main Hawaiian Islands: coordinated research between PIFSC and various partners Day and night surveys are used to develop fishery-independent methods to assess stocks of economically important insular fish.	• HARA, MARA, ASARA, WCPRA.	• Variable, up to 30 DAS per research area per year. • HARA surveyed annually, ASARA, WCPRA surveyed every 3 years. • Sampling occurs day and night	• Hook-and-line	• Hand, electric, hydraulic reels. • Each vessel fishes 2 lines. Each line is baited with 4–6 hooks.. • 1–30 minutes per fishing operation..	• HARA: 7,680 operations per year. • MARA: 1.920 every 3rd year (average) 640 operations per year). • ASARA: 1,920 every 3rd year (average e 640 per year). • WCPRA: 1,920 every 3rd year (average 640 per year).
Kona Integrated Ecosystem Assessment Cruise.	Survey transects conducted off the Kona coast and Kohala Shelf area to develop ecosystem models for coral reefs, socioeconomic indicators, circulation patterns, larval fish transport and settlement. Sampling includes active acoustics to determine relative biomass density of sound scattering layers; trawls to sample within the scattering layers; cetacean observations; surface and water column oceanographic measurements and water sample collection..	• HARA; 2–10 nmi from shore.	• Variable timing, depending on ship availability, up to 10 DAS. • Day and night	• Cobb trawl (midwater trawl). • Hook-and-line	• Tow speed: 3 kts ..... • Duration: 60–240 min ..... • Electric or hydraulic reel: Each operation involves 1–3 lines, with squid lures, soaked 10–60 min at depths between 200m to 600m.	• 15–20 tows/yr. • No more than 50 hours of effort. • Approximately 10 mesopelagic squid caught per yr.

Sampling of Juvenile-stage Bottomfish via Settlement Traps.	Sampling activity to capture juvenile recruits of eteline snappers and grouper that have recently transitioned from the pelagic to demersal habitat. Target species include Deep-7 bottomfish and the settlement habitats these stages are associated with.	• HARA ..... • 0.2–5 nmi from shore	• July–September ..... • Up to 25 DAS Day and night ..	• Trap (settlement)	• Cylindrical traps are clipped throughout the water column onto a vertical line anchored on bottom at up to 400 m, supported by a surface float.	• 10 traps per line set; up to 4 line sets soaked per day, from overnight up to 3 days. • Up to 100 lines of traps set per yr. • Catch of 2500 juvenile stage bottomfish per year.
Mariana Resource Survey ..	Sampling activity to quantify baseline bottomfish and reef fish resources in the Mariana Archipelago Research Area. Various artificial habitat designs, Cobb trawl and IK trawls will be developed, enclosed in mesh used to retain captures, and evaluated collect pelagic-stage specimens of reef fish and bottomfish species. Traps will be primarily set in mesophotic habitats (50–200 m depths) and in the quality of each habitat for recent recruits. deep-slope bottomfish habitats (200–500m depths).	• MARA ..... • 0–25 nmi from shore	• May—August Up to 102 DAS (once every three years). • Midwater trawls are conducted at night, surface trawls are conducted day and night. • In-water activities are conducted during the day. All others are day and night.	• Large-mesh Cobb midwater trawl Isaacs-Kidd midwater trawl. • Small-mesh surface trawl nets (Isaacs-Kidd, neuston, ring, bongo nets). • Traps (Kona crab, enclosure). • Hook-and-line	• Tow speed: 3 kts ..... • Duration: 60–240 min trawls; 2 tows per night. • Depth(s): deployed at various depths during same tow to target fish at different water depths, usually between 100 m and 200m. • Tow speed: 3 kts ..... • Duration: up to 60 min ..... • Depth: 0–200 m ..... • Up to ten Kona crab traps can be tied together with a buoy on the end net for retrieval. They are left for approximately 20 min. Two strings of six enclosure traps each would be deployed at night on sand, rubble and pavement (*i.e.* not coral) substrate, and retrieved the next morning. • Up to 20 traps per string, separated by 20 fathoms of ground line; two depths 10–35 fathoms. • Up to 2 strings per DAS ..... • Electric or hydraulic reel: each operation involves 1–3 lines, with squid lures, soaked 10–60 min at depths between 200 m to 600 m.	• 15–20 tows per survey per year. • 15–20 tows (any combination of the nets described). • 25 gear sets per cruise. • Up to 400 strings set per year. • 1000 sets per survey.
Pelagic Longline, Troll, and Handline Gear Trials.	Investigate effectiveness of various types of hooks, hook guards, gear configurations, or other modified fishing practices for reducing the bycatch of non-target species and retaining or increasing target catch.	• HARA ..... • Longline fishing would occur outside of: (1) All longline exclusions zones in the Hawai'i EEZ; (2) the Insular False Killer Whale range, and (3) all special resource areas. • Longline fishing would occur up to approximately 500 nmi from the shores of the Hawai'i Archipelago. • Trolling and handline occurs 25 to 500 nmi from shore (excluding any special resource areas).	• 21 DAS ..... • Day and night	• Pelagic longline ..... • Trolling, and handline (hook-and-line).	• Soak time: 600–1800 min ..... • Troll fishing with up to 4 troll lines each with 1–2 baited hooks or 1–2 hook troll lures at 4–10 kts. • Pelagic handline (hook-and-line) fishing at 10–100 m midwater depths, with hand, electric, or hydraulic reels. Up to 4 lines. Each line is baited with 4 hooks. • Up to 4 hrs per troll or handline operation.	• Up to 21 longline operations per year. • Up to 21 troll or handline (combined) operations per year.

TABLE 1—SUMMARY DESCRIPTION OF PIFSC FISHERIES AND ECOSYSTEM RESEARCH ACTIVITIES IN THE PACIFIC ISLANDS REGION—Continued

Survey name	Survey description	General area of operation	Season, frequency & yearly days at sea (DAS)	Gear used	Gear details	Total number of samples (approximated)
Pelagic Oceanographic Cruise.	Investigate physical (*e.g.,* fronts) and biological features that define the habitats for important commercial and protected species of the North Pacific Ocean. Sampling also includes active acoustics to determine relative biomass density of sound scattering layers; trawls to sample within the scattering layers; surface and water column oceanographic measurements and water sample collection.	• WCPRA ..... • 25–1000 nmi from shore in any direction.	• Annual (season variable) Up to 30 DAS. • Midwater trawls are conducted at night, surface trawls are conducted day and night. • All other activities are conducted day and night.	• Large-mesh Cobb midwater trawl. • Plankton drop net (stationary surface sampling). • Small-mesh surface and midwater trawl nets (Isaacs-Kidd, neuston, ring, bongo nets).	• Tow speed: 3 kts ..... • Duration: 60–240 min ..... • 1 meter diameter plankton drop net would be deployed down to 100 m. • Duration: up to 60 min. • Depth: 0–200 m	• 20 tows per year, alternating with Kona IEA cruise 4 liters of micronekton per tow. • 20 drops per year (collections would be less than one liter of plankton). • 15–20 tows (any combination of the nets described) <1 liter of organisms per tow.
Lagoon Ecosystem Characterization.	Measure the abundance and distribution of reef fish (including juvenile bumphead parrotfish).	• WCPRA	• Up to 14 DAS ..... • Conducted during the day	• Divers with hand net or speargun. • Hook-and-line	• SCUBA, snorkel, 12-inch diameter small mesh hand net. • Standard rod and reel using lures or fish bait from shoreline or small boat.	• 10 dives per survey. • 10 fin clips collected for genetic analyses. • 1–30 minute casts. • 60 casts per survey.

Description of Active Acoustic Sound Sources—This section contains a brief technical background on sound, the characteristics of certain sound types, and on metrics used in this proposal inasmuch as the information is relevant to PIFSC's specified activity and to an understanding of the potential effects of the specified activity on marine mammals found later in this document. We also describe the active acoustic devices used by PIFSC. For general information on sound and its interaction with the marine environment, please see, *e.g.,* Au and Hastings (2008); Richardson *et al.* (1995); Urick (1983).

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly, except in certain cases in shallower water. Amplitude is the height of the sound pressure wave or the ''loudness'' of a sound and is typically described using the relative unit of the decibel (dB). A sound pressure level (SPL) in dB is described as the ratio between a measured pressure and a reference pressure (for underwater sound, this is 1 microPascal (μPa)) and is a logarithmic unit that accounts for large variations in amplitude; therefore, a relatively small change in dB corresponds to large changes in sound pressure. The source level (SL) represents the SPL referenced at a distance of 1 m from the source (referenced to 1 μPa), while the received level is the SPL at the listener's position (referenced to 1 μPa).

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Root mean square is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average. Root mean square accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels. This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures. Peak sound pressure (also referred to as zero-to-peak sound pressure or 0-pk) is the maximum instantaneous sound pressure measurable in the water at a specified distance from the source and is represented in the same units as the rms sound pressure (dB re 1 μPa).

Sound exposure level (SEL; represented as dB re 1 μPa^2-second) represents the total energy in a stated frequency band over a stated time interval or event, and considers both intensity and duration of exposure. The per-pulse SEL is calculated over the time window containing the entire pulse (*i.e.,* 100 percent of the acoustic energy). SEL is a cumulative metric; it can be accumulated over a single pulse, or calculated over periods containing multiple pulses. Cumulative SEL represents the total energy accumulated by a receiver over a defined time window or during an event.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in a manner similar to ripples on the surface of a pond and may be either directed in a beam or beams (as for the sources considered here) or may radiate in all directions (omnidirectional sources). The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Sounds are often considered to fall into one of two general types: Pulsed and non-pulsed (defined in the following paragraphs). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.,* Ward, 1997 in Southall *et al.,* 2007). Please see Southall *et al.* (2007) for an in-depth discussion of these concepts. The distinction between these two sound types is not always obvious, as certain signals share properties of both pulsed and non-pulsed sounds. A signal near a source could be categorized as a pulse; but, due to propagation effects as it moves farther from the source, the signal duration becomes longer (*e.g.,* Greene and Richardson, 1988). Pulsed sound sources (*e.g.,* airguns, explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI, 1986, 2005; Harris, 1998; NIOSH, 1998; ISO, 2003) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features. Non-pulsed sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or intermittent (ANSI, 1995; NIOSH, 1998). Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (*e.g.,* rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment. Non-pulsed sounds typically have less capacity to induce physical injury as compared with pulsed sounds. All active acoustic sources used by PIFSC produce non-pulsed intermittent sound.

A wide range of active acoustic sources are used in PIFSC fisheries surveys for remotely sensing bathymetric, oceanographic, and biological features of the environment. Most of these sources involve relatively high frequency, directional, and brief repeated signals tuned to provide sufficient focus and resolution on specific objects. PIFSC also uses passive listening sensors (*i.e.,* remotely and passively detecting sound rather than producing it), which do not have the potential to impact marine mammals. PIFSC active acoustic sources include various echosounders (*e.g.,* multibeam systems), scientific sonar systems, positional sonars (*e.g.,* net sounders for determining trawl position), and environmental sensors (*e.g.,* current profilers).

Mid- and high-frequency underwater acoustic sources typically used for scientific purposes operate by creating an oscillatory overpressure through rapid vibration of a surface, using either electromagnetic forces or the piezoelectric effect of some materials. A vibratory source based on the piezoelectric effect is commonly referred to as a transducer. Transducers are usually designed to excite an acoustic wave of a specific frequency, often in a highly directive beam, with the directional capability increasing with operating frequency. The main parameter characterizing directivity is the beam width, defined as the angle subtended by diametrically opposite ''half power'' (−3 dB) points of the main lobe. For different transducers at a single operating frequency the beam

width can vary from 180° (almost omnidirectional) to only a few degrees. Transducers are usually produced with either circular or rectangular active surfaces. For circular transducers, the beam width in the horizontal plane (assuming a downward pointing main beam) is equal in all directions, whereas rectangular transducers produce more complex beam patterns with variable beam width in the horizontal plane.

The types of active sources employed in fisheries acoustic research and monitoring, based largely on their relatively high operating frequencies and other output characteristics (*e.g.,* signal duration, directivity), should be considered to have very low potential to cause effects to marine mammals that would rise to the level of a ''take,'' as defined by the MMPA. Acoustic sources operating at high output frequencies (≤ 180 kHz) that are outside the known functional hearing capability of any marine mammal are unlikely to be detected by marine mammals. Although it is possible that these systems may produce subharmonics at lower frequencies, this component of acoustic output would also be at significantly lower SPLs. While the production of subharmonics can occur during actual operations, the phenomenon may be the result of issues with the system or its installation on a vessel rather than an issue that is inherent to the output of the system. Many of these sources also generally have short duration signals and highly directional beam patterns, meaning that any individual marine mammal would be unlikely to even receive a signal that would likely be inaudible.

Acoustic sources present on most PIFSC fishery research vessels include a variety of single, dual, and multi-beam echosounders (many with a variety of modes), sources used to determine the orientation of trawl nets, and several current profilers with lower output frequencies that overlap with hearing ranges of certain marine mammals (*e.g.,* 30–180 kHz). However, while likely potentially audible to certain species, these sources also have generally short ping durations and are typically focused (highly directional) to serve their intended purpose of mapping specific objects, depths, or environmental features. These characteristics reduce the likelihood of an animal receiving or perceiving the signal. A number of these sources, particularly those with relatively lower output frequencies coupled with higher output levels can be operated in different output modes (*e.g.,* energy can be distributed among multiple output beams) that may lessen the likelihood of perception by and potential impact on marine mammals; however, we have analyzed the effects of these sources under the assumption that they will be operating at frequencies and energy outputs that are most likely to be detected by marine mammals and may result in Level B harassment.

We now describe specific acoustic sources used by PIFSC. The acoustic system used during a particular survey is optimized for surveying under specific environmental conditions (*e.g.,* depth and bottom type). Lower frequencies of sound travel further in the water (*i.e.,* longer range) but provide lower resolution (*i.e.,* less precision). Pulse width and power may also be adjusted in the field to accommodate a variety of environmental conditions. Signals with a relatively long pulse width travel further and are received more clearly by the transducer (*i.e.,* good signal-to-noise ratio) but have a lower range resolution. Shorter pulses provide higher range resolution and can detect smaller and more closely spaced objects in the water. Similarly, higher power settings may decrease the utility of collected data. For example, power level is adjusted according to bottom type, as some bottom types have a stronger return and require less power to produce data of sufficient quality. Accordingly, power is typically set to the lowest level possible in order to receive a clear return with the best data. Survey vessels may be equipped with multiple acoustic systems; each system has different advantages that may be utilized depending on the specific survey area or purpose. In addition, many systems may be operated at one of two frequencies or at a range of frequencies. Primary source categories are described below, and characteristics of representative predominant sources are summarized in Table 2. Predominant sources are those that, when operated, would be louder than and/or have a larger acoustic footprint than other concurrently operated sources, at relevant frequencies.

(1) *Single and Multi-Frequency Narrow Beam Scientific Echosounders*—Echosounders and sonars work by transmitting acoustic pulses into the water that travel through the water column, reflect off the seafloor, and return to the receiver. Water depth is measured by multiplying the time elapsed by the speed of sound in water (assuming accurate sound speed measurement for the entire signal path), while the returning signal itself carries information allowing ''visualization'' of the seafloor. Multi-frequency split-beam echosounders are deployed from PIFSC survey vessels to acoustically map the distributions and estimate the abundances and biomasses of many types of fish; characterize their biotic and abiotic environments; investigate ecological linkages; and gather information about their schooling behavior, migration patterns, and avoidance reactions to the survey vessel. The use of multiple frequencies allows coverage of a broad range of marine acoustic survey activity, ranging from studies of small plankton to large fish schools in a variety of environments from shallow coastal waters to deep ocean basins. Simultaneous use of several discrete echosounder frequencies facilitates accurate estimates of the size of individual fish, and can also be used for species identification based on differences in frequency-dependent acoustic backscattering among species.

(2) *Multibeam Echosounder and Sonar*—Multibeam echosounders and sonars operate similarly to the devices described above. However, the use of multiple acoustic ''beams'' allows coverage of a greater area compared to single beam sonar. The sensor arrays for multibeam echosounders and sonars are usually mounted on the keel of the vessel and have the ability to look horizontally in the water column as well as straight down. Multibeam echosounders and sonars are used for mapping seafloor bathymetry, estimating fish biomass, characterizing fish schools, and studying fish behavior.

(3) *Acoustic Doppler Current Profiler (ADCP)*—An ADCP is a type of sonar used for measuring water current velocities simultaneously at a range of depths. Whereas current depth profile measurements in the past required the use of long strings of current meters, the ADCP enables measurements of current velocities across an entire water column. The ADCP measures water currents with sound, using the Doppler effect. A sound wave has a higher frequency when it moves towards the sensor (blue shift) than when it moves away (red shift). The ADCP works by transmitting ''pings'' of sound at a constant frequency into the water. As the sound waves travel, they ricochet off particles suspended in the moving water, and reflect back to the instrument. Due to the Doppler effect, sound waves bounced back from a particle moving away from the profiler have a slightly lowered frequency when they return. Particles moving toward the instrument send back higher frequency waves. The difference in frequency between the waves the profiler sends out and the waves it receives is called the Doppler shift. The instrument uses this shift to calculate how fast the

particle and the water around it are moving. Moreover, sound waves that hit particles far from the profiler take longer to come back than waves that strike close by. By measuring the time it takes for the waves to return to the sensor, and the Doppler shift, the profiler can measure current speed at many different depths with each series of pings.

An ADCP anchored to the seafloor can measure current speed not just at the bottom, but at equal intervals to the surface. An ADCP instrument may be anchored to the seafloor or can be mounted to a mooring or to the bottom of a boat. ADCPs that are moored need an anchor to keep them on the bottom, batteries, and a data logger. Vessel-mounted instruments need a vessel with power, a shipboard computer to receive the data, and a GPS navigation system so the ship's movements can be subtracted from the current velocity data. ADCPs operate at frequencies between 75 and 300 kHz.

(4) *Net Monitoring Systems*—During trawling operations, a range of sensors may be used to assist with controlling and monitoring gear. Net sounders give information about the concentration of fish around the opening to the trawl, as well as the clearances around the opening and the bottom of the trawl; catch sensors give information about the rate at which the codend is filling; symmetry sensors give information about the optimal geometry of the trawls; and tension sensors give information about how much tension is in the warps and sweeps.

TABLE 2—OPERATING CHARACTERISTICS OF REPRESENTATIVE PREDOMINANT PIFSC ACTIVE ACOUSTIC SOURCES

Active acoustic system	Operating frequencies	Maximum source level	Single ping duration (ms) and repetition rate (Hz)	Orientation/directionality	Nominal beamwidth
Simrad EK60 narrow beam echosounder	38, 70, 120, 200 kHz.	224 dB	1 ms at 1 Hz	Downward looking	7°
Simrad EM300 multibeam echosounder	30 kHz	237 dB	0.7–15 ms at 5 Hz.	Downward looking	1°
ADCP Ocean Surveyor	75 kHz	223.6 dB	1 ms at 4 Hz	Downward looking (30° tilt)	4°
Netmind	30, 200 kHz	190 dB	up to 0.3 ms at 7–9 Hz.	Trawl-mounted	50°

Nearshore and Land-based Surveys—The Pacific Reef Assessment and Monitoring Program (RAMP) and Marine Debris Research and Removal Surveys involve circumnavigating islands and atolls using small vessels that may approach the shoreline. Additionally, the Marine Debris Research and Removal Surveys may involve land vehicle (trucks) operations in areas of marine debris where vehicle access is possible from highways or rural/dirt roads adjacent to coastal resources. The RAMP and Marine Debris Research and Removal Surveys have the potential to disturb pinnipeds hauled out during research activities either from approaches of nearshore small vessel based research or land based debris research and clean-up activities.

Description of Marine Mammals in the Area of the Specified Activity

We have reviewed PIFSC's species descriptions—which summarize available information regarding status and trends, distribution and habitat preferences, behavior and life history, and auditory capabilities of the potentially affected species—for accuracy and completeness and refer the reader to Sections 3 and 4 of PIFSC's application, instead of reprinting the information here (note that PIFSC provides additional information regarding marine mammal observations around the Main Hawaiian Islands in Table 3.3 of their application, including information about group size and seasonality). Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SAR; *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.,* physical and behavioral descriptions) may be found on NMFS's website (*www.fisheries.noaa.gov/find-species*).

Table 3 lists all species with expected potential for occurrence in the specified geographical regions where PIFSC proposes to conduct the specified activity and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow the Society for Marine Mammalogy Committee on Taxonomy (2020). PBR, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population, is discussed in greater detail later in this document (see ''Negligible Impact Analysis'').

Stocks are not designated for most species in areas of the specified geographical regions outside of the Hawaiian EEZ. Therefore, while all species with expected potential for occurrence in the specified geographical regions are listed in Table 3, the listed stocks are in most cases specific to the Hawaiian EEZ. The only exceptions are NMFS-designated stocks for the humpback whale, rough-toothed dolphin, spinner dolphin, and false killer whale in American Samoa (animals belonging to these stocks would occur in the ASARA), and a false killer whale stock designated for Palmyra Atoll (animals belonging to this stock would occur in the WCPRA). With the exception of the humpback whale, which is discussed in greater detail following Table 3, and the aforementioned Palmyra Atoll stock of false killer whale, animals of any species occurring in the MARA or areas of the WCPRA outside of the Hawaiian EEZ and American Samoa EEZ would not be part of any NMFS-designated stock. Aside from the four species listed above, animals of any species occurring in the American Samoa EEZ would not be part of any NMFS-designated stock. As a reminder, the HARA, MARA, and ASARA are considered to include waters of the contiguous zone around these archipelagoes (*i.e.,* 0–24 nmi from land), while the WCPRA is considered to include all remaining EEZ waters around those archipelagoes as well as the high seas and waters around U.S. possessions of the Pacific Remote Islands Area.

Marine mammal abundance estimates presented in this document represent the total number of individuals that

make up a given stock or the total number estimated within a particular study or survey area. Abundance estimates and related information, PBR values, and annual M/SI values given in Table 3 are specific to the stocks for which they are listed. This information is generally not available for these species occurring in areas outside the ranges of NMFS-designated stocks. NMFS-designated stocks in the Hawai'i region include animals found both within the Hawaiian Islands EEZ and in adjacent high seas waters; however, because data on abundance, distribution, and human-caused impacts are largely lacking for high seas waters, the status of these stocks are generally evaluated based on data from the U.S. EEZ waters of the Hawaiian Islands (including the Main Hawaiian Islands and Northwestern Hawaiian Islands). For certain species, existing data support the existence of demographically distinct resident populations associated with different regions within the Hawaiian Islands, and separate stocks are designated accordingly. NMFS-designated stocks for American Samoa include animals occurring within U.S. EEZ waters around American Samoa. All managed stocks in the specified geographical regions are assessed in either NMFS's U.S. Pacific SARs or U.S. Alaska SARs. All values presented in Table 3 are the most recent available at the time of writing and are available online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments.*

Twenty-six species (with 46 managed stocks; no stock is designated for Deraniyagala's beaked whale) are considered to have the potential to co-occur with and potentially be taken by PIFSC activities. Species that could potentially occur in the research areas but are not expected to have the potential for interaction with PIFSC research gear or that are not likely to be harassed by PIFSC's use of active acoustic devices are described briefly but omitted from further analysis. These include extralimital species, which are species that do not normally occur in a given area but for which there are one or more occurrence records that are considered beyond the normal range of the species. Extralimital species or stocks include the North Pacific right whale (*Eubalaena japonica;* all areas except ASARA), Omura's whale (*Balaenoptera omurai;* all areas), Antarctic minke whale (*B. bonaerensis;* ASARA and WCPRA), southern bottlenose whale (*Hyperoodon planifrons;* ASARA and WCPRA), common dolphin (*Delphinus delphis;* all areas), northern elephant seal (*Mirounga angustirostris;* HARA and WCPRA), and northern fur seal (*Callorhinus ursinus;* HARA and WCPRA).

TABLE 3—MARINE MAMMALS POTENTIALLY PRESENT IN THE VICINITY OF PIFSC RESEARCH ACTIVITIES

Common name	Scientific name	Stock [1]	Occurrence [2]				ESA/MMPA status; strategic (Y/N) [3]	Stock abundance (CV, N_{min}, most recent abundance survey) [4]	PBR	Annual M/SI [5]
			HARA	MARA	ASARA	WCPRA				
Order Cetartiodactyla—Cetacea—Superfamily Mysticeti (baleen whales) Family Balaenopteridae (rorquals)										
Humpback whale *	*Megaptera novaeangliae kuzira.*	American Samoa	X	X	X	X	-; N	unk (n/a; 150; 2008)	0.4	0
		Central North Pacific (CNP).	.....	.....	.....	.....	E/D; Y	10,103 (0.3; 7,891; 2006).	83	25
		Western North Pacific	.....	.....	.....	.....	E/D; Y	1,107 (0.3; 865; 2006)	3	2.6
Minke whale	*Balaenoptera acutorostrata scammoni.*	Hawaii	X	X	X	X	-; N	unk	undet	0
Bryde's whale	*B. edeni brydei*	Hawaii	X	X	X	X	-; N	1,751 (0.29; 1,378; 2010).	13.8	0
Sei whale	*B. borealis borealis*	Hawaii	X	X	.....	X	E/D; Y	391 (0.9; 204; 2010)	0.4	0.2
Fin whale	*B. physalus physalus*	Hawaii	X	X	.....	X	E/D; Y	154 (1.05; 75; 2010)	0.1	0
Blue whale	*B. musculus musculus*	CNP	X	X	.....	X	E/D; Y	133 (1.09; 63; 2010)	0.1	0
Superfamily Odontoceti (toothed whales, dolphins, and porpoises) Family Physeteridae										
Sperm whale	*Physeter macrocephalus*	Hawaii	X	X	X	X	E/D; Y	4,559 (0.33; 3,478; 2010).	13.9	0.7
Family Kogiidae										
Pygmy sperm whale	*Kogia breviceps*	Hawaii	X	X	.....	X	-; N	unk	undet	0
Dwarf sperm whale	*K. sima*	Hawaii [6]	X	X	X	X	-; N	unk	undet	0
Family Ziphiidae (beaked whales)										
Cuvier's beaked whale	*Ziphius cavirostris*	Hawaii	X	X	X	X	-; N	723 (0.69; 428; 2010)	4.3	0
Longman's beaked whale.	*Indopacetus pacificus*	Hawaii	X	.....	.....	X	-; N	7,619 (0.66; 4,592; 2010).	46	0
Blainville's beaked whale.	*Mesoplodon densirostris*	Hawaii	X	X	.....	X	-; N	2,105 (1.13; 980; 2010)	10	0
Deraniyagala's beaked whale.	*M. hotaula*	n/a	.....	.....	.....	X	-; N	unk	undet	unk
Family Delphinidae										
Rough-toothed dolphin *	*Steno bredanensis*	Hawaii	X	X	X	X	-; N	72,528 (0.39; 52,833; 2010).	423	2.1
		American Samoa	.....	.....	.....	.....	-; N	unk	undet	unk
Common bottlenose dolphin *.	*Tursiops truncatus truncatus.*	Hawai'i Pelagic	X	X	X	X	-; N	21,815 (0.57; 13,957; 2010).	140	0
		Kauai and Ni'ihau	.....	.....	.....	.....	-; N	184 (0.11; 97; 2015)	1.0	unk

TABLE 3—MARINE MAMMALS POTENTIALLY PRESENT IN THE VICINITY OF PIFSC RESEARCH ACTIVITIES—Continued

Common name	Scientific name	Stock [1]	Occurrence [2]				ESA/ MMPA status; strategic (Y/N) [3]	Stock abundance (CV, N_{min}, most recent abundance survey) [4]	PBR	Annual M/SI [5]
			HARA	MARA	ASARA	WCPRA				
		Oahu [6]	.....	.....	.....	.....	-; N	743 (0.54; 388; 2006)	undet	unk
		4-Island Region [6]	.....	.....	.....	.....	-; N	191 (0.24; unk; 2006)	undet	unk
		Hawai'i Island	.....	.....	.....	.....	-; N	128 (0.13; 91; 2013)	0.9	unk
Pantropical spotted dolphin *.	*Stenella attenuata attenuata.*	Hawai'i Pelagic	X	X	X	X	-; N	55,795 (0.4; 40,338; 2010).	403	0
		Oahu	.....	.....	.....	.....	-; N	unk	undet	unk
		4-Island Region	.....	.....	.....	.....	-; N	unk	undet	unk
		Hawai'i Island	.....	.....	.....	.....	-; N	unk	undet	≥ 0.2
Spinner dolphin *	*S. longirostris longirostris.*	Hawai'i Pelagic	X	X	X	X	-; N	unk	undet	0
		Kauai and Ni'ihau	.....	.....	.....	.....	-; N	601 (0.2; unk; 2005)	undet	unk
		Oahu/4-Island Region	.....	.....	.....	.....	-; N	355 (0.09; unk; 2007)	undet	unk
		Hawai'i Island	.....	.....	.....	.....	-; N	665 (0.09; 617; 2012)	6.2	unk
		Kure and Midway Atoll [6]	.....	.....	.....	.....	-; N	260 (n/a; 139; 1998)	undet	unk
		Pearl and Hermes Reef	.....	.....	.....	.....	-; N	unk	undet	unk
		American Samoa	.....	.....	.....	.....	-; N	unk	undet	unk
Striped dolphin	*S. coeruleoalba*	Hawai'i Pelagic	X	X	.....	X	-; N	61,021 (0.38; 44,922; 2010).	449	0
Fraser's dolphin	*Lagenodelphis hosei*	Hawaii	X	X	.....	X	-; N	51,491 (0.66; 31,034; 2010).	310	0
Risso's dolphin	*Grampus griseus*	Hawaii	X	X	.....	X	-; N	11,613 (0.43; 8,210; 2010).	82	0
Melon-headed whale *	*Peponocephala electra*	Hawaii	X	X	.....	X	-; N	8,666 (1.0; 4,299; 2010)	43	0
		Kohala Resident	.....	.....	.....	.....	-; N	447 (0.12; 404; 2009)	4	0
Pygmy killer whale	*Feresa attenuata*	Hawaii	X	X	.....	X	-; N	10,640 (0.53; 6,998; 2010).	56	1.1
False killer whale *	*Pseudorca crassidens*	Northwestern Hawaiian Islands.	X	X	X	X	-; N	617 (1.11; 290; 2010)	2.3	0.4
		Hawai'i Pelagic	.....	.....	.....	.....	-; N	1,540 (0.66; 928; 2010)	9.3	7.6
		Hawai'i Insular	.....	.....	.....	.....	E/D; Y	167 (0.14; 149; 2015)	0.3	0
		American Samoa	.....	.....	.....	.....	-; N	unk	undet	unk
		Palmyra Atoll	.....	.....	.....	.....	-; N	1,329 (0.65; 806; 2005)	6.4	0.3
Killer whale	*Orcinus orca*	Hawaii	X	X	X	X	-; N	146 (0.96; 74; 2010)	0.7	0
Short-finned pilot whale	*Globicephala macrorhynchus.*	Hawaii	X	X	X	X	-; N	19,503 (0.49; 13,197; 2010).	106	0.9
Order Carnivora—Superfamily Pinnipedia Family Phocidae (earless seals)										
Hawaiian monk seal *	*Neomonachus schauinslandi.*	Hawaii	X	.....	.....	X	E/D; Y	1,351 (0.03; 1,325; 2017).	4.6	≥1.6

* Species marked with an asterisk are addressed in further detail in text below. Additional detail for all species may be found in Sections 3 and 4 of PIFSC's application.

[1] All species with potential for take by PIFSC are presented in Table 1. All known stocks are presented here but marine mammals in the MARA, ASARA, and WCPRA are generally not assigned to designated stocks.

[2] HARA: Hawaiian Archipelago Research Area; MARA: Mariana Archipelago Research Area; ASARA: American Samoa Archipelago Research Area; WCPRA: Western and Central Pacific Research Area.

[3] Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[4] CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance.

[5] These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.,* commercial fisheries, subsistence hunting, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value.

[6] Abundance estimates for these stocks are not considered current. PBR is therefore considered undetermined for these stocks, as there is no current minimum abundance estimate for use in calculation. We nevertheless present the most recent abundance estimates, as these represent the best available information for use in this document.

Humpback Whale—Prior to 2016, humpback whales were listed under the ESA as an endangered species worldwide. Following a 2015 global status review (Bettridge *et al.,* 2015), NMFS established 14 distinct population segments (DPS) with different listing statuses (81 FR 62259; September 8, 2016) pursuant to the ESA. The DPSs that occur in U.S. waters do not necessarily equate to the existing stocks designated under the MMPA and shown in Table 2. Because MMPA stocks cannot be portioned, *i.e.,* parts managed as ESA-listed while other parts managed as not ESA-listed, until such time as the MMPA stock delineations are reviewed in light of the DPS designations, NMFS considers the existing humpback whale stocks under the MMPA to be endangered and depleted for MMPA management purposes (*e.g.,* selection of a recovery factor, stock status).

Within western and central Pacific waters, three DPSs may occur: The Western North Pacific (WNP) DPS (endangered), Hawai'i DPS (not listed), and Oceania DPS (not listed). Whales encountered in the HARA would be from the Hawai'i DPS; whales encountered in the MARA from the WNP DPS; and whales encountered in the ASARA from the Oceania DPS. While not possible to know in advance the identity of whales encountered in the WCPRA, in reality the DPS identity would likely be determined based on proximity to either the HARA, MARA, or ASARA. PIFSC has requested authorization of humpback whale take by M/SI only for the CNP stock (*i.e.,* Hawai'i DPS) and has not requested take of humpback whales (from any stock) by

Level B harassment; see ''Estimated Take'' section.

With regard to abundance, an updated analysis of data from the Structure of Populations, Levels of Abundance and Status of Humpback Whales in the North Pacific (SPLASH) study provided an estimate of 21,808 (CV = 0.04) humpback whales in the North Pacific Ocean (Barlow *et al.,* 2011). Bettridge *et al.* (2015) stated that this estimate may still be an underestimate of actual humpback whale abundance due to biases that could not be corrected for using the available data. Calambokidis *et al.* (2008) approximated the size of the whale populations frequenting each breeding area at 10,000 individuals in Hawai'i and 1,000 for the WNP areas. Although Barlow *et al.* (2011) did not apportion their estimate to individual breeding areas, Bettridge *et al.* (2015) state that the proportions are likely to be similar to those estimated by Calambokidis *et al.* (2008) and therefore about 20 percent larger than the Calambokidis *et al.* (2008) estimates, *i.e.,* 12,000 individuals in the Hawai'i DPS and 1,200 individuals in the WNP DPS. The size of the Oceania DPS has been estimated at 3,827 (CV = 0.12) whales for a portion of the DPS breeding range covering New Caledonia, Tonga, French Polynesia, and the Cook Islands (SPWRC, 2006).

In winter, most humpback whales occur in the subtropical and tropical waters of the Northern and Southern Hemispheres, then migrate to higher latitudes in the summer to feed (Muto *et al.,* 2018). Peak abundance in Hawaiian waters occurs from late-February to early-April (Mobley *et al.,* 2001). The Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) was established in 1992 by the U.S. Congress to protect humpback whales and their habitat in Hawai'i (NOAA 2018a). The sanctuary provides essential breeding, calving, and nursing areas necessary for the long-term recovery of the North Pacific humpback whale population. The HIHWNMS provides protection to humpbacks in the shallow waters (from the shoreline to a depth of 100 fathoms or 183 m) around the four islands area of Maui, Penguin Bank; off the north shore of Kauai, the north and south shores of Oahu, and the north Kona and Kohala coast of the island of Hawai'i (NOAA 2018a). These areas, as well as some of the waters surrounding them, are also considered biologically important areas (BIAs) for reproduction (Table 3; Baird *et al,.* 2015).

Please see Caretta *et al.* (2019) for additional information on the Central North Pacific and Western North Pacific stocks, and Caretta *et al.* (2009) for additional information on the American Samoa stock.

Rough-toothed Dolphin—Rough-toothed dolphins are found throughout the world in tropical and warm-temperate waters. They are present around all the MHI and have been observed close to the islands and atolls at least as far northwest as Pearl and Hermes Reef in the NWHI. Although analysis of genetic samples indicates that designation of a separate Hawai'i Island stock may be warranted, only a single Hawai'i stock has been designated. Waters off the west side of Hawai'i Island have been identified as a BIA for the small and resident population of rough-toothed dolphins (Table 4; Baird *et al.,* 2015). Rough-toothed dolphins are common in the South Pacific from the Solomon Islands to French Polynesia and the Marquesas, and have been among the most commonly observed cetaceans during summer and winter surveys conducted from 2003–06 around the American Samoan island of Tutuila (though they were not observed during 2006 surveys of Swain's Island and the Manua Group). In addition, a rough-toothed dolphin was caught incidentally in the American Samoa-based longline fishery in 2008, indicating that some dolphins maintain a more pelagic distribution. Rough-toothed dolphins are thought to be common throughout the Samoan archipelago. No abundance estimates are available for rough-toothed dolphins in American Samoa, though investigation of published density estimates for rough-toothed dolphins in other tropical Pacific regions yields a plausible abundance estimate range of 692–3,115 rough-toothed dolphins in the American Samoa EEZ. Therefore, a plausible range of PBR values would be 3.4–22 dolphins (assuming a default growth rate and recovery factor of 0.4) (Carretta *et al.,* 2015). Please see Carretta *et al.* (2015, 2018) for more information about these stocks.

Bottlenose Dolphin—Bottlenose dolphins are widely distributed throughout the world in tropical and warm-temperate waters. The species is primarily coastal in much of its range, but there are populations in some offshore deepwater areas as well. Bottlenose dolphins are common throughout the Hawaiian Islands, from the island of Hawai'i to Kure Atoll, and are found in shallow inshore waters and deep water. Baird *et al.* (2015) identified three BIAs in the Hawaiian Archipelago for small and resident populations of bottlenose dolphins (Table 3). Photo-identification and genetic studies in the MHI suggest limited movement of bottlenose dolphins between islands and offshore waters and the existence of demographically distinct resident populations at each of the four MHI island groups (as reflected in the current stock designations). Genetic data support inclusion of bottlenose dolphins in deeper waters surrounding the MHI as part of the broadly distributed pelagic population which, in Hawaiian waters, is managed as a pelagic stock. The boundary between the pelagic stock and insular stocks is placed at the 1,000-m isobath (the boundary between the Oahu and 4-Islands stocks is designated as equidistant between the 500 m isobaths around Oahu and the 4-Islands Region, through the middle of Kaiwi Channel). Although it is likely that additional demographically independent populations of bottlenose dolphins exist in the NWHI, those animals are considered part of the pelagic stock until additional data become available upon which to base stock designations. Photo-identification studies conducted from 2012–15 identified a minimum of 97 distinct individuals in the Kauai-Ni'ihau stock (Table 2), though earlier photo-identification studies conducted from 2003–05 (and now considered outdated) resulted in an abundance estimate of 147 (CV = 0.11), or 184 animals when corrected for the proportion of marked individuals (Baird *et al.,* 2009). Similarly for the Hawai'i Island stock, photo-identification studies conducted from 2000–06 (and now considered outdated) resulted in an abundance estimate of 102 (CV = 0.13), or 128 animals when corrected for the proportion of marked individuals (Baird *et al.,* 2009), whereas later studies conducted from 2010–13 identified a minimum of 91 distinct individuals (Table 2). For both of these stocks, a current PBR value is calculated using the more recent minimum abundance estimates. Available abundance information for other bottlenose dolphin stocks is shown in Table 3. Please see Carretta *et al.* (2018) for additional information about these stocks of bottlenose dolphin.

Pantropical Spotted Dolphin—Pantropical spotted dolphins are primarily found in tropical and subtropical waters worldwide, and have been observed in all months of the year around the MHI, in areas ranging from shallow nearshore water to depths of 5,000 m, although sighting rates peak in depths from 1,500 to 3,500 m. As with bottlenose dolphins, genetic analyses suggest the existence of island-associated stocks. However, although commonly observed off of three of the

MHI island groups, they are largely absent from waters around Kauai and Niʻihau, and only three insular stocks are designated. The Oahu and 4-Islands stocks are considered to include animals within 20 km of those island groups, whereas the Hawaiʻi Island stock includes animals within 65 km of Hawai'i Island. The pelagic stock includes animals occurring in Hawaiian EEZ and adjacent high seas waters outside these insular stock areas. No abundance information is available for the insular stocks. Baird *et al.* (2015) identified two BIAs for small and resident populations of pantropical spotted dolphins in the Hawaiian Archipelago (Table 3). Please see Carretta *et al.* (2018) for additional information about these stocks.

Spinner Dolphin—Spinner dolphins occur in all tropical and most subtropical waters between 30–40° N and 20–40° S latitude, generally in areas with a shallow mixed layer, shallow and steep thermocline, and little variation in surface temperature (Perrin 2009a). Within the central and western Pacific, spinner dolphins are island-associated and use shallow protected bays to rest and socialize during the day then move offshore at night to feed. They are common in nearshore waters throughout the Hawaiian archipelago (Carretta *et al.,* 2012). There are seven stocks found within the PIFSC fisheries and ecosystem research areas: (1) Hawaiʻi Island, (2) Oahu/4-Islands, (3) Kauai/Niʻihau, (4) Pearl & Hermes Reef, (5) Kure/Midway, (6) Hawai'i pelagic, including animals found both within the Hawaiian Islands EEZ (outside of island-associated boundaries) and in adjacent international waters, and (7) the American Samoa stock, which includes animals inhabiting the U.S. EEZ waters around American Samoa. Baird *et al.* identified five BIAs for small and resident populations of spinner dolphins within the Hawaiian Archipelago (Table 3). Please see Caretta *et al.* (2019) for additional information about the Hawaiian Island Stocks Complex (including the Hawai'i Island, Oahu/4-islands, Kauai/Niʻihau, Pearl & Hermes Reef, Midway Atoll/Kure, Hawai'i Pelagic stocks) and Caretta *et al.* (2011) for additional information on the American Samoa stock.

Melon-headed Whale—Melon-headed whales are distributed worldwide in tropical and warm-temperate waters. The distribution of reported sightings suggests that the oceanic habitat of this species is in primarily equatorial waters (Perryman *et al.,* 1994). They generally occur offshore in deep oceanic waters. Nearshore distribution is generally associated with deep water areas near to the coast (Perryman 2009). Photo-identification and telemetry studies suggest there are two demographically-independent populations of melon-headed whales in Hawaiian waters, the Hawaiian Islands stock and the Kohala resident stock (Carretta *et al.,* 2015). The Hawaiian Islands stock includes melon-headed whales inhabiting waters throughout the U.S. EEZ of the Hawaiian Islands, including the area of the Kohala resident stock, and adjacent high seas waters, and (2) the Kohala resident stock, which includes melon-headed whales off the Kohala Peninsula and west coast of Hawai'i Island and in less than 2500m of water. At this time, assignment of individual melon-headed whales within the overlap area to either stock requires photographic-identification of the animal. Resighting data and social network analyses of photographed individuals indicate very low rates of interchange between the Hawaiian Islands and Kohala resident stocks (Aschettino *et al.,* 2012). This finding is supported by preliminary genetic analyses that suggest a restricted gene flow between the Kohala residents and other melon-headed whales sampled in Hawaiian waters (Oleson *et al.,* 2013). Baird *et al.* (2015) identified a BIA for the small and resident Kohola stock of melon-headed whales off the northwestern tip of Hawai'i Island (Table 3). Please see Caretta *et al.* (2018) for additional information about these stocks.

False Killer Whale—False killer whales occur throughout tropical and warm temperate waters worldwide. They are largely pelagic, but also occur nearshore and in shallow waters around oceanic islands (Baird 2009b). Five stocks are recognized in the U.S. EEZ of the Pacific Ocean: (1) The Main Hawaiian Islands insular stock, which includes animals found within 72 km (38.9 nm) of the MHIs; (2) the NWHI stock, which includes animals inhabiting waters within the NWHI and a 50 nmi radius around Kauai; (3) the Hawai'i pelagic stock, which includes animals found inhabiting waters greater than 11 km (5.9 nmi) from the MHI, including adjacent high seas waters; (4) the Palmyra Atoll stock, which includes animals found within the U.S. EEZ of Palmyra Atoll; and (5) the American Samoa stock, which includes animals found within the U.S. EEZ of American Samoa. On August 23, 2018, NMFS designated waters from the 45-m depth contour to the 3,200-m depth contour around the main Hawaiian Islands from Niʻihau east to Hawai'i as critical habitat for the Main Hawaiian Islands insular DPS of false killer whales (83 FR 35062; July 24, 2018). Additionally, Baird *et al.* (2015) identified waters throughout the MHI as a BIA for the small and resident Main Hawaiian Islands insular stock of false killer whales (Table 3). As described in detail below, a take reduction plan was finalized in 2012 to address high rates of false killer whale mortality and serious injury in Hawai'i-based longline fisheries. Please see Caretta *et al.* (2018) for additional information on the Hawaiian Islands Stock Complex (including the MHI Insular stock, NWHI stock, and Hawai'i pelagic stock), and Caretta *et al.* (2011) and (2012) for additional information on the American Samoa and Palmyra Atoll stocks, respectively.

Hawaiian monk seal—The majority of the Hawaiian monk seal population can be found around the NWHI, but a small and growing population lives around the MHIs. As summarized in Carretta *et al.* (2014, 2012, and citations herein), Hawaiian monk seals are distributed predominantly in six NWHI subpopulations at French Frigate Shoals, Laysan and Lisianski Islands, Pearl and Hermes Reef, and Midway and Kure Atoll. They also occur at Necker and Nihoa Islands, which are the southernmost islands in the NWHI. Genetic variation among NWHI monk seals is extremely low and may reflect both a long-term history at low population levels and more recent human influences (Schultz *et al.* 2008). On average, 10–15 percent of the seals migrate among the NWHI subpopulations. Thus, the NWHI subpopulations are not isolated, though the different island subpopulations have exhibited considerable demographic independence. Observed interchange of individuals among the NWHI and MHI regions is uncommon, and genetic stock structure analysis supports management of the species as a single stock. Please see Caretta *et al.* (2019) for additional information on this species.

Take Reduction Planning—Take reduction plans are designed to help recover and prevent the depletion of strategic marine mammal stocks that interact with certain U.S. commercial fisheries, as required by Section 118 of the MMPA. The immediate goal of a take reduction plan is to reduce, within six months of its implementation, the M/SI of marine mammals incidental to commercial fishing to less than the PBR level. The long-term goal is to reduce, within five years of its implementation, the M/SI of marine mammals incidental to commercial fishing to insignificant levels, approaching a zero serious injury and mortality rate, taking into account the economics of the fishery, the availability of existing technology, and

existing state or regional fishery management plans. Take reduction teams are convened to develop these plans.

For marine mammals off Hawaii, there is currently one take reduction plan in effect (False Killer Whale Take Reduction Plan). The goal of this plan is to reduce M/SI of false killer whales in Hawaii-based deep-set and shallow-set longline fisheries; the plan addresses only the Hawai'i Insular and Hawai'i Pelagic stocks of false killer whale. A team was convened in 2010 and a final plan produced in 2012 (77 FR 71260; November 29, 2012). The most recent five-year averages of M/SI for these stocks are below PBR. More information is available online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/false-killer-whale-take-reduction.* PIFSC has requested the authorization of incidental M/SI for false killer whale; however, this take is expected to potentially occur only for the Hawai'i Pelagic stock or for false killer whales belonging to unspecified stocks and occurring in high seas waters (see ''Estimated Take'' later in this document). PIFSC longline research would not occur within the ranges of other designated stocks of false killer whale.

Regulatory measures required by the plan include gear requirements, longline prohibited areas, training and certification in marine mammal handling and release, captains' supervision of marine mammal handling and release, and posting of NMFS-approved placards on longline vessels. On July 18, 2018, NMFS issued a temporary rule (83 FR 33848) to close one of the prohibited areas to deep-set longline fishing for the remainder of the calendar year, because a bycatch trigger established per the regulations implementing the plan was met. PIFSC does not conduct research with longline gear within any of the exclusion zones established by the plan, and PIFSC longline gear adheres to all relevant requirements placed on commercial gear. PIFSC is not conducting commercial fishing as described by the MMPA, but PIFSC is adhering to these commercial fishing restrictions nevertheless. There are no take reduction plans currently in effect for fisheries in American Samoa, the Marianas, or other locations considered herein.

Unusual Mortality Events (UME)—A UME is defined under the MMPA as ''a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response.'' Based on records from 1991 to the present, there have not been any formally recognized UMEs in the Pacific Islands. However, some migratory whales may have been impacted by UMEs occurring in Alaska. For more information on UMEs, please visit: *www.fisheries.noaa.gov/national/marine-life-distress/marine-mammal-unusual-mortality-events.*

Biologically Important Areas

In 2015, NOAA's Cetacean Density and Distribution Mapping Working Group identified Biologically Important Areas (BIAs) for 24 cetacean species, stocks, or populations in seven regions (US East Coast, Gulf of Mexico, West Coast, Hawaiian Islands, Gulf of Alaska, Aleutian Islands and Bering Sea, and Arctic) within U.S. waters through an expert elicitation process. BIAs are reproductive areas, feeding areas, migratory corridors, and areas in which small and resident populations are concentrated. BIAs are region-, species-, and time-specific. A description of the types of BIAs found within PIFSC fishery research areas follows:

Reproductive Areas: Areas and months within which a particular species or population selectively mates, gives birth, or is found with neonates or other sensitive age classes.

Feeding Areas: Areas and months within which a particular species or population selectively feeds. These may either be found consistently in space and time, or may be associated with ephemeral features that are less predictable but can be delineated and are generally located within a larger identifiable area.

Migratory Corridors: Areas and months within which a substantial portion of a species or population is known to migrate; the corridor is typically delimited on one or both sides by land or ice.

Small and Resident Population: Areas and months within which small and resident populations occupying a limited geographic extent exist.

The delineation of BIAs does not have direct or immediate regulatory consequences. Rather, the BIA assessment is intended to provide the best available science to help inform analyses and planning for applicants, and to support regulatory and management decisions under existing authorities, and to support the reduction of anthropogenic impacts on cetaceans and to achieve conservation and protection goals. In addition, the BIAs and associated information may be used to identify information gaps and prioritize future research and modeling efforts to better understand cetaceans, their habitat, and ecosystems. Table 4 provides a list of BIAs found within PIFSC fisheries research areas (Baird *et al.,* 2015).

TABLE 4—BIOLOGICALLY IMPORTANT AREAS WITHIN PIFSC RESEARCH AREAS

BIA name	Species	BIA type	Time of year	Size (km^2)
HAWAIIAN ARCHIPELAGO RESEARCH AREA (HARA)				
Kure Atoll and Midway Atoll	Spinner dolphin	Small and resident	Year-round	4,630
Pearl and Hermes Reef	Spinner dolphin	Small and resident	Year-round	2,099
Kauai and Ni'ihau	Spinner dolphin	Small and resident	Year-round	7,226
Ni'ihau and Kauai	Bottlenose dolphin	Small and resident	Year-round	2,764
Kauai, Ni'ihau, Maui, Hawai'i Islands	Humpback whale	Reproduction	February-March	5,846
Oahu and 4-Islands Area	Spinner dolphin	Small and resident	Year-round	14,616
Oahu	Bottlenose dolphin	Small and resident	Year-round	3,802
Oahu	Pantropical spotted dolphin	Small and resident	Year-round	1,048
Hawai'i Island to Ni'ihau Island	False killer whale	Small and resident	Year-round	5,430
4-Islands Area	Bottlenose dolphin	Small and resident	Year-round	10,622
Maui and Lanai	Pantropical spotted dolphin	Small and resident	Year-round	699
Hawai'i Island	Cuvier's beaked whale	Small and resident	Year-round	23,583
Hawai'i Island	Blainville's beaked whale	Small and resident	Year-round	7,442
Hawai'i Island	Bottlenose dolphin	Small and resident	Year-round	4,732
Hawai'i Island	Melon-headed whale	Small and resident	Year-round	1,753
Hawai'i Island	Short-finned pilot whale	Small and resident	Year-round	2,968

TABLE 4—BIOLOGICALLY IMPORTANT AREAS WITHIN PIFSC RESEARCH AREAS—Continued

BIA name	Species	BIA type	Time of year	Size (km^2)
Hawai'i Island	Rough-toothed dolphin	Small and resident	Year-round	7,175
Hawai'i Island	Spinner dolphin	Small and resident	Year-round	9,469
Hawai'i Island	Pantropical spotted dolphin	Small and resident	Year-round	5,505
Hawai'i Island	Pygmy killer whale	Small and resident	Year-round	2,265
Hawai'i Island	Dwarf sperm whale	Small and resident	Year-round	2,675

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.,* Richardson *et al.,* 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.,* low-frequency cetaceans).

Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 dB threshold from the normalized composite audiograms, with an exception for lower limits for low-frequency cetaceans where the result was deemed to be biologically implausible and the lower bound of the low-frequency cetacean hearing range from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 5.

TABLE 5—MARINE MAMMAL HEARING GROUPS (NMFS, 2018)

Hearing group	Generalized hearing range *
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz.
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz.
High-frequency (HF) cetaceans (true porpoises, *Kogia,* river dolphins, cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*).	275 Hz to 160 kHz.
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz.
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz.

* Represents the generalized hearing range for the entire group as a composite (*i.e.,* all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al.,* 2007) and PW pinniped (approximation).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information. Twenty-six marine mammal species (25 cetacean species and one phocid pinniped) have the potential to co-occur with PIFSC research activities—please refer to Table 3. Of the 25 cetacean species that may be present, six are classified as low-frequency cetaceans, 17 are classified as mid-frequency cetaceans, and two are classified as high-frequency cetaceans.

Potential Effects of the Specified Activity on Marine Mammals and Their Habitat

This section includes a summary and discussion of the ways that components of the specified activity (*e.g.,* gear deployment, use of active acoustic sources, visual disturbance) may impact marine mammals and their habitat. The ''Estimated Take'' section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The ''Negligible Impact Analysis and Determination'' section considers the content of this section and the material it references, the ''Estimated Take'' section, and the ''Proposed Mitigation'' section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks. In the following discussion, we consider potential effects to marine mammals from ship strike, physical interaction with the gear types described previously, use of active acoustic sources, and visual disturbance of pinnipeds.

Ship Strike

Vessel collisions with marine mammals, or ship strikes, can result in death or serious injury of the animal. Wounds resulting from ship strike may include massive trauma, hemorrhaging, broken bones, or propeller lacerations (Knowlton and Kraus, 2001). An animal at the surface may be struck directly by a vessel, a surfacing animal may hit the bottom of a vessel, or an animal just below the surface may be cut by a vessel's propeller. Animals may survive superficial strikes. These interactions are typically associated with large whales, which on occasion, are fatally struck by large commercial ships. Although smaller cetaceans or pinnipeds are more maneuverable in relation to large vessels than are large whales, they may also be susceptible to ship strike. The severity of injuries typically depends on the size and speed of the vessel, with the probability of death or serious injury increasing as vessel speed increases (Knowlton and Kraus, 2001; Laist *et al.,* 2001; Vanderlaan and Taggart, 2007; Conn and Silber, 2013). Impact forces increase with speed, as does the probability of a strike at a given distance due to reduced detection and reaction time (Silber *et al.,* 2010; Gende *et al.,* 2011).

Pace and Silber (2005) found that the probability of death or serious injury by ship strike increased rapidly with increasing vessel speed. Specifically, the predicted probability of serious

injury or death increased from 45 to 75 percent as vessel speed increased from 10 to 14 kt, and exceeded 90 percent at 17 kt. Higher speeds during collisions result in greater force of impact, but higher speeds also appear to increase the chance of severe injuries or death through increased likelihood of collision by pulling whales toward the vessel (Clyne, 1999; Knowlton *et al.,* 1995). In a separate study, Vanderlaan and Taggart (2007) analyzed the probability of lethal mortality of large whales at a given speed, showing that the greatest rate of change in the probability of a lethal injury to a large whale as a function of vessel speed occurs between 8.6 and 15 kt. The chances of a lethal injury decline from approximately 80 percent at 15 kt to approximately 20 percent at 8.6 kt. At speeds below 11.8 kt, the chances of lethal injury drop below fifty percent, while the probability asymptotically increases toward one hundred percent above 15 kt.

In an effort to reduce the number and severity of strikes of the endangered North Atlantic right whale (*Eubalaena glacialis*), NMFS implemented speed restrictions in 2008 (73 FR 60173; October 10, 2008). These restrictions require that vessels greater than or equal to 65 ft (19.8 m) in length travel at less than or equal to 10 kt near key port entrances and in certain areas of right whale aggregation along the U.S. eastern seaboard. Conn and Silber (2013) estimated that these restrictions reduced total ship strike mortality risk levels by 80 to 90 percent.

For vessels used in PIFSC research activities, transit speeds average 10 kt (but vary from 6–14 kt), while vessel speed during active sampling with towed gear is typically only 2–4 kt. At sampling speeds, both the possibility of striking a marine mammal and the possibility of a strike resulting in serious injury or mortality are discountable. Ship strikes, as analyzed in the studies cited above, generally involve commercial shipping, which is much more common in both space and time than is research activity. Jensen and Silber (2004) summarized ship strikes of large whales worldwide from 1975–2003 and found that most collisions occurred in the open ocean and involved large vessels (*e.g.,* commercial shipping). Commercial fishing vessels, which are similar in size to some of the ships used by PIFSC, were responsible for three percent of recorded collisions, while only one such incident (0.75 percent of recorded ship strikes) was reported for a research vessel during that time period.

It is possible for ship strikes to occur while traveling at slow speeds. For example, a hydrographic survey vessel traveling at low speed (5.5 kt) while conducting mapping surveys off the central California coast struck and killed a blue whale in 2009. The State of California determined that the whale had suddenly and unexpectedly surfaced beneath the hull, with the result that the propeller severed the whale's vertebrae, and that this was an unavoidable event. The strike represents the only such incident in approximately 540,000 hours of similar coastal mapping activity ($p = 1.9 \times 10^{-6}$; 95% CI = $0 - 5.5 \times 10^{-6}$; NMFS, 2013). In addition, a research vessel reported a fatal strike in 2011 of a dolphin in the Atlantic, demonstrating that it is possible for strikes involving smaller cetaceans or pinnipeds to occur. In that case, the incident report indicated that an animal apparently was struck by the vessel's propeller as it was intentionally swimming near the vessel. While indicative of the type of unusual events that cannot be ruled out, neither of these instances represents a circumstance that would be considered reasonably foreseeable or that would be considered preventable.

Although the likelihood of vessels associated with research surveys striking a marine mammal are low, this rule requires a robust ship strike avoidance protocol (see ''Proposed Mitigation''), which we believe eliminates any foreseeable risk of ship strike. We anticipate that vessel collisions involving PIFSC research vessels, while not impossible, represent unlikely, unpredictable events. Furthermore, PIFSC has never reported a ship strike associated with fisheries research activities conducted or funded by the PIFSC. Given the proposed mitigation measures such as the presence of bridge crew watching for obstacles at all times (including marine mammals), the presence of marine mammal observers on some surveys, (see ''Proposed Mitigation'') as well as the small number of research cruises relative to commercial ship traffic, we believe that the possibility of ship strike is discountable. Moreover, given the relatively slow speeds at which PIFSC research vessels travel during sampling activities and during transit, even if a marine mammal is struck, it would not likely result in serious injury or mortality (Knowlton and Kraus, 2001; Laist *et al.,* 2001; Vanderlaan and Taggart, 2007; Conn and Silber, 2013). No incidental take resulting from ship strike is anticipated.

Research Gear

The types of research gear used by PIFSC were described previously under ''Detailed Description of Activity.'' Here, we broadly categorize the gear as either (1) extremely unlikely to result in marine mammal interactions, or (2) gear that may result in marine mammal interactions. Former category is not considered further, while those in the latter category is discussed below. Marine mammal interaction is most likely for trawls and longlines.

Trawl nets and longlines deployed by PIFSC are similar to gear used in various commercial fisheries. There are documented occurrences of and potential for marine mammal interaction with these gear types via physical contact such as capture or entanglement. Read *et al.* (2006) estimated marine mammal bycatch in U.S. fisheries from 1990–99 and derived an estimate of global marine mammal bycatch by expanding U.S. bycatch estimates using data on fleet composition from the United Nations Food and Agriculture Organization (FAO). Although most U.S. bycatch for both cetaceans (84 percent) and pinnipeds (98 percent) occurred in gillnets (a type of gear not used by PIFSC), global marine mammal bycatch in trawls and longlines is likely substantial given that total global bycatch may be hundreds of thousands of individuals per year (Read *et al.,* 2006). In addition, global bycatch via longline has likely increased, as longlines are currently the most common method of capturing swordfish and tuna since the U.N. banned the use of high seas driftnets over 2.5 km long in 1991 (high seas driftnets were previously often 40–60 km long) (Read, 2008; FAO, 2001).

Marine mammals are intelligent and inquisitive—when their pursuit of prey coincides with human pursuit of the same resources, physical interaction with fishing gear may occur (*e.g.,* Beverton, 1985). Fishermen and marine mammals are both drawn to areas of high prey density, and certain fishing activities may further attract marine mammals by providing food (*e.g.,* bait, captured fish, bycatch discards) or by otherwise making it easier for animals to feed on a concentrated food source. Similarly, near-surface foraging opportunities may present an advantage for marine mammals by negating the need for energetically expensive deep foraging dives (Hamer and Goldsworthy, 2006). Trawling, for example, can make available previously unexploited food resources by gathering prey that may otherwise be too fast or deep for normal

predation, or may concentrate calories in an otherwise patchy landscape (Fertl and Leatherwood, 1997). Pilot whales, which are generally considered to be teuthophagous (*i.e.,* feeding primarily on squid), were commonly observed in association with Atlantic mackerel (*Scomber scombrus*) trawl fisheries from 1977–88 in the northeast U.S. EEZ (Waring *et al.,* 1990). Not surprisingly, stomach contents of captured whales contained high proportions of mackerel (68 percent of non-trace food items), indicating that the ready availability of a novel, concentrated, high-calorie prey item resulted in changed dietary composition (Read, 1994).

These interactions can result in injury or death for the animal(s) involved and/or damage to fishing gear. Coastal animals, including various pinnipeds, bottlenose dolphins, and harbor porpoises, are perhaps the most vulnerable to these interactions with set or passive fishing gear (*e.g.,* gillnets, traps) the most likely culprit (*e.g.,* Beverton, 1985; Barlow *et al.,* 1994; Read *et al.,* 2006; Byrd *et al.,* 2014; Lewison *et al.,* 2014). However, interactions with trawls and longlines may also occur and therefore also warrant mitigation measures (NMFS, 2017). Although all marine mammal species have some risk for interaction with fishing gear (*e.g.,* Northridge, 1984), the extent of interactions is likely dependent on the biology, ecology, and behavior of the species involved and the type, location, and nature of the fishery.

Trawl Nets—As described previously, trawl nets are towed nets (*i.e.,* active fishing) consisting of a cone-shaped net with a codend or bag for collecting the fish and can be designed to fish at the bottom, surface, or any other depth in the water column. Here we refer to bottom trawls and pelagic trawls (midwater or surface, *i.e.,* any net not designed to tend the bottom while fishing). Trawl nets can capture or entangle marine mammals. This may occur in bottom trawls, presumably when marine mammals feed on fish caught therein, and in pelagic trawls which may or may not be coincident with marine mammals feeding (Northridge, 1984).

Capture or entanglement may occur whenever marine mammals are swimming near the gear, intentionally (*e.g.,* foraging) or unintentionally (*e.g.,* migrating), and any animal captured in a net is at significant risk of drowning unless quickly freed. Netting and tow lines (also called lazy lines) may also entangle around the a marine mammal's head, body, flukes, pectoral fins, or dorsal fin. Interaction that does not result in the immediate death of the animal by drowning can cause injury (*i.e.,* Level A harassment) or serious injury. Constricting lines wrapped around the animal can immobilize the animal or injure by cutting into or through blubber, muscles and bone (*i.e.,* penetrating injuries) or constricting blood flow to or severing appendages. Immobilization of the animal, if it does not result in immediate drowning, can cause internal injuries from prolonged stress and/or severe struggling and/or impede the animal's ability to feed (resulting in starvation or reduced fitness) (Andersen *et al.,* 2008).

Marine mammal interactions with trawl nets, through capture or entanglement, are well-documented. Dolphins are known to attend operating nets in order to either benefit from disturbance of the bottom or to prey on discards or fish within the net. For example, Leatherwood (1975) reported that the most frequently observed feeding pattern for bottlenose dolphins in the Gulf of Mexico involved herds following working shrimp trawlers, apparently feeding on organisms stirred up from the benthos. Bearzi and di Sciara (1997) opportunistically investigated working trawlers in the Adriatic Sea from 1990–94 and found that ten percent were accompanied by foraging bottlenose dolphins. Pelagic trawls appear to have greater potential to capture cetaceans, because the nets may be towed at faster speeds, these trawls are more likely to target species that are important prey for marine mammals (*e.g.,* squid, mackerel), and because pelagic trawls often fish in deeper waters with potential for a more diverse assemblage of species (Hall *et al.,* 2000).

Globally, at least 17 cetacean species are known to feed in association with trawlers and trawl nets have killed individuals of at least 25 species, including several large whales, porpoises, and a variety of delphinids (Perez, 2006; Young and Iudicello, 2007; Karpouzli and Leaper, 2004; Hall *et al.,* 2000; Fertl and Leatherwood, 1997; Northridge, 1991; Song *et al.,* 2010). Trawls have killed at least eighteen species of seals and sea lions (Wickens, 1995; Perez, 2006; Zeeberg *et al.,* 2006). Records of direct interaction between trawl nets and marine mammals (both cetaceans and pinnipeds) exist where trawling and animals co-occur. A lack of recorded interactions where animals are known to be present may indicate simply that trawling is absent or are an insignificant component of fisheries in that region or that interactions were not observed, recorded, or reported.

In evaluating risk relative to a specific fishery (or comparable research survey), one must consider the size of the net as well as frequency, timing, and location of deployment. These considerations inform determinations of whether marine mammal take is likely. Other NMFS science centers have records of marine mammal take from bottom, surface, and midwater trawl nets. However, PIFSC has no history of marine mammal take from trawl nets used during PIFSC fisheries and ecosystem surveys.

Longlines—Longlines are a passive fishing technique of consisting of strings of baited hooks that are either anchored to the bottom (targeting groundfish), or are free-floating (targeting pelagic species). PIFSC does not utilize free-floating longlines. Any longline generally consists of a mainline from which leader lines (gangions) with baited hooks branch off at a specified interval. Bottom longlines may be of monofilament or multifilament natural or synthetic lines.

The longline is left to passively fish (*i.e,* soak) for a set period of time before the vessel returns to retrieve the gear. Two or more floats act as visual markers to facilitate gear retrieval. Longlines may also utilize radio beacons to assist gear detection. Radio beacons are particularly import for pelagic longlines that may drift a significant distance from the deployment location.

Marine mammals may be hooked or entangled in longline gear, with interactions potentially resulting in death due to drowning, strangulation, severing of carotid arteries or the esophagus, infection, an inability to evade predators, or starvation due to an inability to catch prey (Hofmeyr *et al.,* 2002), although it is more likely that marine mammals will survive if they can reach the surface to breathe. Injuries, including serious injury, may consist of lacerations and puncture wounds. Animals may attempt to depredate on either bait or catch, with subsequent hooking, or may become accidentally entangled. As described for trawls, entanglement can lead to constricting lines wrapped around the animals and/or immobilization, and even if entangling materials are removed the wounds caused may continue to weaken the animal or allow further infection (Hofmeyr *et al.,* 2002). Large whales may become entangled in a longline and then break free with a portion of gear trailing, resulting in alteration of swimming energetics due to drag and ultimate loss of fitness and potential mortality (Andersen *et al.,* 2008). Weight of the gear can cause entangling lines to further constrict and further injure the animal. Hooking injuries and ingested gear are most

common in small cetaceans and pinnipeds, but have been observed in large cetaceans (*e.g.,* sperm whales). The severity of the injury depends on the species, whether ingested gear includes hooks, whether the gear works its way into the gastrointestinal (GI) tract, whether the gear penetrates the GI lining, and the location of the hooking (*e.g.,* embedded in the animal's stomach or other internal body parts) (Andersen *et al.,* 2008). Bottom longlines pose less of a threat to marine mammals due to their deployment on the ocean bottom but can still result in entanglement in buoy lines or hooking as the line is either deployed or retrieved. The rate of interaction between longline fisheries and marine mammals depends on the degree of overlap between longline effort and species distribution, hook style and size, type of bait and target catch, and fishing practices (such as setting/hauling during the day or at night).

As was noted for trawl nets, many species of cetaceans and pinnipeds are documented to have been killed by longlines, including several large whales, porpoises, a variety of delphinids, seals, and sea lions (Perez, 2006; Young and Iudicello, 2007; Northridge, 1984, 1991; Wickens, 1995). Records of direct interaction between longlines and marine mammals (both cetaceans and pinnipeds) exist where longline fishing and animals co-occur. A lack of recorded interactions where animals are known to be present may indicate simply that longlining is absent or an insignificant component of fisheries in that region or that interactions were not observed, recorded, or reported.

In evaluating risk relative to a specific fishery (or research survey), one must consider the length of the line and number of hooks deployed as well as frequency, timing, and location of deployment. These considerations inform determinations of whether interaction with marine mammals is likely. PIFSC has not recorded marine mammal interactions or takes with any longline survey. While a lack of historical interactions does not in and of itself indicate that future interactions are unlikely, we believe that the historical record, considered in context with the frequency and timing of these activities, as well as mitigation measures employed indicate that future marine mammal interactions with these gears would be uncommon.

Other research gear—PIFSC conducts a variety of instrument deployments and insular fish abundance surveys between 50m and 600m and bottomfish essential fish habitat (EFH) surveys between 100–400m (see Table 1.1 in PIFSC's application) using gear similar to that used in a variety of commercial fisheries. Thus such research gear has the potential for entangling marine mammals surfacing from dives. Such ''instrument deployments'' include aMOUSS, BotCam, BRUVS deployed from a vessel and connected to the surface with a line to a float or vessel; environmental sampling instruments deployed by line such as CTD; baited or unbaited bottom traps such as lobster traps and fish traps deployed from a vessel and connected to the surface with line to a float.

All other gears used in PIFSC fisheries research (*e.g.,* various plankton nets, CTDs, remotely operated vehicles (ROVs)) do not have the expected potential for marine mammal interactions. PIFSC has no record of marine mammal interaction or takes from these types of gear. Specifically, we consider CTDs, ROVs, small surface trawls, plankton nets, other small nets, camera traps, dredges, and vertically deployed or towed imaging systems to be no-impact gear types. Unlike trawl nets, seine nets, and longline gear, which are used in both scientific research and commercial fishing applications, these other gears are not considered similar or analogous to any commercial fishing gear and are not designed to capture any commercially salable species, or to collect any sort of sample in large quantities. They are not considered to have the potential to take marine mammals primarily because of their design or how they are deployed. For example, CTDs are typically deployed in a vertical cast on a cable and have no loose lines or other entanglement hazards. A Bongo net is typically deployed on a cable, whereas neuston nets (these may be plankton nets or small trawls) are often deployed in the upper one meter of the water column; either net type has very small size (*e.g.,* two bongo nets of 0.5 m^2 each or a neuston net of approximately 2 m^2) and no trailing lines to present an entanglement risk. These other gear types are not considered further in this document.

Acoustic Effects

Detailed descriptions of the potential effects of PIFSC's use of acoustic sources are provided in other **Federal Register** notices for incidental take regulations issued to other NMFS Science Centers (*e.g.,* the ''Acoustic Effects'' section of the proposed rule for the taking of marine mammals incidental to NMFS Alaska Fisheries Science Center fisheries research (83 FR 37660; August 1, 2018) and the ''Potential Effects of Underwater Sound'' section of the proposed rule for the taking of marine mammals incidental to NMFS Southeast Fisheries Science Center research (84 FR 6603; February 27, 2019)). No significant new information is available, and those discussions provide the necessary adequate and relevant information regarding the potential effects of PIFSC's specified activity on marine mammals and their habitat. Therefore, we refer the reader to those documents rather than repeating the information here.

Exposure to sound through the use of active acoustic systems for research purposes may result in Level B harassment. However, as detailed in the previously referenced discussions, Level A harassment in the form of permanent threshold shift (PTS) is extremely unlikely to occur, and we consider such effects discountable. With specific reference to Level B harassment that may occur as a result of acoustic exposure, we note that the analytical methods described in the incidental take regulations for other NMFS Science Centers are retained here. However, the state of science with regard to our understanding of the likely potential effects of the use of systems like those used by PIFSC has advanced in recent years, as have readily available approaches to estimating the acoustic footprints of such sources, with the result that we view this analysis as highly conservative. Although more recent literature provides documentation of marine mammal responses to the use of these and similar acoustic systems (*e.g.,* Cholewiak *et al.,* 2017; Quick *et al.,* 2017; Varghese *et al.,* 2020), the described responses do not generally comport with the degree of severity that should be associated with Level B harassment, as defined by the MMPA. We retain the analytical approach described in the incidental take regulations for other NMFS Science Centers for consistency with existing analyses and for purposes of efficiency here, and consider this acceptable because the approach provides a conservative estimate of potential incidents of Level B harassment (see ''Estimated Take'' section of this document). In summary, while we propose to authorize the amount of take by Level B harassment indicated in the ''Estimated Take'' section, and consider these potential takings at face value in our negligible impact analysis, it is uncertain whether use of these acoustic systems are likely to cause take at all, much less at the estimated levels.

Potential Effects of Visual Disturbance

Hawaiian monk seals occur in the HARA and WCPRA. Hawaiian monk seals use numerous sites in the MHI and the NWHI to haul out (*e.g.,* sandy beaches, rocky outcroppings, exposed reefs). Here, the physical presence and sounds of researchers walking by or passing nearby in small boats may disturb animals present. PIFSC expects some of these animals will exhibit a behavioral response to the visual stimuli (*e.g.,* including alert behavior, movement, vocalizing, or flushing). NMFS does not consider the lesser reactions (*e.g.,* alert behavior) to constitute harassment. These events are expected to be infrequent and cause only a temporary disturbance on the order of minutes. Monitoring results from other activities involving the disturbance of pinnipeds and relevant studies of pinniped populations that experience more regular vessel disturbance indicate that individually significant or population level impacts are unlikely to occur (*e.g.,* Henry and Hammil, 2001).

In areas where disturbance of haulouts due to periodic human activity (*e.g.,* researchers approaching on foot, passage of small vessels, maintenance activity) occurs, monitoring results have generally indicated that pinnipeds typically move or flush from the haulout in response to human presence or visual disturbance, although some individuals typically remain hauledout (*e.g.,* SCWA, 2012). Upon the occurrence of low-severity disturbance (*i.e.,* the approach of a vessel or person as opposed to an explosion or sonic boom), pinnipeds typically exhibit a continuum of responses, beginning with alert movements (*e.g.,* raising the head), which may then escalate to movement away from the stimulus and possible flushing into the water. Flushed pinnipeds typically re-occupy the haulout within minutes to hours of the stimulus (Acevedo-Gutierrez and Johnson 2007).

In a popular tourism area of the Pacific Northwest where human disturbances occurred frequently, past studies observed stable populations of seals over a twenty-year period (Calambokidis *et al.,* 1991). Despite high levels of seasonal disturbance by tourists using both motorized and non-motorized vessels, Calambokidis *et al.* (1991) observed an increase in site use (pup rearing) and classified this area as one of the most important pupping sites for seals in the region. Another study observed an increase in seal vigilance when vessels passed the haulout site, but then vigilance relaxed within ten minutes of the vessels' passing (Fox, 2008). If vessels passed frequently within a short time period (*e.g.,* 24 hours), a reduction in the total number of seals present was also observed (Fox, 2008).

Level A harassment, serious injury, or mortality could likely only occur as a result of trampling in a stampede (a potentially dangerous occurrence in which large numbers of animals succumb to mass panic and rush away from a stimulus) or abandonment of pups. Pups could be present at times during PIFSC research effort, but PIFSC researchers take precautions to minimize disturbance and prevent any possibility of stampedes, including choosing travel routes as far away from hauledout pinnipeds as possible and by moving sample site locations to avoid consistent haulout areas. In addition, Hawaiian monk seals do not typically haul out in large groups where stampedes would be of concern.

Disturbance of pinnipeds caused by PIFSC survey activities would be expected to last for only short periods of time, separated by significant amounts of time in which no disturbance occurred. Because such disturbance is sporadic, rather than chronic, and of low intensity, individual marine mammals are unlikely to incur any detrimental impacts to vital rates or ability to forage and, thus, loss of fitness. Correspondingly, even local populations, much less the overall stock of animals, are extremely unlikely to accrue any significantly detrimental impacts.

Anticipated Effects on Marine Mammal Habitat

Effects to Prey—In addition to direct, or operational, interactions between fishing gear and marine mammals, indirect (*i.e.,* biological or ecological) interactions occur as well, in which marine mammals and fisheries both utilize the same resource, potentially resulting in competition that may be mutually disadvantageous (*e.g.,* Northridge, 1984; Beddington *et al.,* 1985; Wickens, 1995). Marine mammal prey varies by species, season, and location and, for some marine mammals, is not well documented. PIFSC fisheries research removals of species commonly utilized by marine mammals are relatively low. Prey of sei whales and blue whales are primarily zooplankton, which are targeted by PIFSC fisheries research with collection only on the order of liters, so the likelihood of research activities changing prey availability is low and impact negligible to none. Humpback whales do not feed within the PIFSC region of fisheries research, so there is no effect (Herman *et al.,* 2007). PIFSC fisheries research activities may affect sperm whale prey (squid), but this is expected to be minor due to the insignificant amount of squid removed through fisheries research (*i.e.,* hundreds of pounds). There may be some minor overlap between the RAMP survey removals of a variety of reef fishes and the Insular Fish Abundance Estimation Comparison Surveys. By example, in the main Hawaiian Islands, the majority of sampling for these surveys is at the periphery of monk seal foraging habitat and is a tiny fraction of what is taken by monk seals or by apex predatory fish or non-commercial fisheries (Sprague *et al.* 2013, Kobayashi and Kawamoto 1995). In the case of false killer whale consumption of tunas, mahi, and ono, there may be some minor overlap with fisheries research removals in the pelagic longline research. However, here the removal by PIFSC fisheries research, regardless of season and location is minor relative to that taken through commercial fisheries. For example, commercial fisheries catches for most pelagic species typically range from the hundreds to thousands of metric tons, whereas the catch in similar fisheries research activities would only occasionally range as high as hundreds to thousands of pounds in any particular year (see Sections 4.2.3 and 4.3.3 of the PIFSC EA for more information on fish catch during research surveys and commercial harvest).

Research catches are also distributed over a wide area because of the random sampling design covering large sample areas. Fish removals by research are therefore highly localized and unlikely to affect the spatial concentrations and availability of prey for any marine mammal species. The overall effect of research catches on marine mammals through competition for prey may therefore be considered insignificant for all species.

Acoustic Habitat—Acoustic habitat is the soundscape—which encompasses all of the sound present in a particular location and time, as a whole—when considered from the perspective of the animals experiencing it. Animals produce sound for, or listen for sounds produced by, conspecifics (communication during feeding, mating, and other social activities), other animals (finding prey or avoiding predators), and the physical environment (finding suitable habitats, navigating). Together, sounds made by animals and the geophysical environment (*e.g.,* produced by earthquakes, lightning, wind, rain,

waves) make up the natural contributions to the total acoustics of a place. These acoustic conditions, termed acoustic habitat, are one attribute of an animal's total habitat.

Soundscapes are also defined by, and acoustic habitat influenced by, the total contribution of anthropogenic sound. This may include incidental emissions from sources such as vessel traffic, or may be intentionally introduced to the marine environment for data acquisition purposes (as in the PIFSC's use of active acoustic sources). Anthropogenic noise varies widely in its frequency content, duration, and loudness and these characteristics greatly influence the potential habitat-mediated effects to marine mammals (please also see the discussion on masking in the Acoustic Effects'' section of the proposed rule for the taking of marine mammals incidental to NMFS Alaska Fisheries Science Center fisheries research (83 FR 37660; August 1, 2018)), which may range from local effects for brief periods of time to chronic effects over large areas and for long durations. Depending on the extent of effects to habitat, animals may alter their communications signals (thereby potentially expending additional energy) or miss acoustic cues (either conspecific or adventitious). For more detail on these concepts see, *e.g.,* Barber *et al.,* 2010; Pijanowski *et al.,* 2011; Francis and Barber, 2013; Lillis *et al.,* 2014.

Problems arising from a failure to detect cues are more likely to occur when noise stimuli are chronic and overlap with biologically relevant cues used for communication, orientation, and predator/prey detection (Francis and Barber, 2013). As described above (''Acoustic Effects''), the signals emitted by PIFSC active acoustic sources are generally high frequency, of short duration, and transient. These factors mean that the signals will attenuate rapidly (not travel over great distances), may not be perceived or affect perception even when animals are in the vicinity, and would not be considered chronic in any given location. PIFSC use of these sources is widely dispersed in both space and time. In conjunction with the prior factors, this means that it is highly unlikely that PIFSC use of these sources would, on their own, have any appreciable effect on acoustic habitat. Sounds emitted by PIFSC vessels would be of lower frequency and continuous, but would also be widely dispersed in both space and time. PIFSC vessel traffic—including both sound from the vessel itself and from the active acoustic sources—is of very low density compared to commercial shipping traffic or commercial fishing vessels and would therefore represent an insignificant incremental increase in the total amount of anthropogenic sound input to the marine environment.

Physical Habitat—PIFSC conducts some bottom trawling, which may physically damage seafloor habitat. In addition, PIFSC fishery research activities and funded fishery research activities use bottom contact fishing gear, including deep-set longline, lobster traps, and settlement traps. These fishing gears contact the seafloor and may cause physical damage but the impacts are localized and minimal as this type of gear is fixed in position rather than towed across the sea floor. Physical damage may include furrowing and smoothing of the seafloor as well as the displacement of rocks and boulders, and such damage can increase with multiple contacts in the same area (Schwinghamer *et al.,* 1998; Kaiser *et al.,* 2002; Malik and Mayer, 2007; NRC, 2002). The effects of bottom contact gear differ in each type of benthic environment. In sandy habitats with strong currents, the furrows created by mobile bottom contact gear quickly begin to erode because lighter weight sand at the edges of furrows can be easily moved by water back towards the center of the furrow (NRC, 2002). Duration of effects in these environments therefore tend to be very short because the terrain and associated organisms are accustomed to natural disturbance. By contrast, the physical features of more stable hard bottom habitats are less susceptible to disturbance, but once damaged or removed by fishing gear, the organisms that grow on gravel, cobbles, and boulders can take years to recover, especially in deeper water where there is less natural disturbance (NRC, 2002). However, the area of benthic habitat affected by PIFSC research each year would be a very small fraction of total area of benthic habitat in the four research areas and effects are not expected to occur in areas of particular importance.

Damage to seafloor habitat may also harm infauna and epifauna (*i.e.,* animals that live in or on the seafloor or on structures on the seafloor), including corals (Schwinghamer *et al.,* 1998; Collie *et al.,* 2000; Stevenson *et al.,* 2004). In general, recovery from biological damage varies based on the type of fishing gear used, the type of seafloor surface (*i.e.,* mud, sand, gravel, mixed substrate), and the level of repeated disturbances. Recovery timelines of 1–18 months are expected. However, repeated disturbance of an area can prolong the recovery time (Stevenson *et al.,* 2004), and recovery of corals may take significantly longer than 18 months.

The Deep Coral and Sponge Research Survey collect small pieces of coral for DNA samples, voucher specimens, and paleoclimate samples. The combined sampling of these studies amounts to about 5.5 pounds/year. Together, these coral samples comprise a small percentage of the total population of coral colonies (see Section 4.2.7 of the PIFSC EA). The RAMP Survey collects up to 500 samples per year of corals (including ESA-listed species), coral products, algae and algal products, and sessile invertebrates. The NMFS Pacific Islands Regional Office has issued a Biological Opinion concluding that PIFSC surveys are not likely to jeopardize the continued existence of any coral species taken.

As described in the preceding, the potential for PIFSC research to affect the availability of prey to marine mammals or to meaningfully impact the quality of physical or acoustic habitat is considered to be insignificant for all species. Effects to marine mammal habitat will not be discussed further in this document.

Estimated Take

This section provides an estimate of the number of incidental takes proposed for authorization. The estimated take informs NMFS' determination of whether the number of takes are ''small'' and the negligible impact determination.

Except with respect to certain activities not pertinent here, the MMPA defines ''harassment'' as: Any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Take of marine mammals incidental to PIFSC research activities could occur as a result of (1) injury or mortality due to gear interaction (Level A harassment, serious injury, or mortality); (2) behavioral disturbance resulting from the use of active acoustic sources (Level B harassment only); or (3) behavioral disturbance of pinnipeds resulting from incidental approach of researchers and research vessels (Level B harassment only). Below we describe how the potential take is estimated.

Estimated Take Due to Gear Interaction

The use of historical interactions as a basis to estimate future take of marine mammals in fisheries research gear has been utilized in the LOA applications and rules of other NMFS Fisheries Science Centers (*e.g.,* Southwest (SWFSC), Northwest (NWFSC)). However, because PIFSC has no history of marine mammal take in any of the gear used during its fisheries and ecosystem research, additional factors must be considered. Instead, NMFS used information from commercial fisheries, other NMFS Fisheries Science Centers operations, and published take as described below.

NMFS believes it is appropriate to include estimates for future incidental takes of a number of species that have not been taken by PIFSC historically, but inhabit the same areas and show similar types of behaviors and vulnerabilities to gear used by other NMFS Fisheries Science Centers and used in commercial fisheries (based on the 2019 List of Fisheries (LOF), see *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries*). A number of factors were taken into account to determine whether a species may have a similar vulnerability to certain types of gear as species taken in commercial gear and research gear elsewhere (*e.g.,* distribution, density, abundance, behavior, feeding ecology, travel in groups, and common association with other species historically taken in commercial gear or other Fisheries Science Centers). While such take could potentially occur, NMFS believes that any occurrences would likely be rare given that no such take in PIFSC research has occurred (despite many years of the same or similar surveys occurring). Moreover, marine mammal behavioral and ecological characteristics reduce the risk of incidental take from research gear, and the required mitigation measures reduce the risk of incidental take.

As background to the process of determining which species not historically taken may have sufficient vulnerability to capture in PIFSC gear to justify inclusion in these proposed regulations, we note that the PIFSC is NMFS's research arm in the central and western Pacific Ocean and may be considered as a leading source of expert knowledge regarding marine mammals (*e.g.,* behavior, abundance, density) in the areas where they operate. The species for which the take request was formulated were selected by the PIFSC, and we have concurred with these decisions.

While PIFSC has not historically taken marine mammal species in its longline gear, it is well documented that some species potentially encountered during PIFSC surveys are taken in commercial longline fisheries. In order to evaluate the potential vulnerability of species to trawl and longline fishing gear and entanglement from instrument deployment and traps, we first consulted the List of Fisheries (LOF). The LOF classifies U.S. commercial fisheries into one of three categories according to the level of incidental marine mammal M/SI that occurs on an annual basis over the most recent five-year period (generally) for which data has been analyzed: Category I, frequent incidental M/SI; Category II, occasional incidental M/SI; and Category III, remote likelihood of or no known incidental M/SI. We provide summary information, as presented in the 2020 LOF (85 FR 21079; April 16, 2020), in Table 6. In order to simplify information presented, and to encompass information related to other similar species from different locations, we group marine mammals by genus (where there is more than one member of the genus found in U.S. waters). Where there are documented incidents of M/SI incidental to relevant commercial fisheries, we note whether we believe those incidents provide sufficient basis upon which to infer vulnerability to capture in PIFSC research gear. For a listing of all Category I, II, and II fisheries using relevant gears, associated estimates of fishery participants, and specific locations and fisheries associated with the historical fisheries takes indicated in Table 4 below, please see the 2020 LOF. For specific numbers of marine mammal takes associated with these fisheries, please see the relevant SARs. More information is available online at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries* and *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments.*

TABLE 6—U.S. COMMERCIAL FISHERIES INTERACTIONS FOR TRAWL AND LONGLINE GEAR FOR RELEVANT SPECIES

Species [1]	Trawl [2]	Vulnerability inferred? [3]	Longline [2]	Vulnerability inferred [3]
Bottlenose dolphin	N	Y	Y	Y
False killer whale	N	N	Y	Y
Humpback whale	N	N	Y	Y
Kogia spp.	N	N	Y	Y
Pygmy killer whale	N	N	Y	Y
Risso's dolphin	N	N	Y	Y
Rough-toothed dolphin	N	Y	Y	Y
Short-finned pilot whale	N	N	Y	Y
Sperm whale	N	N	Y	Y
Striped dolphin	N	Y	Y	Y
Cuvier's beaked whale	N	N	Y	Y
Blainville's beaked whale	N	N	Y	Y
Pantropical spotted dolphin	N	Y	N	Y
Spinner dolphin	N	Y	N	Y

[1] Please refer to Table 3 for taxonomic reference.

[2] Indicates whether any member of the species has documented incidental M/SI in a U.S. fishery using that gear in the most recent five-year timespan for which data is available.

[3] Indicates whether NMFS has inferred that a species not historically taken by PIFSC has the potential to be taken in the future based on records of marine mammals taken by U.S. commercial fisheries. Y = yes, N = no.

Information related to incidental M/SI in relevant commercial fisheries is not, however, the sole determinant of appropriateness for authorizing take incidental to PIFSC survey operations. Numerous factors (*e.g.,* species-specific

knowledge regarding animal behavior, overall abundance in the geographic region, density relative to PIFSC survey effort, feeding ecology, propensity to travel in groups commonly associated with other species historically taken) were considered by the PIFSC to determine whether a species not previously taken by PIFSC may be taken during future research activities. In some cases, NMFS have determined that species without documented M/SI may nevertheless be vulnerable to capture in PIFSC research gear. Those species with no records of historical interaction with PIFSC research gear and no documented M/SI in relevant commercial fisheries, and for which the PIFSC has not requested the authorization of incidental take, are not considered further in this section. The PIFSC believes generally that any sex or age class of those species for which take authorization is requested could be taken.

To estimate the potential number of takes by M/SI from PIFSC research gear, we first determine which species may have vulnerability to capture by gear type. Of those species, we then determine whether any may have similar propensity to be taken by a given gear as a historically-taken species in U.S. commercial fisheries (inferred vulnerability). For these species, we assume it is possible that take could occur while at the same time contending that, absent significant range shifts or changes in habitat usage, capture of a species not historically taken by PIFSC research activities would likely be a very rare event. Therefore, we assume that take by PIFSC would be a rare event such that authorization of a single take over the five-year period, for each region where the gear is used and the species is present, is likely sufficient given the low risk of marine mammals interacting with PIFSC gear.

Longline—While longline research would only be conducted outside of the longline exclusion areas (see *https://www.fisheries.noaa.gov/national/marine-mammal-protection/false-killer-whale-take-reduction*), several species of small cetaceans were deemed to have a similar vulnerability to longline gear as some historically-taken species by other NMFS Fisheries Science Centers or by commercial fisheries using factors outlined above. The commercial fisheries, HI deep-set longline (Category 1) and the HI shallow-set longline and American Samoa longline (both Category II) fisheries, report taking marine mammals. The longline fisheries the LOF identifies having taken marine mammals on the High Seas are the Western Pacific Pelagic (HI Deep-set component, Category 1) and Western Pacific Pelagic (HI Shallow-set component, Category II).

PIFSC assumes any take of marine mammals in longline fisheries research activities will be a rare occurrence. As stated above, NMFS expects that take of marine mammals by M/SI by PIFSC would be a rare event such that no more than a single take of each species/stock by M/SI over the five-year period, is reasonably likely to occur. Therefore, PIFSC requested one take in longline gear over the five-year authorization period throughout the PIFSC research area for each of the following species: Bottlenose dolphin (Hawai'i pelagic stock), Blainville's beaked whale (Hawai'i pelagic stock), Cuvier's beaked whale (Hawai'i pelagic stock), *Kogia* spp. (Hawai'i stocks), false killer whale (Hawai'i pelagic stock), Pantropical spotted dolphin (all stocks), pygmy killer whale (Hawai'i stock), rough toothed dolphin (Hawai'i stock), Risso's dolphin (Hawai'i stock), short-finned pilot whale (Hawai'i stock), and striped dolphin (Hawai'i stock) (Table 5). While the LOF includes commercial fishery takes of false killer whales and rough-toothed dolphins from the respective American Samoa stocks, PIFSC is not requesting take by M/SI of these species/stocks because they do not anticipate conducting longline research anywhere within the range of these species/stocks throughout the time period addressed by this application (*e.g.,* longline surveys in the WCPRA would occur within 500 nmi of the HARA, which is at least 1600 nmi from the ASARA and outside of the range of the American Samoa stocks of false killer whales and rough-toothed dolphins). Additionally, the LOF includes commercial fishery takes of the MHI insular stock of false killer whales, but PIFSC will not be conducting longline research within the stock's range, and so is not requesting M&SI/Level A takes of this stock. Spinner dolphins have not been reported taken in Hawai'i based longline fisheries in the LOF. The PIFSC is therefore not requesting any take of this species in analogous fisheries research gear.

While PIFSC has not historically taken large whales in its longline gear, these species are taken in commercial longline fisheries. There are two large whale species that have been taken by commercial longline fisheries and for which PIFSC is requesting a single take each over the five-year authorization period in longline gear: The humpback whale and the sperm whale. Both of these species are listed as endangered under the ESA and thus by definition, depleted under the MMPA. Although large whale species could become entangled in longline gear, the probability of interaction with PIFSC longline gear is extremely low considering a much lower level of survey effort and shorter duration sets relative to that of commercial fisheries. For example, in 2014 approximately 47.1 million hooks were deployed in commercial longline fishing in the PIFSC research areas (see *https://www.fisheries.noaa.gov/resource/data/hawaii-longline-fishery-logbook-summary-reports*); in contrast PIFSC proposes to deploy up to 73,500 hooks/year or 0.0015 percent of the effort in these commercial fisheries. The mitigation measures taken by PIFSC are also expected to reduce the likelihood of taking large whales (see *Proposed Mitigation* section) Although there is only a limited potential for take, PIFSC is requesting one take of humpback whale (central North Pacific stock) in longline gear and one take of a sperm whale (Hawai'i stock) by M/SI based on analogy with commercial fisheries over the five-year authorization period of this application.

Trawl—Although PIFSC has never taken small delphinids in a pelagic midwater trawl such as an Isaacs-Kidd or Cobb trawl, and no commercial trawl fisheries in PIFSC research areas have reported takes, there is a remote possibility such a take could occur. This research targets very small pelagic species (*e.g.,* micronekton, pelagic larvae) not likely to attract foraging small delphinids. Thus incidental catch of a small delphinid is unlikely in either technique but even less so for the Isaacs-Kidd trawl due to the very small opening (about 3 m x 3 m) whereas the mouth of the PIFSC Cobb trawls are about 10 m x 10 m. However, to address a rare situation or event, PIFSC requests one take each of the following small delphinids in trawl gear over the five year period of this application: Bottlenose dolphin (all stocks), rough-toothed dolphin (Hawai'i stock), spinner dolphin (all stocks), Pantropical spotted dolphin (all stocks), and striped dolphin (Hawai'i stock).

Instrument and Trap Deployments—Humpback whales inhabit shallow waters, typically within the 100-fathom isobaths in the HARA (Baird *et al.,* 2000). PIFSC conducts a variety of instrument deployments and insular fish abundance surveys between 50 m and 600 m and bottomfish EFH surveys between 100–400 m (see Table 1.1 in PIFSC's application) using gear similar to that used in a variety of commercial fisheries. Thus such research gear has the potential for entangling humpback whales surfacing from dives. Such

instruments include aMOUSS, BotCam, BRUVS deployed from a vessel and connected to the surface with a line to a float or vessel; environmental sampling instruments deployed by line; and baited or unbaited bottom traps such as lobster traps and fish traps deployed from a vessel and connected to the surface with line to a float.

Therefore PIFSC is requesting one take of humpback whale (central North Pacific stock) in gear associated with deployed instruments and traps. In addition, based on a similarity in behavior, several species of ''curious'' small delphinids have the potential for becoming entangled in gear associated with instrument deployments. PIFSC has established mitigation measures already in place to reduce potential interactions (*e.g.,* no deployment when marine mammals are known to be in the immediate area). Because there is a remote chance such entanglement may occur when an animal investigates such gear, PIFSC requests one take each over the five-year authorization period of each of the following small delphinid species: Bottlenose dolphin (all stocks), rough-toothed dolphin (Hawai'i stock), spinner dolphin (all stocks), and Pantropical spotted dolphin (all stocks) in ''instrument deployment'' gears.

Other gear—PIFSC considered the risk of interaction with marine mammals for all the research gear and instruments it uses, but PIFSC did not request incidental takes for research gear other than midwater trawls, longline, instrument deployments, and traps. PIFSC acknowledges that by having hooks, nets, lines, or vessels in the water there is a potential for incidental take of marine mammals during research activities. However, many of the fisheries and ecosystem research activities conducted by PIFSC involve gear or instruments that do not present a large enough risk to be included as part of the mortality, serious injury, or Level A harassment take request. These include gear and instruments that are operated by hand or close enough to the vessel that they can be continuously observed and controlled such as dip nets, scoop nets, handheld gear and instruments used by SCUBA divers or free divers (cameras, transect lines, and spears), environmental data collectors deployed or attached by hand to the reef, marine debris removal tools (knives and float bags), and small surface net trawls adjacent to the vessel. Other gear or instruments that are used so infrequently, operate so slowly, or carried out with appropriate mitigation measures so as not to present a reasonable risk of interactions with marine mammals include: Autonomous vehicles such as gliders, autonomous underwater vehicles (AUVs), unmanned aerial vehicles (UAVs), unmanned aircraft systems (UASs), and towed optical assessment devices (TOADs); submersibles; towed-divers; troll fishing; larval settlement traps temporarily installed on the reef; expendable bathythermographs (XBTs); and environmental data collectors temporarily deployed from a vessel to the seafloor and then retrieved remotely such as high-frequency recording packages (HARPs) and ecological acoustic readers (EARs). Please refer to Table 1.1 and Appendix A in PIFSC's application for a list of the research projects that use this gear and descriptions of their use.

The gear and instruments listed above are not considered to have a reasonable potential to take marine mammals given their physical characteristics, how they are fished, and the environments where they are used. There have been no marine mammal mortalities, serious injuries, or other Level A takes associated with any of these gear types. Because of this, PIFSC does not expect these activities to result in take of marine mammals in the PIFSC research areas, and as such is not requesting marine mammal take for these gears or instruments.

Bottomfishing—There is evidence that cetaceans and Hawaiian monk seals occasionally pursue fish caught on various hook-and-line gear (depredation of fishing lines) deployed in commercial and non-commercial fisheries across Hawai'i (Nitta and Henderson 1993, Kobayashi and Kawamoto 1994). This depredation behavior, which is documented as catch loss from the hook-and-line gear, may be beneficial to the marine mammal in providing prey but it also opens the possibility for the marine mammal to be hooked or entangled in the gear. PIFSC gave careful consideration to the potential for including incidental take requests for marine mammals in bottom handline (bottomfishing) gear because of the planned increase in research effort using that gear in the Insular Fish Abundance Estimation Comparison Survey (from approximately 700 sets per year to over 7000 sets per year). PIFSC has not had any interactions in the past with marine mammals while conducting research with bottomfishing gear in the MHI.

Bottlenose dolphins have been identified as the primary species associated with depredation of catch in the bottomfish fishery and they appear to be adept at pulling hooked fish from the gear without breaking the line or taking hooks off the line (Kobayashi and Kawamoto 1994). It is not known if these interactions result in injury, serious injury, or mortality of bottlenose dolphins or other cetaceans (Caretta *et al.,* 2015). No mortality or serious injuries of monk seals have been attributed to the MHI bottomfish handline fishery (Caretta *et al.,* 2019). In 2016, 11 seal hookings were documented and all were classified as non-serious injuries, although six of these would have been deemed serious had they not been mitigated (Henderson 2017, Mercer 2018). The hook-and-line rigging used to target ulua (jacks, *Caranx* spp.) are typical of shoreline fisheries that are distinct from the bottomfishing gear and methods used by PIFSC during its fisheries and ecosystem research. Although there are some similarities between the shoreline fishery and the bottomfishing gear used by PIFSC (*e.g.,* circle hooks), the general size and the way the hooks are rigged (*e.g.,* baits, leaders, weights, tackle) are typically different and probably present different risks of incidental hooking to monk seals. Ulua hooks are generally much larger circle hooks than PIFSC uses because the targeted ulua are usually greater than 50 pounds in weight. Shoreline fisheries (deployed from shore with rod and reel) also typically use ''slide bait'' or ''slide rigs'' that allow the use of live bait (small fish or octopus) hooked in the middle of the bait. If a monk seal pursued this live bait and targeted the center of the bait or swallowed it whole, it could get hooked in the mouth. PIFSC research with bottomfishing gear uses pieces of fish for bait that attract bottomfish but not monk seals. Monk seals could be attracted to a caught bottomfish but, given the length of the target bottomfish, it is unlikely that a monk seal would be physically capable of swallowing the whole fish and thus swallowing the hook. The risk of monk seals getting hooked on bottomfishing gear used in PIFSC research is therefore less than the risk of getting hooked on shoreline hook-and-line gears which are identified in Caretta *et al.* (2019).

PIFSC has no records of marine mammals interacting with bottomfishing research gear and given the mitigation measures the PIFSC would be required to implement for bottomfishing research to prevent marine mammals from interacting with bottomfishing activities (*e.g.,* avoiding fishing when monk seals are present; see *Proposed Mitigation* below), NMFS has concluded that the risk of marine mammal interactions with its research bottomfishing gear is not high enough to warrant authorizing incidental take for

marine mammals in that gear. These proposed regulations would require PIFSC to document potential depredation of its bottomfish research gear (catch loss) in the future, and increase monitoring efforts when catch loss becomes apparent, in an effort to better understand the potential risks of hooking to monk seals and other marine mammals.

TABLE 7—TOTAL ESTIMATED TAKE DUE TO GEAR INTERACTION, 2021–26 [A]

Common name (stock)	PIFSC potential M/SI Level A take request (all areas combined)							
	Midwater trawl		Hook-and-line		Instrument deployments and traps		Sum all gear (trawl, hook-and-line, and instruments and traps) annual request	Sum all gears 5-year request [a]
	Calculated average take per year	Total takes over 5-year period	Calculated average take per year	Total takes over 5-year period	Calculated average take per year	Total takes over 5-year period		
Blainville's beaked whale (Hawai'i stock)	.....	.....	0.2	1	.....	.....	0.2	1
Cuvier's Beaked whale (Hawai'i pelagic stock)	.....	.....	0.2	1	.....	.....	0.2	1
Bottlenose dolphin (Hawai'i pelagic stock)	0.2	1	0.2	1	0.2	1	0.6	3
Bottlenose dolphin (All stocks, except above)	0.2	1	.....	.....	0.2	1	0.4	2
False killer whale (Hawai'i pelagic or unspecified [b])	.....	.....	0.2	1 [c]	.....	.....	0.2	1
Humpback whale (Central North Pacific stock)	.....	.....	0.2	1	0.2	1	0.4	2
Kogia spp. (Hawai'i stocks)	.....	.....	0.2	1	.....	.....	0.2	1
Pantropical spotted dolphin (all stocks)	0.2	1	0.2	1	0.2	1	0.6	3
Pygmy killer whale (Hawai'i stock)	.....	.....	0.2	1	.....	.....	0.2	1
Risso's dolphin (Hawai'i stock)	.....	.....	0.2	1	.....	.....	0.2	1
Rough-toothed dolphin (Hawai'i stock)	0.2	1	0.2	1	0.2	1	0.6	3
Rough-toothed dolphin (all stocks except above)	.....	.....	0.2	1	0.2	1	0.4	2
Short-finned pilot whale (Hawai'i stock)	.....	.....	0.2	1	.....	.....	0.2	1
Sperm whale (Hawai'i stock)	.....	.....	0.2	1	.....	.....	0.2	1
Spinner dolphin (all stocks)	0.2	1	.....	.....	0.2	1	0.4	2
Striped dolphin (all stocks)	0.2	1	0.2	1	.....	.....	0.4	2

[a] Please see Table 6 and preceding text for explanation of take estimates. Takes proposed for authorization are informed by area- and gear-specific vulnerability. Because we have no specific information to indicate whether any given future interaction might result in M/SI versus Level A harassment, we conservatively assume that all interactions equate to mortality for these fishing gear interactions.
[b] Hawai'i pelagic stock is designated as strategic. ''Unspecified stock'' occurs on the high seas.
[c] Longline research would only occur outside of FKW exclusion zone; potential take not in HARA, only within WCPRA.

Estimated Take Due to Acoustic Harassment

As described previously (''Potential Effects of the Specified Activity on Marine Mammals and Their Habitat''), we believe that PIFSC use of active acoustic sources has, at most, the potential to cause Level B harassment of marine mammals. In order to attempt to quantify the potential for Level B harassment to occur, NMFS (including the PIFSC and acoustics experts from other parts of NMFS) developed an analytical framework considering characteristics of the active acoustic systems described previously under ''Description of Active Acoustic Sound Sources,'' their expected patterns of use, and characteristics of the marine mammal species that may interact with them. We believe that this quantitative assessment benefits from its simplicity and consistency with current NMFS acoustic guidance regarding Level B harassment but caution that, based on a number of deliberately precautionary assumptions, the resulting take estimates may be seen as an overestimate of the potential for behavioral harassment to occur as a result of the operation of these systems. Additional details on the approach used and the assumptions made that result in these estimates are described below.

Acoustic Thresholds

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals behavioral harassment (equated to Level B harassment) is reasonably expected or to incur PTS of some degree (Level A harassment). We note NMFS has begun efforts to update its behavioral thresholds, considering all available data, and is formulating a strategy for updating those thresholds for all types of sound sources considered in incidental take authorizations. It is NMFS's intention to conduct both internal and external review of any new thresholds prior to finalizing this rule. In the interim, we apply the traditional thresholds.

Level B Harassment for non-explosive sources—Though significantly driven by received sound level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.,* frequency, predictability, duty cycle), the environment (*e.g.,* bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.,* 2007, Ellison *et al.,* 2011). Based on the best available science and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μPa (rms) for continuous (*e.g.* vibratory pile-driving, drilling) and above 160 dB re 1 μPa (rms) for intermittent (*e.g.,* scientific sonar, seismic airgun) sources.

The Marine Mammal Commission (Commission) has previously suggested NMFS apply the 120 dB continuous Level B harassment threshold to scientific sonar such as the ones proposed by the PIFSC. NMFS has responded to this comment in multiple **Federal Register** notices of issuance for other NMFS science centers. Here we summarize why the 160 dB threshold is appropriate when estimating take from acoustic sources used during PIFSC research activities. NMFS historically

has referred to the 160 dB threshold as the impulsive threshold, and the 120 dB threshold as the continuous threshold, which in and of itself is conflicting as one is referring to pulse characteristics and the other is referring to the temporal component. A more accurate term for the impulsive threshold is the intermittent threshold. This distinction is important because, when assessing the potential for hearing loss (permanent threshold shift (PTS) or temporary threshold shift (TTS)) or non-auditory injury (*e.g.,* lung injury), the spectral characteristics of source (impulsive vs. non-impulsive) is critical to assessing the potential for such impacts. However, for behavior, the temporal component is more appropriate to consider. Gomez *et al.* (2016) conducted a systematic literature review (370 papers) and analysis (79 studies, 195 data cases) to better assess probability and severity of behavioral responses in marine mammals exposed to anthropogenic sound. They found a significant relationship between source type and behavioral response when sources were split into broad categories that reflected whether sources were continuous, sonar, or seismic (the latter two of which are intermittent sources). Moreover, while Gomez *et al* (2017) acknowledges acoustically sensitive species (beaked whales and harbor porpoise), the authors do not recommend an alternative method for categorizing sound sources for these species when assessing behavioral impacts from noise exposure.

To apply the continuous 120 dB threshold to all species based on data from known acoustically sensitive species (one species of which is the harbor porpoise, which does not inhabit PIFSC research areas) is not warranted, as it would be unnecessarily conservative for non-sensitive species. Qualitatively considered in our effects analysis below is that beaked whales and harbor porpoise are more acoustically sensitive than other cetacean species, and thus are more likely to demonstrate overt changes in behavior when exposed to such sources. Further, in absence of very sophisticated acoustic modeling, our propagation rates are also conservative. Therefore, the distance to the 160 dB threshold is likely much closer to the source than calculated. In summary, the PIFSC's proposed activity only includes the use of intermittent sources (scientific sonar). Therefore, the 160 dB threshold is applicable when quantitatively estimating take by behavioral harassment incidental to PIFSC scientific sonar for all marine mammal species.

Level A harassment for non-explosive sources—NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). However, as described in greater detail in the *Potential Effects* section, given the highly directional, *e.g.,* narrow beam widths, NMFS does not anticipate animals would be exposed to noise levels resulting in PTS. Therefore, the Level A criteria do not apply here and are not discussed further; NMFS is proposing take by Level B harassment only.

Level B harassment—The operating frequencies of active acoustic systems used by the PIFSC range from 30–200 kHz (see Table 1). These frequencies are within the very upper hearing range limits of baleen whales (7 Hz to 35 kHz). The Simrad EM300 operates at a frequency of 30 kHz and the Simrad EK60 operates at 30–200 kHz. Baleen whales may be able to detect sound from the Simrad EM300 and the Simrad EK60 when it operates at the lower frequency. However, the beam pattern is extremely narrow (1 degree) at that frequency. The ADCP Ocean Surveyor operates at 75 kHz, which is outside of baleen whale hearing capabilities. Therefore, we would not expect any exposures to these signals to result in behavioral harassment in baleen whales.

The assessment paradigm for active acoustic sources used in PIFSC fisheries research is relatively straightforward and has a number of key simple and conservative assumptions. NMFS' current acoustic guidance requires in most cases that we assume Level B harassment occurs when a marine mammal receives an acoustic signal at or above a simple step-function threshold. For use of these active acoustic systems used during PIFSC research, NMFS uses the threshold is 160 dB re 1 µPa (rms) as the best available science indicates the temporal characteristics of a source are most influential in determining behavioral impacts (Gomez *et al.,* 2016), and it is NMFS long standing practice to apply the 160 dB threshold to intermittent sources. Estimating the number of exposures at the specified received level requires several determinations, each of which is described sequentially below:

(1) A detailed characterization of the acoustic characteristics of the effective sound source or sources in operation;

(2) The operational areas exposed to levels at or above those associated with Level B harassment when these sources are in operation;

(3) A method for quantifying the resulting sound fields around these sources; and

(4) An estimate of the average density for marine mammal species in each area of operation.

Quantifying the spatial and temporal dimension of the sound exposure footprint (or ''swath width'') of the active acoustic devices in operation on moving vessels and their relationship to the average density of marine mammals enables a quantitative estimate of the number of individuals for which sound levels exceed the relevant threshold for each area. The number of potential incidents of Level B harassment is ultimately estimated as the product of the volume of water ensonified at 160 dB rms or higher and the volumetric density of animals determined from simple assumptions about their vertical stratification in the water column. Specifically, reasonable assumptions based on what is known about diving behavior across different marine mammal species were made to segregate those that predominately remain in the upper 200 m of the water column versus those that regularly dive deeper during foraging and transit. Methods for estimating each of these calculations are described in greater detail in the following sections, along with the simplifying assumptions made, and followed by the take estimates.

Sound source characteristics—An initial characterization of the general source parameters for the primary active acoustic sources operated by the PIFSC was conducted, enabling a full assessment of all sound sources used by the PIFSC and delineation of Category 1 and Category 2 sources, the latter of which were carried forward for analysis here. This auditing of the active acoustic sources also enabled a determination of the predominant sources that, when operated, would have sound footprints exceeding those from any other simultaneously used sources. These sources were effectively those used directly in acoustic propagation modeling to estimate the zones within which the 160 dB rms received level would occur.

Many of these sources can be operated in different modes and with different output parameters. In modeling their potential impact areas, those features among those given previously in Table 2 (*e.g.,* lowest operating frequency) that

would lead to the most precautionary estimate of maximum received level ranges (*i.e.,* largest ensonified area) were used. The effective beam patterns took into account the normal modes in which these sources are typically operated. While these signals are brief and intermittent, a conservative assumption was taken in ignoring the temporal pattern of transmitted pulses in calculating Level B harassment events. Operating characteristics of each of the predominant sound sources were used in the calculation of effective line-kilometers and area of exposure for each source in each survey.

TABLE 8—EFFECTIVE EXPOSURE AREAS FOR PREDOMINANT ACOUSTIC SOURCES ACROSS TWO DEPTH STRATA

Active acoustic system	Effective exposure area: Sea surface to 200 m depth (km^2)	Effective exposure area: Sea surface to depth at which sound is attenuated to 160 dB SPL (km^2) [a]
Simrad EK60	0.0082	0.0413
Simrad EM300	0.112	3.7661
ADCP Ocean Surveyor	0.0086	0.0187

[a] Greater than 200 m depth.

Calculating effective line-kilometers—As described below, based on the operating parameters for each source type, an estimated volume of water ensonified at or above the 160 dB rms threshold was calculated. In all cases where multiple sources are operated simultaneously, the one with the largest estimated acoustic footprint was considered to be the effective source. Two depth zones were defined for each of the four research areas: 0–200 m and > 200 m. Effective line distance and volume ensonified was calculated for each depth strata (0–200 m and > 200 m), where appropriate. In some cases, this resulted in different sources being predominant in each depth stratum for all line km (*i.e.,* the total linear distance traveled during acoustic survey operations) when multiple sources were in operation. This was accounted for in estimating overall exposures for species that utilize both depth strata (deep divers). For each ecosystem area, the total number of line km that would be surveyed was determined, as was the relative percentage of surveyed line km associated with each source. The total line-kilometers for each survey, the dominant source, the effective percentages associated with each depth, and the effective total volume ensonified are given below (Table 7).

Calculating volume of water ensonified—The cross-sectional area of water ensonified to a 160 dB rms received level was calculated using a simple spherical spreading model of sound propagation loss (20 log R) such that there would be 60 dB of attenuation over 1000 m. Spherical spreading is a reasonable assumption even in relatively shallow waters since, taking into account the beam angle, the reflected energy from the seafloor will be much weaker than the direct source and the volume influenced by the reflected acoustic energy would be much smaller over the relatively short ranges involved. We also accounted for the frequency-dependent absorption coefficient and beam pattern of these sound sources, which is generally highly directional. The lowest frequency was used for systems that are operated over a range of frequencies. The vertical extent of this area is calculated for two depth strata. These results, shown in Table 9, were applied differentially based on the typical vertical stratification of marine mammals (see Table 10).

Following the determination of effective sound exposure area for transmissions considered in two dimensions, the next step was to determine the effective volume of water ensonified at or above 160 dB rms for the entirety of each survey. For each of the three predominant sound sources, the volume of water ensonified is estimated as the athwartship cross-sectional area (in square kilometers) of sound at or above 160 dB rms (as illustrated in Figure 6.1 of PIFSC's application) multiplied by the total distance traveled by the ship. Where different sources operating simultaneously would be predominant in each different depth strata, the resulting cross-sectional area calculated took this into account. Specifically, for shallow-diving species this cross-sectional area was determined for whichever was predominant in the shallow stratum, whereas for deeper-diving species this area was calculated from the combined effects of the predominant source in the shallow stratum and the (sometimes different) source predominating in the deep stratum. This creates an effective total volume characterizing the area ensonified when each predominant source is operated and accounts for the fact that deeper-diving species may encounter a complex sound field in different portions of the water column.

TABLE 9—FIVE-YEAR TOTAL LINE KILOMETERS FOR EACH VESSEL AND ITS PREDOMINANT SOURCE WITHIN TWO DEPTH STRATA

Vessel—survey	Average line kms per vessel	Dominant source	% Time source dominant (0–200m)	Line km/dominant source (0–200m)	Volume ensonified at 0–200 m Depth (km^3)	% Time source dominant (>200m)	Line km/dominant source (>200m)	Volume ensonified at >200 m Depth (km^3)
Hawaiian Archipelago Research Area								
Hi'ialakai RAMP	36000	Simrad EM 300.	25	9000	1000.8	25	9000	32894.1
	36000	ADCP Ocean Surveyor.	75	27000	232.2	75	27000	272.1
Hi'ialakai Coral Reef Benthic Mapping	17000	Simrad EM 300.	100	17000	1890.4	100	17000	62133.3
Oscar Elton Sette Kona IEA	5000	EK60	0	0	0	100	5000	165.5
	5000	ADCP Ocean Surveyor.	100	5000	43.0	0	0	0
Oscar Elton Sette Insular Fish Abundance Estimation	3000	EK60	0	0	0	100	3000	99.3
	3000	ADCP Ocean Surveyor.	100	3000	28.5	0	0	0
Hi'ialakai Deep Coral and Sponge Research	5500	Simrad EM300.	100	5500	611.6	100	5500	20102.0
Oscar Elton Sette Sampling Pelagic Stages of Insular Fish Species.	4000	EK60	0	0	0	100	4000	132.4
	4000	ADCP Ocean Surveyor.	100	4000	34.4	0	0	0
Oscar Elton Sette Cetacean Ecology Assessment	40000	EK60	0	0	0	100	40000	1324.0
	40000	ADCP Ocean Surveyor.	100	40000	344.0	0	0	0
Hi'ialakai or *Oscar Elton Sette* RAMP Gear & Instrument Development & Field Trials.	2500	EK60	0	0	0	100	2500	82.8
	2500	ADCP Ocean Surveyor.	100	2500	21.5	0	0	0
Mariana Archipelago Research Area								
Hi'ialakai RAMP	18000	Simrad EK60.	25	4500	500.4	25	4500	16447.1
	18000	ADCP Ocean Surveyor.	75	13500	116.1	75	13500	136.4
Hi'ialakai Coral Reef Benthic Mapping	8600	Simrad EM 300.	100	8600	956.3	100	8600	31432.1
Oscar Elton Sette Insular Fish Abundance Estimation	2000	EK60	0	0	0	100	2000	66.2
	2000	ADCP Ocean Surveyor.	100	2000	17.2	0	0	0
Hi'ialakai Deep Coral and Sponge	5500	Simrad EM 300.	100	5500	611.6	100	5500	20102.0
Oscar Elton Sette Sampling Pelagic Stages of Insular Fish.	2000	EK60	0	0	0	100	2000	66.2

TABLE 9—FIVE-YEAR TOTAL LINE KILOMETERS FOR EACH VESSEL AND ITS PREDOMINANT SOURCE WITHIN TWO DEPTH STRATA—Continued

Vessel—survey	Average line kms per vessel	Dominant source	% Time source dominant (0–200m)	Line km/dominant source (0–200m)	Volume ensonified at 0–200 m Depth (km^3)	% Time source dominant (>200m)	Line km/dominant source (>200m)	Volume ensonified at >200 m Depth (km^3)
	2000	ADCP Ocean Surveyor.	100	2000	17.2	0	0	0
Oscar Elton Sette Cetacean Ecology Assessment	20000	EK60	0	0	0	100	20000	662.0
	20000	ADCP Ocean Surveyor.	100	20000	172.0	0	0	0
Hi'ialakai Mariana Baseline Surveys	3000	EK60	0	0	0	100	3000	99.3
	3000	ADCP Ocean Surveyor.	100	3000	25.8	0	0	0
American Samoa Research Area								
NOAA ship *Hi'ialakai* RAMP	18000	Simrad EK60.	25	4500	500.4	25	4500	16447.1
	18000	ADCP Ocean Surveyor.	75	13500	116.1	75	13500	136.4
Hi'ialakai Coral Reef Benthic Mapping	8600	Simrad EM 300.	100	8600	956.3	100	8600	31432.1
	2000	EK60	0	0	0	100	2000	66.2
NOAA ship *Oscar Elton Sette* Insular Fish Abundance Estimation.		ADCP Ocean Surveyor.	100	2000	17.2	0	0	0
Hi'ialakai Deep Coral and Sponge Research	500	Simrad EM 300.	100	500	55.6	100	500	1827.5
Oscar Elton Sette Sampling Pelagic Stage of Insular Fish.	2000	EK60	0	0	0	100	2000	66.2
	2000	ADCP Ocean Surveyor.	100	2000	17.2	0	0	0
Oscar Elton Sette Cetacean Ecology Assessment	20000	EK60	0	0	0	100	20000	662.0
	20000	ADCP Ocean Surveyor.	100	20000	172.0	0	0	0
Western and Central Pacific Research Area								
Hi'ialakai RAMP	18000	Simrad EK60.	25	4500	500.4	25	4500	16447.1
	18000	ADCP Ocean Surveyor.	75	13500	116.1	75	13500	136.4
Hi'ialakai Coral Reef Benthic Mapping	8600	Simrad EM 300.	100	8600	956.3	100	8600	31432.1
Oscar Elton Sette Oceanographic	7000	EK60	0	0	0	100	7000	231.7
	7000	ADCP Ocean Surveyor.	100	7000	60.2	0	0	0
Oscar Elton Sette Insular Fish Abundance Estimation	2000	EK60	0	0	0	100	2000	66.2

	2000	ADCP Ocean Surveyor.	100	2000	17.2	0	0	0
Hi'ialakai Deep Coral and Sponge	500	Simrad EM 300.	100	500	55.6	100	500	1827.5
Oscar Elton Sette Sampling Pelagic Stages of Insular Fish.	2000	EK60	0	0	0	100	2000	66.2
	2000	ADCP Ocean Surveyor.	100	2000	17.2	0	0	0
Oscar Elton Sette Cetacean Ecology Assessment	20000	EK60	0	0	0	100	20000	662.0
	20000	ADCP Ocean Surveyor.	100	20000	172.0	0	0	0

Marine Mammal Densities—One of the primary limitations to traditional estimates of behavioral harassment from acoustic exposure is the assumption that animals are uniformly distributed in time and space across very large geographical areas, such as those being considered here. There is ample evidence that this is in fact not the case, and marine species are highly heterogeneous in terms of their spatial distribution, largely as a result of species-typical utilization of heterogeneous ecosystem features. Some more sophisticated modeling efforts have attempted to include species-typical behavioral patterns and diving parameters in movement models that more adequately assess the spatial and temporal aspects of distribution and thus exposure to sound. While simulated movement models were not used to mimic individual diving or aggregation parameters in the determination of animal density in this estimation, the vertical stratification of marine mammals based on known or reasonably assumed diving behavior was integrated into the density estimates used.

First, typical two-dimensional marine mammal density estimates (animals/km^2) were obtained from various sources for each ecosystem area. These were estimated from marine mammal Stock Assessment Reports and other sources (please see Table 6–5 of PIFSC's application). There are a number of caveats associated with these estimates:

(1) They are often calculated using visual sighting data collected during one season rather than throughout the year. The time of year when data were collected and from which densities were estimated may not always overlap with the timing of PIFSC fisheries surveys (detailed previously in ''Detailed Description of Activities'').

(2) The densities used for purposes of estimating acoustic exposures do not take into account the patchy distributions of marine mammals in an ecosystem, at least on the moderate to fine scales over which they are known to occur. Instead, animals are considered evenly distributed throughout the assessed area, and seasonal movement patterns are not taken into account.

(3) Marine mammal density information is in many cases based on limited historical surveys and may be incomplete or absent for many regions of the vast geographic area addressed by PIFSC fisheries research. As a result density estimates for some species/stocks in some regions are based on the best available data for other regions and/or similar stocks.

In addition, and to account for at least some coarse differences in marine mammal diving behavior and the effect this has on their likely exposure to these kinds of often highly directional sound sources, a volumetric density of marine mammals of each species was determined. This value is estimated as the abundance averaged over the two-dimensional geographic area of the surveys and the vertical range of typical habitat for the population. Habitat ranges were categorized in two generalized depth strata (0–200 m and greater than 200 m) based on gross differences between known generally surface-associated and typically deep-diving marine mammals (*e.g.,* Reynolds and Rommel, 1999; Perrin *et al.,* 2009). Animals in the shallow-diving stratum were assumed, on the basis of empirical measurements of diving with monitoring tags and reasonable assumptions of behavior based on other indicators, to spend a large majority of their lives (*i.e.,* greater than 75 percent) at depths shallower than 200 m. Their volumetric density and thus exposure to sound is therefore limited by this depth boundary. Species in the deeper diving stratum were reasonably estimated to dive deeper than 200 m and spend 25 percent or more of their lives at these greater depths. Their volumetric density and thus potential exposure to sounds up to the 160 dB rms level is extended from the surface to the depth at which this received level condition occurs. Their volumetric density and thus potential exposure to sound at or above the 160 dB rms threshold is extended from the surface to 500 m, (*i.e.,* nominal maximum water depth in regions where these surveys occur).

The volumetric densities are estimates of the three-dimensional distribution of animals in their typical depth strata. For shallow-diving species the volumetric density is the area density divided by 0.2 km (*i.e.,* 200 m). For deeper diving species, the volumetric density is the area density divided by a nominal value of 0.5 km (*i.e.,* 500 m). The two-dimensional and resulting three-dimensional (volumetric) densities for each species in each ecosystem area are shown in Table 10.

TABLE 10—VOLUMETRIC DENSITIES CALCULATED FOR EACH SPECIES IN THE PIFSC RESEARCH AREAS

Species (common name)	Typical dive depth strata		Area density (#/km^2)	Volumetric density (#/km^3)
	0–200 m	>200 m		
Hawaiian Archipelago Research Area				
Pantropical spotted dolphin	X		0.02332	0.1166
Striped dolphin	X		0.025	0.125
Spinner dolphin- all insular	X		0.009985	0.0499255
Rough-toothed dolphin	X		0.02963	0.14815
Bottlenose dolphin	X		0.00899	0.04495
Risso's dolphin		X	0.00474	0.00948
Fraser's dolphin	X		0.02104	0.1052
Melon-headed whale	X		0.00354	0.0177
Melon-headed whale- Kohala stock	X		0.001415	0.0070734
Pygmy killer whale	X		0.00435	0.02175
False killer whale- pelagic		X	0.0006	0.0012
False killer whale- MHI insular		X	0.0009	0.0018
False killer whale- NWHI		X	0.0014	0.0028
Short-finned pilot whale		X	0.00797	0.01594
Killer whale	X		0.00006	0.0003
Sperm whale		X	0.00186	0.00372
Pygmy sperm whale		X	0.00291	0.00582
Dwarf sperm whale		X	0.00714	0.01428
Blainville's beaked whale		X	0.00086	0.00172
Cuvier's beaked whale		X	0.0003	0.0006

TABLE 10—VOLUMETRIC DENSITIES CALCULATED FOR EACH SPECIES IN THE PIFSC RESEARCH AREAS—Continued

Species (common name)	Typical dive depth strata		Area density (#/km^2)	Volumetric density (#/km^3)
	0–200 m	>200 m		
Longman's beaked whale		X	0.00311	0.00622
Unidentified Mesoplodon		X	0.00189	0.00378
Unidentified beaked whale		X	0.00117	0.00234
Hawaiian monk seal	X		0.003741	0.0187042
Mariana Archipelago Research Area				
Pantropical spotted dolphin	X		0.0226	0.113
Striped dolphin	X		0.00616	0.0308
Spinner dolphin	X		0.009985	0.0499255
Rough-toothed dolphin	X		0.00314	0.0157
Bottlenose dolphin	X		0.00029	0.00145
Risso's dolphin		X[1]	0.00021	0.00042
Fraser's dolphin	X		0.02104	0.1052
Melon-headed whale	X		0.00428	0.0214
Pygmy killer whale	X		0.00014	0.0007
False killer whale- pelagic		X[1]	0.00111	0.00222
Short-finned pilot whale		X	0.00159	0.00318
Killer whale	X		0.00006	0.0003
Sperm whale		X	0.00123	0.00246
Pygmy sperm whale		X	0.00291	0.00582
Dwarf sperm whale		X	0.00714	0.01428
Blainville's beaked whale		X	0.00086	0.00172
Cuvier's beaked whale		X	0.0003	0.0006
Unidentified beaked whale		X	0.00117	0.00234
American Samoa Research Area				
Pantropical spotted dolphin	X		0.02332	0.1166
Spinner dolphin	X		0.00475	0.02375
Rough-toothed dolphin	X		0.02963	0.14815
Bottlenose dolphin	X		0.00899	0.04495
False killer whale	X		0.00090	0.0045
Short-finned pilot whale		X	0.00797	0.01594
Killer whale	X		0.00006	0.0003
Sperm whale		X	0.00186	0.00372
Dwarf sperm whale		X	0.00714	0.01428
Cuvier's beaked whale		X	0.00030	0.0006
Unidentified beaked whale		X	0.00117	0.00234
Western and Central Pacific Research Area				
Pantropical spotted dolphin	X		0.02332	0.1166
Striped dolphin	X		0.025	0.125
Spinner dolphin	X		0.011095	0.055475
Rough-toothed dolphin	X		0.02963	0.14815
Bottlenose dolphin	X		0.00899	0.04495
Risso's dolphin		X[1]	0.00474	0.00948
Fraser's dolphin	X		0.02104	0.1052
Melon-headed whale	X		0.00354	0.0177
Pygmy killer whale	X		0.00435	0.02175
False killer whale		X[1]	0.00102	0.00204
Short-finned pilot whale		X	0.00797	0.01594
Killer whale	X		0.00006	0.0003
Sperm whale		X	0.00186	0.00372
Pygmy sperm whale		X	0.00291	0.00582
Dwarf sperm whale		X	0.00714	0.01428
Blainville's beaked whale		X	0.00086	0.00172
Cuvier's beaked whale		X	0.0003	0.0006
Deraniyagala's beaked whale		X	0.0003	0.0006
Longman's beaked whale		X	0.00311	0.00622
Unidentified beaked whale		X	0.00117	0.00234

[1] NMFS has classified these species as deep diving in the PIFSC research areas, which is different from their classification as shallow-diving species by the other NMFS Fisheries Science Centers. These classifications of deep-diving are based on unpublished data from telemetry studies including depth of dive and stomach contents of deep-diving prey items (E. Oleson, personal communication, November 10, 2015).

Using Area of Ensonification and Volumetric Density to Estimate Exposures—Estimates of potential incidents of Level B harassment (*i.e.,* potential exposure to levels of sound at or exceeding the 160 dB rms threshold)

are then calculated by using (1) the combined results from output characteristics of each source and identification of the predominant sources in terms of acoustic output; (2) their relative annual usage patterns for each operational area; (3) a source-specific determination made of the area of water associated with received sounds at the extent of a depth boundary; and (4) determination of a biologically-relevant volumetric density of marine mammal species in each area. Estimates of Level B harassment by acoustic sources are the product of the volume of water ensonified at 160 dB rms or higher for the predominant sound source for each relevant survey and the volumetric density of animals for each species. Source- and stratum-specific exposure estimates are the product of these ensonified volumes and the species-specific volumetric densities (Tables 8, 9 and 10). The general take estimate equation for each source in each depth statrum is density * (ensonified volume * line kms). To illustrate, we use the ADCP Ocean Surveyor in the HARA and the pantropical spotted dolphin as an example.

(1) ADCP Ocean Surveyor ensonified volume (0–200 m) = 0.0086 km^2

(2) Total Line kms = 81,500 km

(3) Pantropical spotted dolphin density (0–200 m) = 0.11660 dolphins/km^3

(4) Estimated exposures to sound ≥ 160 dB rms = 0.11660 pantropical spotted dolphin/km^3 * (0.0086 km^2 * 81,500 km) = 81.72 (rounded up) = 82 estimated pantropical spotted dolphin exposures to SPLs ≥ 160 dB rms resulting from use of the ADCP Ocean Surveyor in the HARA

Totals in Tables 11–14 represent sums across all relevant surveys and sources rounded up to the nearest whole number. Note that take of baleen whales is not predicted due to the lack of overlap in their hearing range with the operating frequencies of PIFSC acoustic sources.

TABLE 11—DENSITIES AND ESTIMATED SOURCE-, STRATUM-, AND SPECIES-SPECIFIC FIVE-YEAR ESTIMATES OF LEVEL B HARASSMENT IN THE HARA

Species/stocks	Volumetric density (#/km^3)	Estimated Level B harassment (numbers of animals) in 0–200m depth stratum			Estimated Level B harassment in >200m depth stratum		Total take [a]
		EK60	EM300	ADCP	EK60	EM300	
Pantropical spotted dolphin	0.11660	0	408	82	0	0	490
Striped dolphin	0.12500	0	438	88	0	0	525
Spinner dolphin- all insular	0.04993	0	175	35	0	0	210
Rough-toothed dolphin	0.14815	0	519	104	0	0	623
Bottlenose dolphin (all stocks)	0.04495	0	157	32	0	0	189
Risso's dolphin	0.00948	0	33	7	17	1091	1148
Fraser's dolphin	0.10520	0	368	74	0	0	442
Melon-headed whale	0.01770	0	62	12	0	0	74
Melon-headed whale- Kohala stock	0.00707	0	25	5	0	0	30
Pygmy killer whale	0.02175	0	76	15	0	0	91
False killer whale- pelagic	0.00120	0	4	1	2	138	145
False killer whale- MHI insular	0.00180	0	6	1	3	207	218
False killer whale- NWHI	0.00280	0	10	2	5	322	339
Short-finned pilot whale	0.01594	0	56	11	29	1835	1931
Killer whale	0.00030	0	1	0	0	0	[b] 6
Sperm whale	0.00372	0	13	3	7	428	451
Pygmy sperm whale	0.00582	0	20	4	10	670	705
Dwarf sperm whale	0.01428	0	50	10	26	1644	1730
Blainville's beaked whale	0.00172	0	6	1	3	198	208
Cuvier's beaked whale	0.00060	0	2	0	1	69	73
Longman's beaked whale	0.00622	0	22	4	11	716	753
Unidentified *Mesoplodon*	0.00378	0	13	3	7	435	458
Unidentified beaked whale	0.00234	0	8	2	4	269	283
Hawaiian monk seal	0.01870	0	66	13	0	0	79

[a] Total take may not equal sum of estimated take from each acoustic source and depth stratum due to rounding of fractional calculated takes.
[b] Where calculated take over five years is less than typical group size, proposed take has been increased to mean group size (U.S. Navy 2017).

TABLE 12—DENSITIES AND ESTIMATED SOURCE-, STRATUM-, AND SPECIES-SPECIFIC FIVE-YEAR ESTIMATES OF LEVEL B HARASSMENT IN THE MARA

Species	Volumetric density (#/km^3)	Estimated Level B harassment (numbers of animals) in 0–200m depth stratum			Estimated Level B harassment in >200m depth stratum			Total take [a]
		EK60	EM300	ADCP	EK60	EM300	ADCP	
Pantropical spotted dolphin	0.11300	0	234	37	0	0	0	271
Striped dolphin	0.03080	0	64	10	0	0	0	74
Spinner dolphin	0.04993	0	103	17	0	0	0	120
Rough-toothed dolphin	0.01570	0	32	5	0	0	0	38
Bottlenose dolphin	0.00145	0	3	0	0	0	0	[b] 6
Risso's dolphin	0.00042	0	1	0	0	29	0	30
Fraser's dolphin	0.10520	0	218	35	0	0	0	[b] 283

TABLE 12—DENSITIES AND ESTIMATED SOURCE-, STRATUM-, AND SPECIES-SPECIFIC FIVE-YEAR ESTIMATES OF LEVEL B HARASSMENT IN THE MARA—Continued

Species	Volumetric density (#/km^3)	Estimated Level B harassment (numbers of animals) in 0–200m depth stratum			Estimated Level B harassment in >200m depth stratum			Total take [a]
		EK60	EM300	ADCP	EK60	EM300	ADCP	
Melon-headed whale	0.02140	0	44	7	0	0	0	[b] 73
Pygmy killer whale	0.00070	0	1	0	0	0	0	[b] 7
False killer whale (pelagic)	0.00222	0	5	1	2	151	0	159
Short-finned pilot whale	0.00318	0	7	1	3	216	0	227
Killer whale	0.00030	0	1	0	0	0	0	[b] 4
Sperm whale	0.00246	0	5	1	2	167	0	175
Pygmy sperm whale	0.00582	0	12	2	5	396	1	416
Dwarf sperm whale	0.01428	0	30	5	13	971	2	1020
Blainville's beaked whale	0.00172	0	4	1	2	117	0	123
Cuvier's beaked whale	0.00060	0	1	0	1	41	0	43
Unidentified beaked whale	0.00234	0	5	1	2	159	0	167

[a] Total take may not equal sum of estimated take from each acoustic source and depth stratum due to rounding of fractional calculated takes.
[b] Where calculated take over five years is less than typical group size, proposed take has been increased to mean group size (U.S. Navy 2017).

TABLE 13—DENSITIES AND ESTIMATED SOURCE-, STRATUM-, AND SPECIES-SPECIFIC FIVE-YEAR ESTIMATES OF LEVEL B HARASSMENT IN THE ASARA

Species	Volumetric density (#/km^3)	Estimated Level B harassment (numbers of animals) in 0–200m depth stratum			Estimated Level B harassment in >200m depth stratum			Total take [a]
		EK60	EM300	ADCP	EK60	EM300	ADCP	
Pantropical spotted dolphin	0.11660	0	176	38	0	0	0	214
Spinner dolphin	0.02375	0	36	8	0	0	0	44
Rough-toothed dolphin	0.14815	0	224	48	0	0	0	272
Bottlenose dolphin	0.04495	0	68	14	0	0	0	82
False killer whale	0.00450	0	7	1	0	0	0	[b] 10
Short-finned pilot whale	0.01594	0	24	5	13	792	2	836
Killer whale	0.00030	0	0	0	0	0	0	[b] 4
Sperm whale	0.00372	0	6	1	3	185	1	195
Dwarf sperm whale	0.01428	0	22	5	11	710	2	749
Cuvier's beaked whale	0.00060	0	1	0	0	30	0	31
Unidentified beaked whale	0.00234	0	4	1	2	116	0	123

[a] Total take may not equal sum of estimated take from each acoustic source and depth stratum due to rounding of fractional calculated takes.
[b] Where calculated take over five years is less than typical group size, proposed take has been increased to mean group size (U.S. Navy 2017).

TABLE 14—DENSITIES AND ESTIMATED SOURCE-, STRATUM-, AND SPECIES-SPECIFIC FIVE-YEAR ESTIMATES OF LEVEL B HARASSMENT IN THE WCPRA

Species	Volumetric density (#/km^3)	Estimated Level B harassment (numbers of animals) in 0–200m depth stratum			Estimated Level B harassment in >200m depth stratum			Total take [a]
		EK60	EM300	ADCP	EK60	EM300	ADCP	
Pantropical spotted dolphin	0.11660	0	176	45	0	0	0	221
Striped dolphin	0.12500	0	189	48	0	0	0	237
Spinner dolphin	0.05548	0	84	21	0	0	0	105
Rough-toothed dolphin	0.14815	0	224	57	0	0	0	281
Bottlenose dolphin	0.04495	0	68	17	0	0	0	85
Risso's dolphin	0.00948	0	14	4	10	471	1	500
Fraser's dolphin	0.10520	0	159	40	0	0	0	[b] 283
Melon-headed whale	0.01770	0	27	7	0	0	0	[b] 73
Pygmy killer whale	0.02175	0	33	8	0	0	0	41
False killer whale	0.00204	0	3	1	2	101	0	107
Short-finned pilot whale	0.01594	0	24	6	16	792	2	841
Killer whale	0.00030	0	0	0	0	0	0	[b] 4
Sperm whale	0.00372	0	6	1	4	185	1	197
Pygmy sperm whale	0.00582	0	9	2	6	289	1	307
Dwarf sperm whale	0.01428	0	22	5	15	710	2	754
Blainville's beaked whale	0.00172	0	3	1	2	85	0	91
Cuvier's beaked whale	0.00060	0	1	0	1	30	0	32

TABLE 14—DENSITIES AND ESTIMATED SOURCE-, STRATUM-, AND SPECIES-SPECIFIC FIVE-YEAR ESTIMATES OF LEVEL B HARASSMENT IN THE WCPRA—Continued

Species	Volumetric density (#/km^3)	Estimated Level B harassment (numbers of animals) in 0–200m depth stratum			Estimated Level B harassment in >200m depth stratum			Total take [a]
		EK60	EM300	ADCP	EK60	EM300	ADCP	
Deraniyagala's beaked whale	0.00060	0	1	0	1	30	0	32
Longman's beaked whale	0.00622	0	9	2	6	309	1	328
Unidentified beaked whale	0.00234	0	4	1	2	116	0	123

[a] Total take may not equal sum of estimated take from each acoustic source and depth stratum due to rounding of fractional calculated takes.
[b] Where calculated take over five years is less than typical group size, proposed take has been increased to mean group size (U.S. Navy 2018).

TABLE 15—TOTAL PROPOSED ANNUAL AND FIVE-YEAR TAKES BY LEVEL B HARASSMENT FROM ACOUSTIC DISTURBANCE

Species	All areas 5-year total take by Level B harassment	All areas average annual take by Level B harassment [a]
Blainville's beaked whale	422	84
Bottlenose dolphin	362	72
Cuvier's beaked whale	179	36
Deraniyagala's beaked whale	32	6
Dwarf sperm whale	4,253	851
False killer whale	978	196
Fraser's dolphin	1,008	202
Hawaiian monk seal	79	16
Killer whale	18	4
Longman's beaked whale	1,081	216
Melon-headed whale	250	50
Pantropical spotted dolphin	1,196	239
Pygmy killer whale	139	28
Pygmy sperm whale	1,428	286
Risso's dolphin	1,678	336
Rough-toothed dolphin	1,214	243
Short-finned pilot whale	3,835	767
Sperm whale	1,018	204
Spinner dolphin	479	96
Striped dolphin	836	167
Unidentified beaked whale	696	139
Unidentified *Mesoplodon*	458	92

[a] Average annual take calculated by dividing total five-year take by five and rounding to nearest whole number.

Estimated Take Due to Physical Disturbance

Take due to physical disturbance could potentially happen, as it is likely that some Hawaiian monk seals will move or flush from known haulouts into the water in response to the presence or sound of PIFSC vessels or researchers. In the MHI and the NWHI, there are numerous sites used by the endangered Hawaiian monk seal to haulout (sandy beaches, rocky outcroppings, exposed reefs) where the physical presence and sounds of researchers walking by or passing nearby in small boats may disturb animals present. Disturbance to Hawaiian monk seals would occur in the HARA only. Physical disturbance would result in no greater than Level B harassment. Behavioral responses may be considered according to the scale shown in Table 16 and based on the method developed by Mortenson (1996). We consider responses corresponding to Levels 2–3 to constitute Level B harassment.

TABLE 16—LEVELS OF PINNIPED BEHAVIORAL DISTURBANCE

Level	Type of response	Definition
1	Alert	Seal head orientation or brief movement in response to disturbance, which may include turning head towards the disturbance, craning head and neck while holding the body rigid in a u-shaped position, changing from a lying to a sitting position, or brief movement of less than twice the animal's body length.
2*	Movement	Movements in response to the source of disturbance, ranging from short withdrawals at least twice the animal's body length to longer retreats over the beach, or if already moving a change of direction of greater than 90 degrees.
3*	Flush	All retreats (flushes) to the water.

* Only observations of disturbance Levels 2 and 3 are recorded as takes.

The 2018 SAR for Hawaiian monk seal estimates the total abundance in the Hawaiian archipelago is 1,415 seals (Caretta *et al.,* 2019). Not all of these seals haul out at the same time or at the same places, and therefore it is difficult to predict if any monk seals will be present at any particular research location at any point in time. Therefore, the best way to estimate the amount of Level B harassment would be to approximate the number of seals hauled out at any point in time across the HARA and the probability that a researcher would be close enough to actually disturb the seal.

Parrish *et al.* (2002) estimated approximately one-third of the total population may be hauled out at any point in time. Assuming that all seals have an equal probability of hauling out anywhere in the archipelago, one-third of 1,351 is approximately 450 individual monk seals. Given that the two surveys with the highest probability of disturbing monk seals (*i.e.,* RAMP and Marine Debris Research and Removal) systematically circumnavigate all the islands and atolls when they are conducted, we could estimate the annual maximum number of Level B harassment takes as 900 during the years when these are conducted. Over the course of five years, this would be approximately 4,500 potential disturbances if all the surveys took place every year at every location across the HARA. However, RAMP surveys occur in the HARA approximately twice every five years and Marine Debris Research and Removal Surveys are rarely funded to a level that would support complete circumnavigation of the HARA each year. In addition, during some RAMP surveys the location of marine debris are identified (and recorded), thus precluding the need for marine debris identification later (only removal). Therefore, the approximately 4,500 potential disturbances over five years could be reduced by two-fifths to approximately 1,800 potential disturbances over five years. Furthermore, not all small boat operations during these surveys are close enough to the shoreline to actually cause a disturbance (*e.g.,* a seal may be hauled out on a beach in a bay but the shallow fringing reef may keep the small boat from getting within half of mile from shore) and the researchers implement avoidance and minimization measures while carrying out the surveys. The approximately 1,800 potential disturbances could realistically be reduced through avoidance or sheer geographical separation by one-half. Therefore, the PIFSC has requested, and NMFS is proposing to authorize, 900 Level B disturbances of Hawaiian monk seals due to the physical presence of researchers over the five-year authorization period, or an average of 180 takes by Level B harassment per year. The annual maximum potential exposures (900) could also realistically be reduced by half due to mitigation and geographical separation to a maximum of 450 takes of Hawaiian monk seals by Level B harassment in a year.

Proposed Mitigation

In order to issue an incidental take authorization under Section 101(a)(5)(A or D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, ''and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking'' for certain subsistence uses. NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned) the likelihood of effective implementation (probability implemented as planned); and

(2) the practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, personnel safety, and practicality of implementation.

Mitigation for Marine Mammals and Their Habitat

The PIFSC has invested significant time and effort in identifying technologies, practices, and equipment to minimize the impact of the proposed activities on marine mammal species and stocks and their habitat. The mitigation measures discussed here have been determined to be both effective and practicable and, in some cases, have already been implemented by the PIFSC. In addition, the PIFSC is actively conducting research to determine if gear modifications are effective at reducing take from certain types of gear; any potentially effective and practicable gear modification mitigation measures will be discussed as research results are available as part of the adaptive management strategy included in this rule.

General Measures

Visual Monitoring—Effective monitoring is a key step in implementing mitigation measures and is achieved through regular marine mammal watches. Marine mammal watches are a standard part of conducting PIFSC fisheries research activities, particularly those activities that use gears that are known to or potentially interact with marine mammals. Marine mammal watches and monitoring occur during daylight hours prior to deployment of gear (*e.g.,* trawls, longline gear), and they continue until gear is brought back on board. If marine mammals are sighted in the area and are considered to be at risk of interaction with the research gear, then the sampling station is either moved or canceled or the activity is suspended until the marine mammals are no longer in the area. On smaller vessels, the Chief Scientist (CS) and the vessel operator are typically those looking for marine mammals and other protected species. When marine mammal researchers are on board (distinct from marine mammal observers dedicated to monitoring for potential gear interactions), they will record the estimated species and numbers of animals present and their behavior. If marine mammal researchers are not on board or available, then the CS in cooperation with the vessel operator will monitor for marine mammals and provide training as practical to bridge crew and other crew to observe and record such information.

Coordination and Communication—When PIFSC survey effort is conducted aboard NOAA-owned vessels, there are both vessel officers and crew and a scientific party. Vessel officers and crew are not composed of PIFSC staff but are employees of NOAA's Office of Marine and Aviation Operations (OMAO), which is responsible for the management and operation of NOAA fleet ships and aircraft and is composed

of uniformed officers of the NOAA Commissioned Corps as well as civilians. The ship's officers and crew provide mission support and assistance to embarked scientists, and the vessel's Commanding Officer (CO) has ultimate responsibility for vessel and passenger safety and, therefore, decision authority regarding the implementation of mitigation measures. When PIFSC survey effort is conducted aboard cooperative platforms (*i.e.,* non-NOAA vessels), ultimate responsibility and decision authority again rests with non-PIFSC personnel (*i.e.,* vessel's master or captain). Although the discussion throughout this Rule does not always explicitly reference those with decision-making authority from cooperative platforms, all mitigation measures apply with equal force to non-NOAA vessels and personnel as they do to NOAA vessels and personnel. Decision authority includes the implementation of mitigation measures (*e.g.,* whether to stop deployment of trawl gear upon observation of marine mammals). The scientific party involved in any PIFSC survey effort is composed, in part or whole, of PIFSC staff and is led by a CS. Therefore, because the PIFSC—not OMAO or any other entity that may have authority over survey platforms used by PIFSC—is the applicant to whom any incidental take authorization issued under the authority of these proposed regulations would be issued, we require that the PIFSC take all necessary measures to coordinate and communicate in advance of each specific survey with OMAO, or other relevant parties, to ensure that all mitigation measures and monitoring requirements described herein, as well as the specific manner of implementation and relevant event-contingent decision-making processes, are clearly understood and agreed-upon. This may involve description of all required measures when submitting cruise instructions to OMAO or when completing contracts with external entities. PIFSC will coordinate and conduct briefings at the outset of each survey and as necessary between the ship's crew (CO/master or designee(s), as appropriate) and scientific party in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures. The CS will be responsible for coordination with the Officer on Deck (OOD; or equivalent on non-NOAA platforms) to ensure that requirements, procedures, and decision-making processes are understood and properly implemented.

The PIFSC will coordinate with the local Pacific Islands Regional Stranding Coordinator and the NMFS Stranding Coordinator for any unusual protected species behavior and any stranding, beached live/dead, or floating protected species that are encountered during field research activities. If a large whale is alive and entangled in fishing gear, the vessel will immediately call the U.S. Coast Guard at VHF Ch. 16 and/or the appropriate Marine Mammal Health and Stranding Response Network for instructions. All entanglements (live or dead) and vessel strikes must be reported immediately to the NOAA Fisheries Marine Mammal Stranding Hotline at 888–256–9840.

Vessel Speed—Vessel speed during active sampling rarely exceeds 5 kt, with typical speeds being 2–4 kt. Transit speeds vary from 6–14 kt but average 10 kt. These low vessel speeds minimize the potential for ship strike (see ''Potential Effects of the Specified Activity on Marine Mammals and Their Habitat'' for an in-depth discussion of ship strike). In addition, as a standard operating practice, PIFSC maintains a 100-yard distance between research vessels and large whales whenever and wherever it conducts fisheries research activities. At any time during a survey or in transit, if a crew member or designated marine mammal observer standing watch sights marine mammals that may intersect with the vessel course that individual will immediately communicate the presence of marine mammals to the bridge for appropriate course alteration or speed reduction, as possible, to avoid incidental collisions.

Other Gears—The PIFSC deploys a wide variety of gear to sample the marine environment during all of their research cruises. Many of these types of gear (*e.g.,* plankton nets, video camera and ROV deployments) are not considered to pose any risk to marine mammals and are therefore not subject to specific mitigation measures. However, at all times when the PIFSC is conducting survey operations at sea, the OOD and/or CS and crew will monitor for any unusual circumstances that may arise at a sampling site and use best professional judgment to avoid any potential risks to marine mammals during use of all research equipment.

Handling Procedures—Handling procedures are those taken to return a live animal to the sea or process a dead animal. The PIFSC will implement a number of handling protocols to minimize potential harm to marine mammals that are incidentally taken during the course of fisheries research activities. In general, protocols have already been prepared for use on commercial fishing vessels. Although commercial fisheries take larger quantities of marine mammals than fisheries research, the nature of such takes by entanglement or capture are similar. Therefore, the PIFSC would adopt commercial fishery disentanglement and release protocols (summarized below), which should increase post-release survival. Handling or disentangling marine mammals carries inherent safety risks, and using best professional judgment and ensuring human safety is paramount.

Captured or entangled live or injured marine mammals are released from research gear and returned to the water as soon as possible with no gear or as little gear remaining on the animal as possible. Animals are released without removing them from the water if possible, and data collection is conducted in such a manner as not to delay release of the animal(s) or endanger the crew. PIFSC is responsible for training PIFSC and partner affiliates on how to identify different species; handle and bring marine mammals aboard a vessel; assess the level of consciousness; remove fishing gear; and return marine mammals to water. Human safety is always the paramount concern.

Trawl Survey Visual Monitoring and Operational Protocols

Visual monitoring protocols, described above, are an integral component of trawl mitigation protocols. Observation of marine mammal presence and behaviors in the vicinity of PIFSC trawl survey operations allows for the application of professional judgment in determining the appropriate course of action to minimize the incidence of marine mammal gear interactions.

The OOD, CS or other designated member of the scientific party, and crew standing watch on the bridge visually scan surrounding waters with the naked eye and rangefinding binoculars (or monocular) for marine mammals prior to, during, and until all trawl operations are completed. Some sets may be made at night or in other limited visibility conditions, when visual observation may be conducted using the naked eye and available vessel lighting with limited effectiveness.

Most research vessels engaged in trawling will have their station in view for 15 minutes or 2 nmi prior to reaching the station, depending upon the sea state and weather. Many vessels will inspect the tow path before deploying the trawl gear, adding another 15 minutes of observation time and gear preparation prior to deployment.

Personnel on watch must monitor the station for 30 minutes prior to deploying the trawl. If personnel on watch observe marine mammals, they must immediately alert the OOD and CS as to their best estimate of the species, quantity, distance, bearing, and direction of travel relative to the ship's position. If any marine mammals are sighted around the vessel during the 30-minute pre-deployment monitoring period before setting gear, the vessel must be moved away from the animals to a different section of the sampling area if the animals appear to be at risk of interaction with the gear. This is what is referred to as the ''move-on'' rule.

If marine mammals are observed at or near the station, the CS and the vessel operator will determine the best strategy to avoid potential takes based on the species encountered, their numbers and behavior, their position and vector relative to the vessel, and other factors. For instance, a whale transiting through the area and heading away from the vessel may not require any move, or may require only a short move from the initial sampling site, while a pod of dolphins gathered around the vessel may require a longer move from the initial sampling site or possibly cancellation of the station if the dolphins follow the vessel. After moving on, if marine mammals are still visible from the vessel and appear to be at risk, the CS or OOD may decide, in consultation with the vessel operator, to move again or to skip the station. In many cases, the survey design can accommodate sampling at an alternate site. Gear would not be deployed if marine mammals have been sighted from the ship in its approach to the station unless those animals do not appear to be in danger of interactions with the gear, as determined by the judgment of the CS and vessel operator. The efficacy of the ''move-on'' rule is limited during nighttime or other periods of limited visibility, although operational lighting from the vessel illuminates the water in the immediate vicinity of the vessel during gear setting and retrieval. In these cases, it is again the judgment of the CS or vessel operator as based on experience and in consultation with the vessel operator to exercise due diligence and to decide on appropriate course of action to avoid unintentional interactions.

Once the trawl net is in the water, the OOD, CS or other designated scientist, and/or crew standing watch continue to monitor the waters around the vessel and maintain a lookout for marine mammals as environmental conditions allow (as noted previously, visibility can be limited for various reasons). If marine mammals are sighted before the gear is fully retrieved, the most appropriate response to avoid incidental take is determined by the professional judgment of the OOD, in consultation with the CS and vessel operator as necessary. These judgments take into consideration the species, numbers, and behavior of the animals, the status of the trawl net operation (net opening, depth, and distance from the stern), the time it would take to retrieve the net, and safety considerations for changing speed or course. If marine mammals are sighted during haul-back operations, there is the potential for entanglement during retrieval of the net, especially when the trawl doors have been retrieved and the net is near the surface and no longer under tension. The risk of catching an animal may be reduced if the trawling continues and the haul-back is delayed until after the marine mammal has lost interest in the gear or left the area. The appropriate course of action to minimize the risk of incidental take is determined by the professional judgment of the OOD, vessel operator, and the CS based on all situation variables, even if the choices compromise the value of the data collected at the station. The PIFSC must retrieve trawl gear immediately if marine mammals are believed to be captured/entangled in a net, line, or associated gear and follow disentanglement protocols.

We recognize that it is not possible to dictate in advance the exact course of action that the OOD or CS should take in any given event involving the presence of marine mammals in proximity to an ongoing trawl tow, given the sheer number of potential variables, combinations of variables that may determine the appropriate course of action, and the need to prioritize human safety in the operation of fishing gear at sea. Nevertheless, PIFSC will account for all factors that shape both successful and unsuccessful decisions, and these details will be fed back into PIFSC training efforts and ultimately help to refine the best professional judgment that determines the course of action taken in future scenarios (see further discussion in ''Proposed Monitoring and Reporting'').

If trawling operations have been suspended because of the presence of marine mammals, the vessel will resume trawl operations (when practicable) only when the animals are believed to have departed the area. This decision is at the discretion of the OOD/CS and is dependent on the situation. PIFSC shall conduct trawl operations as soon as is practicable upon arrival at the sampling station following visual monitoring pre-deployment. PIFSC shall implement standard survey protocols to minimize potential for marine mammal interactions, including maximum tow durations at target depth and maximum tow distance, and shall carefully empty the trawl as quickly as possible upon retrieval. Standard tow durations for midwater trawls are between two and four hours as target species (*e.g.,* pelagic stage eteline snappers) are relatively rare, and longer haul times are necessary to acquire the appropriate scientific samples. However, trawl hauls will be terminated and the trawl retrieved upon the determination and professional judgment of the officer on watch, in consultation with the CS or other designated scientist and other experienced crew as necessary, that this action is warranted to avoid an incidental take of a marine mammal.

Longline Survey Visual Monitoring and Operational Protocols

Visual monitoring requirements for all longline surveys are similar to the general protocols described above for trawl surveys. Please see that section for full details of the visual monitoring protocol and the move-on rule mitigation protocol. In summary, requirements for longline surveys are to: (1) Conduct visual monitoring prior to arrival on station; (2) implement the move-on rule if marine mammals are observed within the area around the vessel and may be at risk of interacting with the vessel or gear; (3) deploy gear as soon as possible upon arrival on station (depending on presence of marine mammals); and (4) maintain visual monitoring effort throughout deployment and retrieval of the longline gear. As was described for trawl gear, the OOD, CS, or personnel on watch will use best professional judgment to minimize the risk to marine mammals from potential gear interactions during deployment and retrieval of gear. If marine mammals are detected during setting operations and are considered to be at risk, immediate retrieval or suspension of operations may be warranted. If operations have been suspended because of the presence of marine mammals, the vessel will resume setting (when practicable) only when the animals are believed to have departed the area. If marine mammals are detected during retrieval operations and are considered to be at risk, haul-back may be postponed. The PIFSC must retrieve gear immediately if marine mammals are believed to be captured/entangled in a net, line, or associated gear and follow disentanglement protocols. These decisions are at the discretion of the

OOD/CS and are dependent on the situation.

The 1994 amendments to the MMPA tasked NMFS with establishing monitoring programs to estimate mortality and serious injury of marine mammals incidental to commercial fishing operations and to develop Take Reduction Plans (TRPs) in order to reduce commercial fishing takes of strategic stocks of marine mammals below Potential Biological Removal (PBR). The False Killer Whale Take Reduction Plan (FKWTRP) was finalized in 2012 to reduce the level of mortality and serious injury of false killer whales in Hawaii-based longline fisheries for tuna and billfish (77 FR 71260; November 29, 2012). Regulatory measures in the FKWTRP include gear requirements, prohibited areas, training and certification in marine mammal handling and release, and posting of NMFS-approved placards on longline vessels. PIFSC does not conduct fisheries and ecosystem research with longline gear within any of the exclusion zones established by the FKWTRP.

Because longline research is currently conducted in conjunction with commercial fisheries, operational characteristics (*e.g.,* branchline and floatline length, hook type and size, bait type, number of hooks between floats) of the longline gear in Hawai'i, American Samoa, Guam, the Commonwealth of the Northern Marianas, or EEZs of the Pacific Insular Areas adhere to the requirements on commercial longline gear based on NMFS regulations (summarized at *https://www.fisheries.noaa.gov/pacific-islands/resources-fishing/regulation-summaries-and-compliance-guides-pacific-islands* and specified in 50 CFR 229, 300, 404, 600, and 665). PIFSC will adhere to the regulations detailed at the link above, and generally follow the following procedures when setting and retrieving longline gear:

- When shallow-setting anywhere and setting longline gear from the stern: Completely thawed and blue-dyed bait will be used (two 1-pound containers of blue-dye will be kept on the boat for backup). Fish parts and spent bait with all hooks removed will be kept for strategic offal discard. Retained swordfish will be cut in half at the head; used heads and livers will also be used for strategic offal discard. Setting will only occur at night and begin 1 hour after local sunset and finish 1 hour before next sunrise, with lighting kept to a minimum.
- When deep-setting north of 23° N and setting longline gear from the stern: 45 Gram (g) or heavier weights will be attached within 1 m of each hook. A line shooter will be used to set the mainline. Completely thawed and blue-dyed bait will be used (two 1-pound containers of blue-dye will be kept on the boat for backup). Fish parts and spent bait with all hooks removed will be kept for strategic offal discard. Retained swordfish will be cut in half at the head; used heads and livers will also be used for strategic offal discard.
- When shallow-setting anywhere and setting longline gear from the side: Mainline will be deployed from the port or starboard side at least 1 m forward of the stern corner. If a line shooter is used, it will be mounted at least 1 m forward from the stern corner. A specified bird curtain will be used aft of the setting station during the set. Gear will be deployed so that hooks do not resurface. 45 g or heavier weights will be attached within 1 m of each hook.
- When deep-setting north of 23° N and setting longline gear from the side: Mainline will be deployed from the port or starboard side at least 1 m forward of the stern corner. If a line shooter is used, it will be mounted at least 1 m forward from the stern corner. A specified bird curtain will be used aft of the setting station during the set. Gear will be deployed so that hooks do not resurface. 45 g or heavier weights will be attached within 1 m of each hook.

Operational characteristics in non-Western Pacific Regional Fisheries Management Council areas of jurisdiction (*i.e.,* outside of the areas under NMFS jurisdiction named above) adhere to the regulations of the applicable management agencies. These agencies include the Western and Central Pacific Fisheries Commission (WCPFC), International Commission for the Conservation of Atlantic Tunas (ICCAT), and Inter-American Tropical Tuna Commission (IATTC). These operational characteristics include specifications in WCPFC 2008, WCPFC 2007, ICCAT 2010, ICCAT 2011, IATTC 2011, and IATTC 2007.

Small Boat and Diver Operations

The following measures are carried out by the PIFSC when working in and around shallow water coral reef habitats. These measures are intended to avoid and minimize impacts to marine mammals and other protected species. Transit from the open ocean to shallow-reef survey regions (depths of < 35 m) of atolls and islands should be no more than 3 nmi, dependent upon prevailing weather conditions and regulations. Each team conducts surveys and in-water operations with at least two divers observing for the proximity of marine mammals, a coxswain driving the small boat, and a topside spotter working in tandem. Topside spotters may also work as coxswains, depending on team assignment and boat layout. Spotters and coxswains will be tasked with specifically looking out for divers, marine mammals, and environmental hazards.

Before approaching any shoreline or exposed reef, all observers will examine the beach, shoreline, reef areas, and any other visible land areas within the line of sight for marine mammals. Divers, spotters, and coxswains undertake consistent due diligence and take every precaution during operations to avoid interactions with any marine mammals (*e.g.,* flushing Hawaiian monk seals). Scientists, divers, and coxswains follow the Best Management Practices (BMPs) for boat operations and diving activities. These practices include but are not limited to the following:

- Constant vigilance shall be kept for the presence of marine mammals;
- When piloting vessels, vessel operators shall alter course to remain at least 100 m from marine mammals;
- Reduce vessel speed to 10 kt or less when piloting vessels within 1 km (as visibility permits) of marine mammals;
- Marine mammals should not be encircled or trapped between multiple vessels or between vessels and the shore;
- If approached by a marine mammal (within 100 yards for large whales and 50 yards for all other marine mammals), put the engine in neutral and allow the animal to pass;
- Unless specifically covered under a separate NMFS research permit that allows activity in proximity to marine mammals, all in-water work, not already underway, will be postponed and must not commence until large whales are beyond 100 yards or other marine mammals are beyond 50 yards;
- Should marine mammals enter the area while in-water work is already in progress, the activity may continue only when that activity has no reasonable expectation to adversely affect the animal(s);
- No feeding, touching, riding, or otherwise intentionally interacting with any marine mammals is permitted unless undertaken to rescue a marine mammal or otherwise authorized by another permit;
- Mechanical equipment will also be monitored to ensure no accidental entanglements occur with protected species (*e.g.,* with PAM float lines, transect lines, and oceanographic equipment stabilization lines); and
- Team members will immediately respond to an entangled animal, halting operations and providing an onsite

response assessment (allowing the animal to disentangle itself, assisting with disentanglement, etc.), unless doing so would put divers, coxswains, or other staff at risk of injury or death.

Marine Debris Research and Removal Activities

Land vehicle (trucks) operations will occur in areas of marine debris where vehicle access is possible from highways or rural/dirt roads adjacent to coastal resources. Prior to initiating any marine debris removal operations, marine debris personnel (marine ecosystem specialists) will thoroughly examine the beaches and near shore environments/waters for Hawaiian monk seals before approaching marine debris sites and initiating removal activities. Debris will be retrieved by personnel who are knowledgeable of and act in compliance with all Federal laws, rules and regulations governing wildlife in the Papahānaumokuākea Marine National Monument and MHI. This includes, but is not limited to maintaining a minimum distance of 50 yards from all monk seals and a minimum of 100 yards from female seals with pups.

Bottomfishing

The PIFSC carefully considered the potential risk of marine mammal interactions with its bottomfishing hook-and-line research gear, and determined that the risk was not high enough to warrant requesting takes in that gear. However, PIFSC intends to implement mitigation measures to reduce the risk of potential interactions and to help improve our understanding of what those risks might be for different species. These efforts will help inform the adaptive management process to determine the appropriate type of mitigation needed for research conducted with bottomfishing gear. PIFSC will implement the following mitigation measures:

- Visual monitoring for marine mammals for at least 30 minutes before gear is set and implementation of the ''move-on'' rule as described above;
- To avoid attracting any marine mammals to a bottomfishing operation, dead fish and bait will not be discarded from the vessel while actively fishing. Dead fish and bait may be discarded after gear is retrieved and immediately before the vessel leaves the sampling location for a new area;
- If a hooked fish is retrieved and it appears to the fisher that it has been damaged by a monk seal or other marine mammal, then visual monitoring will be enhanced around the vessel for the next ten minutes. Fishing may continue during this time. If a shark is sighted, then visual monitoring would be returned to normal. If a monk seal, bottlenose dolphin, or other marine mammal is seen in the vicinity of a bottomfishing operation, then the gear would be retrieved immediately and the vessel would be moved to another sampling location where marine mammals are not present. Catch loss would be tallied on the data sheet, as would a ''move-on'' for a marine mammal; and
- If bottomfishing gear is lost while fishing, then visual monitoring will be enhanced around the vessel for the next ten minutes. Fishing may continue during this time. If a shark is sighted, then visual monitoring would be returned to normal under the assumption that marine mammals and sharks are unlikely to co-occur. If a monk seal, bottlenose dolphin, or other marine mammal is seen in the vicinity, it would be observed until a determination can be made of whether gear is sighted attached to the animal, gear is suspected to be on the animal (*i.e.,* it demonstrates uncharacteristic behavior such as thrashing), or gear is not observed on the animal and it behaves normally. If a cetacean or monk seal is sighted with the gear attached or suspected to be attached, then the procedures and actions for incidental takes would be initiated (see ''Monitoring and Reporting''). Gear loss would be tallied on the data sheet, as would a ''move-on'' because of a marine mammal.

Instrument and Trap Deployment

Visual monitoring requirements for instrument and trap deployments are similar to the general protocols described above for trawl and longline surveys. Please see that section for full details of the visual monitoring protocol and the move-on rule mitigation protocol. In summary, requirements for longline surveys are to: (1) Conduct visual monitoring prior to arrival on station; (2) implement the move-on rule if marine mammals are observed within the area around the vessel and may be at risk of interacting with the vessel or gear; (3) deploy gear as soon as possible upon arrival on station (depending on presence of marine mammals); and (4) maintain visual monitoring effort throughout deployment and retrieval of the gear. As was described for trawl and longline gear, the OOD, CS, or personnel on watch will use best professional judgment to minimize the risk to marine mammals from potential gear interactions during deployment and retrieval of gear. If marine mammals are detected during setting operations and are considered to be at risk, immediate retrieval or suspension of operations may be warranted. If operations have been suspended because of the presence of marine mammals, the vessel will resume setting (when practicable) only when the animals are believed to have departed the area. If marine mammals are detected during retrieval operations and are considered to be at risk, haul-back may be postponed. PIFSC must retrieve gear immediately if marine mammals are believed to be entangled in an instrument or trap line or associated gear and follow disentanglement protocols. These decisions are at the discretion of the OOD/CS and are dependent on the situation.

In order to minimize the potential risk of entanglement during instrument and trap deployment, PIFSC is evaluating possible modifications to total line length and the relative length of floating line to sinking line used for stationary gear that is deployed from ships or small boats (*e.g.,* stereo-video data collection). A certain amount of extra line (or scope) is needed whenever deploying gear/instruments to the seafloor to prevent currents from moving the gear/instruments off station. If the line is floating line and there is no current then the scope will be floating on the surface. Alternatively, scope in sinking line may gather below the water surface when currents are slow or absent. Because current speeds vary, there is a need for scope every time that gear is deployed.

Line floating on the surface presents the greatest risk for marine mammal entanglement because: (1) When marine mammals (*e.g.,* humpback whales) come to the surface to breathe, the floating line is more likely to become caught in their mouths or around their fins; and (2) humpback whales tend to spend most of their time near the surface, generally in the upper 150 m of the water column.

Currently, PIFSC uses only floating line to deploy stationary gear from ships or small boats. Floating line is used in order to maintain the vertical orientation of the line immediately above the instrument on the seafloor. The floating line also helps to keep the line off of the seafloor where it could snag or adversely affect benthic organisms or habitat features.

This mitigation measure would involve the use of sinking line for approximately the top ⅓ of the line. The other approximately lower ⅔ would still be floating line. This configuration would allow any excess scope in the line to sink to a depth where it would be below where most

whales and dolphins commonly occur. Specific line lengths, and ratios of floating line to sinking line, would vary with actual depth and the total line length. This mitigation measure would not preclude the risk of whales or dolphins swimming into the submerged line, but this risk is believed to be lower relative to line floating on the surface.

Based on our evaluation of the PIFSC's proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an incidental take authorization for an activity, section 101(a)(5)(A) of the MMPA states that NMFS must set forth ''requirements pertaining to the monitoring and reporting of such taking.'' The MMPA implementing regulations at 50 CFR 216.104(a)(13) require that requests for incidental take authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the action area (*e.g.,* presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) Action or environment (*e.g.,* source characterization, propagation, ambient noise); (2) affected species (*e.g.,* life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.,* age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) Long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.,* marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and
- Mitigation and monitoring effectiveness.

PIFSC shall designate a compliance coordinator who shall be responsible for ensuring compliance with all requirements of any LOA issued pursuant to these regulations and for preparing for any subsequent request(s) for incidental take authorization.

PIFSC plans to make its training, operations, data collection, animal handling, and sampling protocols more systematic in order to improve its ability to understand how mitigation measures influence interaction rates and ensure its research operations are conducted in an informed manner and consistent with lessons learned from those with experience operating these gears in close proximity to marine mammals. It is in this spirit that we propose the monitoring requirements described below.

Visual Monitoring

Marine mammal watches are a standard part of conducting fisheries research activities, and are implemented as described previously in ''Proposed Mitigation.'' Dedicated marine mammal visual monitoring occurs as described (1) for some period prior to deployment of most research gear; (2) throughout deployment and active fishing of all research gears; (3) for some period prior to retrieval of longline gear; and (4) throughout retrieval of all research gear. This visual monitoring is performed by trained PIFSC personnel or other trained crew during the monitoring period. Observers record the species and estimated number of animals present and their behaviors. This may provide valuable information towards an understanding of whether certain species may be attracted to vessels or certain survey gears. Separately, personnel on watch (those navigating the vessel and other crew; these will typically not be PIFSC personnel) monitor for marine mammals at all times when the vessel is being operated. The primary focus for this type of watch is to avoid striking marine mammals and to generally avoid navigational hazards. These personnel on watch typically have other duties associated with navigation and other vessel operations and are not required to record or report to the scientific party data on marine mammal sightings, except when gear is being deployed, soaking, or retrieved or when marine mammals are observed in the path of the ship during transit.

PIFSC will also monitor disturbance of hauled-out pinnipeds resulting from the presence of researchers, paying particular attention to the distance at which pinnipeds are disturbed. Disturbance will be recorded according to the three-point scale, representing increasing seal response to disturbance, shown in Table 16.

Training

NMFS considers the proposed suite of monitoring and operational procedures to be necessary to avoid adverse interactions with protected species and still allow PIFSC to fulfill its scientific missions. However, some mitigation measures such as the move-on rule require judgments about the risk of gear interactions with protected species and the best procedures for minimizing that risk on a case-by-case basis. Vessel operators and Chief Scientists are charged with making those judgments at sea. They are all highly experienced professionals but there may be inconsistencies across the range of research surveys conducted and funded by PIFSC in how those judgments are made. In addition, some of the mitigation measures described above could also be considered ''best practices'' for safe seamanship and avoidance of hazards during fishing (*e.g.,* prior surveillance of a sample site before setting trawl gear). At least for some of the research activities considered, explicit links between the implementation of these best practices and their usefulness as mitigation measures for avoidance of protected species may not have been formalized and clearly communicated with all scientific parties and vessel operators. NMFS therefore proposes a series of improvements to PIFSC protected species training, awareness, and reporting procedures. NMFS expects these new procedures will facilitate and improve the implementation of the mitigation measures described above.

PIFSC will initiate a process for its Chief Scientists and vessel operators to communicate with each other about their experiences with marine mammal interactions during research work with the goal of improving decision-making regarding avoidance of adverse interactions. As noted above, there are many situations where professional judgment is used to decide the best course of action for avoiding marine mammal interactions before and during the time research gear is in the water. The intent of this mitigation measure is

to draw on the collective experience of people who have been making those decisions, provide a forum for the exchange of information about what went right and what went wrong, and try to determine if there are any rules-of-thumb or key factors to consider that would help in future decisions regarding avoidance practices. PIFSC would coordinate not only among its staff and vessel captains but also with those from other fisheries science centers and institutions with similar experience.

PIFSC would also develop a formalized marine mammal training program required for all PIFSC research projects and for all crew members that may be posted on monitoring duty or handle incidentally caught marine mammals. Training programs would be conducted on a regular basis and would include topics such as monitoring and sighting protocols, species identification, decision-making factors for avoiding take, procedures for handling and documenting marine mammals caught in research gear, and reporting requirements. PIFSC will work with the Pacific Islands commercial fisheries Observer Program to customize a new marine mammal training program for researchers and ship crew. The Observer Program currently provides protected species training (and other types of training) for NMFS-certified observers placed on board commercial fishing vessels. PIFSC Chief Scientists and appropriate members of PIFSC research crews will be trained using similar monitoring, data collection, and reporting protocols for marine mammal as is required by the Observer Program. All PIFSC research crew members that may be assigned to monitor for the presence of marine mammals during future surveys will be required to attend an initial training course and refresher courses annually or as necessary. The implementation of this training program would formalize and standardize the information provided to all research crew that might experience marine mammal interactions during research activities.

For all PIFSC research projects and vessels, written cruise instructions and protocols for avoiding adverse interactions with marine mammals will be reviewed and, if found insufficient, made fully consistent with the Observer Program training materials and any guidance on decision-making that arises out of the two training opportunities described above. In addition, informational placards and reporting procedures will be reviewed and updated as necessary for consistency and accuracy. All PIFSC research cruises already include pre-sail review of marine mammal protocols for affected crew but PIFSC will also review its briefing instructions for consistency and accuracy.

Following the first year of implementation of the LOA, PIFSC will convene a workshop with PIRO Protected Resources, PIFSC fishery scientists, NOAA research vessel personnel, and other NMFS staff as appropriate to review data collection, marine mammal interactions, and refine data collection and mitigation protocols, as required. PIFSC will also coordinate with NMFS' Office of Science and Technology to ensure training and guidance related to handling procedures and data collection is consistent with other fishery science centers, where appropriate.

Handling Procedures and Data Collection

PIFSC must develop and implement standardized marine mammal handling, disentanglement, and data collection procedures. These standard procedures will be subject to approval by NMFS's Office of Protected Resources (OPR). Improved standardization of handling procedures were discussed previously in ''Proposed Mitigation.'' In addition to improving marine mammal survival post-release, PIFSC believes adopting these protocols for data collection will also increase the information on which ''serious injury'' determinations (NMFS, 2012a, 2012b) are based, improve scientific knowledge about marine mammals that interact with fisheries research gear, and increase understanding of the factors that contribute to these interactions. PIFSC personnel will receive standard guidance and training on handling marine mammals, including how to identify different species, bring an individual aboard a vessel, assess the level of consciousness, remove fishing gear, return an individual to the water, and record activities pertaining to the interaction.

PIFSC will record interaction information on their own standardized forms. To aid in serious injury determinations and comply with the current NMFS Serious Injury Guidelines, researchers will also answer a series of supplemental questions on the details of marine mammal interactions.

Finally, for any marine mammals that are killed during fisheries research activities, scientists will collect data and samples pursuant to Appendix D of the PIFSC Draft Environmental Assessment, ''Protected Species Mitigation and Handling Procedures for PIFSC Fisheries Research Vessels.''

Reporting

As is normally the case, PIFSC will coordinate with the relevant stranding coordinators for any unusual marine mammal behavior and any stranding, beached live/dead, or floating marine mammals that are encountered during field research activities. The PIFSC will follow a phased approach with regard to the cessation of its activities and/or reporting of such events, as described in the proposed regulatory texts following this preamble. In addition, Chief Scientists (or vessel operators) will provide reports to PIFSC leadership and to the Office of Protected Resources (OPR). As a result, when marine mammals interact with survey gear, whether killed or released alive, a report provided by the CS will fully describe any observations of the animals, the context (vessel and conditions), decisions made and rationale for decisions made in vessel and gear handling. The circumstances of these events are critical in enabling PIFSC and OPR to better evaluate the conditions under which takes are most likely occur. We believe in the long term this will allow the avoidance of these types of events in the future.

The PIFSC will submit annual summary reports to OPR including:

(1) Annual line-kilometers surveyed during which the EK60, EM 300, and ADCP Ocean Surveyor (or equivalent sources) were predominant (see ''Estimated Take by Acoustic Harassment'' for further discussion), specific to each region;

(2) Summary information regarding use of all longline and trawl gear, including number of sets, tows, etc., specific to each research area and gear;

(3) Accounts of surveys where marine mammals were observed during sampling but no interactions occurred;

(4) Accounts of all incidents of marine mammal interactions, including circumstances of the event and descriptions of any mitigation procedures implemented or not implemented and why;

(5) Summary information related to any disturbance of pinnipeds, including event-specific total counts of animals present, counts of reactions according to the three-point scale shown in Table 14, and distance of closest approach;

(6) A written description of any mitigation research investigation efforts and findings (*e.g.,* line modifications);

(7) A written evaluation of the effectiveness of PIFSC mitigation strategies in reducing the number of marine mammal interactions with

survey gear, including best professional judgment and suggestions for changes to the mitigation strategies, if any; and

(8) Details on marine mammal-related training taken by PIFSC and partner affiliates.

The period of reporting will be annually. The first annual report must cover the period from the date of issuance of the LOA through the end of that calendar year and the entire first full calendar year of the authorization. Subsequent reports would cover only one full calendar year. Each annual report must be submitted not less than ninety days following the end of a given year. PIFSC shall provide a final report within thirty days following resolution of comments on the draft report. Submission of this information serves an adaptive management framework function by allowing NMFS to make appropriate modifications to mitigation and/or monitoring strategies, as necessary, during the proposed five-year period of validity for these regulations.

NMFS has established a formal incidental take reporting system, the Protected Species Incidental Take (PSIT) database, requiring that incidental takes of protected species be reported within 48 hours of the occurrence. The PSIT generates automated messages to NMFS leadership and other relevant staff, alerting them to the event and to the fact that updated information describing the circumstances of the event has been inputted to the database. The PSIT and CS reports represent not only valuable real-time reporting and information dissemination tools but also serve as an archive of information that may be mined in the future to study why takes occur by species, gear, region, etc. The PIFSC is required to report all takes of protected species, including marine mammals, to this database within 48 hours of the occurrence and following standard protocol.

In the unanticipated event that PIFSC fisheries research activities clearly cause the take of a marine mammal in a prohibited manner, PIFSC personnel engaged in the research activity shall immediately cease such activity until such time as an appropriate decision regarding activity continuation can be made by the PIFSC Director (or designee). The incident must be reported immediately to OPR and the NMFS Pacific Islands Regional Office. OPR will review the circumstances of the prohibited take and work with PIFSC to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The immediate decision made by PIFSC regarding continuation of the specified activity is subject to OPR concurrence. The report must include the following information:

(i) Time, date, and location (latitude/longitude) of the incident;

(ii) Description of the incident including, but not limited to, monitoring prior to and occurring at time of the incident;

(iii) Environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, visibility);

(iv) Description of all marine mammal observations in the 24 hours preceding the incident;

(v) Species identification or description of the animal(s) involved;

(vi) Status of all sound source use in the 24 hours preceding the incident;

(vii) Water depth;

(viii) Fate of the animal(s) (*e.g.* dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared, etc.); and

(ix) Photographs or video footage of the animal(s).

In the event that PIFSC discovers an injured or dead marine mammal and determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.,* in less than a moderate state of decomposition), PIFSC shall immediately report the incident to OPR and the NMFS Pacific Islands Regional Office. The report must include the information identified above. Activities may continue while OPR reviews the circumstances of the incident. OPR will work with PIFSC to determine whether additional mitigation measures or modifications to the activities are appropriate.

In the event that PIFSC discovers an injured or dead marine mammal and determines that the injury or death is not associated with or related to PIFSC fisheries research activities (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, scavenger damage), PIFSC shall report the incident to OPR and the Pacific Islands Regional Office, NMFS, within 24 hours of the discovery. PIFSC shall provide photographs or video footage or other documentation of the stranded animal sighting to OPR.

In the event of a ship strike of a marine mammal by any PIFSC or partner vessel involved in the activities covered by the authorization, PIFSC or partner shall immediately report the information described above, as well as the following additional information:

(i) Vessel's speed during and leading up to the incident;

(ii) Vessel's course/heading and what operations were being conducted;

(iii) Status of all sound sources in use;

(iv) Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;

(v) Estimated size and length of animal that was struck; and

(vi) Description of the behavior of the marine mammal immediately preceding and following the strike.

PIFSC will also collect and report all necessary data, to the extent practicable given the primacy of human safety and the well-being of captured or entangled marine mammals, to facilitate serious injury (SI) determinations for marine mammals that are released alive. PIFSC will require that the CS complete data forms and address supplemental questions, both of which have been developed to aid in SI determinations. PIFSC understands the critical need to provide as much relevant information as possible about marine mammal interactions to inform decisions regarding SI determinations. In addition, the PIFSC will perform all necessary reporting to ensure that any incidental M/SI is incorporated as appropriate into relevant SARs.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.,* population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be ''taken'' by mortality, serious injury, and Level A or Level B harassment, we consider other factors, such as the likely nature of any behavioral responses (*e.g.,* intensity, duration), the context of any such responses (*e.g.,* critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the

environmental baseline (*e.g.,* as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, and specific consideration of take by M/SI previously authorized for other NMFS research activities).

Serious Injury and Mortality

We note here that the takes from potential gear interactions enumerated below could result in non-serious injury, but their worse potential outcome (mortality) is analyzed for the purposes of the negligible impact determination.

In addition, we discuss here the connection, and differences, between the legal mechanisms for authorizing incidental take under section 101(a)(5) for activities such as those proposed by PIFSC, and for authorizing incidental take from commercial fisheries. In 1988, Congress amended the MMPA's provisions for addressing incidental take of marine mammals in commercial fishing operations. Congress directed NMFS to develop and recommend a new long-term regime to govern such incidental taking (see MMC, 1994). The need to develop a system suited to the unique circumstances of commercial fishing operations led NMFS to suggest a new conceptual means and associated regulatory framework. That concept, PBR, and a system for developing plans containing regulatory and voluntary measures to reduce incidental take for fisheries that exceed PBR were incorporated as sections 117 and 118 in the 1994 amendments to the MMPA. In *Conservation Council for Hawaii* v. *National Marine Fisheries Service,* 97 F. Supp. 3d 1210 (D. Haw. 2015), which concerned a challenge to NMFS' regulations and LOAs to the Navy for activities assessed in the 2013–2018 HSTT MMPA rulemaking, the Court ruled that NMFS' failure to consider PBR when evaluating lethal takes in the negligible impact analysis under section 101(a)(5)(A) violated the requirement to use the best available science.

PBR is defined in section 3 of the MMPA as ''the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population'' (OSP) and, although not controlling, can be one measure considered among other factors when evaluating the effects of M/SI on a marine mammal species or stock during the section 101(a)(5)(A) process. OSP is defined in section 3 of the MMPA as ''the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element.'' An overarching goal of the MMPA is to ensure that each species or stock of marine mammal is maintained at or returned to its OSP.

PBR values are calculated by NMFS as the level of annual removal from a stock that will allow that stock to equilibrate within OSP at least 95 percent of the time, and is the product of factors relating to the minimum population estimate of the stock (N_{min}), the productivity rate of the stock at a small population size, and a recovery factor. Determination of appropriate values for these three elements incorporates significant precaution, such that application of the parameter to the management of marine mammal stocks may be reasonably certain to achieve the goals of the MMPA. For example, calculation of the minimum population estimate (N_{min}) incorporates the level of precision and degree of variability associated with abundance information, while also providing reasonable assurance that the stock size is equal to or greater than the estimate (Barlow *et al.,* 1995), typically by using the 20th percentile of a log-normal distribution of the population estimate. In general, the three factors are developed on a stock-specific basis in consideration of one another in order to produce conservative PBR values that appropriately account for both imprecision that may be estimated, as well as potential bias stemming from lack of knowledge (Wade, 1998).

Congress called for PBR to be applied within the management framework for commercial fishing incidental take under section 118 of the MMPA. As a result, PBR cannot be applied appropriately outside of the section 118 regulatory framework without consideration of how it applies within the section 118 framework, as well as how the other statutory management frameworks in the MMPA differ from the framework in section 118. PBR was not designed and is not used as an absolute threshold limiting commercial fisheries. Rather, it serves as a means to evaluate the relative impacts of those activities on marine mammal stocks. Even where commercial fishing is causing M/SI at levels that exceed PBR, the fishery is not suspended. When M/SI exceeds PBR in the commercial fishing context under section 118, NMFS may develop a take reduction plan, usually with the assistance of a take reduction team. The take reduction plan will include measures to reduce and/or minimize the taking of marine mammals by commercial fisheries to a level below the stock's PBR. That is, where the total annual human-caused M/SI exceeds PBR, NMFS is not required to halt fishing activities contributing to total M/SI but rather utilizes the take reduction process to further mitigate the effects of fishery activities via additional bycatch reduction measures. In other words, under section 118 of the MMPA, PBR does not serve as a strict cap on the operation of commercial fisheries that may incidentally take marine mammals.

Similarly, to the extent PBR may be relevant when considering the impacts of incidental take from activities other than commercial fisheries, using it as the sole reason to deny (or issue) incidental take authorization for those activities would be inconsistent with Congress's intent under section 101(a)(5), NMFS' long-standing regulatory definition of ''negligible impact,'' and the use of PBR under section 118. The standard for authorizing incidental take for activities other than commercial fisheries under section 101(a)(5) continues to be, among other things that are not related to PBR, whether the total taking will have a negligible impact on the species or stock. Nowhere does section 101(a)(5)(A) reference use of PBR to make the negligible impact finding or to authorize incidental take through multi-year regulations, nor does its companion provision at section 101(a)(5)(D) for authorizing non-lethal incidental take under the same negligible-impact standard. NMFS' MMPA implementing regulations state that take has a negligible impact when it does not ''adversely affect the species or stock through effects on annual rates of recruitment or survival''—likewise without reference to PBR. When Congress amended the MMPA in 1994 to add section 118 for commercial fishing, it did not alter the standards for authorizing non-commercial fishing incidental take under section 101(a)(5), implicitly acknowledging that the negligible impact standard under section 101(a)(5) is separate from the PBR metric under section 118. In fact, in 1994 Congress also amended section 101(a)(5)(E) (a separate provision governing commercial fishing incidental take for species listed under the ESA) to add compliance with the new section 118 but retained the standard of the negligible impact finding under section 101(a)(5)(A) (and section 101(a)(5)(D)), showing that Congress understood that the determination of negligible impact and the application of PBR may share

certain features but are, in fact, different.

Since the introduction of PBR in 1994, NMFS had used the concept almost entirely within the context of implementing sections 117 and 118 and other commercial fisheries management-related provisions of the MMPA. Prior to the Court's ruling in *Conservation Council for Hawaii* v. *National Marine Fisheries Service* and consideration of PBR in a series of section 101(a)(5) rulemakings, there were a few examples where PBR had informed agency deliberations under other MMPA sections and programs, such as playing a role in the issuance of a few scientific research permits and subsistence takings. But as the Court found when reviewing examples of past PBR consideration in *Georgia Aquarium* v. *Pritzker,* 135 F. Supp. 3d 1280 (N.D. Ga. 2015), where NMFS had considered PBR outside the commercial fisheries context, ''it has treated PBR as only one 'quantitative tool' and [has not used it] as the sole basis for its impact analyses.'' Further, the agency's thoughts regarding the appropriate role of PBR in relation to MMPA programs outside the commercial fishing context have evolved since the agency's early application of PBR to section 101(a)(5) decisions. Specifically, NMFS' denial of a request for incidental take authorization for the U.S. Coast Guard in 1996 seemingly was based on the potential for lethal take in relation to PBR and did not appear to consider other factors that might also have informed the potential for ship strike in relation to negligible impact (61 FR 54157; October 17, 1996).

The MMPA requires that PBR be estimated in SARs and that it be used in applications related to the management of take incidental to commercial fisheries (*i.e.,* the take reduction planning process described in section 118 of the MMPA and the determination of whether a stock is ''strategic'' as defined in section 3), but nothing in the statute requires the application of PBR outside the management of commercial fisheries interactions with marine mammals. Nonetheless, NMFS recognizes that as a quantitative metric, PBR may be useful as a consideration when evaluating the impacts of other human-caused activities on marine mammal stocks. Outside the commercial fishing context, and in consideration of all known human-caused mortality, PBR can help inform the potential effects of M/SI requested to be authorized under section 101(a)(5)(A). As noted by NMFS and the U.S. Fish and Wildlife Service in our implementing regulations for the 1986 amendments to the MMPA (54 FR 40341, September 29, 1989), the Services consider many factors, when available, in making a negligible impact determination, including, but not limited to, the status of the species or stock relative to OSP (if known); whether the recruitment rate for the species or stock is increasing, decreasing, stable, or unknown; the size and distribution of the population; and existing impacts and environmental conditions. In this multi-factor analysis, PBR can be a useful indicator for when, and to what extent, the agency should take an especially close look at the circumstances associated with the potential mortality, along with any other factors that could influence annual rates of recruitment or survival.

When considering PBR during evaluation of effects of M/SI under section 101(a)(5)(A), we first calculate a metric for each species or stock that incorporates information regarding ongoing anthropogenic M/SI from all sources into the PBR value (*i.e.,* PBR minus the total annual anthropogenic mortality/serious injury estimate in the SAR), which is called ''residual PBR'' (Wood *et al.,* 2012). We first focus our analysis on residual PBR because it incorporates anthropogenic mortality occurring from other sources. If the ongoing human-caused mortality from other sources does not exceed PBR, then residual PBR is a positive number, and we consider how the anticipated or potential incidental M/SI from the activities being evaluated compares to residual PBR using the framework in the following paragraph. If the ongoing anthropogenic mortality from other sources already exceeds PBR, then residual PBR is a negative number and we consider the M/SI from the activities being evaluated as described further below.

When ongoing total anthropogenic mortality from the applicant's specified activities does not exceed PBR and residual PBR is a positive number, as a simplifying analytical tool we first consider whether the specified activities could cause incidental M/SI that is less than 10 percent of residual PBR (the ''insignificance threshold,'' see below). If so, we consider M/SI from the specified activities to represent an insignificant incremental increase in ongoing anthropogenic M/SI for the marine mammal stock in question that alone (*i.e.,* in the absence of any other take) will not adversely affect annual rates of recruitment and survival. As such, this amount of M/SI would not be expected to affect rates of recruitment or survival in a manner resulting in more than a negligible impact on the affected stock unless there are other factors that could affect reproduction or survival, such as Level A and/or Level B harassment, or other considerations such as information that illustrates uncertainty involved in the calculation of PBR for some stocks. In a few prior incidental take rulemakings, this threshold was identified as the ''significance threshold,'' but it is more accurately labeled an insignificance threshold, and so we use that terminology here, as we did in the U.S. Navy's Atlantic Fleet Training and Testing (AFTT) final rule (83 FR 57076; November 14, 2018), and two-year rule extension (84 FR 70712; December 23, 2019), as well as the U.S. Navy's Hawaii-Southern California Training and Testing (HSTT) final rule (83 FR 66846; December 27, 2018) and two-year rule extension (85 FR 41780; July 10, 2020). Assuming that any additional incidental take by Level B harassment from the activities in question would not combine with the effects of the authorized M/SI to exceed the negligible impact level, the anticipated M/SI caused by the activities being evaluated would have a negligible impact on the species or stock. However, M/SI above the 10 percent insignificance threshold does not indicate that the M/SI associated with the specified activities is approaching a level that would necessarily exceed negligible impact. Rather, the 10 percent insignificance threshold is meant only to identify instances where additional analysis of the anticipated M/SI is not required because the negligible impact standard clearly will not be exceeded on that basis alone.

Where the anticipated M/SI is near, at, or above residual PBR, consideration of other factors (positive or negative), including those outlined above, as well as mitigation is especially important to assessing whether the M/SI will have a negligible impact on the species or stock. PBR is a conservative metric and not sufficiently precise to serve as an absolute predictor of population effects upon which mortality caps would appropriately be based. For example, in some cases stock abundance (which is one of three key inputs into the PBR calculation) is underestimated because marine mammal survey data within the U.S. EEZ are used to calculate the abundance even when the stock range extends well beyond the U.S. EEZ. An underestimate of abundance could result in an underestimate of PBR. Alternatively, we sometimes may not have complete M/SI data beyond the U.S. EEZ to compare to PBR, which could result in an overestimate of

residual PBR. The accuracy and certainty around the data that feed any PBR calculation, such as the abundance estimates, must be carefully considered to evaluate whether the calculated PBR accurately reflects the circumstances of the particular stock. M/SI that exceeds residual PBR or PBR may still potentially be found to be negligible in light of other factors that offset concern, especially when robust mitigation and adaptive management provisions are included.

In *Conservation Council for Hawaii* v. *National Marine Fisheries Service,* which involved the challenge to NMFS' issuance of LOAs to the Navy in 2013 for activities in the HSTT Study Area, the Court reached a different conclusion, stating, ''Because any mortality level that exceeds PBR will not allow the stock to reach or maintain its OSP, such a mortality level could not be said to have only a 'negligible impact' on the stock.'' As described above, the Court's statement fundamentally misunderstands the two terms and incorrectly indicates that these concepts (PBR and ''negligible impact'') are directly connected, when in fact nowhere in the MMPA is it indicated that these two terms are equivalent.

Specifically, PBR was designed as a tool for evaluating mortality and is defined as the number of animals that can be removed while ''allowing that stock to reach or maintain its [OSP].'' OSP describes a population that falls within a range from the population level that is the largest supportable within the ecosystem to the population level that results in maximum net productivity, and thus is an aspirational management goal of the overall statute with no specific timeframe by which it should be met. PBR is designed to ensure minimal deviation from this overarching goal, with the formula for PBR typically ensuring that growth towards OSP is not reduced by more than 10 percent (or equilibrates to OSP 95 percent of the time). Given that, as applied by NMFS, PBR certainly allows a stock to ''reach or maintain its [OSP]'' in a conservative and precautionary manner—and we can therefore clearly conclude that if PBR were not exceeded, there would not be adverse effects on the affected species or stocks. Nonetheless, it is equally clear that in some cases the time to reach this aspirational OSP level could be slowed by more than 10 percent (*i.e.,* total human-caused mortality in excess of PBR could be allowed) without adversely affecting a species or stock through effects on its rates of recruitment or survival. Thus even in situations where the inputs to calculate PBR are thought to accurately represent factors such as the species' or stock's abundance or productivity rate, it is still possible for incidental take to have a negligible impact on the species or stock even where M/SI exceeds residual PBR or PBR.

As discussed above, while PBR is useful in informing the evaluation of the effects of M/SI in section 101(a)(5)(A) determinations, it is just one consideration to be assessed in combination with other factors and is not determinative. For example, as explained above, the accuracy and certainty of the data used to calculate PBR for the species or stock must be considered. And we reiterate the considerations discussed above for why it is not appropriate to consider PBR an absolute cap in the application of this guidance. Accordingly, we use PBR as a trigger for concern while also considering other relevant factors to provide a reasonable and appropriate means of evaluating the effects of potential mortality on rates of recruitment and survival, while acknowledging that it is possible to exceed PBR (or exceed 10 percent of PBR in the case where other human-caused mortality is exceeding PBR but the specified activity being evaluated is an incremental contributor, as described in the last paragraph) by some small amount and still make a negligible impact determination under section 101(a)(5)(A).

We note that on June 17, 2020, NMFS finalized new Criteria for Determining Negligible Impact under MMPA section 101(a)(5)(E). The guidance explicitly notes the differences in the negligible impact determinations required under section 101(a)(5)(E), as compared to sections 101(a)(5)(A) and 101(a)(5)(D), and specifies that the procedure in that document is limited to how the agency conducts negligible impact analyses for commercial fisheries under section 101(a)(5)(E). In the proposed rule (and above), NMFS has described its method for considering PBR to evaluate the effects of potential mortality in the negligible impact analysis. NMFS has reviewed the 2020 guidance and determined that our consideration of PBR in the evaluation of mortality as described above and in the proposed rule remains appropriate for use in the negligible impact analysis for the PIFSC's fisheries research activities under section 101(a)(5)(A).

Our evaluation of the M/SI for each of the species and stocks for which mortality could occur follows. By considering the maximum potential incidental M/SI in relation to PBR and ongoing sources of anthropogenic mortality, we begin our evaluation of whether the potential incremental addition of M/SI through PIFSC research activities may affect the species' or stock's annual rates of recruitment or survival. We also consider the interaction of those mortalities with incidental taking of that species or stock by harassment pursuant to the specified activity (see Harassment section below).

We propose to authorize take by M/SI over the five-year period of validity for these proposed regulations as indicated in Table 16 below. For the purposes of the negligible impact analysis, we assume that all takes from gear interaction could potentially be in the form of M/SI.

We previously authorized the take by M/SI of marine mammals incidental to fisheries research operations conducted by the SWFSC (see 80 FR 58981 and 80 FR 68512), the NWFSC (see 83 FR 36370 and 83 FR 47135), and the Alaska Fisheries Science Center (AFSC) (see 84 FR 46788 and 84 FR 54893). However, this take would not occur to the same stocks for which we propose to authorize take incidental to PIFSC fisheries research operations; therefore, we do not consider M/SI takes from other science center activities. The final rule for the U.S. Navy's HSTT also authorized take of the Hawai'i stock of sperm whales by M/SI. Therefore, that authorized take by the Navy has been considered in this assessment. As used in this document, other ongoing sources of human-caused (anthropogenic) mortality refers to estimates of realized or actual annual mortality reported in the SARs and does not include authorized (but unrealized) or unknown mortality. Below, we consider the total taking by M/SI proposed for authorization for PIFSC to produce a maximum annual M/SI take level (including take of unidentified marine mammals that could accrue to any relevant stock) and compare that value to the stock's PBR value, considering ongoing sources of anthropogenic mortality (as described in footnote 4 of Table 16 and in the following discussion). PBR and annual M/SI values considered in Table 16 reflect the most recent information available (*i.e.,* final 2019 SARs). In the Harassment section below, we consider the interaction of those mortalities with incidental taking of that species or stock by harassment pursuant to the specified activity.

TABLE 17—SUMMARY INFORMATION RELATED TO PIFSC PROPOSED ANNUAL TAKE BY MORTALITY OR SERIOUS INJURY AUTHORIZATION, 2021–2026

Species	Stock	Stock abundance	Proposed PIFSC M/SI take (annual) [1] [2]	Stock PBR	Stock annual M/SI	U.S. Navy HSTT authorized take by M/SI	r-PBR (PBR-stock annual M/SI) [3]	Proposed M/SI take/r-PBR (%)
Blainville's beaked whale (Hawai'i stock)	Hawai'i	2,105	0.2	10	0	0	10	2.00
Cuvier's Beaked whale (Hawai'i pelagic stock)	Hawai'i Pelagic	723	0.2	4.3	0	0	4.3	4.65
Bottlenose dolphin (Hawai'i pelagic stock)	Hawai'i Pelagic	21,815	0.6	140	0	0	140	0.43
Bottlenose dolphin (All stocks, except above) [4]	All stocks except Hawai'i Pelagic.	N/A	0.4	N/A	N/A	0	N/A	N/A
False killer whale (Hawai'i pelagic or unspecified) [5]	Hawai'i Pelagic or unspecified	1,540	0.2	9.3	7.6	0	1.7	11.76
Humpback whale (Central North Pacific stock)	Central North Pacific	10,103	0.4	83	25	0	58	0.69
Kogia spp. (Hawai'i stocks)	Hawai'i	Unknown	0.2	undetermined	0	0	N/A	N/A
Pantropical spotted dolphin (all stocks) [6]	all stocks	55,795	0.6	403	0	0	403	0.15
Pygmy killer whale (Hawai'i stock)	Hawai'i	10,640	0.2	56	1.1	0	54.9	0.36
Risso's dolphin (Hawai'i stock)	Hawai'i	11,613	0.2	82	0	0	82	0.24
Rough-toothed dolphin (Hawai'i stock)	Hawai'i	72,528	0.6	423	2.1	0	420.9	0.14
Rough-toothed dolphin (all stocks except above)	All stocks except Hawai'i	N/A	0.4	N/A	N/A	0	N/A	N/A
Short-finned pilot whale (Hawai'i stock)	Hawai'i	19,503	0.2	106	0.9	0	105.1	0.19
Sperm whale (Hawai'i stock)	Hawai'i	4,559	0.2	13.9	0.7	0.14	13.06	1.53
Spinner dolphin (all stocks) [7]	All stocks	665	0.4	6.2	1.0	0	5.2	7.69
Striped dolphin (all stocks)	All stocks	61,021	0.4	449	0	0	449	0.09

Please see Table 5 and preceding text for details on estimated take by M/SI.

[1] As explained earlier in this document, gear interaction could result in mortality, serious injury, or Level A harassment. Because we do not have sufficient information to enable us to parse out these outcomes, we present such take as a pool. For purposes of this negligible impact analysis we assume the worst case scenario (that all such takes incidental to research activities result in mortality).

[2] This column represents the total number of incidents of M/SI that could potentially accrue to the specified species or stock as a result of NMFS's fisheries research activities and is the number carried forward for evaluation in the negligible impact analysis (later in this document). The proposed take authorization is formulated as a five-year total; the annual average is used only for purposes of negligible impact analysis. We recognize that portions of an animal may not be taken in a given year.

[3] This value represents the calculated PBR less the average annual estimate of ongoing anthropogenic mortalities (*i.e.,* total annual human-caused M/SI, which is presented in the SARs) (see Table 3). For some stocks, a minimum population abundance value (and therefore PBR) is unavailable. In these cases, the proportion of estimated population abundance represented by the Level B harassment total and/or the proportion of residual PBR represented by the estimated maximum annual M/SI cannot be calculated.

[4] PBR known for Kauai and Ni'ihau and Hawaiian Islands stocks but a total PBR for multiple stocks cannot be determined.

[5] PIFSC fisheries and ecosystem research would not occur within the ranges of other specified false killer whale stocks. "Unspecified stock" only occurs on the high seas.

[6] Stock abundance and PBR presented only for Hawai'i Pelagic stock, which is the only stock with estimates of population and PBR.

[7] Stock abundance and PBR presented only for Hawai'i Island stock, which is the only stock with estimates of population and PBR.

The majority of stocks that may potentially be taken by M/SI (11 of 15) fall below the insignificance threshold (*i.e.,* 10 percent of residual PBR). The annual proposed take of false killer whales is slightly above the insignificance threshold (11.76 percent of the Hawai'i pelagic stock residual PBR). An additional three stocks do not have current PBR values and therefore are evaluated using other factors which are discussed later.

In this section, we first consider stocks for which the proposed authorized M/SI falls below the insignificance threshold. Next, we consider those stocks with proposed M/SI above the insignificance threshold (*i.e.,* Hawai'i pelagic stock of false killer whales) and those without PBR values or known annual M/SI (bottlenose dolphin (all stocks except Hawai'i Pelagic); Hawai'i stocks of Kogia species; and rough-toothed dolphin (all stocks except Hawai'i)).

Stocks With M/SI Below the Insignificance Threshold

As noted above, for a species or stock with incidental M/SI less than 10 percent of residual PBR, we consider M/SI from the specified activities to represent an insignificant incremental increase in ongoing anthropogenic M/SI that alone (*i.e.,* in the absence of any other take and barring any other unusual circumstances) will clearly not adversely affect annual rates of recruitment and survival. In this case, as shown in Table 16, the following species or stocks have proposed M/SI from PIFSC fisheries research below their insignificance threshold: Blainville's beaked whale (Hawai'i stock), Cuvier's Beaked whale (Hawai'i pelagic stock), bottlenose dolphin (Hawai'i pelagic stock), humpback whale (Central North Pacific stock), pantropical spotted dolphin (all stocks), pygmy killer whale (Hawai'i stock), Risso's dolphin (Hawai'i stock), rough-toothed dolphin (Hawai'i stock), short-finned pilot whale (Hawai'i stock), sperm whale (Hawai'i stock), spinner dolphin (all stocks), and striped dolphin (all stocks).

For these stocks with authorized M/SI below the insignificance threshold, there are no other known factors, information, or unusual circumstances that indicate anticipated M/SI below the insignificance threshold could have adverse effects on annual rates of recruitment or survival and they are not discussed further.

Stocks With M/SI Above the Insignificance Threshold and/or Undetermined PBR

For false killer whales from the Hawai'i Pelagic stock, the annual potential M/SI due to PIFSC fisheries research activities is approximately 12 percent of residual PBR. PBR for the Hawai'i Pelagic stock is currently set at 9.3 and the annual average of known ongoing anthropogenic M/SI is 7.6, yielding a residual PBR value of 1.7. The annual average M/SI incidental to PIFSC research activity is 0.2, or 11.76 percent of residual PBR. The only known source of other anthropogenic mortality for this species is in commercial fisheries. The status of this transboundary stock of false killer whales is assessed based on the estimated abundance and estimates of mortality and serious injury within the U.S. EEZ of the Hawaiian Islands because estimates of human-caused mortality and serious injury from all U.S. and non-U.S. sources in high seas waters are not available, and because the geographic range of this stock beyond the Hawaiian Islands EEZ is poorly known. The False Killer Whale Take Reduction Plan (FKWTRP) was finalized in 2012 to reduce the level of mortality and serious injury of false killer whales in Hawaii-based longline fisheries for tuna and billfish (77 FR 71260; November 29, 2012). For the 5-yr period prior to the implementation of the FKWTRP, the average rate of mortality and serious injury to pelagic stock false killer whales within the Hawaiian Islands EEZ (13.6 animals per year) exceeded the PBR (9.3 animals per year). In most cases, the NMFS Guidelines for Assessing Marine Mammal Stocks (NMFS 2005) suggest pooling estimates of mortality and serious injury across 5 years to reduce the effects of sampling variation. If there have been significant changes in fishery operation that are expected to affect take rates, such as the 2013 implementation of the FKWTRP, the guidelines recommend using only the years since regulations were implemented. Using only bycatch information from 2013–2015, the estimated mortality and serious injury of false killer whales within the HI EEZ (4.1) is below the PBR (9.3) (Caretta *et al.,* 2018). Using the average M/SI from 2013–2015 (*i.e.,* the years with available data after FKWTRP established) to calculate residual PBR, the annual average M/SI incidental to PIFSC research activity (0.2 per year) is 3.85 percent of residual PBR, which falls below the insignificance threshold. There are no other factors that would lead us to believe that take by M/SI of 12 percent of SARS-reported residual PBR (7.6 animals per year) would be problematic for this species. Therefore, takes of false killer whales under this LOA are not expected or likely to adversely affect the species or stock through effects on annual rates of recruitment or survival.

PBR is unknown for the Hawai'i stocks of dwarf and pygmy sperm whales (*Kogia* spp.). A 2002 shipboard line-transect survey resulted in abundance estimates for *Kogia* species in the Hawaiian Islands EEZ (Barlow 2006); however, there were no on-effort sightings of *Kogia* during the 2010 shipboard survey of the Hawaiian EEZ (Bradford *et al.,* 2013), such that there is no current abundance estimates for these stocks (Caretta *et al.,* 2014). No interactions between nearshore fisheries and dwarf sperm whales have been reported in Hawaiian waters. One pygmy sperm whale was found entangled in fishing gear off Oahu in 1994 (Bradford & Lyman 2013), but the gear was not described and the fishery not identified. No estimates of human-caused mortality or serious injury are currently available for nearshore hook and line fisheries because these fisheries are not observed or monitored for protected species bycatch. There are currently two distinct longline fisheries based in Hawaii: A deep-set longline (DSLL) fishery that targets primarily tunas, and a shallow-set longline fishery (SSLL) that targets swordfish. Both fisheries operate within U.S. waters and on the high seas. Between 2007 and 2011, one pygmy or dwarf sperm whale was observed hooked in the SSLL fishery (100 percent observer coverage) (McCracken 2013; Bradford & Forney 2013). Based on an evaluation of the observer's description of the interaction and following the most recently developed criteria for assessing serious injury in marine mammals (NMFS 2012), this animal was considered not seriously injured (Bradford & Forney 2013). No pygmy or dwarf sperm whales were observed hooked or entangled in the DSLL fishery (20–22 percent observer coverage). Eight unidentified cetaceans were taken in the DSLL fishery, and two unidentified cetaceans were taken in the SSLL fishery, some of which may have been *Kogia* spp. There have been no reported fishery related mortality or injuries within the Hawaiian Islands EEZ, such that the total mortality and serious injury can be considered to be insignificant and approaching zero. Therefore, we expect that the proposed take of *Kogia* spp. by M/SI incidental to PIFSC research activity (no more than one over five

years or in any year, and average of 0.2 per year) would be insignificant.

The Kauai/Niʻihau, Oahu, 4-Islands, and Hawaiʻi Islands stocks of bottlenose dolphins (Hawaiʻi Islands stock complex) were most recently assessed in the 2017 SARs (Caretta *et al.,* 2018). PBR was calculated for the Kauai/Niʻihau (1.0 bottlenose dolphins per year) and Hawaiʻi Island (0.9 dolphins per year) stocks, but was undetermined for the Oahu and 4-Islands stocks. Annual total M/SI was unknown for all stocks. Prior to the 2017 SARs, the most recent assessment of the Hawaiʻi Islands stock complex was in 2013, where the PBR for the Oahu and 4-Islands stocks were calculated as 4.9 and 1.6 dolphins per year, respectively (Caretta *et al.,* 2014). The total estimated M/SI for bottlenose dolphins within the U.S. EEZ around the Hawaiian Islands is 0 animals per year. Using the estimated zero annual stock M/SI, the residual PBR for each stock is equal to the most recently calculated PBR for each stock, from the 2017 and 2013 SARs (1.0 animals per year for the Kauai/Niʻihau stock, 4.9 for the Oahu stock, 1.6 for the 4-Islands stock, and 0.9 for the Hawaiʻi Island stock). PIFSC cannot predict which specific stock of bottlenose dolphins may be taken by M/SI. Assuming the proposed annual average take by M/SI incidental to PIFSC fisheries research activities (0.4 per year) occurs within each stock, the take is above the insignificance threshold (*i.e.,* 10 percent of residual PBR) for all stocks except the Oahu stock. We consider qualitative information such as population dynamics and context to determine if the proposed amount of bottlenose dolphin takes from these stocks would have a negligible impact on annual rates of survival and recruitment. Marine mammals are K-selected species, meaning they have few offspring, long gestation and parental care periods, and reach sexual maturity later in life. Therefore, between years, reproduction rates vary based on age and sex class ratios. As such, population dynamics is a driver when looking at reproduction rates. We focus on reproduction here because we conservatively consider inter-stock reproduction is the primary means of recruitment for these stocks. Recent photo-identification and genetic studies off Oahu, Maui, Lanai, Kauai, Niihau, and Hawaii suggest limited movement of bottlenose dolphins between islands and offshore waters (Baird *et al.,* 2009; Martien *et al.,* 2012). Several studies have purported that male bottlenose dolphins are more likely to engage in depredation or related behaviors with trawls and recreational fishing (Corkeron *et al.,* 1990; Powell & Wells, 2011) or become entangled in gear (Reynolds *et al.,* 2000; Adimey *et al.,* 2014). Male bias has also been reported for strandings with evidence of fishery interaction (Stolen *et al.,* 2007; Fruet *et al.,* 2012; Adimey *et al.,* 2014) and for *in situ* observations of fishery interaction (Corkeron *et al.,* 1990; Finn *et al.,* 2008; Powell & Wells, 2011). Therefore, we believe males (which are less likely to influence recruitment rate) are more likely at risk than females. Given reproduction is the primary means of recruitment and females play a significantly larger role in their offspring's reproductive success (also known as Bateman's Principle), the mortality of females rather than males is, in general, more likely to influence recruitment rate. PIFSC has requested, and NMFS is proposing to authorize, two takes of bottlenose dolphins by M/SI from any stock over the course of five years. The average 5-yr estimates of annual mortality and serious injury for bottlenose dolphins in the Hawaiian Islands EEZ is zero, the stocks are not facing heavy anthropogenic pressure, and there are no identified continuous indirect stressors threatening the stock. While we cannot determine from which stock(s) the potential take by M/SI may occur, we do not expect that take by M/SI of up to two bottlenose dolphins by M/SI over five years from any of the identified or undefined stocks in the PIFSC research areas would adversely affect annual rates of recruitment or survival for these populations.

PIFSC has requested take of rough-toothed dolphins by M/SI from the Hawaiʻi stock (0.6 per year) and from all stocks other than the Hawaiʻi stock (0.4 per year). The proposed take by M/SI for the Hawaiʻi stock of rough-toothed dolphins falls below the insignificance threshold. For rough-toothed dolphins from all stocks except the Hawaiʻi stock, PIFSC has requested an average of 0.2 takes by M/SI per year from longline fisheries research and 0.2 takes by M/SI per year from instrument deployments. The only other defined stock of rough-toothed dolphins in the PIFSC is the American Samoa stock. However, PIFSC will not be conducting longline fisheries research in the ASARA, therefore no take of rough-toothed dolphins from the American Samoa stock by M/SI incidental to longline fisheries research is expected or proposed to be authorized.

No abundance estimates are currently available for rough-toothed dolphins in U.S. EEZ waters of American Samoa. However, density estimates for rough-toothed dolphins in other tropical Pacific regions can provide a range of likely abundance estimates in this unsurveyed region. Using density estimates from other regions, NMFS has calculated a minimum abundance estimate (426–2,731 animals) and resulting PBR (3.4 to 22 animals per year) for the American Samoa stock of rough-toothed dolphins (Caretta *et al.,* 2011). Information on fishery-related mortality of cetaceans in American Samoa is limited, but the gear types used in American Samoan fisheries are responsible for marine mammal mortality and serious injury in other fisheries throughout U.S. waters. The most recent information on average incidental M/SI of rough-toothed dolphins in American Samoa is from longline fisheries observed from 2006 to 2008 (Caretta *et al.,* 2011). During that time period, the average annual take of rough-toothed dolphins M/SI in American Samoa was 3.6 per year. That average exceeds the lowest estimated PBR for the American Samoa stock of rough-toothed dolphins, but the potential average annual take of rough-toothed dolphins by M/SI incidental to instrument deployment (0.2 per year) is well below the insignificance threshold using the highest estimated PBR. In fact, if the 2006–2008 average fishery-related take by M/SI is still accurate, the proposed average annual take by M/SI incidental to instrument deployment falls below the insignificance threshold if the actual PBR is as low as six animals per year. Absent any new information on annual fishery-related M/SI or PBR, NMFS does not expect that 0.2 takes per year of the American Samoa stock of rough-toothed dolphins by M/SI would be problematic for the stock. If all 0.4 PIFSC proposed takes by M/SI per year (0.2 from longline fisheries research and 0.2 from instrument deployment) were to occur to an undescribed stock of rough-toothed dolphins, due to their extensive range throughout tropical and warm-temperate waters, NMFS also does not expect that such a small number of takes by M/SI would be problematic for populations of rough-toothed dolphins in the Pacific Ocean. Therefore, takes of rough-toothed dolphins under this LOA are not expected or likely to adversely affect the species or stock through effects on annual rates of recruitment or survival.

Harassment

As described in greater depth previously (see ''Acoustic Effects''), we do not believe that PIFSC use of active acoustic sources has the likely potential to cause any effect exceeding Level B harassment of marine mammals. We have produced what we believe to be precautionary estimates of potential

incidents of Level B harassment. There is a general lack of information related to the specific way that these acoustic signals, which are generally highly directional and transient, interact with the physical environment and to a meaningful understanding of marine mammal perception of these signals and occurrence in the areas where PIFSC operates. The procedure for producing these estimates, described in detail in ''Estimated Take Due to Acoustic Harassment,'' represents NMFS's best effort towards balancing the need to quantify the potential for occurrence of Level B harassment with this general lack of information. The sources considered here have moderate to high output frequencies, generally short ping durations, and are typically focused (highly directional with narrower beamwidths) to serve their intended purpose of mapping specific objects, depths, or environmental features. In addition, some of these sources can be operated in different output modes (*e.g.,* energy can be distributed among multiple output beams) that may lessen the likelihood of perception by and potential impacts on marine mammals in comparison with the quantitative estimates that guide our proposed take authorization. We also produced estimates of incidents of potential Level B harassment due to disturbance of hauled-out Hawaiian monk seals that may result from the physical presence of researchers; these estimates are combined with the estimates of Level B harassment that may result from use of active acoustic devices. The estimated take by Level B harassment in each research area is calculated using the total proposed research effort over the course of five years. In order to assess the proposed take on an annual basis, the total estimated take has been divided by five.

TABLE 18—TOTAL PROPOSED TAKE BY LEVEL B HARASSMENT IN THE HARA

Species	Stock	Stock abundance	HARA Level B 5-year take	HARA Level B average annual take [a]	Annual percent of stock
Blainville's beaked whale	Hawai'i	2,105	208	42	2.0
Bottlenose dolphin	Hawai'i Pelagic	21,815	189	38	0.2
	Kauai and Ni'ihau	184			20.5
	Oahu [b]	743			5.1
	4-Island Region [b]	191			19.8
	Hawai'i Island	128			29.5
Cuvier's beaked whale	Hawai'i	723	73	15	2.0
Dwarf sperm whale	Hawai'i	Unknown	1,730	346	N/A
False killer whale	Hawai'i Insular	167	218	44	26.1
	Northwestern Hawaiian Islands.	617	339	68	11.0
	Hawai'i pelagic	1,540	145	29	1.9
Fraser's dolphin	Hawai'i	51,491	442	88	0.2
Hawaiian monk seal	Hawai'i	1,351	[c] 979	[d] 468	34.6
Killer whale	Hawai'i	146	6	1	4.1
Longman's beaked whale	Hawai'i	7,619	753	151	2.0
Melon-headed whale	Hawai'i	8,666	74	15	0.2
	Kohala	447	30	6	1.3
Pantropical spotted dolphin	Hawai'i pelagic	55,795	490	98	0.2
	Oahu	Unknown			N/A
	4-Island Region	Unknown			N/A
	Hawai'i Island	Unknown			N/A
Pygmy killer whale	Hawai'i	10,640	91	18	0.2
Pygmy sperm whale	Hawai'i	Unknown	705	141	N/A
Risso's dolphin	Hawai'i	11,613	1,148	230	2.0
Rough-toothed dolphin	Hawai'i	72,528	623	125	0.2
Short-finned pilot whale	Hawai'i	19,503	1,931	386	2.0
Sperm whale	Hawai'i	4,559	451	90	2.0
Spinner dolphin	Hawai'i pelagic	Unknown	210	42	N/A
	Kauai and Ni'ihau	601			7.0
	Oahu/4-Island Region	355			11.8
	Hawai'i Island	665			6.3
	Kure and Midway Atoll [b]	260			16.2
	Pearl and Hermes Reef	Unknown			N/A
Striped dolphin	Hawai'i pelagic	61,021	525	105	0.2
Unidentified beaked whale	N/A	N/A	283	57	N/A
Unidentified *Mesoplodon*	N/A	N/A	458	92	N/A

[a] Annual take by Level B harassment is calculated by dividing the five-year total estimated take by five, rounded to nearest whole number

[b] Abundance estimates for these stocks are not considered current. We nevertheless present the most recent abundance estimates, as these represent the best available information for use in this document.

[c] 79 takes incidental to use of acoustic sources, 900 takes incidental to disturbance from human presence.

[d] 15.8 takes incidental to use of acoustic sources, 450 takes incidental to disturbance from human presence (maximum potential annual take from physical disturbance).

With the exception of the American Samoa stocks of spinner dolphins, rough-toothed dolphins, and false killer whales, marine mammals in the MARA, ASARA, and WCPRA are not assigned to stocks, and no current abundance estimates are available for these stocks or populations. Therefore, rather than presenting the proposed takes by Level B harassment as proportions of relevant stocks, the proposed take in these three research areas is grouped in Table 18 by species.

TABLE 19—TOTAL PROPOSED TAKE BY LEVEL B HARASSMENT IN THE MARA, ASARA, AND WCPRA

Species	MARA 5-year take	MARA Annual take	ASARA 5-year take	ASARA Annual take	WCPRA 5-year take	WCPRA Annual take	All areas 5-year total take	All areas annual take [a]
Blainville's beaked whale	123	25	0	0	91	18	214	43
Bottlenose dolphin	6	1	82	16	85	17	173	35
Cuvier's beaked whale	43	9	31	6	32	6	106	21
Deraniyagala's beaked whale	0	0	0	0	32	6	32	6
Dwarf sperm whale	1,020	204	749	150	754	151	2,523	505
False killer whale	159	32	[b] 10	[b] 2	107	21	276	55
Fraser's dolphin	283	57	0	0	283	57	451	90
Hawaiian monk seal	0	0	0	0	0	0	0	0
Killer whale	4	1	4	1	4	1	12	3
Longman's beaked whale	0	0	0	0	328	66	328	66
Melon-headed whale	73	15	0	0	73	15	146	29
Pantropical spotted dolphin	271	54	214	43	221	44	706	141
Pygmy killer whale	7	1	0	0	41	8	48	10
Pygmy sperm whale	416	83	0	0	307	61	723	145
Risso's dolphin	30	6	0	0	500	100	530	106
Rough-toothed dolphin	38	8	[b] 272	[b] 54	281	56	591	118
Short-finned pilot whale	227	45	836	167	841	168	1,904	381
Sperm whale	175	35	195	39	197	39	567	113
Spinner dolphin	120	24	[b] 44	[b] 9	105	21	269	54
Striped dolphin	74	15	0	0	237	47	311	62
Unidentified beaked whale	167	33	123	25	123	25	413	83
Unidentified *Mesoplodon*	0	0	0	0	0	0	0	0

[a] Annual take by Level B harassment is calculated by dividing the five-year total estimated take by five, rounded to nearest whole number.
[b] American Samoa stock; stock abundance unknown.

The acoustic sources proposed to be used by PIFSC are generally of low source level, higher frequency, and narrow beamwidth. As described previously, there is some minimal potential for temporary effects to hearing for certain marine mammals, but most effects would likely be limited to temporary behavioral disturbance. Effects on individuals that are taken by Level B harassment will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring), reactions that are considered to be of low severity (*e.g.,* Ellison *et al.,* 2012). Individuals may move away from the source if disturbed; however, because the source is itself moving and because of the directional nature of the sources considered here, there is unlikely to be even temporary displacement from areas of significance and any disturbance would be of short duration. The areas ensonified above the Level B harassment threshold during PIFSC surveys are extremely small relative to the overall survey areas. Although there is no information on which to base any distinction between incidents of harassment and individuals harassed, the same factors, in conjunction with the fact that PIFSC survey effort is widely dispersed in space and time, indicate that repeated exposures of the same individuals would be very unlikely. The short term, minor behavioral responses that may occur incidental to PIFSC use of acoustic sources, are not expected to result in impacts the reproduction or survival of any individuals, much less have an adverse impact on the population.

Similarly, disturbance of hauled-out Hawaiian monk seals by researchers (expected in the HARA) are expected to be infrequent and cause only a temporary disturbance on the order of minutes. Monitoring results from other activities involving the disturbance of pinnipeds and relevant studies of pinniped populations that experience more regular vessel disturbance indicate that individually significant or population level impacts are unlikely to occur. PIFSC's nearshore surveys that may result in disturbance to Hawaiian monk seals are conducted infrequently, with each individual island visited at most once per year. While there is some slight possibility of an individual Hawaiian monk seal moving between islands and being exposed to visual disturbance from multiple PIFSC surveys over the course of the year, it is unlikely that an individual seal would be harassed more than once per year. When considering the individual animals likely affected by this disturbance, only a small fraction of the estimated population abundance of the affected stocks would be expected to experience the disturbance. Therefore, the PIFSC activity cannot be reasonably expected to, and is not reasonably likely to, adversely affect species or stocks through effects on annual rates of recruitment or survival.

For these reasons, we do not consider the proposed level of take by acoustic or visual disturbance to represent a significant additional population stressor when considered in context with the proposed level of take by M/SI for any species, including those for which no abundance estimate is available.

Conclusions

In summary, as described in the *Serious Injury and Mortality* section, the proposed takes by serious injury or mortality from PIFSC activities, alone, are unlikely to adversely affect any species or stock through effects on annual rates of recruitment or survival. Further, the low severity and magnitude of expected Level B harassment is not predicted to affect the reproduction or survival of any individual marine mammals, much less the rates of recruitment or survival of any species or stock. Therefore, the authorized Level B harassment, alone or in combination with the SI/M authorized for some species or stocks, will result in a negligible impact on the effected stocks and species.

Based on the analysis contained herein of the likely effects of the

specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, we preliminarily find that the total marine mammal take from the proposed activities will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(A) of the MMPA for specified activities. The MMPA does not define a threshold under which the authorized number of takes would be considered ''small'' and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

Please see Tables 17 through 19 for information relating to this small numbers analysis. The total amount of taking proposed for authorization is less than five percent for a majority of stocks, and the total amount of taking proposed for authorization is less than one-third of the stock abundance for all defined stocks.

Species without defined stocks typically range across very large areas and it is unlikely that PIFSC's proposed activities, with their small impact areas, would encounter, much less take more than one third of the stock. For species with defined stocks but no abundance estimates available (American Samoa stocks of false killer whale, rough-toothed dolphin, and spinner dolphin), we note that the anticipated number of incidents of take by Level B harassment are very low for each species (*i.e.,* 2–54 takes by Level B harassment per year). While abundance information is not available for these stocks, we do not expect that the proposed annual take by Level B harassment would represent more than one third of any population to be taken and therefore the total amount of proposed taking would be considered small relative to the overall population size.

Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by the issuance of regulations to the PIFSC. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Adaptive Management

The regulations governing the take of marine mammals incidental to PIFSC fisheries research survey operations would contain an adaptive management component. The inclusion of an adaptive management component will be both valuable and necessary within the context of five-year regulations for activities that have been associated with marine mammal mortality.

The reporting requirements associated with this proposed rule are designed to provide OPR with monitoring data from the previous year to allow consideration of whether any changes are appropriate. OPR and the PIFSC will meet annually to discuss the monitoring reports and current science and whether mitigation or monitoring modifications are appropriate. The use of adaptive management allows OPR to consider new information from different sources to determine (with input from the PIFSC regarding practicability) on an annual or biennial basis if mitigation or monitoring measures should be modified (including additions or deletions). Mitigation measures could be modified if new data suggests that such modifications would have a reasonable likelihood of reducing adverse effects to marine mammals and if the measures are practicable.

The following are some of the possible sources of applicable data to be considered through the adaptive management process: (1) Results from monitoring reports, as required by MMPA authorizations; (2) results from general marine mammal research and sound research; and (3) any information which reveals that marine mammals may have been taken in a manner, extent, or number not authorized by these regulations or subsequent LOAs.

Endangered Species Act (ESA)

There are multiple marine mammal species listed under the ESA with confirmed or possible occurrence in the proposed specified geographical regions (see Table 3). OPR has initiated consultation with NMFS's Pacific Islands Regional Office under section 7 of the ESA on the promulgation of five-year regulations and the subsequent issuance of a 5-year LOA to PIFSC under section 101(a)(5)(A) of the MMPA. This consultation will be concluded prior to issuing any final rule.

Request for Information

NMFS requests interested persons to submit comments, information, and suggestions concerning the PIFSC request and the proposed regulations (see **ADDRESSES**). All comments will be reviewed and evaluated as we prepare final rules and make final determinations on whether to issue the requested authorizations. This document and referenced documents provide all environmental information relating to our proposed action for public review.

Classification

The Office of Management and Budget has determined that this proposed rule is not significant for purposes of Executive Order 12866.

Pursuant to section 605(b) of the Regulatory Flexibility Act (RFA), the Chief Counsel for Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy of the Small Business Administration that this proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities. NMFS is the sole entity that would be responsible for adhering to the requirements in these proposed regulations, and NMFS is not a small governmental jurisdiction, small organization, or small business, as defined by the RFA. Because of this certification, a regulatory flexibility analysis is not required and none has been prepared.

This proposed rule does not contain a collection-of-information requirement subject to the provisions of the Paperwork Reduction Act (PRA) because the applicant is a Federal agency. Notwithstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the PRA unless that collection of information displays a currently valid OMB control number. These requirements have been approved by OMB under control number 0648–0151 and include applications for regulations, subsequent LOAs, and reports.

List of Subjects in 50 CFR Part 219

Exports, Fish, Imports, Indians, Labeling, Marine mammals, Penalties, Reporting and recordkeeping requirements, Seafood, Transportation.

Dated: March 8, 2021.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

For reasons set forth in the preamble, 50 CFR part 219 is proposed to be amended as follows:

PART 219—REGULATIONS GOVERNING THE TAKING AND IMPORTING OF MARINE MAMMALS

■ 1. The authority citation for part 219 continues to read as follows:

Authority: 16 U.S.C. 1361 *et seq.*

■ 2. Add subpart G to part 219 to read as follows:

Subpart G—Taking Marine Mammals Incidental to Pacific Islands Fisheries Science Center Fisheries Research

Sec.

Subpart G—Taking Marine Mammals Incidental to Pacific Islands Fisheries Science Center Fisheries Research

§ 219.61 Specified activity and specified geographical region.

(a) Regulations in this subpart apply only to the National Marine Fisheries Service's (NMFS) Pacific Islands Fisheries Science Center (PIFSC) and those persons it authorizes or funds to conduct activities on its behalf for the taking of marine mammals that occurs in the areas outlined in paragraph (b) of this section and that occurs incidental to research survey program operations.

(b) The taking of marine mammals by PIFSC may be authorized in a Letter of Authorization (LOA) only if it occurs during fishery research within the Hawaiian Archipelago, Mariana Archipelago, American Samoa Archipelago, and Western and Central Pacific Ocean.

§ 219.62 Effective dates.

Regulations in this subpart are effective from [30 DAYS AFTER PUBLICATION DATE OF FINAL RULE] through [DATE 5 YEARS AFTER EFFECTIVE DATE OF FINAL RULE].

§ 219.63 Permissible methods of taking.

Under LOAs issued pursuant to §§ 216.106 of this chapter and 219.67, the Holder of the LOA (hereinafter ''PIFSC'') may incidentally, but not intentionally, take marine mammals within the area described in § 219.61(b) in the following ways, provided PIFSC is in compliance with all terms, conditions, and requirements of the regulations in this subpart and the appropriate LOA:

(a) By Level B harassment associated with physical or visual disturbance of hauled-out pinnipeds;

(b) By Level B harassment associated with use of active acoustic systems; and

(c) By Level A harassment, serious injury, or mortality provided the take is associated with the use of longline gear, trawl gear, or deployed instruments and traps.

§ 219.64 Prohibitions.

Notwithstanding takings contemplated in § 219.61 and authorized by a LOA issued under § 216.106 of this chapter and § 219.67, no person in connection with the activities described in § 219.61 may:

(a) Violate, or fail to comply with, the terms, conditions, and requirements of this subpart or a LOA issued under § 216.106 of this chapter and § 219.67;

(b) Take any marine mammal species or stock not specified in such LOA;

(c) Take any marine mammal in any manner other than as specified in the LOA;

(d) Take a marine mammal specified in such LOA if NMFS determines such taking results in more than a negligible impact on the species or stocks of such marine mammal; or

(e) Take a marine mammal specified in such LOA if NMFS determines such taking results in an unmitigable adverse impact on the species or stock of such marine mammal for taking for subsistence uses.

§ 219.65 Mitigation requirements.

When conducting the activities identified in § 219.61(a), the mitigation measures contained in any LOA issued under § 216.106 of this chapter and § 219.67 must be implemented. These mitigation measures shall include but are not limited to:

(a) *General conditions.* (1) PIFSC shall take all necessary measures to coordinate and communicate in advance of each specific survey with the National Oceanic and Atmospheric Administration's (NOAA) Office of Marine and Aviation Operations (OMAO) or other relevant parties on non-NOAA platforms to ensure that all mitigation measures and monitoring requirements described herein, as well as the specific manner of implementation and relevant event-contingent decision-making processes, are clearly understood and agreed upon. Although the discussion throughout these regulations does not always explicitly reference those with decision making authority from cooperative platforms, all mitigation measures apply with equal force to non-NOAA vessels and personnel as they do to NOAA vessels and personnel.

(2) PIFSC shall coordinate and conduct briefings at the outset of each survey and as necessary between ship's crew (Commanding Officer or designee(s), as appropriate) and scientific party in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

(3) PIFSC shall coordinate as necessary on a daily basis during survey cruises with OMAO personnel or other relevant personnel on non-NOAA platforms to ensure that requirements, procedures, and decision-making processes are understood and properly implemented.

(4) When deploying any type of sampling gear at sea, PIFSC shall at all times monitor for any unusual circumstances that may arise at a sampling site and use best professional judgment to avoid any potential risks to marine mammals during use of all research equipment.

(5) PIFSC shall implement handling and/or disentanglement protocols as specified in the guidance that shall be provided to PIFSC survey personnel.

(b) *Vessel strike avoidance.* (1) PIFSC must maintain a 100-meter (m) separation distance between research vessels and large whales at all times. At any time during a survey or transit, if a crew member or designated marine mammal observer standing watch sights marine mammals that may intersect with the vessel course that individual must immediately communicate the presence of marine mammals to the bridge for appropriate course alteration or speed reduction, as possible, to avoid incidental collisions.

(2) PIFSC must reduce vessel speed to 10 knots (kt) or less when piloting vessels within 1 kilometer (km; as visibility permits) of marine mammals.

(c) *Trawl survey protocols.* (1) PIFSC shall conduct trawl operations as soon as is practicable upon arrival at the sampling station.

(2) PIFSC shall initiate marine mammal watches (visual observation) at

least 30 minutes prior to beginning of net deployment, but shall also conduct monitoring during any pre-set activities including trackline reconnaissance, CTD casts, and plankton or bongo net hauls. Marine mammal watches shall be conducted by scanning the surrounding waters with the naked eye and rangefinding binoculars (or monocular). During nighttime operations, visual observation shall be conducted using the naked eye and available vessel lighting.

(3) PIFSC shall implement the move-on rule mitigation protocol, as described in this paragraph. If one or more marine mammals are observed within 500 meters (m) of the planned location in the 10 minutes before setting the trawl gear, and are considered at risk of interacting with the vessel or research gear, or appear to be approaching the vessel and are considered at risk of interaction, NWFSC shall either remain onsite or move on to another sampling location. If remaining onsite, the set shall be delayed. If the animals depart or appear to no longer be at risk of interacting with the vessel or gear, a further 10 minute observation period shall be conducted. If no further observations are made or the animals still do not appear to be at risk of interaction, then the set may be made. If the vessel is moved to a different section of the sampling area, the move-on rule mitigation protocol would begin anew. If, after moving on, marine mammals remain at risk of interaction, the PIFSC shall move again or skip the station. Marine mammals that are sighted further than 500 m from the vessel shall be monitored to determine their position and movement in relation to the vessel to determine whether the move-on rule mitigation protocol should be implemented. PIFSC may use best professional judgment in making these decisions.

(4) PIFSC shall maintain visual monitoring effort during the entire period of time that trawl gear is in the water (*i.e.,* throughout gear deployment, fishing, and retrieval). If marine mammals are sighted before the gear is fully removed from the water, PIFSC shall take the most appropriate action to avoid marine mammal interaction. PIFSC may use best professional judgment in making this decision. PIFSC must retrieve gear immediately if marine mammals are believed to be captured/entangled in a net or associated gear (*e.g.,* lazy line) and follow disentanglement protocols.

(5) If trawling operations have been suspended because of the presence of marine mammals, PIFSC may resume trawl operations when practicable only when the animals are believed to have departed the area. PIFSC may use best professional judgment in making this determination.

(6) PIFSC shall implement standard survey protocols to minimize potential for marine mammal interactions, including maximum tow durations at target depth and maximum tow distance, and shall carefully empty the trawl as quickly as possible upon retrieval.

(7) Dead fish and bait shall not be discarded from the vessel while actively fishing. Dead fish and bait shall be discarded after gear is retrieved and immediately before the vessel leaves the sampling location for a new area.

(d) *Longline survey protocols.* (1) PIFSC shall deploy longline gear as soon as is practicable upon arrival at the sampling station.

(2) PIFSC shall initiate marine mammal watches (visual observation) no less than 30 minutes (or for the duration of transit between set locations, if shorter than 30 minutes) prior to both deployment and retrieval of longline gear. Marine mammal watches shall be conducted by scanning the surrounding waters with the naked eye and rangefinding binoculars (or monocular). During nighttime operations, visual observation shall be conducted using the naked eye and available vessel lighting.

(3) PIFSC shall implement the move-on rule mitigation protocol, as described in this paragraph. If one or more marine mammals are observed in the vicinity of the planned location before gear deployment, and are considered at risk of interacting with the vessel or research gear, or appear to be approaching the vessel and are considered at risk of interaction, PIFSC shall either remain onsite or move on to another sampling location. If remaining onsite, the set shall be delayed. If the animals depart or appear to no longer be at risk of interacting with the vessel or gear, a further observation period shall be conducted. If no further observations are made or the animals still do not appear to be at risk of interaction, then the set may be made. If the vessel is moved to a different section of the sampling area, the move-on rule mitigation protocol would begin anew. If, after moving on, marine mammals remain at risk of interaction, the PIFSC shall move again or skip the station. Marine mammals that are sighted shall be monitored to determine their position and movement in relation to the vessel to determine whether the move-on rule mitigation protocol should be implemented. PIFSC may use best professional judgment in making these decisions. PIFSC must retrieve gear immediately if marine mammals are believed to be captured/entangled in a net, line, or associated gear and follow disentanglement protocols.

(4) PIFSC shall maintain visual monitoring effort during the entire period of gear deployment and retrieval. If marine mammals are sighted before the gear is fully deployed or retrieved, PIFSC shall take the most appropriate action to avoid marine mammal interaction. PIFSC may use best professional judgment in making this decision.

(5) If deployment or retrieval operations have been suspended because of the presence of marine mammals, PIFSC may resume such operations when practicable only when the animals are believed to have departed the area. PIFSC may use best professional judgment in making this decision.

(6) When conducting longline research in Hawai'i, American Samoa, Guam, the Commonwealth of the Northern Marianas, or EEZs of the Pacific Insular Areas, PIFSC shall adhere to the requirements on commercial longline gear as specified in 50 CFR parts 229, 300, 404, 600, and 665, and shall adhere to the following procedures when setting and retrieving longline gear:

(i) When shallow-setting anywhere and setting longline gear from the stern, completely thawed and blue-dyed bait shall be used (two one-pound containers of blue-dye shall be kept on the boat for backup). Fish parts and spent bait with all hooks removed shall be kept for strategic offal discard. Retained swordfish shall be cut in half at the head; used heads and livers shall also be used for strategic offal discard. Setting shall only occur at night and begin 1 hour after local sunset and finish 1 hour before next sunrise, with lighting kept to a minimum.

(ii) When deep-setting north of 23° N and setting longline gear from the stern, 45 gram (g) or heavier weights shall be attached within 1 m of each hook. A line shooter shall be used to set the mainline. Completely thawed and blue-dyed bait shall be used (two 1-pound containers of blue-dye shall be kept on the boat for backup). Fish parts and spent bait with all hooks removed shall be kept for strategic offal discard. Retained swordfish shall be cut in half at the head; used heads and livers shall also be used for strategic offal discard.

(iii) When shallow-setting anywhere and setting longline gear from the side, mainline shall be deployed from the port or starboard side at least 1 m forward of the stern corner. If a line

shooter is used, it shall be mounted at least 1 m forward from the stern corner. A specified bird curtain shall be used aft of the setting station during the set. Gear shall be deployed so that hooks do not resurface. 45 g or heavier weights shall be attached within 1 m of each hook.

(iv) When deep-setting north of 23° N and setting longline gear from the side, mainline shall be deployed from the port or starboard side at least 1 m forward of the stern corner. If a line shooter is used, it shall be mounted at least 1 m forward from the stern corner. A specified bird curtain shall be used aft of the setting station during the set. Gear shall be deployed so that hooks do not resurface. 45 g or heavier weights shall be attached within 1 m of each hook.

(7) Dead fish and bait shall not be discarded from the vessel while actively fishing. Dead fish and bait shall be discarded after gear is retrieved and immediately before the vessel leaves the sampling location for a new area.

(e) *Small boat and diver protocols.* (1) Surveys and in-water operations shall be conducted with at least two divers observing for the proximity of marine mammals, a coxswain driving the small boat, and a topside spotter. Spotters and coxswains shall be tasked with looking out for divers, marine mammals, and environmental hazards. Topside spotters may also work as coxswains, depending on team assignment and boat layout.

(2) Before approaching any shoreline or exposed reef, all observers shall examine any visible land areas for the presence of marine mammals. Scientists, divers, and coxswains shall follow best management practices (BMPs) for boat operations and diving activities, including:

(i) Maintain constant vigilance for the presence of marine mammals.

(ii) Marine mammals shall not be encircled or trapped between multiple vessels or between vessels and the shore.

(iii) If approached by a marine mammal, the engine shall be put in neutral and the animal allowed to pass.

(iv) All in-water work not already underway shall be postponed until whales are beyond 100 yards or other marine mammals are beyond 50 yards from the vessel or diver, unless the work is covered under a separate permit that allows activity in proximity to marine mammals. Activity shall commence only after the animal(s) depart the area.

(v) If marine mammals enter the area while in-water work is already in progress, the activity may continue only when that activity has no reasonable expectation to adversely affect the animal(s). PIFSC may use best professional judgment in making this decision.

(vi) Personnel shall make no attempt to feed, touch, ride, or otherwise intentionally interact with any marine mammals unless undertaken to rescue a marine mammal or otherwise authorized by another permit.

(vii) Mechanical equipment shall be monitored to ensure no entanglements occur with protected species.

(viii) Team members shall immediately respond to an entangled animal, halting operations and providing and onsite response assessment (allowing the animal to disentangle itself, assisting with disentanglement, *etc.*), unless doing so would compromise human safety.

(f) *Marine debris research and removal protocols.* (1) Prior to initiating any marine debris removal operations, marine debris personnel shall thoroughly examine the beaches and near shore environments/waters for Hawaiian monk seals before approaching marine debris sites and initiating removal activities.

(2) Debris shall be retrieved in compliance with all Federal laws, rules, and regulations governing wildlife in the area, including maintaining a minimum distance of 50 yards from all monk seals and a minimum of 100 yards from female seals with pups.

(g) *Bottomfishing protocols.* (1) PIFSC shall initiate marine mammal watches (visual observation) no less than 30 minutes (or for the duration of transit between set locations, if shorter than 30 minutes) prior to both deployment and retrieval of bottomfishing hook-and-line gear. Marine mammal watches shall be conducted by scanning the surrounding waters with the naked eye and rangefinding binoculars (or monocular). During nighttime operations, visual observation shall be conducted using the naked eye and available vessel lighting.

(2) PIFSC shall implement the move-on rule mitigation protocol, as described in this paragraph. If one or more marine mammals are observed in the vicinity of the planned location before gear deployment, and are considered at risk of interacting with the vessel or research gear, or appear to be approaching the vessel and are considered at risk of interaction, PIFSC shall either remain onsite or move on to another sampling location. If remaining onsite, the set shall be delayed. If the animals depart or appear to no longer be at risk of interacting with the vessel or gear, a further observation period shall be conducted. If no further observations are made or the animals still do not appear to be at risk of interaction, then the set may be made. If the vessel is moved to a different section of the sampling area, the move-on rule mitigation protocol would begin anew. If, after moving on, marine mammals remain at risk of interaction, the PIFSC shall move again or skip the station. Marine mammals that are sighted shall be monitored to determine their position and movement in relation to the vessel to determine whether the move-on rule mitigation protocol should be implemented. PIFSC may use best professional judgment in making these decisions.

(3) Dead fish and bait shall not be discarded from the vessel while actively fishing. Dead fish and bait shall be discarded after gear is retrieved and immediately before the vessel leaves the sampling location for a new area.

(4) If a hooked fish is retrieved and it appears to the fisher (based on best professional judgment) that it has been damaged by a marine mammal, visual monitoring shall be enhanced around the vessel for the next ten minutes. Fishing may continue during this time. If a shark is sighted, visual monitoring may return to normal. If a marine mammal is seen in the vicinity of a bottomfishing operation, the gear shall be retrieved immediately and the vessel shall move to another sampling location where marine mammals are not present. Catch loss and a ''move on'' for marine mammals shall be tallied on the data sheet.

(5) If bottomfishing gear is lost while fishing, visual monitoring shall be enhanced around the vessel for the next ten minutes. Fishing may continue during this time. If a shark is sighted, visual monitoring may return to normal. If a marine mammal is observed in the vicinity, it shall be monitored until a determination can be made (based on best professional judgment) of whether gear is sighted attached to the animal, gear is suspected to be on the animal, or gear is not observed on the animal and it behaves normally. If gear is sighted with gear attached or suspected to be attached, procedures and actions for incidental take shall be initiated, as outlined in § 219.66. Gear loss and a ''move on'' for marine mammals shall be tallied on the data sheet.

(h) *Instrument and trap deployments.* (1) PIFSC shall initiate marine mammal watches (visual observation) no less than 30 minutes (or for the duration of transit between set locations, if shorter than 30 minutes) prior to both deployment and retrieval of instruments and traps. Marine mammal watches shall be conducted by scanning the surrounding waters with the naked eye and rangefinding binoculars (or monocular).

(2) PIFSC shall implement the move-on rule mitigation protocol, as described in this paragraph. If one or more marine mammals are observed in the vicinity of the planned location before gear deployment, and are considered at risk of interacting with the vessel or research gear, or appear to be approaching the vessel and are considered at risk of interaction, PIFSC shall either remain onsite or move on to another sampling location. If remaining onsite, the instrument or trap deployment shall be delayed. If the animals depart or appear to no longer be at risk of interacting with the vessel or gear, a further observation period shall be conducted. If no further observations are made or the animals still do not appear to be at risk of interaction, then the gear may be deployed. If the vessel is moved to a different section of the sampling area, the move-on rule mitigation protocol would begin anew. If, after moving on, marine mammals remain at risk of interaction, the PIFSC shall move again or skip the station. Marine mammals that are sighted shall be monitored to determine their position and movement in relation to the vessel to determine whether the move-on rule mitigation protocol should be implemented. PIFSC may use best professional judgment in making these decisions. PIFSC must retrieve gear immediately if marine mammals are believed to be entangled in an instrument or trap line or associated gear and follow disentanglement protocols.

§ 219.66 Requirements for monitoring and reporting.

(a) *Compliance coordination.* PIFSC shall designate a compliance coordinator who shall be responsible for ensuring compliance with all requirements of any LOA issued pursuant to § 216.106 of this chapter and § 219.67 and for preparing for any subsequent request(s) for incidental take authorization.

(b) *Visual monitoring program.* (1) Marine mammal visual monitoring shall occur prior to deployment of trawl nets, longlines, bottomfishing gear, instruments, and traps, respectively; throughout deployment of gear and active fishing of research gears (not including longline soak time); prior to retrieval of longline gear; and throughout retrieval of all research gear.

(2) Marine mammal watches shall be conducted by watch-standers (those navigating the vessel and/or other crew) at all times when the vessel is being operated.

(c) *Training.* (1) PIFSC must conduct annual training for all chief scientists and other personnel who may be responsible for conducting dedicated marine mammal visual observations to explain mitigation measures and monitoring and reporting requirements, mitigation and monitoring protocols, marine mammal identification, completion of datasheets, and use of equipment. PIFSC may determine the agenda for these trainings.

(2) PIFSC shall also dedicate a portion of training to discussion of best professional judgment, including use in any incidents of marine mammal interaction and instructive examples where use of best professional judgment was determined to be successful or unsuccessful.

(3) PIFSC shall coordinate with NMFS' Office of Science and Technology to ensure training and guidance related to handling procedures and data collection is consistent with other fishery science centers, where appropriate.

(d) *Handling procedures and data collection.* (1) PIFSC must develop and implement standardized marine mammal handling, disentanglement, and data collection procedures. These standard procedures will be subject to approval by NMFS's Office of Protected Resources (OPR).

(2) For any marine mammal interaction involving the release of a live animal, PIFSC shall collect necessary data to facilitate a serious injury determination, when practicable.

(3) PIFSC shall provide its relevant personnel with standard guidance and training regarding handling of marine mammals, including how to identify different species, bring an individual aboard a vessel, assess the level of consciousness, remove fishing gear, return an individual to water, and log activities pertaining to the interaction.

(4) PIFSC shall record marine mammal interaction information on standardized forms, which will be subject to approval by OPR. PIFSC shall also answer a standard series of supplemental questions regarding the details of any marine mammal interaction.

(e) *Reporting.* (1) Marine mammal capture/entanglements (live or dead) must be reported immediately to the relevant regional stranding coordinator (Hawai'i Statewide Marine Animal Stranding, Entanglement, and Reporting Hotline, 888–256–9840; Guam Conservation Office Hotline, 671–688–3297; Commonwealth of the Northern Mariana Islands Division of Fish and Wildlife Hotline, 670–287–8537; American Samoa Department of Marine and Wildlife Resources, 684–633–4456), OPR (301–427–8401), and NMFS Pacific Islands Regional Office (808–725–5000).

(2) PIFSC shall report all incidents of marine mammal interaction to NMFS's Protected Species Incidental Take database within 48 hours of occurrence and shall provide supplemental information to OPR upon request. Information related to marine mammal interaction (animal captured or entangled in research gear) must include details of survey effort, full descriptions of any observations of the animals, the context (vessel and conditions), decisions made, and rationale for decisions made in vessel and gear handling.

(3) PIFSC shall submit an annual summary report to OPR:

(i) The report must be submitted no later than ninety days following the end of a given calendar year. The first annual report must cover the period from the date of issuance of the LOA through the end of that calendar year and the entire first full calendar year of the authorization. Subsequent reports will cover only one full calendar year. PIFSC shall provide a final report within thirty days following resolution of comments on the draft report.

(ii) These reports shall contain, at minimum, the following:

(A) Annual line-kilometers surveyed during which the EK60, EM 300, and ADCP Ocean Surveyor (or equivalent sources) were predominant and associated pro-rated estimates of actual take;

(B) Summary information regarding use of all longline, bottomfishing, and trawl gear, including number of sets, tows, *etc.,* specific to each gear;

(C) Accounts of surveys where marine mammals were observed during sampling but no interactions occurred;

(D) Accounts of all incidents of marine mammal interactions, including circumstances of the event and descriptions of any mitigation procedures implemented or not implemented and why and, if released alive, serious injury determinations;

(E) Summary information related to any disturbance of pinnipeds, including event-specific total counts of animals present, counts of reactions according to the three-point scale, and distance of closest approach;

(F) A written description of any mitigation research investigation efforts and findings (*e.g.,* line modifications);

(G) A written evaluation of the effectiveness of PIFSC mitigation strategies in reducing the number of marine mammal interactions with survey gear, including best professional judgment and suggestions for changes to the mitigation strategies, if any; and

(H) A summary of all relevant training provided by PIFSC and any

coordination with NMFS Office of Science and Technology and the Pacific Islands Regional Office.

(f) *Reporting of injured or dead marine mammals.* (1) In the unanticipated event that the activity defined in § 219.61(a) clearly causes the take of a marine mammal in a prohibited manner, PIFSC personnel engaged in the research activity shall immediately cease such activity until such time as an appropriate decision regarding activity continuation can be made by the PIFSC Director (or designee). The incident must be reported immediately to OPR and the NMFS Pacific Islands Regional Office. OPR will review the circumstances of the prohibited take and work with PIFSC to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The immediate decision made by PIFSC regarding continuation of the specified activity is subject to OPR concurrence. The report must include the following information:

(i) Time, date, and location (latitude/longitude) of the incident;

(ii) Description of the incident including, but not limited to, monitoring prior to and occurring at time of the incident;

(iii) Environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, visibility);

(iv) Description of all marine mammal observations in the 24 hours preceding the incident;

(v) Species identification or description of the animal(s) involved;

(vi) Status of all sound source use in the 24 hours preceding the incident;

(vii) Water depth;

(viii) Fate of the animal(s) (*e.g.* dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared, etc.); and

(ix) Photographs or video footage of the animal(s).

(2) In the event that PIFSC discovers an injured or dead marine mammal and determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.,* in less than a moderate state of decomposition), PIFSC shall immediately report the incident to OPR and the NMFS Pacific Islands Regional Office The report must include the information identified in paragraph (f)(1) of this section. Activities may continue while OPR reviews the circumstances of the incident. OPR will work with PIFSC to determine whether additional mitigation measures or modifications to the activities are appropriate.

(3) In the event that PIFSC discovers an injured or dead marine mammal and determines that the injury or death is not associated with or related to the activities defined in § 219.61(a) (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, scavenger damage), PIFSC shall report the incident to OPR and the Pacific Islands Regional Office, NMFS, within 24 hours of the discovery. PIFSC shall provide photographs or video footage or other documentation of the stranded animal sighting to OPR.

(4) In the event of a ship strike of a marine mammal by any PIFSC or partner vessel involved in the activities covered by the authorization, PIFSC or partner shall immediately report the information in paragraph (f)(1) of this section, as well as the following additional information:

(i) Vessel's speed during and leading up to the incident;

(ii) Vessel's course/heading and what operations were being conducted;

(iii) Status of all sound sources in use;

(iv) Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;

(v) Estimated size and length of animal that was struck; and

(vi) Description of the behavior of the marine mammal immediately preceding and following the strike.

§ 219.67 Letters of Authorization.

(a) To incidentally take marine mammals pursuant to these regulations, PIFSC must apply for and obtain an LOA.

(b) An LOA, unless suspended or revoked, may be effective for a period of time not to exceed the expiration date of these regulations.

(c) If an LOA expires prior to the expiration date of these regulations, PIFSC may apply for and obtain a renewal of the LOA.

(d) In the event of projected changes to the activity or to mitigation and monitoring measures required by an LOA, PIFSC must apply for and obtain a modification of the LOA as described in § 219.68.

(e) The LOA shall set forth:

(1) Permissible methods of incidental taking;

(2) Means of effecting the least practicable adverse impact (*i.e.,* mitigation) on the species, its habitat, and on the availability of the species for subsistence uses; and

(3) Requirements for monitoring and reporting.

(f) Issuance of the LOA shall be based on a determination that the level of taking will be consistent with the findings made for the total taking allowable under these regulations.

(g) Notice of issuance or denial of an LOA shall be published in the **Federal Register** within thirty days of a determination.

§ 219.68 Renewals and modifications of Letters of Authorization.

(a) An LOA issued under §§ 216.106 of this chapter and 219.67 for the activity identified in § 219.61(a) shall be renewed or modified upon request by the applicant, provided that:

(1) The proposed specified activity and mitigation, monitoring, and reporting measures, as well as the anticipated impacts, are the same as those described and analyzed for these regulations (excluding changes made pursuant to the adaptive management provision in paragraph (c)(1) of this section); and

(2) OPR determines that the mitigation, monitoring, and reporting measures required by the previous LOA under these regulations were implemented.

(b) For an LOA modification or renewal requests by the applicant that include changes to the activity or the mitigation, monitoring, or reporting (excluding changes made pursuant to the adaptive management provision in paragraph (c)(1) of this section) that do not change the findings made for the regulations or result in no more than a minor change in the total estimated number of takes (or distribution by species or years), OPR may publish a notice of proposed LOA in the **Federal Register**, including the associated analysis of the change, and solicit public comment before issuing the LOA.

(c) An LOA issued under §§ 216.106 of this chapter and 219.67 for the activity identified in § 219.61(a) may be modified by OPR under the following circumstances:

(1) OPR may utilize an adaptive management process to modify or augment the existing mitigation, monitoring, or reporting measures (after consulting with PIFSC regarding the practicability of the modifications) if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring set forth in the preamble for these regulations.

(i) Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA:

(A) Results from PIFSC's monitoring reports from the previous year(s).

(B) Results from other marine mammal and/or sound research or studies.

(C) Any information that reveals marine mammals may have been taken in a manner, extent or number not authorized by these regulations or subsequent LOAs.

(ii) If, through adaptive management, the modifications to the mitigation, monitoring, or reporting measures are substantial, OPR will publish a notice of proposed LOA in the **Federal Register** and solicit public comment.

(2) If OPR determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in LOAs issued pursuant to § 216.106 of this chapter and § 219.67, an LOA may be modified without prior notice or opportunity for public comment. Notice would be published in the **Federal Register** within thirty days of the action.

§§ 219.69—219.70 [Reserved]

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